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ΤΙΤΛΟΣ:A SURVEY CASE BASED REASONING BUSINESS WORLDWIDE

ΟΝΟΜΑΤΑ: ΓΛΕΝΤΗ ΠΟΛΥΞΕΝΗ (2584)

ΜΠΛΑΤΣΟΥ ΒΑΣΙΛΙΚΗ-ΜΑΡΙΑ (3287)

ΠΑΠΑΔΑΚΗ ΑΙΚΑΤΕΡΙΝΗ (3606)

ΚΑΘΗΓΗΤΗΣ:ΠΑΠΑΔΑΚΗΣ ΝΙΚΟΛΑΟΣ

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ΠΕΡΙΛΗΨΗ

Η πτυχιακή εργασία ασχολείται με τη ροή εργασίας της επιχείρησης και από ποιους παράγοντες αυτή επηρεάζεται. Υπάρχουν πολλοί παράγοντες, ενδογενείς και εξωγενείς, οι οποίοι επηρεάζουν την εργασία μέσα σε μία επιχείρηση. Ο πρώτος και πιο κύριος είναι η άμεση ενημέρωση και αφομοίωση των πληροφοριών. Γι αυτό το λόγο, κάθε επιχείρηση πρέπει να έχει κάποιο υπεύθυνο παραγωγής και εργασίας (‘agent’), ο οποίος λαμβάνει υπόψη όλες τις απαραίτητες πληροφορίες, διακρίνοντας τις σε χρήσιμες και μη-χρήσιμες, και εφαρμόζοντας τις στην παραγωγή, προκειμένου να έχει η επιχείρηση τα επιθυμητά αποτελέσματα, δηλαδή ένα σωστό προϊόν και κέρδος, και οι εργαζόμενοι να είναι αποδοτικοί και ικανοποιημένοι.

Για να το κάνει αυτό ο ‘agent’ χρησιμοποιεί διάφορου τύπου προγράμματα και συστήματα. Ένα από τα πιο γνωστά είναι το ‘The ADEPT Agent Architecture’ , το οποίο συμπεριλαμβάνει γνώσεις από μάρκετινγκ, μάνατζμεντ και διαπραγμάτευσης.

Σε μία επιχείρηση μπορεί να υπάρχουν περισσότεροι από έναν υπεύθυνο (‘agent’). Τότε, το πιο σημαντικό είναι να υπάρχει συνεννόηση και άμεση συνεργασία μεταξύ αυτών για να καταφέρουν να έχουν το επιθυμητό αποτέλεσμα. Πρέπει, συνεχώς, να υπάρχει επικοινωνία και διαπραγματεύσεις μεταξύ τους, προκειμένου να υπάρχει αρμονία μεταξύ των διαφόρων τμημάτων της επιχείρησης και να μην επηρεάζει ο ένας τον άλλο αρνητικά. Ως αποτέλεσμα αυτού, η ροή της εργασίας θα είναι ομαλή και ικανοποιητική.

Τέλος, πέρα από το κέρδος της επιχείρησης πρέπει να λαμβάνεται υπόψη και διάφοροι εξωτερικοί παράγοντες. Δεν είναι αρκετό μία επιχείρηση να έχει το επιθυμητό αποτέλεσμα και οι εργαζόμενοι να είναι ικανοποιημένοι, αν έχει αρνητικό αντίκτυπο στο περιβάλλον ή σε

άλλες επιχειρήσεις. Γι αυτό το λόγο, πέρα από τη παραγωγή και τους εργαζόμενους, μία επιχείρηση πρέπει να βλέπει πόσο ρυπαίνει το περιβάλλον και αν επηρεάζει αρνητικά τη ποιότητα ζωής και την παραγωγή των άλλων επιχειρήσεων.

Λαμβάνοντας υπόψη όλα τα παραπάνω και με την ορθή χρήση των κατάλληλων συστημάτων, μία επιχείρηση μπορεί να είναι αποδοτική και η ροή εργασίας της να είναι επιθυμητή και ικανοποιητική και από τις δύο πλευρές.

Abstract

The huge amount of information sources, which are available on the Internet demands developed solutions for enquiring, mediating, and maintaining relevant information for the common user. The majority of information agents are independent computational software entities that are especially meant to offer pro-active resource discovery, solve information procedure of information consumers and providers, and provide value-added information services and products. These kinds of agents are considered to cope with all the range of difficulties relating to the information overload of the user, preferably just in time. Based on a systematic classification of information agents, this paper presents an overview of the basic key allowing technologies needed to build such agents, and a variety of examples of information agent systems, in order to understand what is going on, nowadays.

CONTENTS

1. Introduction

In order to be able to support efficient workflow design, recent commercial workflow systems are providing templates of common business procedures. These templates are usually called cases and can be modified individually or collectively into a new workflow to meet the business specification. The majority of passages approach the workflow of modern management, which is bases on a structured workflow cycle and recent advances in model management and case based reasoning techniques. (amp.aom.org) The workflow modeling involves the translation of high-level business requirements into workflow schemes, which may be executive by appropriate workflow engines. In order to specify a model like this is needed knowledge due to the fact that development of a typical workflow model requires detailed understanding of the business procedure logic, the organizational chart and the information systems assessed by it. The reuse of task, which tested a procedure of knowledge and associated procedure models to guide workflow modeling and design efforts are essential to provide basic templates for business. In addition, these templates may be instantiated and appropriately modified to needs of organizations. There is a lack of design guidelines and workflow modeling tools at present to support techniques such as generation of alternative workflow procedure models for a given set of business requirements. (aaai.org) Suffice it to say that workflow modeling involves definition and selection of appropriate tasks, sequencing of the tasks to satisfy data and logical dependences, allocation of agents to execute tasks, scheduling of tasks considering concurrency and validating and verifying the model. Generally, with the adoption of workflow management systems and the advent of flexible procedure integration technology such as web services, there is an acute need for developing tools and approaches to support workflow design and modeling.

2. Workflow design

To begin with, the workflow design procedure consists of two different phases. In the first phase, many relevant business tasks are ordered into a seamless whole, satisfying pre-conditions and post-conditions. As a result, it's the workflow model, in other words a project network defined by a partial ordering amongst all the relevant tasks. In the second phase, a procedure model is selected from the available alternatives and is further annotated with appropriate agents, resources and timing information, following by incorporation of routing details, such as forks and joins to facilitate concurrent executions. Both phases of design may reuse procedure knowledge from available repositories. The approach of these cases in the articles consists of case retrieval, case reuse, case adaptation and case verification tasks. We are trying to support the workflow model during the workflow design. (aaai.org) In general, the reuse and revise phases might include not only minor but also major modifications of the retrieved solutions. What is more, the based-case usually uses the Simple Hierarchical Ordered Planning, which allows reuse of appropriate prototypical cases from repositories during problem solving. In the first article of our researching, the case is divided into 3 basic steps. The first one is the case representation, and then the development of retrieval algorithms and lastly, the development of a planning based techniques for composition. (amp.aom.org)
In the case representation, the workflow schemes are stored as a prototypical cases and each one of it is stored as an instance level case. They are executive traces of those cases for well-specified inputs. The development of repository has concentrated on the workflow models in the fields of engineering design, product development and supply chain management. In the procedure ontology, the existence of primitive tasks might be combined into complex workflows. It is used to source a

variety of components and materials through bidding and contracting procedure, which offers by vendors. (emeraldinsight.com)

Going further in the repository management, the workflow cases have been derived from best exercises handbooks for different functional areas, observations of manual procedure execution and procedure from knowledge workers. To begin with the organizational hierarchy, this is oriented towards enabling retrieval based on organizational structure. The task hierarchy is being developed in order to identify common tasks that maybe performed in different functional areas; as a result this hierarchy supports the development of efficient, query mechanisms. As the number of cases increases, the index effectiveness is essential. (pubsonline.informs.org)

The last step is a scenario of workflow modeling, where a workflow designer might search the repository for workflows related to the outsourcing of it. During this step, the business might resolve pre - condition and post-condition requirements, as well as to modify many different tasks inside the composite task to ensure validity. The development of this new procedure illustrates how a particular type of outsourcing can be retrieved from the repository and instantiated in the context of tool procedure. (amj.aom.org)

Additional design possibilities include:

1. The procedure repository can include a product development procedure model with outsourcing which is a retrieval and instantiating product,
2. There are some procurement procedures where, in instead of tender-based outsourcing, auction mechanisms can be used
3. A new product development workflow maybe composed by assembling one case with a procurement workflow case, the fabrication and follow-up is outsourced. (aaai.org)

The illustration of another article proves that workflow systems are generally based on an understanding procedure model, which proves out all of the possible execution paths associated with a business procedure. This makes sure that the work activities which comprise each of the

likely execution scenarios are fully described. This approach to specifying business procedure works well for cases of a procedure. It is too difficult to explain the characteristics of all the unanticipated situations, which may arise during the execution of a program; the idea of exceptions was developed when unexpected events are grouped into Classes which are related to similarities that they possess in terms of the conditions under those they might arise. (amp.aom.org) There are lots of exception handlers, who can be defined in the form of programmatic procedures to solve the effects of specific events as they are detected. At the lowest level, some exceptions can be defined for events such as separated by zero errors. For business procedures, this level of detail is too fine-grained and it is more effective to define exceptions at a higher level, typically in terms of the business procedure to those they relate to. This approach is distinguished from other research activities in the area of seeking to extend specific procedure and workflow technologies in order to provide support for expected and unexpected events by incorporating detection and handling capabilities. This survey is classified all of them into four types: basic failures, application failures, expected exceptions and unexpected exceptions. Additionally, it is obviously worthwhile identifying some of the major factors have influenced further research in efforts and have a great effect on this research initiative. (emeraldinsight.com)

Nowadays, many organizations have developed a number of Information Technology (IT) systems in order to improve various aspects of the management of their business procedures. The aim of these systems is the way that information is gathered, managed, distributed, and presented to people in key business functions and operations. Specifically, the IT system should have some characteristics, such as :
• to permit the decision maker to have access in relevant information wherever it is situated in the organization. This can be effective despite the fact that information may be stored in many different types of system and in many different information models.

• to allow the decision maker to request and obtain information about the management services from other departments inside the organization, and sometimes even from outside the organization.
• to be able to identify and deliver on time, relevant information which may not have been asked for .
• to inform the decision maker of changes which have been made elsewhere in the business procedure which are relevant with the context.
• to identify the parties who may be interested in the outcome and results of the decision making activity.

The survey had analyzed a number of business procedures, from various industrial and commercial domains, resulted in several common characteristics, which are the following:
• Multiple organizations are often included in the business procedure. Each of them attempts to maximize its own profit within the overall activity.
• Organizations are physically distributed, which means that they may be across one site, across a country, or even across continents.
• Within organizations, there is not ownership of the tasks, information and resources involved in the business procedure.
• Different groups are relatively autonomous, in other words they control how their resources are consumed, by whom, at what cost, and in what time frame. In addition, they have their own information systems, with their own idiosyncratic representations, for managing their resources.
• There is a requirement to control and manage the overall business procedure. However, there is often a need to place constraints on the entire procedure, such as total time or total budget.
• The majority of business procedures are highly dynamic and unpredictable and it is difficult to give a complete specification of all the activities that need to be performed and how they should be ordered. Any deadline plans which are produced are often disrupted by avoidable delays or unanticipated events. For instance, people are ill or tasks take longer than expected. (amp.aom.org) Studied all these characteristics, it had been decided that the most natural way to view the business procedure is as a collection of autonomous, problem solving

agents which communicate only when they have no dependencies. In this context, an agent can be viewed as an encapsulated problem solving entity which exhibits the following properties:

• Autonomy→ agents perform most of their problem solving tasks without the direct intervention of humans or other agents, and they have manipulated their own actions and their own state.

• Social ability→ agents communicate, when they deem appropriate, with other artificial agents and humans in order to complete their problem solution and to help others with their activities. This requires that agents have a means by which they can interact their requirements to others and an internal mechanism for deciding what and when social interactions are not inappropriate.

• Pro-activeness→ agents take the final decision where is adequate.

• Responsiveness→ agents take place in their environment and respond in a timely fashion to changes which occur in it.

(books.google.com)

As a consequence, the choice of agent's technology was motivated by the following observations:

(i) the domain includes an inherent distribution of data, problem solving capabilities, and responsibilities

(ii) the integrity of the existing organizational structure and
the autonomy of its sub-parts needs to be maintained, which appeals to the autonomous nature of the agents

(iii) the interactions are fairly sophisticated, involving negotiation, information sharing, and coordination and

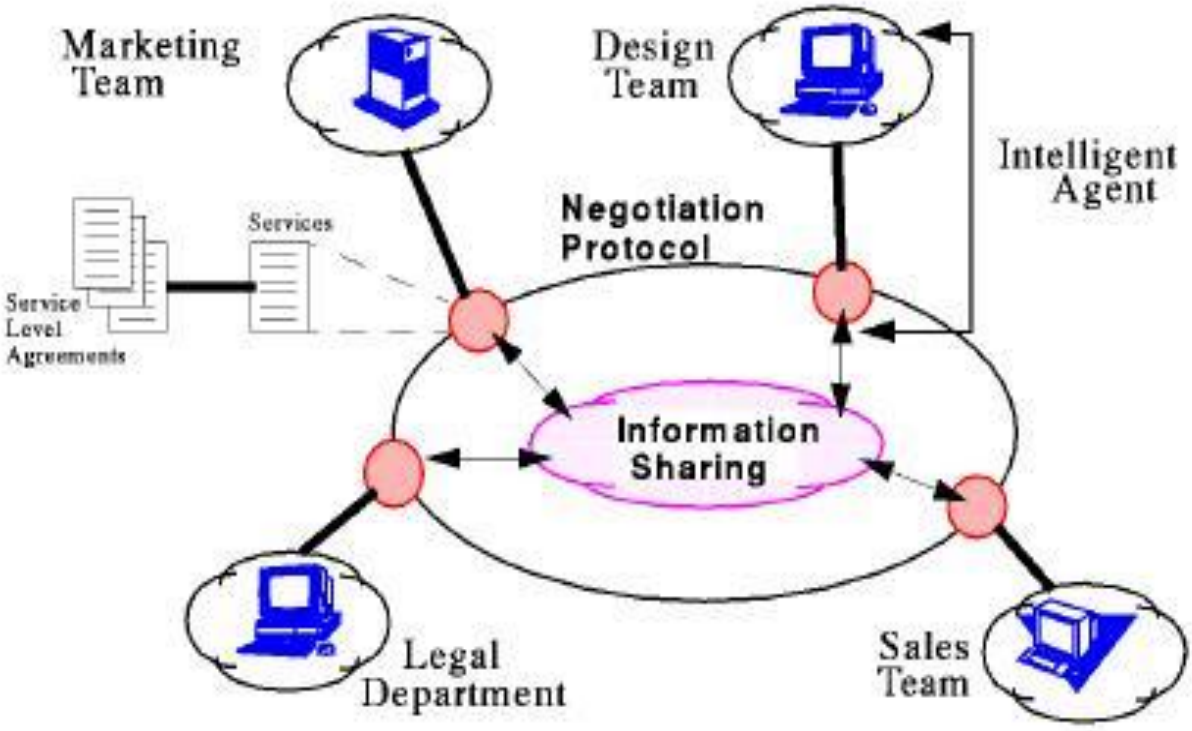
(iv) the problem solution may not be entirely described from start to finish. The problem solvers need to be responsive to changes in the environment and to unpredictability in the business procedure and take opportunities when they must.

