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Intelligent agent: A review

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Abstract
This paper introduce the basic concept of intelligent agent. In artificial intelligence, an intelligent agent (IA) is an autonomous entity which observes and acts upon an environment and directs its activity towards achieving goals. Intelligent agents may also learn or use knowledge to achieve their goals. They may be very simple or very complex.
Exp: A reflex machine such as a thermostat is an intelligent agent, as is a human being, as is a community a human beings working together towards a goal.
An agent: An agent is anything that can be viewed as perceiving its environment through sensers and acting upon that environment through effectors. A human agent has eyes, Ears and other organs for sensors, and hands, legs, mouth, and other body parts of effectors.

Keywords: types of intelligent software agents, attributes of intelligent software agent, architecture of intelligent agents, intelligent agent application

1. Introduction

Various authors have proposed different definitions of agents; these commonly include concept such as.
persistence: code is not executed on demand but runs continuously and decide for itself when should perform some activity.
Autonomy: agents have capabilities of tasks selections, prioritrization, goal- directed behavior, decision making without human intervention.
Social ability: agents are able to engage other components through some sort of communication and coordination, they may collaborate on a task.
Reactivity: agents perceive the context in which they operate and react to it appropriately.

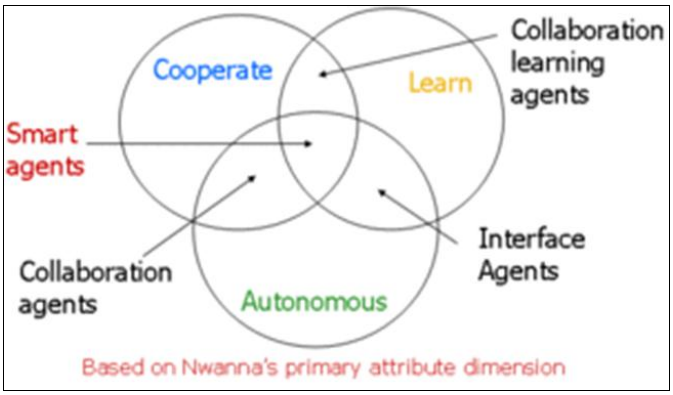

Fig 1

Types of intelligent agent software

There are only four essential types of intelligent software agents:

- Buyer agents
- User or personal agent
- Monitoring- and-surveillance agents
- Data mining agents

Buyer agents(shopping bots):- buyer agents travel around a network retrieving information about goods and services. These agets known as "shopping bots", work very efficiently for commodity products such as CDs, books, electronoic components.

User agents(personal agents): user agents or personal agents, are intelligent agents that take action on your behalf. In this category belong those intelligent agents that already perform, the following task.

- Check your e-mail, sort it according to the user's order of preference, alert you when important e mails arrive. Play computer games as your opponent or patrol game areas for you.
- Find information for you on the subject of your choice.
- Facilitate with online job search duties by scanning known job boards and sending the resume to opportunities who meet the desired criteria.

Monitoring and surveillance (predictive) agents

monitoring and surveillance agents are used to observe and report on equipment, usually computer systems. The agents may keep track of company inventory levels, observe compitiors' prices and relay them back to the company, watch stock manipulation by insider trading and rumors etc.

Eap

NASA's jet propulsion laboratory has an agent that monitors inventory, planning and scheduling equipment ordering to keep costs down, as well as food storage facility.

Data mining agents
This agent uses information technology to find trends and patterns in an abundance of information from many different sources. The user can sort through this information in order to find whatever information they are seeking. A data mining agent operates in a data ware –house' brings together information from lots of different sources. " data mining" is the process of looking through the data warehouse to find information that you can use to take action, such as ways to increase sales or keep customers who are considering defecting.