(amj.aom.org)

2.1 The ADEPT Agent Architecture

Each agent should be able to perform one or more services. A service gives answers to some unit of problem solving activity. The simplest service, which called a task, represents an atomic unit of problem solving attempt in the ADEPT system. These atomic units can be combined to form complex services by adding ordering constraints and conditional control. The services can be easily complex and at the topmost level the entire business procedure can be viewed as a service. Services are linked to one or more agents who are responsible for managing and executing them. Each service is managed by one agent, although it may involve execution of subservices by a number of other agents. Since agents are autonomous there is no need of dependencies between them. If an agent requires a service which is managed by another agent it cannot simply instruct it to start the service. In fact, the agents should, definitely, come to a mutually acceptable agreement about the terms and conditions under which the desired service will be performed. The mechanism for making SLAs is negotiation, a joining decision making procedure in which the parties verbalize their demands and then move towards agreement by a procedure of concession or search for new alternatives in the market. In order to negotiate with one another, agents need a protocol which proves specifically the role of the current message interchange. (amp.aom.org) Additionally, the agents need a means of describing and referring to the domain terms involved in the negotiation. (books.google.com)

For example, both agents need to be sure they are describing the same service even though they may both have a different brand or name for it and represent it in a completely different way. This heterogeneity is inherent in most organizations because each department typically models its own information and resources in its own way. Nevertheless, when the agents communicate with each other, a number of semantic mappings and transformations may need to be performed to create a mutually understandable information sharing language. The following diagram represents all this procedure. (amj.aom.org)



All 'adept' agents have the same basic architecture. This involves a responsible agent, who communicates with the public and the subsidiary agencies and tasks within its agency. An agent’s agency represents its major problem for the solving resources. The responsible agent has a number of functional components; some of them are the communication, the service execution, the situation assessment, and the interaction management. This architecture is broadly based on the GRATE and ARCHON agent models. The domain resources can either be individual tasks or agents representing subsidiary agencies. The second case allows a nested agent system to be constructed in which higher-level agents understand their functionality through lower level agents. For instance, the higher level agent may represent a legal agency whose work is carried out by lots of lawyers. (emeraldinsight.com)
The differences between an agent in an agency and a peer agent relate

to the levels of autonomy and helpfulness. The common aspect is that in both cases the agents negotiate to reach an agreement. However in the former case the agent can not reject the proposal immediately and the agent must negotiate in a cooperative and not in a competitive manner since there is a degree of purpose. (pubsonline.informs.org) In summary, there is a hard connection between an agent and its agency and a loose between an agent and its peers. The adept agent architecture involves the following parts:

1. Communication Module

The communication module interacts with messages between an agent and its agency and between the peer agents. During this task execution and management messages are delivered between the agent's Service Execution Module (SEM) and the tasks are managed by that agent. During the service execution management, messages are delivered between the agent's SEM and the SEM of another agent. Finally, during the negotiation, messages are routed between the agent's Interaction Management Module (IMM) and the IMM of the agent or agents, which are being negotiated with.

2. Interaction Management Module

The interaction management module deals with the services through the negotiation. The Situation Assessment Module (SAM) gives priority to the IMM in order to begin negotiation for services the agent needs. The IMM's decision creating capabilities are supported by the three following different types of information: scheduler constraints emanating from the SAM, the knowledge an agent has about itself and its own agency and the knowledge the agent keeps for the peer agents. Based on these sources of knowledge and the negotiation model the IMM creates initial proposals, estimates the incoming proposals, offers new counterproposals, and, consequently, accepts or rejects the proposals. If a proposal is accepted then the IMM creates a new SLA in order to be able to represent their agreement. (amj.aom.org)

3. Situation Assessment Module

The situation assessment module is the reason for assessing and monitoring the agent's ability to meet the SLAs, which has been already

agreed and the potential SLAs which may be agreed in the future. This contains two main parts: scheduling and exception handling. The former involves a record of the availability of the agent's resources which can be used to decide whether SLAs can be met or whether new SLAs should be accepted. The exception handler receives an exception reports from the SEM through the service execution and decides the correct answer. For instance, if a service is delayed then the SAM has to decide to locally schedule again it, to renegotiate its SLA, or to connect it together. (aaai.org)

4. Service Execution Module

The service execution module is responsible for managing services throughout their execution. This contains three main parts: the service execution management, the information management through the routing information between the tasks, services and other agents and the exception handling, in which monitor the execution of tasks and services for unexpected events. (books.google.com)

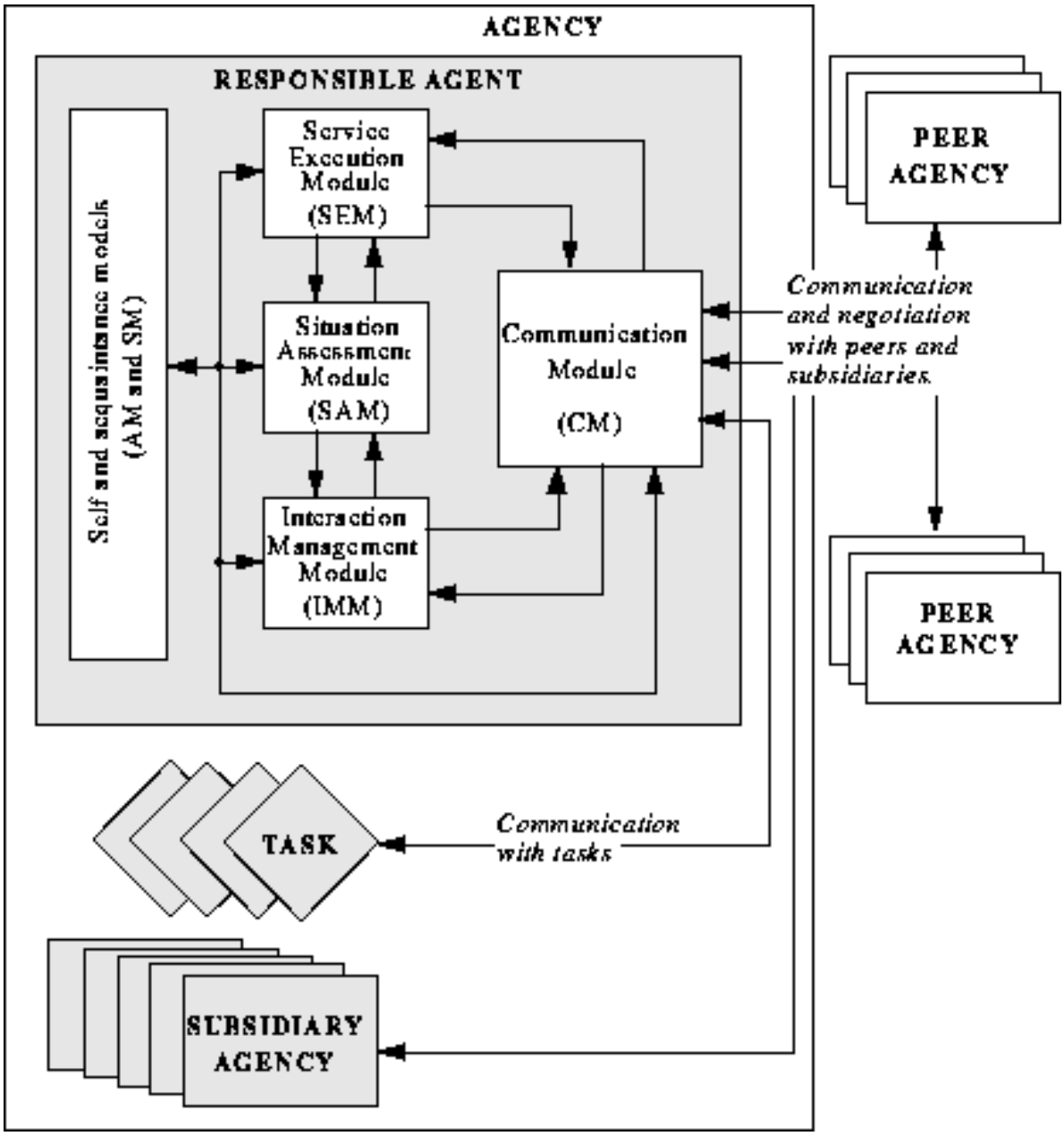
5. Acquaintance Models

By the acquaintance model, the agent keeps and offers access to the SLAs agreed with other agents, and a list of peers which can provide a variety of services of interest.

6. Self Model

The self model is the first storage site for SLAs to which the agent is committed, descriptions of the services the agent can provide, run time application or service specific and preserve the information. (amp.aom.org)

The following picture represents this procedure.



The adept agent architecture

2.2 Information Sharing

The negotiation between the agents certainly requires a vital means of communication. Communication like this can be separated into two levels. The former is actually transporting the messages and the latter is conveying the 'wanting' meaning of the message. The first one is dealt separately by the agent's technique and the second is a bit more ineffective and requires a standard design. Because of all the characteristics it contains, it is quite difficult to persist that all agents adopt a particular model of information. (pubsonline.informs.org)
An agent, who is operating in an ADEPT environment should put in a useful way one of a set of illocutionary acts in order to make specific what kind of intention the agent have by the message.
Considering the action of proposing an SLA to another agent during negotiation through the use of the PROPOSE message type, we can easily realize that the agent sending the message aims the characteristics of the message to be understandable as a proposal for a specific service that the recipe has registered as being able to provide. Supposing that the agent has agreed to provide the whole service, which contains everything. (amp.aom.org) In order to fulfill this agreement, this agent needs to make an extend research in the proposed network site, but is not able to perform completely this task. What is more, the agent must negotiate with the other agents to provide this service. To begin with the negotiation, the first agent may provide this service at the most reasonable time and cost. This might cause a response. At the top of each message an ADEPT agent must clearly indicate the intention of the message, in addition to understanding the aim behind the message, a successful agent must be able to pretend the contents of it to be understood. (amj.aom.org)

The final stage for effective cooperation is that the agent receiving a message must be able to realize the meaning of the symbols and relations, which are used in the message. On condition that this kind of agent has a SLA, in which provides with the service under certain conditions. Then if the agent focuses on the other agent, on the basis of their agreement, the survey in a particular location, agent must be aware

of what is meant by a “location” for it to understand the message. For an agent to be certain that the subject of a message will be understood properly, the sender must use a specific kind of vocabulary of that can be understood by all the agents. Suppose that in local information model, the symbol “location” refers to the postal address of the client, which is devoting to a network and the symbol “site” refers to the location of the proposed network. These agents do not share the same model of information, particularly they are completely similar, but they use different symbols for the same reason, and the same symbol for different ideas. (aaai.org) To arrange a survey of the site, these parallel agents should be in contact, and therefore information that should be used in terms of information must be translated into equivalent information. An ADEPT agent is required to announce the information models in which it may represent knowledge. In this way an agent that wishes communicated with that agent must use much acceptable information model for expressing the message theme. (amj.aom.org) Generally, the ADEPT system is absolutely supportive to the development of information models through an information model language. This language is specifically objective and provides the normal strict, integer, floating and 'Boolean' types as well as conserves such as countless types, object classes and lists, which make enable more confusing types to be explained. For instance, the structure of an SLA is defined in the ADEPT information model using this language. This information model adopts the four basic types from the Types information model. These basic types are used to create a model of time so that durations, start times and end times of services may be specified. (books.google.com) A construct of type contains slots each of type that indicate the day, month, hour and minute of that point in time or interval of time. A construct of this type is defined using this type and others.

3. Information agents: Definition, classification, and basic skills

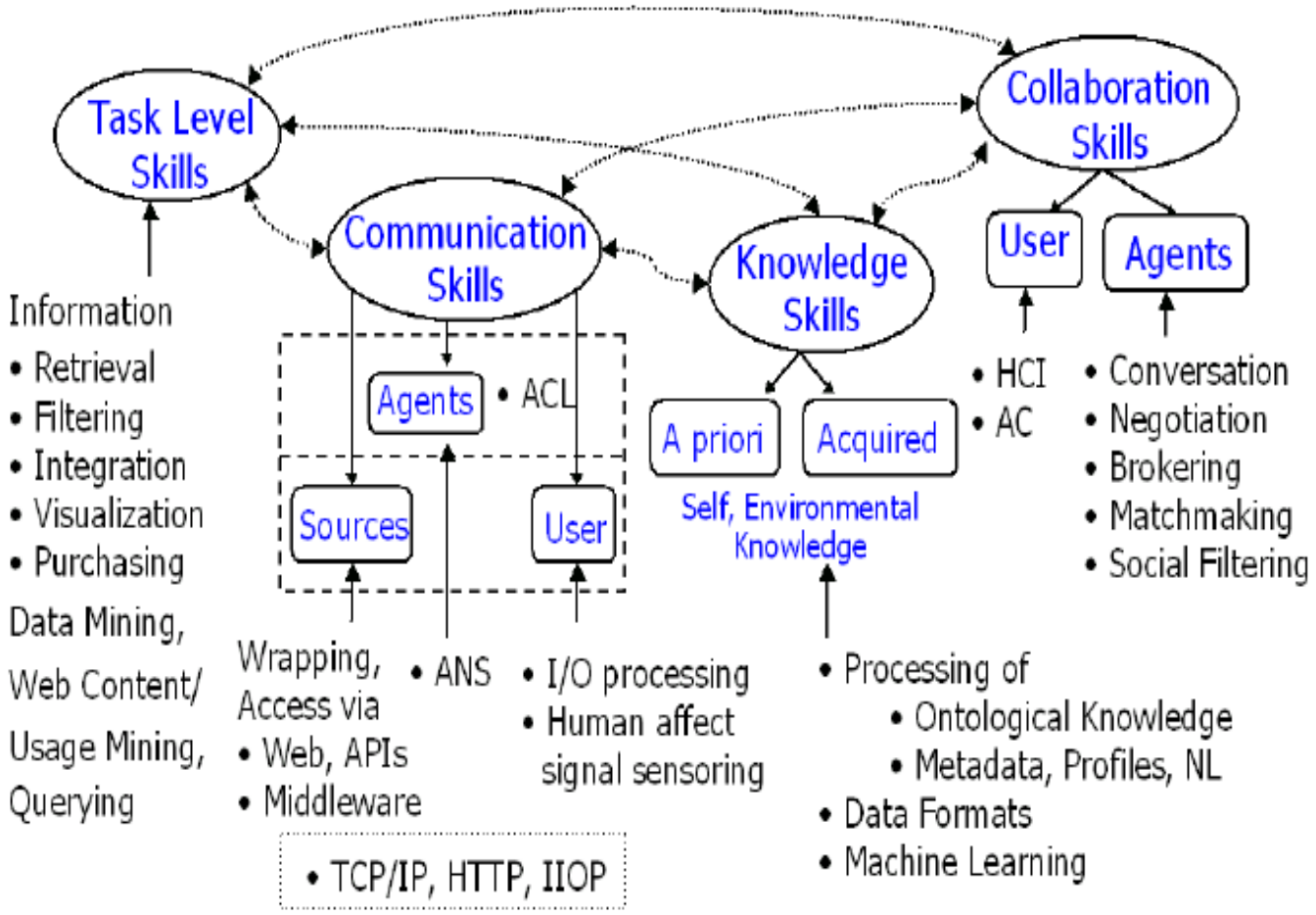
The information agents are a special type of called clever software agents. Software agent technology coming from distributed artificial intelligence is inherently temporary. Although, the idea of an agency is quite broadly used in literature, it may rather be seen as a tool for analyzing systems, not a sharp characteristic that divides the world into agents and non agents. However, intelligent agents are usually claimed to exhibit autonomous behavior, which is decided by their pro activeness, that means taking the first and originate in order to satisfy given design objectives and exhibition target directed behavior, reactive or deliberative actions, which means perceiving the environment and at the same time change management to meet given design objectives, and social communication between groups with other agents and human users when needed. (amp.aom.org)

It is based on the accurate application domain and view on the possible future solution for a particular problem that a quite clever agent is supposed to do in exercise. Today, the majority of agents are employed in different settings, such as industrial control, Internet searching, personal assistance, network management, games, software distribution, and many others. Agent technology is quite on its way to produce mature standards that are referring to software agent architectures and applications such as OMG MAF and FIPA. Further inspection indicates that the European network of excellence for agent-based computing established in 1998, international workshops, and conferences on the subject, like ATAL, CIA, Autonomous Agents, PAAM, and ICMAS, strongly given software agent technology since its public breakthrough almost five years ago. Intelligent agents for the Internet are called information agents in general. But what exactly is an information agent? We can explain an information agent as an autonomous, compulsory software entity and we mean an intelligent agent who has complete access to one or more, heterogeneous and geographically divided information sources, and which actively enquires, mediates, and keeps continuously relevant information on behalf of users or other agents, in the right time in the right place. As a result, an information agent is supposed to satisfy one or more of the following requirements.

· Information management. It is enabling to offer a transparent access to one or many different information sources. In addition, it searches, extracts, analyzes, and filters all the appropriate data, monitors sources, and updates relevant information on behalf of its users or other agents. In general, the procedure of information supposes a broad variety of scenarios including advanced information in databases and also buying of relevant information from providers on electronic marketplaces.
· Information presentation. The agent is able to interact heterogeneous data and to provide multi-dimensional opinions on relevant information to the user.
· Intelligent user assistance. The agent can easily be adjusted to changes in user views, the information, and network environment as well. It just provides intelligent, interactive help for all the common users supporting their information, which is based on business on the Internet. The utilization of intelligent user balances like believable, life-like characters can radically develop not only the awareness of the user on its personal information agent but the way information is copied with. Many systems of information agents have been daily increased or are currently under development in academic and commercial research labs, but they still need to wait a little in order to make it out to the real world of Internet users. Despite this, the ambitious and pretending aim to satisfy all of the requirements that are mentioned above appears to be not very far from being accomplished in the next ten years. (emeraldinsight.com)
The information agents can be divided into several different classes according to one or more of the following features.
1. Non-cooperative or cooperative information agents are relying on the ability of the agents in order to cooperate with each other for the completion of their tasks. Several protocols and services are available for achieving communication among autonomous information agents in different situations, like hierarchical task delegation, contracting, and negotiation.
2. Adaptive information agents have the ability to adapt themselves into changes in networks and information environments. Examples of such kind of agents are learning personal assistants on the internet. Generally, the rational information agents are common in an economic sense. They

act and may even cooperate together to increase their own benefits. One main application similarity of such kind of agents is the automated trading and electronic commerce on the Internet. Some instances include the variety of shop and systems for agent mediated auctions on the internet. (aaai.org)

3. Mobile information agents can travel alone through the Internet. Such agents may include a dynamic load balancing in large-scale networks, lower of information which is the transfer among information servers, applications, and migration of small business logic within medium-range corporate procedure on demand. According to the meaning and classification of information agents we can have differences between communication, knowledge, collaboration, and rather low-level task skills as depicted. In this stage, the answer key enabling technologies are below each of the different types of skills. Communication skills of an information agent explain systematically either cooperation with information systems and databases, human users, or other agents. In the latter case, the use of an agent communication language should be considered on top of, for example, middleware platforms or specific APIs. (books.google.com) The representation and procedure of ontological knowledge and metadata, profits and natural language input, translation of data formats as well as the application of machine learning techniques give the opportunity to improve an information agent to acquire and maintain knowledge on itself and its environment. High-level cooperation of an information agent with other agents can give the answer, for example, on service break down, matchmaking, negotiation, and collaborative filtering, whereas collaborating with its human users mainly replies to the application of techniques, which come from human instead of computer interaction and affective computing. (amp.aom.org)



Basic skills of an information agent

Some different approaches for building information agents are that the most known approaches for building information agents are the following.

1. User programming. An information agent is programmable exploited by its user from scratch, for example by using a collection of user-programmed rules for preparing the information related to a particular task. The basic problem with this approach is that it needs too much insight, understanding and trying from the user. For example, a user has to realize and catch the opportunity for employing an agent, take initiative to create it, combine it with explicit knowledge and keep the underlying rules over time.

2. Knowledge engineering. An agent is considered as a-priori with a great deal of domain particular background knowledge about the

application and the user. Some same related problems with this approach are that it requires a big variety of efforts from the knowledge engineer, the agent is highly domain specific and its knowledge is relatively standard, as a result the agent is hardly adaptable to different application domains.

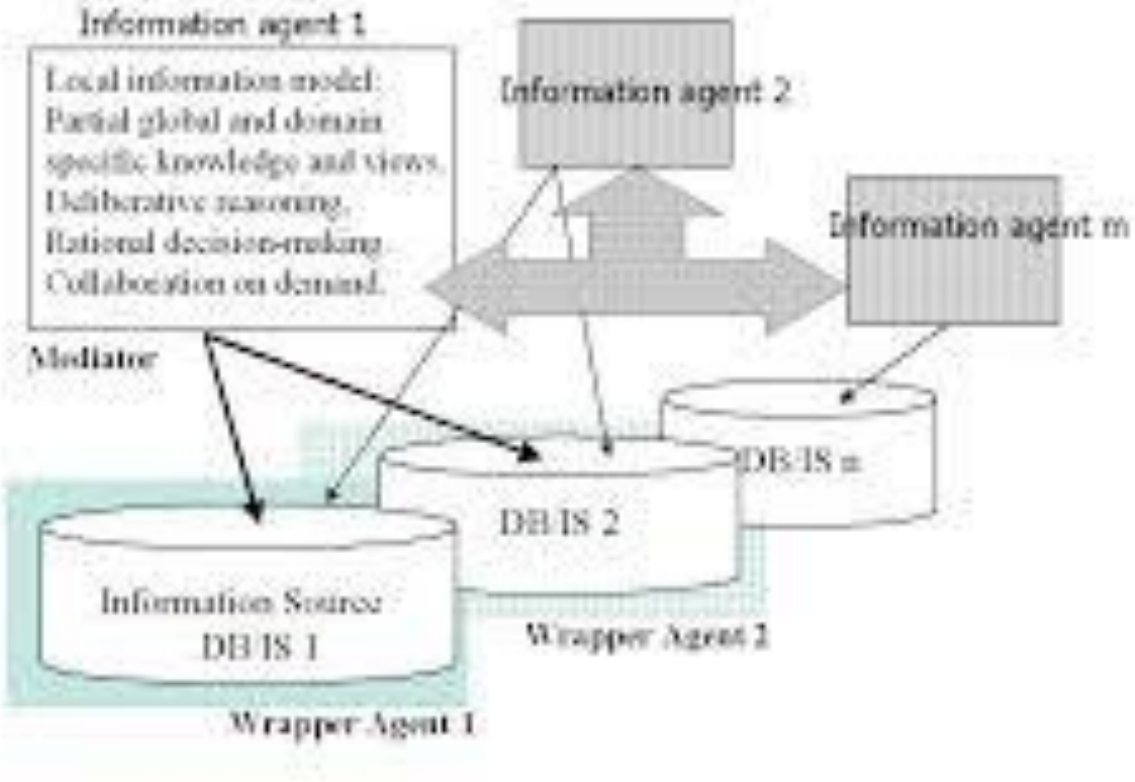
3. Machine learning. An agent should automatically acquire which knowledge is needed in order to assist the user by applying appropriate methods from machine learning. Of course, the situation to be satisfied in this approach is that the use of the application includes highly repetitive and different behavior from many different users. (aaai.org) Adaptation of the agent to individual user preferences and habits is a clear benefit in that it, for example, offers customized results and requires not only less work from the user and application developer, but it also develops the issue of trust between the user and their learning information agent. So in our further survey, we provide an overview of the basic key enabling technologies of IAT needed to create intelligent information agents for the Internet, and point to related examples of systems of such agents who have been currently developed in the committee. The result is structured in according to the classification and basic skills of information agents, which have been mentioned before. For a more specific and technical inspection of individual techniques, methods, and systems we refer to the corresponding, by giving references. In conclusion, we will provide an outlook to possible future perspectives of information agent technology for the next decade. (pubsonline.informs.org)

Now, we will have a look in the cooperative information systems and agents. The rapidly increasing rate of change in today's information business environment is combined with increased global competition, can make corporations copy with new challenges in putting their products and services to the market. This has as a consequence an increasing demand for the streamlining of operations and an efficient access to information resources that are given to a local or worldwide network. Although low-level infrastructure has been developed to support the relationship between the databases and application programs, this is not sufficient enough, especially when dealing with higher-level

object organizations such as vertical business object frameworks and workflow. The existence of many database systems does not support any kind of pro-active information discovery. This has replied to the example of so-called cooperative information systems originated by describing an advanced middleware procedure based on the conclusion of intelligent information agents that offer higher levels of cooperation and provide the required services. The answer key of a CIS is to balance the autonomy of databases and legacy systems, with the possible combination of explaining them by the use of information agents to perform cooperating work. (amj.aom.org) On the other hand, information agents should cooperate each other without losing an individually significant degree of autonomy in planning and task execution. (emeraldinsight.com)

The next survey is focused on the mediators for the intelligent integration of information. Many past efforts towards an intelligent agent-based integration of information depend on the idea of a so-called mediator agent. The basic aim of this special kind of information agent is to enable intelligent apprenticeship across information systems. A mediator can be explained as " a software module that exploits encoded knowledge about some sets or subsets of data to create information about a higher layer of applications". (amj.aom.org) In the meanwhile, the federated or multi-database architecture concentrates on data representation through different types of programs and appropriate translations, the mediator approach concentrates on permanent conditions that perform value-added activities but simultaneously keep the information model more or less hidden, typically in this form of definition. (amp.aom.org) A mediator is supported by a set of information agents, each of them giving access to a local information source and extracting content from that source, and performing the suitable data conversation. In order to provide value-added information services, the mediator might be able to cooperate with other information agents such as broker or matchmaker agents by covering different

domains and sets of service providers. The obligations of a mediator agent is to translate between its own and other domain particular meanings either by the help of a common relationship maintained by a keen ontology agent, or by utilizing its partial global knowledge on ontological relationships between basic ideas which may occur within requests from other agents and the results of query processing over heterogeneous sources. (books.google.com) Furthermore, to decompose and execute complex processes on available relevant sources with the help of a matchmaker agent, and to indicate the partial responses obtained from multiple information sources sent by wrapper agents into a uniform. The perspective of the DARPA intelligent integration of information research program allows frequencies among mediators via facilitators on demand. A layer consisted of three parts reference architecture consists of various types of services such as facilitation, brokering, mediation and integration, wrapping and data access. The architecture is undefined to agents that can support these services given to each layer. However, most mediator-based information systems implemented to date and to some extent in others, consider scripts with just one central mediator agent collaborating with multiple wrapper agents. The issue of ontology based relationships among multiple mediators or facilitators is absent, as we can see in the figure below. (amp.aom.org) The same goes with multi-brokering and distributed matchmaking among different agent businesses. A centralized system comes from just a single mediator and multiple agents. The basic key supporting techniques is he basic key supporting techniques for increasing collaborative information agents and systems concern interaction and coordination among the agents.



Macrostructure of a cooperative information system, mediator, wrappers

3.1 Inter-agent communication

We have mentioned before that middle ware platforms for given computing to enable transparent approach to heterogeneous information and data sources. However, for the purpose of realizing distributed systems with true beginning beyond simple coordination, discussions are necessary. That is the basic target behind the ongoing efforts in order to design conversations in an agent communication language (ACL). An ACL shows the syntax and meaning of messages either performances or primitive communication, that agents can exchange by describing the desired agent state and confusing attitudes to find by each of the language performances, that indicate the intention of the conversations which are prepared. (amj.aom.org) The utilization of such performances is based on the speech act theory. The receiver sides can understand how to procedure and keep on with its action by the course of the primitive conversations, which are driven by the agents' strategies and attitude but are independent from any content language or ontology, n other words the agent's local view. One of the most necessary things about using an ACL for negotiation is that it allows a model with a richer communication between the negotiating parties. (amj.aom.org) For instance, the FIPA ACL rejecting proposal communicative act gives to the agent the chance to give a reason for the rejection. Many KQML derivatives are on the market designed for different application characteristics and purposes, but no standard ACL with standards exists yet. The requirements for using ACLs in information agent systems include (a) an API for composing, sending, and receiving of ACL messages, (b) a supporting procedure, such as an agent naming service and registration, (c) the code actions to perform as given by the semantics of message type, particular domain and application. (books.google.com) In general anyone can divide between multi-agent

systems using an ACL for agent communication, and APIs facilities of ACL-speaking capabilities into an application or multi-agent system.

Another issue of a vital coordination enabling distributed semantic information brokering at the same time is that of realizing the meaning of words, views and ideas across multiple application domains which are used within the content of the exchanged messages. Related efforts take part in an automated, ontology-based cooperation by using methods, tools, and languages for better representation and sharing, such as non-proprietary languages for knowledge and content interchange, like full set, first-order, predicate logic-based knowledge interchange format (KIF), semantic language (SL) by FIPA, or common views. (emeraldinsight.com)

Therefore, there is coordinating societies of information agents. Specifically, coordination is the procedure of managing notions between activities of one or more actors performed to achieve a goal and to avoid arguments while having maximum effectiveness. It includes task decomposition, resource allocation, synchronization, group decision making, communication, and the preparation and adoption of common objectives. (amp.aom.org) A different range of approaches for coordination strategies involving multi-agent planning and decentralized negotiation protocols for multi-agent environments exist. Recent works also investigate the advantages of learning how to choose a necessary coordination strategy by a single agent in a multi-agent system. (books.google.com) Coordinating collaboration among information agents may follow a kind of social obligations from given or following infrastructures, delegation of tasks and responsibilities, or team plans. Research into modeling coordinating behavior and entailed strategies keep on related works are inspired, particularly, by research in CSCW, cognitive, and social sciences. As an example for cooperating societies

of heterogeneous agents we briefly introduce the techniques of service brokering and matchmaking. For this reason we can find many differences among three general types of agents, which distinguishing as:

1. Provider agents provide their abilities, such as information search services, retail electronic commerce for special products, to their users or to other agents.

2. Requester agents consume information and services by offering to provider agents in the system. Requests for any provider agent capabilities have to be sent to a middle agent.