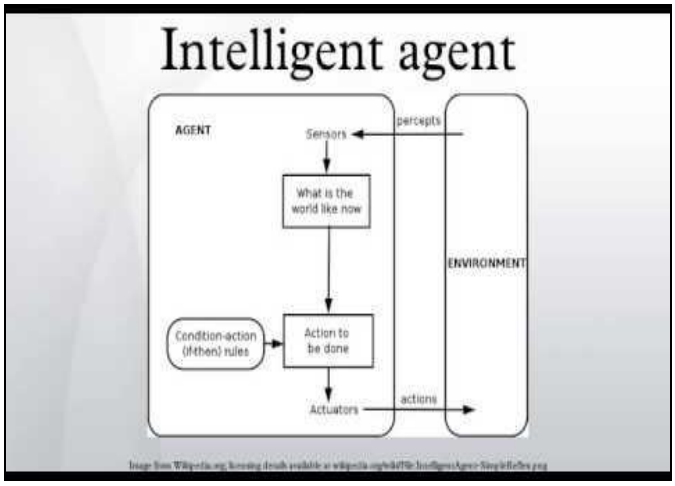

Fig 1

Attributes of intelligent software agents
Intelligent agent software has some following attributes:

- **Autonomy:** agents operate without the direct intervention of humans or others and have some kind of control over their actions and internal state.
- **Social ability:** agents interact with other agents and human via some kind of agent communication language.
- **Reactivity:** agents perceive their environment which may be physical world, user via graphical user interface, a collection of agents.
- **Proactively:** agents do not simply act in response to their environment; they are able to exhibit goal-director behavior by taking initiative.
- **Goal orienteers:** an agent is capable of handling complex high-level tasks. the decision how such a task is best split up in smaller sub tasks and in which order and in which way these sub tasks should be made by the agents itself.

Architecture of Intelligent Agents
An intelligent agent may be defined as an autonomous independent entity which senses the environment around it, plans its behaviour and directs its activity in accomplishing goal. It has the ability to adapt itself to its environment, sensing objects and evaluating circumstances and act to achieve a certain agenda. It has a high degree of authority, a high degree of reasoning capabilities and independent learning process. It should be capable of choosing its plan of action to maximize the rate of success. The general architecture of an agent is shown in figure. The various layers involved are percepts, data-preprocessors, broker, and learning element, plan generation and execution element, local library and global library.

Precepts
Preceptors are basically all the sensors which give the raw input describing the environment which surronds the agent. They include 2D, cameras, 3D cameras, microphones, pressure sensors, temperature sensors, and all other sensors the agent needs to be equipped with. The data collected by these sensors assist the agent in studing the environment in which it needs to perform its activities.

Data pre-processors
It perform all the hard- coded data manip-ulation which reduces the complexity of data handling at the higher levels.It involves primitive steps like data decompression, noise filtering, down sampling also more complex operations like object recognition,speech recognition, obstacle detection.

Data type broker
It is responsible for all communication between the learning element and pre-processor and between two pre-processor. it is aware of the identity of every pre-processors or sensor it is connected to and has the necessary API Required for each one of them. When ever a client request for a service, the broker checks for the availability of the server can understand, makes the do the task, collects the result and returns the result to the client. The presence of the broker is advantageous in the sense that every client needs to be aware of only the broker and be capable of interfacing with it. If ever server is added or repaired or removed or replaced, only the broker needs to be updated about it.

The learning element / experirnce generator
It is the component that makes the decision that the agent has to follow based on the expectation from the agent. it works in 2 phases. first, it requests the broker for the necessary raw experirnce from the pre processor and down loads the related abstract experiences from the global library and based on the expectation, generates a more task specific abstract experience. This is sent to the 'plan generation and execution' element which gives the feed back received from the plan generator, if necessary, it generates the abstract experience and the cycle continues until the expected success is achieved. Once the experience is proved to be successful, it is uploaded to the global library contains most of the abstract experience and is developed enough to sustain an effective experience generation at the agent level in one go.

The local library
It stores all the raw experiences delivered by the broker till the learning process is complete and plan are generated by the plan generator. It also temporarily stores the abstract experience that is downloaded from the global library.The global library primarly stores all the maximum success rate abstract experiences produced at the agent level during its course of action. Global libraray obviously has higher storage capacities when compared to the local library. Furthermore, there could be an interface between global library and pre-processor to facilitate the enhancement of computational

capabilities.

Eg: consider the object recognition component. if an agent were to be capable of recognizing objects in the real world, it needs to have a huge database of object features stored. Then there would be speech recognition component which itself needs another huge database. Each of these components require lots of memory which is not possible to be provided at the local level.