3. Middle agents, such as matchmaker or broker agents, have obligations among both, requesters and providers, for some mutually beneficial cooperation. Each provider should register at first himself with one or more middle agent. Provider agents advertise their capabilities through campaigns or advertisements by sending some appropriate messages and describing the kind of service they provide. Both brokering and match making require, and more specific, a common language enabling the description and automated procedureing of advertised and requested capabilities of information agents. The first steps have been already taken in this direction, such as the increase of the agent capability description language LARKS or recently started efforts on a general agent effective language DAML. Many other ability description languages, like CDL, do not offer any mechanism to enable agents to efficiently way on respective descriptions. Every requirement a match maker or broker agent takes will be combined with its actual set of advertisements. If the match is successful, a match maker agent gives back a ranked set of appropriate service provider agents, with the relevant advertisements, to the requester. In contrary to a broker agent, it does not occupy with the task of contacting the relevant providers itself

by means of transmitting the service request to the service provider and communicating the effective results to the requester. This avoids data transmission bottlenecks, but definitely develops the amount of communication among participating agents. Recently, only a few approaches could deal with multiple broker or match maker agents. (pubsonline.informs.org)

3.2 Adaptive information agents

Adaptive information agents should copy with uncertain, incomplete and unclear information in an efficient, dependable way such that they are able to make clever decisions on the spot. Adaptation of an agent to its environment can be done in an isolated manner or in cooperation with other agents by using methods either for single or multi-agent learning, in a respected way. Learning among multiple agents might be collective, which means that the agents adjust themselves in order to improve the majority of advantages of the system. Despite this fact, the system adaptation can even interact without any collaboration when the individual learning of one agent influences that of the other agents in a beneficial way. (books.google.com) An agent may exhibit adaptive behavior in a way to a variety of internal reasoning processes concerning communication, coordination, planning, scheduling, and task execution monitoring. (aaai.org) All the notions and systems for single or multi-agent adaptation may be cost by different criteria. Some of them are the applied strategy, such as learning by example, analogy, or discovery, the type of feedback and guidance for the agents by means of supervised or unsupervised learning, the type of communication among agents, human users and the multi-agent system in the environment, the aim of learning to develop the skills of a single agent or the whole system, and, finally, the giving out of data and concurrent reputation for adaptation in the multi-agent system. The most known application domain of adaptive single and multi-agent systems is electronic commerce, nowadays and information gathering on the Web. Some others equally important domains are infrastructure, digital libraries, logistics, and telecommunication networks.

Some researchers open a discussion of questions and challenging research issues, such as the following:

Mechanisms for learning successful negotiation and coordination are some types of strategies in a multi-agent system. When is the adjustment of single agents harmful or beneficial to the system? How can a collaborative behavior among multiple adaptive information agents effectively include? Which situations for knowledge discovery, representation and maintenance are most suitable for an information agent in an open environment?

A large range of machine learning techniques are useful within information agent systems and include many comprehensive readings in such techniques. The most popular kinds of learning methods, ranging from neural network learning through Q-learning and case-based reasoning (CBR) to genetic learning, in order to coordinate with adaptive agents are the following:

· Supervised learning. User feedback is received by the agent who makes more specific some desired activity and the main point of learning is to match this desired activity as closely as possible.

· Unsupervised learning. This refers to adaptation without any views from the user or other agents. The characteristic of learning is to find useful and desired activities or patterns of activities through a self organizing procedure. (books.google.com)

· Reinforcement learning. User feedback indicates the utility of some activity performed by the agent the purpose of which is to learn how to maximize this utility. A comprehensive notion of the research area of adaptation of single agents and multi-agent systems is provided in any case.

The non-cooperative case explains a non-cooperative adaptive information agent who gradually adjusts to changes in the user, information, and network environment by its own without any communication or discussion with other agents. (books.google.com) To keep on, the key for supporting technologies for the development of any single, adaptive information agent include, in particular, human and agent communication, visualization of information spaces to the user, content based user proliferation, and adaptive knowledge discovery in databases. (pubsonline.informs.org) Other relevant techniques concern, such as the learning of a single agent to select information sources based on the principle of maximum expected utility that is having limited information on the environment. Human and agent communication and visualization of information spaces mean that any flexible, convenient interaction between these two (HAI) helps to increase the awareness and thereby the acceptance of the information agent and its work by the user. This is the reason why an adaptive information agent should deal with its users and cooperate in a most convenient way through an intelligent interface. HAI is largely motivated by the confusion of indirect management, that is, the user is involved in a cooperative interaction procedure in which human and agent both begin communication, monitor events, and perform tasks. Such an interaction include the processing and analysis of the user's input, such as speech, and affective signals, the managing the cooperation procedure based on the agent's knowledge of the domain, user, media, and task model, and eventually the design of the presentation of output using techniques like gestures, natural language, or graphics. (amp.aom.org)

Individually sensitive information of the user through the available encompasses not only waiting for its needs on the fly, but also visualizing the space in a real-time event. The latter can be easily understood, for example, by utilizing virtual reality (VR) techniques and

life-like synthetic characters. This also requires automated speech recognition, body language, giving for affective computing, and projecting of potentially big scale data resulting from the agent's online data mining activities. Such effective environments, like CAVE permit the guidance of the user by their personal information agents while he is trekking through the information world. First implications have been done in that direction through modeling 3D shopping malls in VRML, which they still have to be equipped with assisting 3D information agents. The same goes with digital world as platforms to support community networking while being strictly coupled with the physical city in terms of shops and initialization. Besides, any future progress in developed HAI is because of the rise of multimedia pushed to a new level by more powerful 3D graphics, a vital increase of mass storage capacity, ultra-high performance connections among sites in the Web and basic knowledge for multimedia integration on the Web, like SMIL. To sym up, HAI and its application to information agents still appear to be an unfortunate territory, despite the recent research efforts in intelligent interfaces and human agent factors that carried out, for example, by projects in the European I3Net firstly started in 1997 as well as in the Special Interest Group on clever information agents as part of Agent Link. (aaai.org)

Content-based filtering and user-interest profiling is a common notion to tackle the information including in the problem. Items are suggested to a user according to correlations found between the items' content, for example, appearance of certain keywords, characteristics, and the given user preferences in a different style. (amj.aom.org) The latter is usually came from and updated by the agent automatically by observing the user's online activities such as visiting pages in Internet, dealing with downloaded documents, adding or deleting bookmarks, and printing, as

well as affective signals such as eye movement or gestures, and credit assignments to the agent. (pubsonline.informs.org)

The agent distributes features from the documents, uses them to form training examples, and offers a replying user interest prototype through application of appropriate machine learning techniques. Other related methods involve learning models of text chapters, practicing of documents to one or more categories, and the creation of possibly dividing categories due to levels of user interest. (books.google.com) The prototype can be used by the agent in order to predict further actions of the user in a further way learning to recommend and pro-actively choose relevant documents. (amj.aom.org) Content-based filtering has some disadvantages. Firstly, information must be in some machine effective form like text or attributes that have to be formed by hand. Although, it appears to be a little difficult to assign procedures to media such as sound, images and video. There is also no associated mechanism for generating notions finds, meaning the agent may not suggest more of what the user has heard before and liked. Finally, content-based methods cannot filter, based on relations of style, quality, that is, the agent cannot distinguish between a well-written and a badly written paper, if both use the same methods. (emeraldinsight.com)

3.3 Rational information agents for electronic business

Electronic commerce may be explained as the set of activities of trading goods and services in the internet. It is a part of electronic business covering a bigger range of issues including business processes and transactions on the Internet associated to customer relationship and supply useful management. (aaai.org)

E-commerce: Some facts and figures E-commerce is radically growing for the past few years. Remarkably, the business-to-business (B2B) market infrastructure of e-commerce is shown to balance that of business-to-consumer (B2C) worldwide by values of US$ 1.3 and 0.1 trillion, each one. On the other hand, consumer online spending money from US$ 7 billion in the whole holiday season of 1999 up to US$ 2.8 billion in the month of January, 2000. Basic available technologies for developing e-commerce and business solutions are the development of any e-business solution depends on basic available technologies such as for standard data representation, explanation and exchange, secure user style and data, like open profiling standard (OPS), W3C's platform for privacy preferences (P3P), a symmetric coding schemes, digital signatures, and digital assignments, make secure electronic payment, like VISA/MC's SET for payment with credit card, digital cash, like DigiCash's eCash, DEC's MilliCent, and smart cards, or expiation from a given customer account like at central virtual markets, and, finally, same standard protocols including most issues of electronic trading, such as IETF's internet open trading protocol (IOTP), open trading protocol (OTP), and open buying on the Internet (OBI). There are many different trading models and schemes that may be compared along. (amj.aom.org) These are the design on economic principles such as domain, competitive and adaptive strategies and equilibrium, the privacy of interests of the candidates and anonymity of identities, the confusion of

trading mechanism in terms of cooperation and communication. As a result, any immediate agreements on an accounting and pricing structure capacity-based or sensitive pricing of users is as important as effective trust and security mechanisms to give the chance to e-commerce transactions in a digital economy. A remaining question is how to model, measure, and reason on trust. The situation becomes even more confusing since customers as well as sellers, their products, services and quality may change rapidly year after year. There is still no impressing method known which appears to be appropriate for agents to behave to such changes in an appropriate way. (amp.aom.org) Despite the vast available sources of electronic commerce a more sophisticated, agent-based trading still holds a key challenge for economists, computer scientists and business managers as well. It might change the shape of the way we think about economic systems and business procedures in an increasingly networked world. In the open and increasingly financial world, personalized information agents not only may pro-actively discover and try hard to take information relevant to their customers but are paid and have to pay for any services they have been offered. (aaai.org) One aspect is that agents manage e-commerce and business functions such as advertising, negotiating, matchmaking and brokering. As a consequence, trading information agents have to maintain effective and efficient ways for making economically rational decisions. This involves notions where agents, for example, make exchanges up to a limit, filter information and negotiation with vendors, dynamically trade commodities such as even some parts within B2B or B2C digital market, or decide on participations from service providers to take for their customer in some kind of negotiation on-line in a consumer-to-business (C2B) ecommerce setting, and develop the level of trust in their actions gradually over time, including only essential risks for both customers and vendors. (books.google.com) Even though, electronic business and

commerce is not the original, classical application system of information agents but it absolutely is the most steadily growing one. However, e-commerce on the internet may happen without any clever agents if agent technology in general does not succeed to be contaminated by currently emerging web transaction standards and systems. (amp.aom.org) In any case, due to a Harvard study published by Moon in 1998, e-commerce applications with digital help for information gathering and guidance in on-line shopping are expected to be 80% more convincing, 30% more attractive and 40% more qualitative. This is where the rational information agents for agent-mediated play an important role. Basic key supporting techniques for agent-mediated trading means that many negotiation and trading mechanisms for clever trading agents depend on distinguishing utility theory, price comparison, content-based recommendation and user prototype, learning of unknown internet pages as well as cooperating recommendation, specific formation among autonomous agents, auction-based protocols, dynamic supply chain management, agent-based marketplaces, variations of the famous contract net protocol and reality schemes. The first four techniques are typically used in non-coordinating cases such as shop purchases, whereas the latter are focused on the class of cooperating trading agents. All the kinds of scenarios for single-agent or multi-agent systems for e-commerce and business can be established, including virtual marketplaces, auctions (B/C2C), and rival auctions (C2B), as well as shop purchases, on line shops, and web portals (B2C/B). Self-interested autonomous agents may negotiate logically to gain and exchange advantages in not permanent coalitions. This is to save costs by cooperating activities with other agents. For this purpose, each agent decides the utility of its negotiation and productions in a given environment by an atomic utility function. (books.google.com) The value of cooperation among agents is divided by a commonly known

characteristic function which decides the guaranteed utility the coalition is able to maintain any case. In a feature function game, the agents may use effective but completely different strategies implied by desired type of economically logical behavior such as altruistic, rational, or group rational. In any case, the difference of the coalition's profit to its members is divided by its obtainment but is claimed to ensure individual rational procedure to provide a minimum of incentive to the agents to cooperate. Methods for the formation and maintenance of stable negotiations mainly come from coordinating game theory, economics, and operations survey. They cover the formation of coalition structures, and the division of gained advantages among coalition candidates. Individual strategies of agents are focused on different kinds of economically logical behavior such as being altruistic, bounded rational, or group rational. Most specifically, more important cases of coalition formation concern superstition environments where at least one pair of available coalitions is not better by keeping touch into one which could be caused by, for instance, communication and cooperation overhead costs, lower of coalition value as a result of restricting utility constraints implied by agents joining a coalition, or anti-trust fouls for particular cooperation. The meaning of stability of formed coalitions depends on the chosen game-theoretic concept of division within coalitions according to the Shapley value, the centre, the bargaining set, or the surrounding. (books.google.com)

In environments where interests and utilities are published for negotiation to form exercises that cannot be succeeded, most current procedures allow for threatening by different types of lies. In addition, in scripts where agents might leave or enter the negotiation procedure at any time and perform a continuous time of incoming tasks, an effective dynamic formation of multiple, emerging events remains to be solved. (amj.aom.org) Dynamic coalition formation can be used for multiple

online auctions to create temporary customer coalitions on the positive side, though the highlighted scenarios and techniques have to be developed yet. (aaai.org) Even though the multiple techniques for automated decision making and coalition formation among self-interested agents are famous none of them has been used so far in the internet. Other applications for different scenarios of utilitarian coalition formation include, for instance, the decentralized power transaction. A well-known available stimulation environment for coalition formation based on selected coalition theories is provided in this procedure. (books.google.com)

4. Case representation

Two types of cases are stored in the CODAW repository. Workflow schemes are stored as original formation. Each installation of a prototypical case, and specifically a case in workflow terminology, is stored as a decided case. Prototypical cases embed the overall sequence of activities that complete a sole business requirement. Instance-level cases are some exceptions of prototypical cases for well-specified income. Each prototypical case may have one or more instance-level cases which are related to it. (amj.aom.org) When a workflow system is considered as updated, it is stored as a new prototypical case in the whole procedure. Prototypical and instance-level cases are represented in CODAW with specific syntactic and grammar elements which are followed. Our repository development efforts have concentrated on enquiring workflow models in the areas of engineering design, product development and supply marketing. We have explained in details the appropriate ontology comprehended on current business exercises in these functional areas, suitable information descriptions for these functions in commercial workflow tools, previous research on developing procedure exercises at higher levels of abstraction, such as procedure handbooks and timely trying on developing anthologies for supporting the procedure. We describe the ontology for NPD as needed in the extent discussions. In our procedure ontology, we claim that the existence of primitive tasks in a given business domain, as shown before. Perhaps these effective tasks are mixed into complex workflows. A workflow system explains the interior structure of a complex task, which after a while might be reused as an extra procedure in the design of additional workflows. Having considered the development of a case representation for the workflow scheme is shown as Unified Modeling Language (UML). The UML activity board is just used for illustrative purposes and shows the activities and control flow including currents, such as forks and joins for the schemes. A is a nominal NPD workflow schema. Shown at the top of the figure are the different organizational roles that are included in distinguishing the activity or the task. (pubsonline.informs.org) Activities can be performed by an only agent or groups of agents. The span of the activity boxes indicates the different

roles involved in performing the activity. For instance, Project Selection and Project Plan Review are performed by all the kinds of processes. Each of one could be represented by a unique or common task. B is the view for a primitive procedure used to source design managers from suppliers. This workflow is used to source a huge range of multiple parts and materials through a contributing procedure. In this procedure, offers from sellers, based on tender requests, are selected focused on a variety of criteria. Both these workflow notions are stored as prototypical cases in the CODAW repository. Ideal and instant cases are confronted in XML with suitable tags for various structural elements. (aaai.org) Details of the structural elements, giving answers and example XML representations are in the beginning of procedure. Details for the basic parts of a ideal case or in other words, the workflow procedure are listed in the first table. The parts of an instance-level case and a workflow instance are listed in the next procedure. Table columns clearly show the element and its answering XML tags, describe the notions of the element and explain its computational representation. We have to state that an only structural element might be described by different XML tags. We use specific object and information modeling techniques for all the parts. The XML representation of the unique case corresponding to the NPD scheme is presented later. The case representation has been designed with a concentration on the whole script and supports delegation of representative and primitive procedure models. We have already adapted tags from standardization tries such as XPDL, WSFL and XLANG and plan to improve suitable XSLT based inter-conversion mechanisms between the CODAW case representation and standards. All the unique cases involve a further procedure graph model, denoted by the WSPG Model procedure. The task graph model is represented by the incentive model. The WSPG Model involves subsequences for the list of task notions, decision types, concurrency nodes and a list of directed control effects. The XML encoding expresses a partial representation for the NPD workflow. (amp.aom.org)

The representative first orders predict logic-based representation and use the AI planning representation for workflows and comparative tasks. The elements WSP recons and WS Post cons for the initial case define

the pre-conditions and post conditions that make sure that the case can be indicated as a different task and used as a single unit. WS Inputs and WS Outputs express the input and output parameters, such as a design problem and a budget, which are vital to activate the case. The original case also shows all the kinds of resources that maybe needed to execute the case. The procedure list identifies the unique and composite tasks that define the workflow scheme. Structural elements of a composite task are defined in the following task. The example representation indicates the whole procedure. (amp.aom.org) This task can only be defined when a list of projects and resources is available explained by the predicates in contexts and upon completion; the task has result of adding new projects, devoted by TPost Cods. The input and output parameters of this procedure are clearly shown TParams and the specific procedure code that implements this task is defined by Task Imp. In the example, the task, the project selection is produced manually by a group. Original cases get primitive for different inputs, which are stored as instance-level cases. The tag WS Instances define all the different instance-level cases related to the task. A corresponding instance-level case is expressed in the second part of the procedure. Instance level cases are grounded versions of the original cases. Tags WI Init State and WI Final State represent the actual values of the parameters of variables in the tasks that show the pre-conditions and post-conditions of unique cases or common tasks. (amj.aom.org) A composite or primitive task is available in a given state, when primitive variables can be easily defined with those in WI Init State. Later, the predicate in tag WS Pre Cods is shown the predicate in tag WI Init State of the instance task, when the logical variable design problem takes on the value HA starter. Satisfying all the conditions in this manner make sure that case WS2 can be used to the current task. Successful requirement of the task changes the first state into the final state, where the predicates of WS Post Cods are added to or rejected from the current state. The declare representation supports planning-based composition during which cases are transformed using logical notion. (books.google.com) The Preference ranking element in the first original case enables ranking amongst multiple cases that may apply to a standard situation. In general, the procedure graph element of

the representation supports many similarities and the declarative representation supports case conclusion. Additional structural elements of instance-level cases involve original or common elements such as usage histories, events and exceptions. Cases might be alternated using this information through text or XQuery based procedure. Further research is required in order to make clear such types of information to guide the whole workflow modeling. (emeraldinsight.com)

5. Repository management

Case development and population of the case base is a key task in development of the CODAW system. Workflow cases to discriminate the repository have been come from best exercises books for different functional areas, observations of manual procedure execution and procedure change from knowledge workers. In the first development of CODAW, we have populated our repository with cases required from real world projects in terms of systems analyze and workflow modeling. Furthermore, we have also gathered workflow cases from the research literature and those mixed with available workflow software. The repository in a CBR system needs to be contracted with the first population of cases, before it can support the CBR procedure. To develop this original population of the case base, we are currently manually expressing our primitive workflows by increasing the associated declare and unique work representations. Currently we have 60 original cases of various organizational business tasks in our repository along with multiple execution instances for each. Further, the repository also expresses a consequent collection of primitive tasks in the library. Currently the set of original and instance-level cases is produced as flat XML files in a directory hierarchy shown by the following structure. (pubsonline.informs.org) The lists based on functional area, task and organizational structure offer multiple tasks into the case base and give opportunity structured case management. The lists are developed by analyzing the current cases in our repository. The functional hierarchy is defined towards supporting primitive usage of cases such as a prototypal case in supply chain being presented with a case in CRM. The organizational hierarchy is oriented towards enabling procedure based on organizational structure. The task list is being improved to define common tasks that maybe performed in different functional tasks. For instance, the search for a case that involves a task described by the keywords, which enables tender generation for bidding, may alter bidding-related tasks across multiple functional tasks. An operation for the tender generation task in the task list supports alteration of suitable procedure models from different functional areas. (aaai.org) However, for each type of task, task parameters, inputs, outputs,

preconditions and after conditions in each context can easily be different. The superlative hierarchy supports the development of efficient domain-specific ideal mechanisms. As the total of cases increases, effective survey is essential. Currently, during case acquirement, the indexing scheme is firstly used for guiding search for a case across domains and also for effective mixing when there are large numbers of unique and instance tasks. Text acquirement is supported using conventional term based information acquirement techniques. XQuery gives opportunities on the contents of the XML tasks using exact matching. In the near future, we recommend extending the primitive scheme in order to involve case organization by event-types, performance, and usage. Development of the current repository has concentrated on representational issues to give retrieval and composition, except of minimizing space requirements and improving efficiency. To specify the use of CODAW for workflow modeling, have thought that business needs evolution and changes are required to the NPD procedure. (amj.aom.org) An organization, which is using this NPD workflow is suggested a strategic change which internal manufacturing is being decreased and upcoming product development tries need to consider resulting of manufacturing. How should the product development workflow model be increased such that the tool step maybe produced? Many alternatives can easily be potential. We underline a possible solution script using CODAW. Firstly, a workflow designer may search the repository for workflows related to producing. The initial search maybe used using keywords, such as Outsourcing, Procurement, which might mix appropriate terms in the textual Case Description part of the case representation. (aaai.org) The acquired cases may involve workflows which producing is modeled as a primitive or composite part. One of the acquired tasks may be a procreant case, which might after a while be selected and used to replace the Tool Fabrication task to increase a new procedure model. The procedure of the composite task to change the Tool fabrication task of the initial NPD procedure is performed manually. During this step, the designer might provide pre-condition and post-condition requirements and specify tasks inside the composite task to be validated. (amp.aom.org) Notice that task

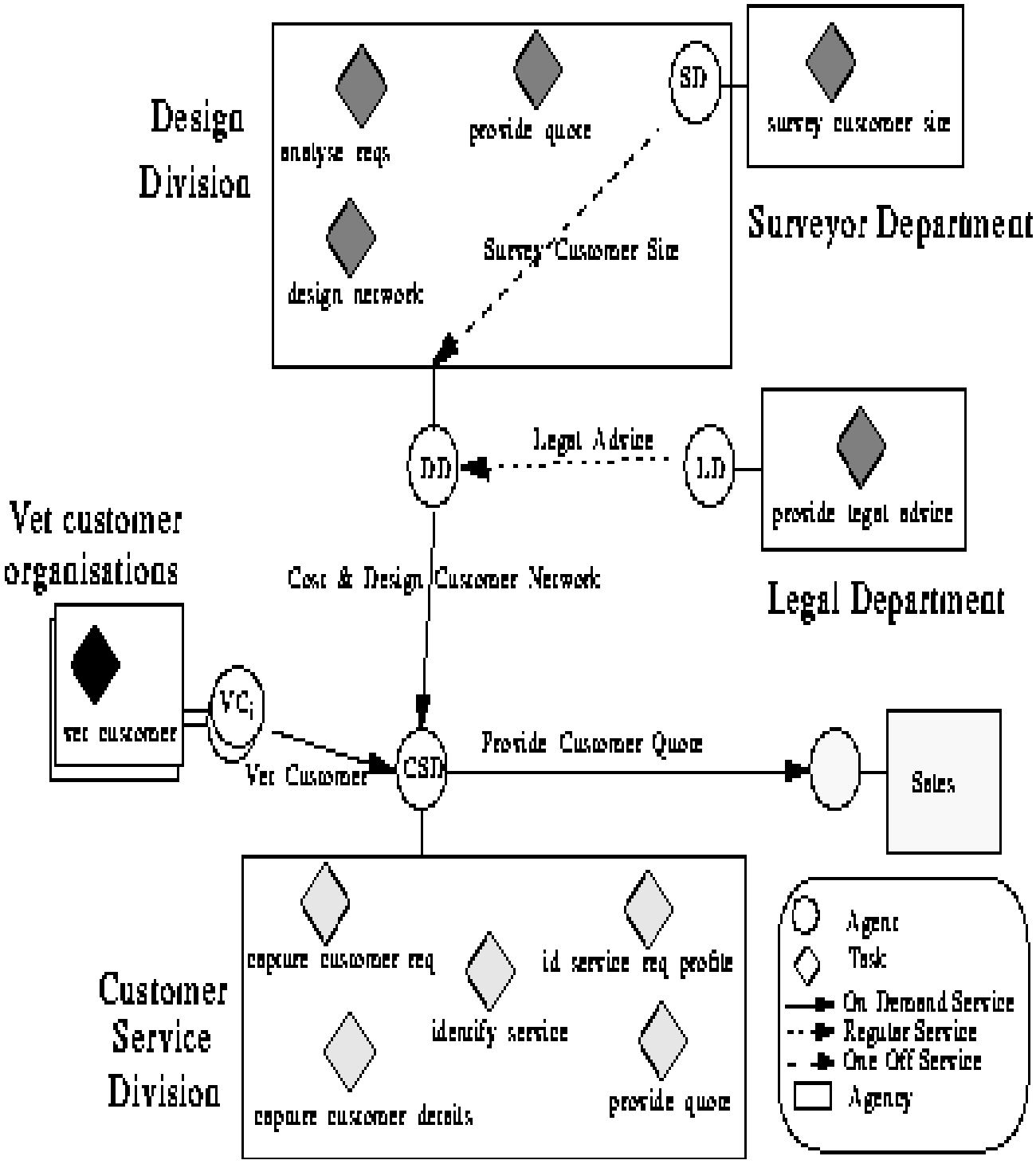
Collect Internal Requests in the original composite procedure is replaced by the task Collect Design Requirements in the new procedure. The development of the new NPD procedure indicates how a particular type of outsourcing through the procedure may be retrieved from the repository and installed in the context of tool producing. Additional design possibilities include: (a) the procedure retrieval may coherently contain a product development procedure model with producing which might be retrieved and installed for the new product, (b) there may also be primitive procedures which instead of tender-based producing, auction regulations may be used, and (c) a new product development workflow maybe composed by making clear one case in the procedure model stops before tool design with a procurement workflow case, wherein fabrication and follow up is defined. The NPD workflow design instance indicates the manual execution of the structured design procedure. The procedure acquirement and adjustment phase of the design cycle offers a rich source of procedure modification potentials leading to a large design search list and in other cases the conventional approach to workflow design. The designing of a product development workflow that handles each effective task, resource and product mixture for various business scripts while capturing all the business rules and definition is an overwhelming task. (amp.aom.org) Automated support in CODAW would make easier design steps such as recognizing and evolving tasks with suitable workflows or composing individual workflow cases into new procedures. Automated support for case acquirement and case definition is essential for effective use of a case-based design system.

5.1 BT's Customer Quote Business Procedure

The main scenario of this part is focused on BT's business procedure of offering a quota for designing a network in order to offer a series of specific services to a random consumer. This kind of procedure takes a customer service request as its input and produces as its output a sentence specifying how much it might cost to build a new network in order to understand that service. It involves up to six different parties, which are the sales department, the customer service division, the legal department, the design division, the surveyor department, and the provider of a service for required customers. (amj.aom.org)

The procedure is established by a customer, who was contacting the customer service division. The customer's details are offered while the customer is being included in their requirements. Whether the customer fails this procedure, then the quotation procedure definitely comes to the end.

Taking everything into account, the customer is successful; its retrievals are recorded against the service portfolio. Whether these retrievals can be met by a standard portfolio item, then an appropriate request can be provided focused on the previous examples. In the case of this kind of services, the procedure is more complex and involves a tentative manager for it. The tentative manager explains the customer's retrievals and while this is happening the legal department checks the longevity of the proposed service. If the desired service is illegal, then the whole quotation procedure comes to the end and the customer is completely informed. On the other hand, if there is something unsure about the service's legality, then the business element is defined while further information is obtained from the customer. If the requested service is moral, then the design phase is able to start. In order to prepare a network design it is usually important to have a plan with all the details of the requiring equipment at the customer's premises (CPE). However, the difference to this is when the desired service is subsequently simple that a survey is not guarantee. Sometimes plans like these may not occur and, some other times, they may be failed. In each case, the tentative manager decides if the customer site should be surveyed or not.



Agent system for the provide customer quote business procedure.