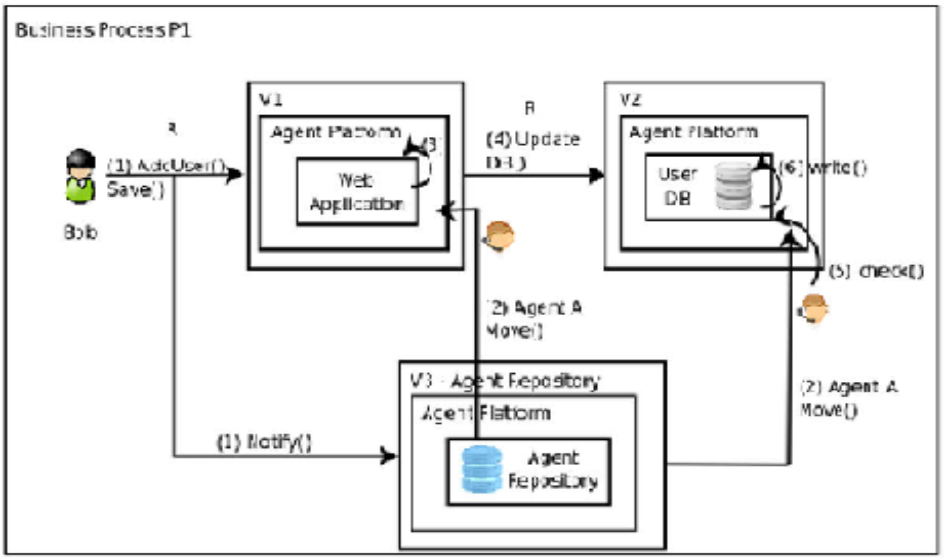

Fig 2

Intelligent agent application

1. **Systems and network management:** system and network management is one of the important application areas to be enhanced using intelligent agent technology. the movement of client/server computing has intensified the complexity of systems being managed, especially in the ares of LANS and network centric computing becomes more prevalent this complexity further escalates. For exp:- they can help filter and take automatic actions at a higher level of abstraction and can even be used to detect and react to patterns in system behavior.
2. **Information access and management:** information access and management is an area of great activity, given the rise in popularity of the internet and explosion of data available to the user. Intelligent agents are helping users not only with search and filtering, but also with categorization, prioritization, selective disseminaton, and collaborative.
3. **Work flow and administrative management:** administrative management includes both workflow management and areas such as computer and telephony integration, where processes are defined and automated. in these areas, users need not only to make processes more efficient, but also reduce the cost of human agents.
4. **Customer help desk:** customer help desk job is to answer calls from customers and find the answer to the problems. when customer call with a problems, the help desk person manually look up answers from hardcopy manuals, but those hard copy manuals have been replaced with searchable CD-ROM collections, and some companies or having the customers search through the internet for an answer, with intelligent agent, customer describe the problems and the agent automatically searches the appropriate database, then presents a consolidated answer the most likely first. This is a good example of using intelligent agent to find and filter information.
5. **Personal shopping assistant:** IBM's personal shopping assistant uses intelligent agent technology to help the internet shopper or the internet shop owner to find the desired item quickly without having to browser page after page of the wrong merchandise. With the personal shopping assistat, stores and merchandise are customized as the intelligent agent learned the shopper's preferences as he/she enters in any online mall or stores or looking at specific merchandise. it could also arrange the merchandise so that the items you the most are the first one you see. Finally, Personal shopping assistant automates your shopping experienceby reminding you to shop when a birthday, an anniversaries or item that is on sale occurred.

Advantages

As computing become more pervasive and network centric computing shifts the focus from the desktop to the network, users want to be more mobile. Not only do they want to access the network resources from any location, they want to access those resources despite bandwidth limitations of mobile technology such as wireless communication, and despite network volatility. The user interface was transformed by the advent of graphical user interface (GUIs), for many computers remain difficult to learn and use. As capabilities and application of computers improve, the user interface needs to accommodate the increase in complexity. Intelligent agent technology allows system to monitors the user's action develop models of uer ability and automatically help out when problem arise.

Conclusion

At the end we conclude that intelligent agents are playing a very vital role in humans life. they are doing very important task in humans life like they can sort their e-mails, they provide you important information. They provide the facility of electronic commerece, adaptive user interface, personal shopping assistant. It is very important to our life..

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