By the business procedure description, the following agent system had been designed. The agents, who devoted by the circles, are chosen to represent effective parts or elements involved in the customer quotation business procedure. The VC agents (Vet Customer agents) represent the needs of external elements as the activity is out of sources. Agent SD is within DD's agency because the design difference has overall management responsibility for the dictator department. In order to understand what that defines, we can notice that all the requirements for site surveys must be changed through the design department.
The procedure is based on when the sales agent sends a request to the CSD agent in order to offer a customer request. The CSD agent clarifies the SLA, which related to the request. The SDL body of this service tends to build a relation of potential ways that the SEM can take. The first path is chosen and the tasks and services in that path are originated and resourced by the SAM. (pubsonline.informs.org)
The SEM begins to explain what the constituent sub-services and tasks are. One of the initial sub-services it involves is to vet the customer. When the SEM comes in executing this service it makes sense by correcting its own SM, and therefore there is no relative SLA and so it reports an exception to the SAM. The SAM determines whether the service cannot be considered locally, by telling to its SM and so it should be sold in from an extensive agent. What is more, it decides that the service should have been followed in a demand manner because it is an activity that is absolutely necessary on each cooperation of the business procedure. By following all this coordination, it is better to negotiate for a longer term SLA including many different parts rather than negotiating for one each times the business procedure is required. What is more, in order to identifying the service nomination and the desired temporary mode, the SAM shows any programmer information which affects the service's tasks. Vet customer service profiling starts with the CSD's IMM sending CAN - DOs to all the agents it can clearly indicate through using its AM as being possibly able to offer this service. (emeraldinsight.com)

Negotiation begins in the right way when the CSD agent currently sends out the first proposals in the form of installed SLAs in order to all the steatite customer agents who offer all the answers with I-CAN. This initial proposal may be accepted to one of the VC agents in which procedure an agreement is as a result made and the negotiation between them is in limits. Although, in the majority of cases the VC agents may find some part of the proposal not very satisfying and so return a revised proposal to CSD. (books.google.com) Probably the CSD and VC agents then keep up with in several current rounds of exchanging SLA messages by either the CSD comes to an agreement with one of the VC agents or all the VC agents refuse all the offers and break off their negotiation. If the CSD agent gets more than one acceptable offer, it selects the one which is much closer to its specific optimum. The initial agent is given the percentage of its success and an SLA for the service which comes into force. The CSD agent has a SLA in demand for omitting all the customers and it might also have a negotiation for costing and designing the customer’s work online. (amj.aom.org) This means that there is less of a negotiation on the subsequent procedure vocations. The services which might produce more negotiations in the quota procedurees are those which are only currently underlined, such as the legal services and survey customer site. (aaai.org)

6. Knowledge Management Issues

Practitioners and business managers uncommonly agree that issues of technology, procedure, people, and marketing must be explained to succeed success. An organization must have satisfying technology to make progress from the rest, specifically in the transaction business environment of today. (amp.aom.org) However, to succeed bottom-line success, even more struggling must be devoted to the other issues. Experience in many organizations has indicated that no more than one third of the knowledge management cost should be focused on technology. The basic organization part of knowledge marketing is the cooperation of exercise which is a group of people who have in common an area of expertise who look for solutions to common problems. Nurturing vital nature is hard enough when the members are in a unique location with good access. When the members are spread around the world, in densely populated areas what they know in a following fashion across the organization. According to a 1997 Ernst & Young Center for Business Innovation 1997 survey which logically shows the biggest definition to knowledge transfer is corporate culture (54%), and the biggest difficulty in managing knowledge is changing people's behavior (56%). Organizations must look for ways to define individual community members to share what they know and to apply the knowledge of others. Finally, correct and trusted element is vital. Organizations must be concerned with putting in place a work environment that improves and supports both maintaining the current element and replacing the stocks over time. From this 1997 Ernst & Young survey, business managers realize that the most essential types of knowledge to have included knowledge about customers (97%), knowledge of best exercises–effective processes (87 %), and knowledge about the competitions and capabilities of their company (86 percent). For the purposes of this article, we can acquire information as logical

results and knowledge as activate information or information transformed into capability for effective action. Despite this, we have no further doubts between the two. Rather, we take the point of view that such definitions do not offer much useful guidance, at least through the basic few stages of knowledge management implication in an organization. Knowledge management shares a goal with the AI community or in other words the development and use of conventional technology to develop the performance of individuals and communities. Knowledge management needs AI. The ideas and technology that have been developed by the AI community are defined for successful knowledge management, for instance the knowledge base. Many different words can be explained this condition such as corporate memory, knowledge repository, best-exercises database, and so on, but it is clear that a high-quality knowledge base is fundamental for successful knowledge management.

Articles munity about knowledge explanation, representation, and definition can all be brought to stand out for knowledge management. In fact, this experience must be brought to clearly succeed the right stories presented. Community members must be able to search and bring into real the facts to bear the relevant knowledge in the repository. In today's knowledge management systems, the search engine is the main element. Search engines apply the unique natural language realizing techniques. Over time, we anticipate what has been learned about operation and acquirement in case-based reasoning systems to be applied. (amj.aom.org) Furthermore, agents and distinguished problem of solving technology will play an increasingly important role. The parts are largely people oriented, distributed, and messy. Everyone is a kind of manager. (books.google.com) To be successfully expressed for knowledge management, AI technology must work for a broad population of people, who are the knowledge workers inside companies. It is essential

to remember that they are not computer specialists. Knowledge is not easily packaged. It is difficult to take it, because it is emphasized and may only be approximately correct. One of the basic problems to the construction of expert systems is the difficulty of knowledge procedure and this problem must also be overdue to achieve success in knowledge management. However, there is some good news. The problem may be more complex in the new context. Systems that support knowledge management typically do not manage to solve a problem alone. (amj.aom.org) On the contrary, they try to indicate the knowledge by different ways such as best exercises, lessons learned, tips, solutions to related problems, and many others that help people in improving their own solutions. Stated another way, the goal nowadays is to help people solve their problems. Contrast this with the original goal of expert systems to solve problems themselves at an expert level. This is not to say that the AI community should give up on the expert systems goal, but rather, that succeeding the goal of giving powerful help to people as they solve problems is of great interest to the knowledge management community and after a while for the bad news. Knowledge management shares the problems of the current situation and inflated expectations that have intake AI. (amp.aom.org) For good or bad, a comparative number of column inches have been devoted to the two subjects. Perhaps as a consequence, negative conclusions have already been shown by some about the lack of early success in knowledge management. This is, of course, clear to the AI community. (pubsonline.informs.org) However, despite the hype, knowledge management is regarded as vital by many chief executive managers, and subsequent progress is being made in a number of organizations. Indeed, knowledge management has passed the primitive expectations and the "trough of disillusionment" and is moving up the "slope of enlightenment". As a result, if the AI community is able to improve

something of value in this area, the “killer app” for knowledge management and, of course, there is an audience waiting to use it. (aaai.org)

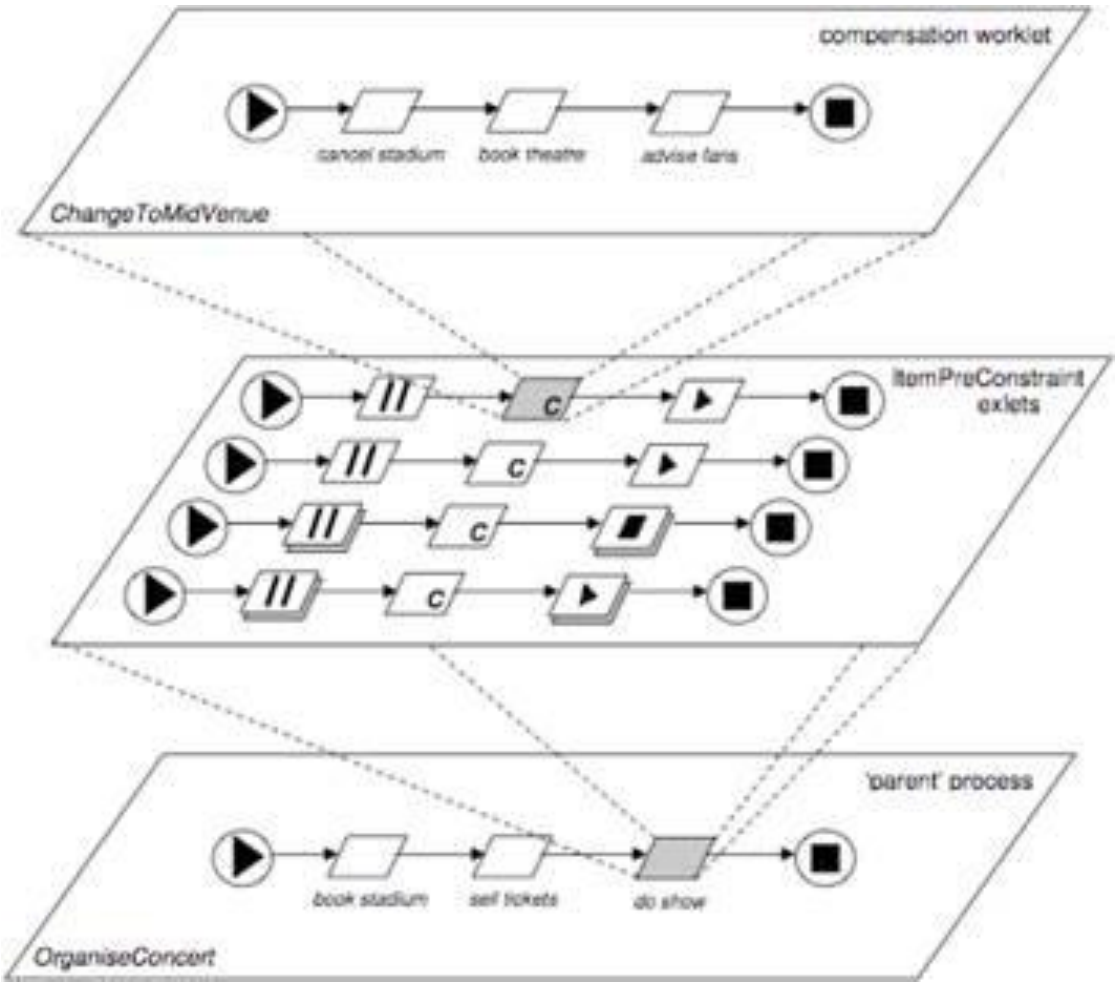
6.1 Communities of Exercise

It is clear from our earlier survey statement that a primary focus o knowledge management work is concentrating effective ways to keep in touch with groups of people. Not surprisingly, most agents agree that the CoP is the basic organizational unit in knowledge management. Many of them offer the following explanation, referring to CoPs at Xerox and National Semiconductor. At the simplest level, they are a small group of people who have worked together over a period of time. Not a team, not a task force, not necessarily an authorized or random group. People in CoPs can perform the same job or coordinate on a common task for the software developers or work together on a product, like engineers, marketers, and manufacturing specialists. They are relatives to the execution of "real work." What keeps them together is a common sense of purpose and a real need to know what each other knows. (amj.aom.org) There are many communities of exercise within a monopoly company, and most people deal with more than one of them. CoPs are known by many nominees in different organizations, such as communities of interest, knowledge communities, technical communities, knowledge ecologies, professional networks, best-exercise networks, and so on.

There is by now a variety of industrial experience on approaches to organizing, operating, and nurturing CoPs. Consulting companies have been among the lead managers, like Hewlett-Packard Consulting, Arthur Andersen, Andersen Consulting, and Ernst & Young. Oil and gas companies have been energetic as well, including BP, Caltex, Chevron, Conoco, Marathon, Mobil, PDVSA, Shell, Statoil, and TOTALFINAELF. Companies such as Intel, Lucent, Siemens, and Xerox have also worked to benefit in this area. Some communities have legal and moral objectives and full-time support staff. For example, Mobil's popular are the best exercise networks. (aaai.org)

The original service, known as the Work let Service consists of two distinct but conventional sub-services and specific a selection sub-service, which gives the opportunity to dynamic flexibility for procedure instances and an Exception Handling sub-service, in which the subject of this paper provides facilities to copy with both expected and unexpected procedure exceptions at meantime. The Exception Handling sub-service or, more simply, the Exception Service allows administrators to express exception handling procedure, which is called exlets for parent workflow procedure, to be invoked when certain events happen, and thereby giving free execution of the parent procedure to keep on unhindered. (amp.aom.org) It has been defined so that the active engine, apart from offering notifications at sure points in the life cycle of a procedure instance, needs no knowledge of an exception happening, or of any subsequent processes of exlets, and in general all exception checking and handling is offered by the service. Furthermore, all exlets in a specification's respiratory automatically become a unique part of the procedure specification for all today and future parts of the procedure, which defines for executive evolution of the procedure while avoiding any retrieval to express the original procedure definition. The Exception Service is built on the same primitive framework as the Work let Selection sub-service, and so uses the same respiratory and dynamic rules access. There are, however, two fundamental differences between the two sub-services. First, where the Selection Service chooses a work let as the consequence of expressing a rule in a rule set, the result of an Exception Service rule being expressed is an exlet, which may provide a work let to be expressed as a compensation procedure. Secondly, while the Selection Service is in progress for certain nominated tasks in a procedure, the Exception Service, when makes available, is produced for every case and task executed by the enactment engine, and will detect

and copy with to ten different kinds of cooperation exceptions and, generally, those exception types are taken part in the following steps. (pubsonline.informs.org) Most modern programming languages offer mechanisms that take part in exception handling routines from the common program logic, which gives the chance to the design of readable, understanding programs. Some same methods are produced into different frameworks and operating systems. Despite the fact that little or no such means are offered in most WfMSs. As usual, any or all possible exceptions must be provided into the normal workflow model, which deals only with accepted elements of modularity, encapsulation and reusability. (books.google.com) For the Exception Service, an exlet, whether it is discrete and external to the parent part or not, may contribute a number of various notions, such as cancel, suspend, complete, fail, restart and refund and be automatically applied at a work exercise, case and specific level. (amj.aom.org) Lastly, because exlets can involve work let as compensation tasks, the original parent procedure only needs to break through the actual business logic for the whole exercise task. (emeraldinsight.com)



Procedure – Exlet – Work let Hierarchy

Each time an exception occurs, the service makes a choice from the respiratory based on the type of exception and the continual data of the work item or case, using a set of rules to select the most appropriate exlet to execute. If the exlet includes a common refund, the associated work let is run as a separate case in the active progress, so that from an engine perspective, the work let and its first element, such as the procedure that invoked the exception is two completely different, unrelated cases. (books.google.com) The service tracks the relationships, data mappings and balances between cases, and keeps execution parts that may be mixed with those of the engine via case managers to offer a complete operational history of each procedure. The above picture

shows the relationship between an official procedure, an exlet respiratory and a refund work let, using as an instance a simple procedure for the programmers of a rock concert. (amj.aom.org) The respiratory of exlets grows as new exceptions develop or different ways of dealing with exceptions are formed, including while the formal procedure is ideal, and those copying methods automatically become an explicit part of the procedure specification for all today and future examples of the procedure. (pubsonline.informs.org) Any number of exlets can express the retrieval of each specific exception type for an individual task or case. An exlet may be a part of one or more agents, that is, it may be used again for several primitive tasks or cases within and across procedure elements. The Selection and Exception sub-services can be used in mixture within case examples to succeed dynamic flexibility and exception handling at the same time.

6.2 The Best-Exercise Knowledge Management Procedure

In this part, we look more closely at the basic procedure associated with best exercises in a CoP. The basic part is shown in. In the element of their common work, community managers apply the current best exercises. As they encounter new conditions, new customers, or contact with their colleagues, they discover new exercises. They submit them as best-exercise proposals. The community searches and looks after the new exercises into the whole part stored in the knowledge notion, and the cycle continues. (amj.aom.org) In the days before the exclusive web, the community knowledge notion might have been a person with a filing home and a phone. Nowadays, it is most likely a web-enabled database. All the selections can take many forms, such as a telephone call, an e-mail message, completing out a best-exercise web form. Different companies adjust lots of different practices to validation. Some take the point of view that every community member should be based on. One is telling their reputation on the line when posting a great exercise, and that is seen as primitive evidence of its validity. Other companies have formal validation procedures. They may include the whole community or only a few classic experts. Some companies include a variety of people outside the community in the procedure, for instance, lawyers, marketing staff members. (aaai.org) It is essential to keep on the tension between the quality of the knowledge and the time it takes to guarantee it. The risks of changing and offering the invalid best exercises are obvious. However, another risk is that the time to keep in touch can be so long that the well-known knowledge will only be beneficial for successful purposes, that is, it will be published too late to be of any practical day-to-day use in the management. (amp.aom.org) At Schlumberger, best exercises offer the common knowledge advantages of each community. A knowledge leader is responsible for animating the community, benefiting the members to take part in, highlighting

successes, recognizing the coordination of individual members, and so on. The knowledge champion cooperate the procedures of validating the exercises submitted by the members and exchanging them into the overall community knowledge respiratory. (aaai.org) Because the knowledge leader champion is well taken in part to understand the issues in which the community members are interested today, they edit the community news. It is vital to note that the community must address a following maintenance task. It is the continual maintenance element, keeping the community knowledge notion clean and up to date. (books.google.com) A person who knows the community well, a knowledge leader, must indicate this task. The leader addresses questions such as, what are the problems taking part in by the community nowadays? What best exercises should be changed? What best exercises can be improved? Where are the respiratory weak? In what areas do best exercises need to be validated from the community? Last but not least, note that all community members are included in the task of knowledge requirement, which is a financial change from the past. In the expert system days, this was an element for a group of focused knowledge managers, AI specialists charged with devoting and specifying the knowledge of the community. It included painstaking questions and coding sessions, a slow procedure exchanged by the fact that the knowledge agents had to take more time to achieve an adequate level of realizing of the domain. Today it is claimed that community members are able to capture the knowledge largely by them. At best, a knowledge leader, maybe defined by small group dealing across the organization, helps them. What knowledge engineers continue to have likely to be part of that small group?

7. Case-Based Reasoning One-stop search

Nowadays, one uses full-text search with a web browser, database search for established data, findings on a local PC, and so on. Each of these searches provides the user to learn different tasks. Furthermore, one should definitely know which system to search to look for the required information. We look for a one-stop shop for search with a single repository, one search box if you will. We recommend that the portal access be applied to one of the basic components of any portal, the search engine itself. There are at least three different challenges. (books.google.com) Firstly, the search practice must understand a user's quota well enough to direct it to the suitable index, database, or file system. (pubsonline.informs.org) Secondly, the interior differences of the various systems must be hidden from the user. Finally, the search agent must maintain the power of the previously separate search systems and provide it to the user. Case-based reasoning (CBR) appears frequently because it shares many common elements with search. We anticipate case bases to be involved in the repositories accessible by a search portal such as the project achievement given in the common example. Speed, precision, recall are the basic parts. We assume that the search engine companies will be hard at work to make substantial progress on speed, precision, and recall.

There are many chances to make a difference here. Among these is developing the ideas used in "Ask Jeeves" or Dell's version, "Ask Dudley." This is a place where there is appealing work to be done and where successful approaches will continue to be adjusted quickly in commercial applications. We are thinking about discrimination with other applications and systems. By communication, we mean changing the ideas of searching so that the search engine doesn't simply change information; it copies with that information with an application so that

the user can communicate with it. For example, update a three-dimensional model or run a simulation. This begins to happen in the comparison shopping systems currently. We anticipate that this is going to be an interesting area over the coming years. About the Multilanguage we can support for multiple languages is obviously essential for organizations that have changed customers and employers around the world. We anticipate much developed approaches to multiple language searches to be improved. We also look forward to developments to support multiple-language texts and continual maintenance.
Today, most knowledge elements are text limited. This is not by desire, it is obvious that much of the knowledge of an organization is not limited in text but in other media. However, the technology to support indicating and searching of images, sound reports, and video is under construction. We involve multiple media in order to emphasize that the knowledge management community is expecting to use new technology in this area if and when the AI community can provide it to the public. (amj.aom.org)

7.1 A Framework for Workflow Exception Handling

In this part we reclaim the notion of a workflow exception in a general sense and the different ways in which they can be exchanged and handled. The assumption is that an exception is a distinct, undependable event which occurs at a specific point in time during the execution of a workflow and relates to a non normal work item. The happening of the exception is claimed to be immediately distinct as is the type of the exception. The element in which the exception is handled will depend on the type of exception that has been detached. There are a big variety of potential ways in which an exception may be copied with but in general, the specific handling strategy cores on three main parts and specifically how the work item will be dealt with, how the other work items in the case will be copied with and what recovery action will be taken to resolve the results of the exception. We continue to acclaim that the range of potential exception kinds and the options for handling them in the following tasks. Exception Types are the sole possibility to specify handlers for expected ways of exception. With this confusion in mind, we consider a comprehensive review of the workflow notion and current commercial workflow systems and business process modeling and execution languages in order to decide the variety of exception events that are responsible of being divided and offer a useful basis for recovery handling. These events can be separated into five distinct groups. In work item failure during the whole procedure of a workflow task is generally characterized by the discredit of the work item to progress any further. This may influence itself in a number of possible forms including a user-initiated adopt of the executing element which implements the work item, the failure of a handwriting, software or hardware network component related to the work item or the user to whom the work item is discriminated signaling failure to the workflow managing. Where the reason for this disappointment is not obvious and

dealt within the procedure model, it needs to be handled elsewhere in order to confirm that both later work items and the procedure as a whole continue to behave properly. (aaai.org) Deadline Expiry is common to detect a limit for a work item in a workflow procedure model. Usually the deadline expresses when the work item should be finished, although deadlines for commitment are also likely to be. In general with a deadline, it is also essential to specify at design time what should be done if the deadline is over and the work item has not been finished. Resource Unavailability is obviously the case that a work item needs access to one or more data resources during its retrieval. If these are not possible to the work item at beginning, then it is usually not possible for the work item to go further. (amj.aom.org) Exactly the same, workflow systems are associated with the fact that work items are usually allocated to resources and it is typically human, who exchange them. Problems with work item system can occur if at workflow time, no resource can be found which meets the activate system facts for the work item or at some time after process, the resource is no longer able to finish or complete the work item. (pubsonline.informs.org) Although the existence of these issues can be automatically completed, they often cannot be detected within the context of the executing process and may involve some form of scales or manual prevention. For this reason, they are ideally fit to resolution via exception copying. External Trigger from sources exterior to a work item are often used as a way of signaling the existence of an event that affects on the work item and acquire some type of handling. (books.google.com) These hypothesis are typically started by non related work items, such as work items that are not directly connected to the work item in question by a control edge or elsewhere within the process system or even in other procedure models or in other words from procedures in the optimum environment in which the workflow system exists. Despite that a work item can expect events such as

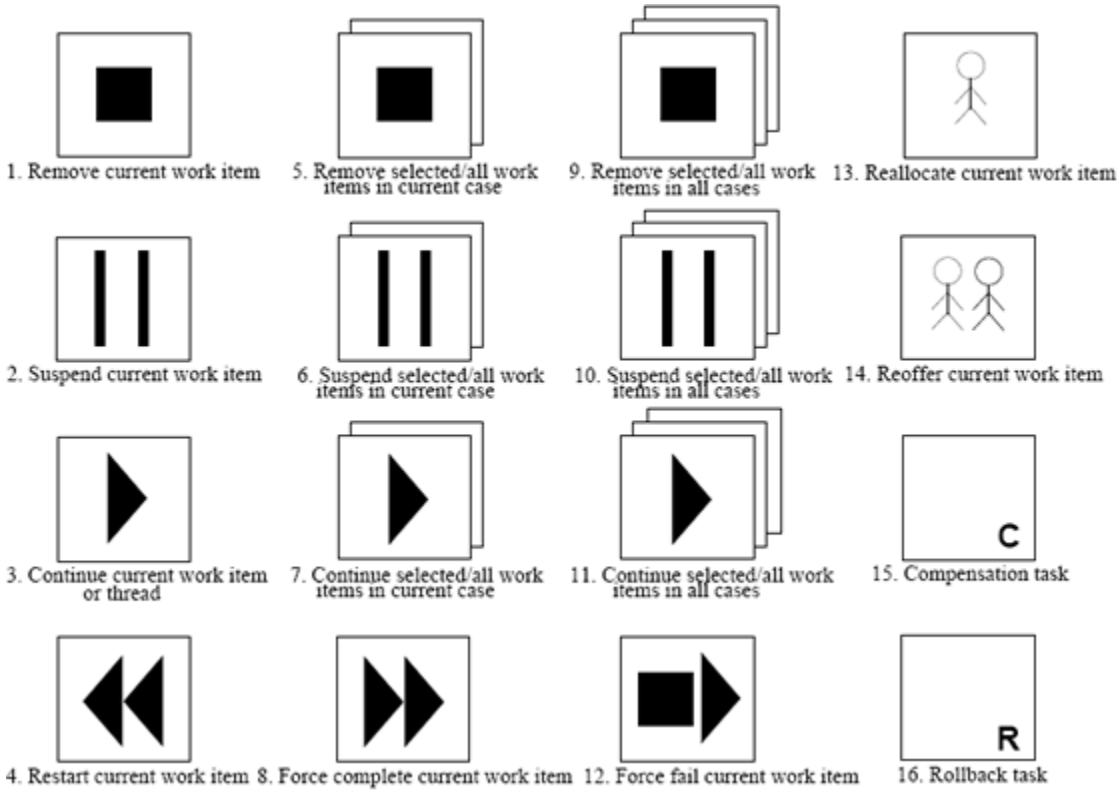
triggers and proliferation for dealing with them can be taken part in at design period, it is not predicted if or when such events will happen. For this reason, the issue of copying with them is not suited to original procedure within the work item implication and is better defined with through exception handling. (amj.aom.org) Generally signals or some other form of procedure manage to stop to indicate that an out-of-bound condition has appeared and uses to be dealt with. A general result of this is that the today work item needs to be stopped, potential undone and some alternative action needed. Constraint Violation in the context of a workflow system are contexts over tasks in the control-flow, data or resource incentives that need to be maintained to ensure the possibility and operational consequence of the workflow procedure is maintaining. Ongoing monitoring is generally needed to adjust that they are enforced. (amp.aom.org) The implication of routines to identify and handle primitive violations appeared within the context of a workflow is exactly the same to the issue of dealing with external factors. Typically the development that will show and need to deal with the violation is a work item although there is no reason why the consumption could not be detected and used at block or procedure level. The constraints might be specific over data, resources or other work items through a procedure model; the access selected for handling them requires being as genetic as possible to ensure that it has broadest approach. In general an exception will associate with a specific work item in a task. There is an attitude of ways in which the exception can be existed despite the fact that the specific details will depend on the today state of the whole system of the work item. Before looking at these factors, we first review the execution lifecycle for a work item. This obviously explains as solid arrows the states through which a work item elements during normal process. It is initially provided to one or more resources for process. A resource issues an allocate command to express that it wishes to make exclusive the

work item at some future time, the work item is then situated to that resource. (aaai.org) Normally this includes adding the work item to the resource's work task and removing any references to the work item that other resources might have undertaken, either on their work tasks or through other means. When the resource wishes to occupy with the work item, it issues a start relation and the state of the work item changes in order to start from the beginning again. (emeraldinsight.com) Lastly, once the work item is completed, the resource tasks a complete order and the state of the work item is changed in order to finish normally at the end. Note that there are two potential elements to this course of tasks, where a work item provided to a resource is chosen by another resource, it is removed from the first resource's wordlist and where an exclusive work item is appeared as not having passed, its state is changed in a particular way. This lifecycle map also offers the basis for deciding what options occur for handling a work item in a given state when an exception is found somewhere. (pubsonline.informs.org)

7.2 Considerations for a Workflow Exception Language

The results gained in the previous inspection in relation to the identity and handling of workflow exceptions provides the core for a general workflow exception dealing with language. In this part of survey, we discuss about a set of incentives for addressing exceptions that might happen during workflow execution and represent a mechanism for integrating these elements with the procedure model more generally. We occupy the applicability of this process to exception handling through a working example. The continual model identified three key parts to handling an exception. These parts offer the basis for the primitives in the graphical exception language, which is come from the actions for dealing with the current work item and is come from the options for dealing with other work items currently energetic in the same and other cases to the two forms of restrictive action that can be executed. These incentives can be separated into different ways of actions that define exception handling strategies. These subsequences can also include standard elements although we do not indicate this capability here. The interlink age of exception handling strategies focused on these incentives and the overall procedure model is shown in the next parts of process. A clear difference is obvious between the procedure model and the exception handling strategies. This is focused on the notion that the procedure model should define the normal subsequence of activities related to a business procedure and should concentrate to present these activities properly without becoming over consuming by excessive thinking of unexpected events that might occur during execution. Exception handling strategies are able to be found to one of five instinctive workflow parts, which include individual tasks, a scope, a block, a procedure, like all of the tasks in a procedure model and a workflow. (amp.aom.org) The element is specific to one particular type of exception, such as work item failure or discharge violation. It might

also be further specialized using conditions focused on parts from the data incentives, for instance there may be two exception handling strategies for a task, one for work items dealt with financial limits, the other with limits above that process. (pubsonline.informs.org) Exception handling strategies explained for more specific definitions take place over those defined at a higher level, where a task has a work item disappointment exception strategy explained and there is also a strategy described at the procedure-level for the same exception style, then the task-level definition is utilized should it experience such an exception. In order to indicate the application of these notions, we represent an example based on the order fulfillment procedure using the YAWL procedure modeling notification. In this procedure, orders are undertaken from customers, and a vital factor for the required items is prepared and rightly used to choose them from the shed. Simultaneously, the customer's credit is checked and shipping is organized for the order. When all of these tasks are finished an inspection is prepared for the consumer and the goods are then packed and dispatched while the customer's process is progressed with the outstanding amount. The order details are then finalized and completed. (amp.aom.org)



The above figure shows us two alternative exception handling strategies for the check credit work item. If the credit need is less than $1000, the further work item is given free and the next work item is started. Where it is $1000 or more, the current work item is not free, the exception point is refined to the initiation of the work item and it is recommended. (amj.aom.org) Furthermore, it expresses the exception handling strategy for the ideal order work item where its definition limit is not met. Recovery includes suspicious the current work item, reassuring it to another resource, running a complete refund task that decides if the order can be dispatched in 48 hours and if not applies a small credit to the whole task, then the pick order work item is started again with the new resource. The next task indicates the resource, which is not possible for handling strategy. Where the needed task is a data resource, this contains stopping the potential work item and starting again it from the

beginning. This strategy is likely to the procedure model. For instance, by accident, it applies to all work items. Where the impossible resource is a human resource the person is focusing on the work item, the recovery action contains detailing the work item, reassuring it to another person and then starting it from the beginning one more time. The following task expresses the approach to handling an account basic element undertaken by one of the tasks in the current procedure. In this condition, the recovery action is to halt all work items in the case and to complete an effective action without doing many changes made since the case began. In other words, any work that has been done on dispatching products to the consumer is completely undertaken. Finally, the last one task indicates the final action that is done when the order value mistreated is excelled for the take order task. This contains halting all work items related to the procedure. (aaai.org)

8. The Road Ahead

In this part, we anticipate the road ahead for knowledge management and, specifically, how the technology and procedures that identify knowledge management might improve over the next century or so. Our approach is to represent a "technology road map" that underlines conventional technology on the critical path to arrive at a new period in organizational process. We hope to fight against the AI community and provide notification for the research and development needed to succeed the goals hypothesized in the proliferation. The road-map method has been indicated by Motorola as an orderly procedure for improving a notion of future technology together with a preparation of its development over time. It was originally expressed as a practical tool to affect positively business managers to give right attention to their technological future. It also offers a means of cooperating to managers and marketing personnel which technologies will be acquiring improvement and application for future goods. The procedure begins by declaring a clear overall purpose, based on product market, competitive or technology elements. Given with such a target, developing the road map is an external brainstorming procedure, often containing people from a range of functions. For example, research and development, manufacturing, marketing, businesses are some of them. The fact that road-map time tasks tend to extend well behind traditional business and goods planning future ads to the challenge. Another advantage of the procedure is that it forces the candidates to be exclusive about their hypothesis, to make clear the problems that must be found solution to find the aim, the order in which they will be solved, and the expected interim results. (pubsonline.informs.org) The procedure has been adjusted by the U.S. agent industry overall. It has been used in order to offer a normal vision, a task to guide survey and improvement for all

factors of the U.S. manager technology base, industry, universities, and government organizations.

The overall purpose was founded by extending historic trends for dynamic random access memory (DRAM) bit measured by a factor of 4 every 3 years until 2010, referring a 64-gigabyte chip in 2010. From this process the requirements for giving encouragement technology to offer such devices to be designed, manufactured, and tested. In the future exploration and development factor of the oil and gas industry, a simply stable aim is to double economic hydrocarbon recovery from the current typical levels of 30 to 40 percent to 60 percent and further. For knowledge management, such a crisp target is not effective. As a consequence, we have recommended the goal of succeeding the knowledge-powered business. (amj.aom.org) The road map is shown in the beginning of the task. Today is the original state of the art in knowledge management. Long term is the potential element of the art for years or so on. The boxes define essential points along the way. In the parts of the process, we examine each of the boxes on the road map, starting with today and going further to the long term. (amp.aom.org) The people aim is on the creation, support and nurture of CoPs. The procedure target is on the capture, validation, completion, and discrimination of best practices. The technology aim is on the portal, backed up by the types of process discussed in the earlier example. Access to the implication is claimed. A portal is a process that gives users a sole way to the information and applications they need to do their jobs. It expresses together on the desktop all the vital information from both inside and outside an industry, everything that is needed to make a business decision and activate. Microsoft provides the term digital retrieval. (aaai.org) The word portal was first established to knowledge management in 1998, following the effective success of internet sites such as Yahoo! in giving access users to look for information. Building

an interior portal is now a standard initial step in knowledge management. To be sure, there are inflated inspections and hype related to portals, which are called portal mania in the July 1999 issue of Knowledge Management Magazine, devoted to the subject. Portals have been looked through as the silver sphere for a number of information technology problems, such as establishing enterprise resource planning (ERP). In answer to the excitement, a number of industrial companies have replaced their offerings, and many more startups are providing portal technology to encourage knowledge management. Although, despite the assumption, there is something of real worth at the heart of the interest, the portal might be the exchange app for knowledge marketing. Nowadays, a portal supports unexpected access to all the organization's information, both constructed and structured. The constructed information is mainly web pages and documents, containing product plans and marketing leaflets. The structured information is usually located in databases. In the case of Schlumberger, the structured data contain reservoir information, agent test data, and coordination data of one part or another. Portals give to everyone information to the process by way of a "thin client," usually a web browser. They normally provide two ways to find data following the original internet portals:
Search: The search can be full text or specific element offering of constructed and unstructured information from file systems, web servers, e-mail, and so on. The search agent is often the "big-ticket" item in a portal solution. (amp.aom.org)
Browsing through a list of categories: Creation and keeping of a common vocabulary and one or more category lists (ontologism) are key tasks related to portal structure. At Schlumberger, we have searched that information seekers are mainly separated between looking for information by searching and discovering it by browsing. In a recent survey of over 1000 people, 10 percent considered to look through

information by browsing, 23 percent mostly by browsing, 37 percent by both searching and browsing, 20 percent mostly by searching, and 10 percent by searching. The analogy of the discrimination is beating, as is the diversity of preferences, which illustrates how vital it is to design portals that support distinct information-seeking examples. The design, construction, and maintenance of the category systems used to organize data in knowledge marketing systems are an area where AI technology could help partly. The task is exactly same as to that of building large-scale knowledge bases or ontologism. Projects such as ONTOLINGUA have started to improve tools and ways for distributed coordinating ontology construction. This sort of approach is critical for knowledge marketing, in which communities of practice are usually geographically divided. Furthermore, there is a crucial percentage to be had by using the ontology exclusion as a guide to look after, permitting the user to search in the "semantic neighborhood" of an important idea. Increasingly, portals are also anticipated to offer services such as the following: Presentation-visualization contain web representation, information visualization, abstract information visualization, and presentation in each part. The web pages presented by a portal are often produced dynamically to put together the task of the user. Subscription-is usually potential to subscribe to a series of tasks. Agents are taught an individual's interests, actively go through news elements, choose the appropriate news, and participate it to the user by e-mail. Collaboration involves strange discussions, chat room parts, and video communication. (books.google.com) This technology is founded, although the notion for exchanging existing coordination tools into portals is not yet well founded. Technology that encourages synchronous interaction, such as video is, of course, more useful in urban communities, where the members work in difficulty the same time zone. Presentation of data is customized for individual users; agents use information. LDAP

authentication is often used to decrease the number of divided user names and passwords needed by people. A document management part of the whole system is a crucial element of a portal solution. (aaai.org) The encouragement for publishing is initiative in most current portals, which provide a greater concentration on access than on publishing. We look forward to seeing more emphasis on publishing in the near term. News, stocks, weather, and so on, are common. Although, a number of industries or particular real-time data elements, are of great interest. High-end agents must support primitive authorization and access control, which becomes radically essential as an organization accesses, stores, and organizes more of its knowledge using the process. For example, employees, customers, and suppliers need access to giving detail information packages but must be developed from accessing data to which they are not included. In the same way, within the organization, some information is for managers only; some is focused on the members of a project team and so on. Nowadays, there is closely little difference between portals and information management systems, back-up databases, or ERP systems. Passing the years, internet portals can be anticipated to follow another mode that has existed in their internet ancestors. They will take places in doing something as well as places to look for something. That is, they will offer a big range of application services. In fact, application service providers (ASPs) have already started to copy portals with the applications they are provided on demand over the web. Returning to security, one benefit of the portal access is that a user can contribute in once and go on to navigate through the knowledge space without having to install again to access each individual application for which he is a normal user. An important cost of knowledge management derives from the tasks of generating, collecting, organizing, and storing data. (pubsonline.informs.org) An essential task comes from using data of poor quality, out of date or

unlikely. By using information again for multiple tasks and multiple audiences, the cost and risk can be lowered. For instance, both employers and consumers can use technical information about a company's goods and services. Using the same information for different aims and audiences offers substantial advantages. It enables relation of the cost of knowledge management and information technology encouragement. It develops quality because more people revise, access, and use each piece of data. It can also have partial advantages for a company because the workers are used to seeing the same data organized in the same way as their consumers, they are on the same part as the customers. (emeraldinsight.com) Of course, sharing is more common than showing the same data to everyone in the same way. Each audience may require a different view of the usual data, a view that is absorbed, organized, and presented in a slightly different way. For instance, a good exercise might be suitable to illustrate to engineers with the experience to value its applicability for their activities and realize the full task in which it should be used, but the same information might not be suitable for employers or customers. (books.google.com) Similarly, despite that a company's goods and services should be shown to customers at the top of the hierarchy of data categories, perhaps information about clients should be at the top of the list for workers. As an example, the Schlumberger hub looks into a normal process for employees and customers. We have improved and express technology in order to permit clients and employees in internet, web, and extranet regulations to use common information that is expressed, organized, and presented through consumer's opinions. It is a kind of technology that achieves the procedure. (books.google.com) First-wave knowledge agent procedures in CoPs typically need help by supporting staff. This might involve reporters who gain and report news or highlight people who have taken part in best-exercise practices. Librarians can help workers

decode and affirm information. Knowledge champions can create the knowledge management procedure and affirm best exercises. (pubsonline.informs.org) An alternative way that can work in some CoPs is self-service knowledge agent. In this notion, CoP members are anticipated to look through what they need by themselves as well as give them to the public and are worth of information themselves. (aaai.org)

9. Conclusion

Improvements of effective case requirement and case cooperation algorithms are vital for the using of CODAW for workflow modeling in real world scripts. The primitive case representation encourage similarity-based case requirement using the procedure graph formalism and planning-based case coordination is provided facilities using the declared representation. Our experience in improving the case respiratory in CODAW has entitled the mixture of maintaining workflow cases that maybe used again in an automated way. (pubsonline.informs.org) Commercial workflow representations are essential and their workflow XML-based representations are radically important to deal with. Furthermore, workflows created using such tools might use uncommon process for executing the workflow procedure models. This has influenced our development of the SFW algorithm to deal with the ontological primitive task. The underlying SF algorithm has indicated to be dependable in large-scale traditional database scheme matching difficult situations. We have contacted extensive similar surveys to worth the bravery of the SFW algorithm to differences in similarity and graph ontologism. SFW is reliable in relative worth of the first similarity evaluated by the string-matching algorithm. We are improving today dependable means to absorb initial similarities concentrated on other properties of cases such as the different structural process in the case representation such as the task kinds, inputs, outputs and ancients. The improvement of the exclusive representations, containing the related predictions and stature descriptors, to support case representation is a complex process. A procedure graph does not offer particular insight into the defining design context of why a specific task was selected and discriminated in a given schema. It does not encourage reasoning about the cooperation between each part. In contrary to these, a plan is a procedure model with particular, developed from initiative

encoding of the explicit knowledge, which gives opportunities to reasoning about selections of process and their inter-relationships. Developing suitable declarative representations needs background specific knowledge and expressing such knowledge is quite difficult. Development of such declared presentations is vital for the subsequence of the Semantic web and workflow technologies in the near future. We underline that our selection of first order prediction normal presentation for case complex has been guided by its use in real-world planning systems and formal models of Semantic Web ontologism. Nowadays, in CODAW, the SHOP algorithm produces a subsequent workflow, which is then post procedure into a workflow with current parts by explaining information reliability constraints. This staged element has been adjusted to specify whether a solution to a new problem occurs or not, in a timely manner. Consideration of currency during the planning process develop the size of the search space and needs models for temporary and resource reasoning. We are recently searching with partial-order planners, which think about concurrency, to create cases. Our survey on planning-based procedure representation techniques has been successfully used for dynamic web services process. The primitive and processing instance-level case representations perhaps used to indicate generic process models using learning techniques such as Inductive Logic programming and hypothesis learning. This paper has investigated a case-based reasoning approach to support workflow modeling and design. The main different characteristics proposed in the paper are:
(1) A case composition for workflow schemes and examples that mixes both declarative and procedural representations
(2) A similarity focused on requiring algorithm for retrieving process graphs of workflow schemes depended on graph-based queries.
(3) The use of a domain unreliable AI planning technique to give opportunities composition of cases into a workflow.

The future work will go on the improvement and testing of the CODAW framework. We have aim to further develop the adjustment and affirmation modules for CODAW, offer techniques for requirements focused on events, and make clear the different phases of the CBR design cycle. Enabling case representation using partial-order planners for improving workflow models with related tasks is an interesting and challenging problem. Last but not least, we plan to activate a real world user studies comparing the CODAW protocol with commercial workflow tools such as Oracle Workflow.

10. References

1. ‘A case-based customer classification approach for direct marketing’
C Chiu - Expert Systems with Applications, 2004 – Elsevier

2. ‘A case-based reasoning with the feature weights derived by analytic hierarchy process for bankruptcy prediction’
CS Park, I Han - Expert Systems with Applications, 2004 – Elsevier

3. ‘A case-based reasoning approach to the make or buy decision’
RT McIvor, PK Humphreys - Integrated Manufacturing Systems, 2004 - emeraldinsight.com

4. ‘A dynamic logistics process knowledge-based system–An RFID multi-agent approach’
HKH Chow, KL Choy, WB Lee - Knowledge-Based Systems, 2007 - Elsevier

5. ‘An empirical survey of individual consumer, business firm and financial institution attitudes towards Islamic methods of finance’
A Gait, A Worthington - International Journal of Social, 2008 - emeraldinsight.com

6. ‘A generic tool for the selection and management of supplier relationships in an outsourced manufacturing environment: the application of case based reasoning’
KL Choy, WB Lee - Logistics Information Management, 2004 - emeraldinsight.com

7. ‘A strategy-based ontology of knowledge management technologies’
A Saito, K Umemoto, M Ikeda - Journal of knowledge , 2007 - emeraldinsight.com

8. ‘A survey of operational expert systems in business (1990–2006)’
SB Eom - Interfaces, 2006 - pubsonline.informs.org

9. ‘A survey on context-aware web service systems’
HL Truong, S Dustdar - International Journal of Web, 2009 - emeraldinsight.com

10. ‘A survey of learning-based techniques of email spam filtering’
E Blanzieri, A Bryl - Artificial Intelligence Review, 2008 - Springer

11. ‘A survey study of critical success factors in agile software projects’
T Chow, DB Cao - Journal of Systems and Software, 2008 – Elsevier

12. ‘Agent-based distributed manufacturing control: A state-of-the-art survey’
P Leitão - Engineering Applications of Artificial Intelligence, 2009 - Elsevier

13. ‘Business performance measurement and change management within a TQM framework’
R McAdam, A Bannister - International Journal of Operations & …, 2004 - emeraldinsight.com

14. ‘Building agent-based corporate information systems: An application to telemedicine’
T Bui - European Journal of Operational Research, 2005 - Elsevier

15. ‘Business intelligence in risk management: Some recent progresses’
DD Wu, SH Chen, DL Olson - Information Sciences, 2014 - Elsevier

16. ‘Closing the gap: a polemic on plant-based research in operations management’
T Hill, A Nicholson, R Westbrook - International Journal of …, 2004 - emeraldinsight.com

17. ‘Corporate mission statements: The bottom line’
JA Pearce, F David - The Academy of Management Executive, 2004 – amp.aom.org

18. ‘Corporate geography: business location principles and cases’
R Laulajainen, HA Stafford - 2005 – books.google.com

19. ‘Developing a market orientation: an organizational strategy perspective’
RW Ruekert - International journal of research in marketing, 2004 - Elsevier

20. ‘Developing industrial case-based reasoning applications: The INRECA methodology’
R Bergmann, KD Althoff, S Breen, M Göker, M Manago - 2004 - books.google.com

21. ‘Design and control of workflow processes: business process management for the service industry’
HA Reijers - 2004 - dl.acm.org

22. ‘Essentials of business research methods’
JF Hair Jr, M Wolfinbarger, AH Money, P Samouel… - 2015 - books.google.com

23. ‘Exploiting multi-agent platform for indirect alignment between multilingual ontologies: A case study on tourism business’
JJ Jung - Expert Systems with Applications, 2011 - Elsevier

24. ‘Information agent technology for the internet: A survey’
M Klusch - Data & Knowledge Engineering, 2004 - Elsevier

25. ‘Integrating case-based and rule-based reasoning to meet multiple design constraints’
CR Marling, GJ Petot, LS Sterling - Computational Intelligence, 2005 - Citeseer

26. ‘Internet-based expert systems’

R Grove - Expert systems, 2004 - Wiley Online Library

27. 'Ontology-supported case-based reasoning approach for intelligent m-Government emergency response services'
K Amailef, J Lu - Decision Support Systems, 2013 - Elsevier

28. 'Task allocation using case-based reasoning for distributed manufacturing systems'
KL Choy, WB Lee - Logistics Information Management, 2004 - emeraldinsight.com

29. 'The case for and against business assumption of social responsibilities'
K Davis - Academy of Management journal, 2004 – amj.aom.org

30. 'The road ahead for knowledge management: an AI perspective'
RG Smith, A Farquhar - AI magazine, 2005 - aaai.org

31. 'Worldwide perspectives and trends in expert systems: An analysis based on the three world congresses on expert systems'
J Liebowitz - AI magazine, 2004 – aaai.org

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