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SMART INTERACTION- AMBIENT INTELLIGENCE

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ABSTRACT

Ambient Intelligence is a technique through which people ensure safety by interacting smartly with the environment. The application areas for this smart interaction with the environment includes: public transport, hospitals, factories and many more. Artificial intelligence, Sensors and other network devices are the basic units for implementing ambient intelligence. Also the decision making software's intelligence defines the capability of ambient intelligence. This paper describes the implementation areas of ambient intelligence and also gives a light on the difficulties in its practical implementation in real world applications.

KEYWORDS: *Ambient Intelligence, artificial intelligence, pervasive computing, ubiquitous computing.*

I. INTRODUCTION

Ambient intelligence was introduced by The European Commission's IST Advisory Group (ISTAG) [1, 2]. Ambient intelligence is a great technology for innovation in the field of academics, industries [3]. Pervasive computing, embedded systems, ubiquitous computing work on the same concept as ambient intelligence.

Fig 1 shows the evolution of AI. Initially AI was applied to hardware. An example of such technology is Neural Nets. AI centralization on computers was in MYCIN knowledge based system. The American Express Authorizer's Assistant were more focussed on network. Currently intelligence is

in the need to be included in human environment. The solution proposed to this problem is Ambient intelligence. Buzzword is an example of ambient intelligence. Ambient intelligence is a combination of AI and other operational technologies.

Fig. 2 shows the importance of AI for Ambient Intelligence. AmI environment may include museum, home etc. Sensing is a mechanism for sensing information from the human being with help of their senses or through automatic systems including camera, ultrasonic devices and microphones. Human being decisions, automatic systems like agents and robots are responsible for a particular action in this world.

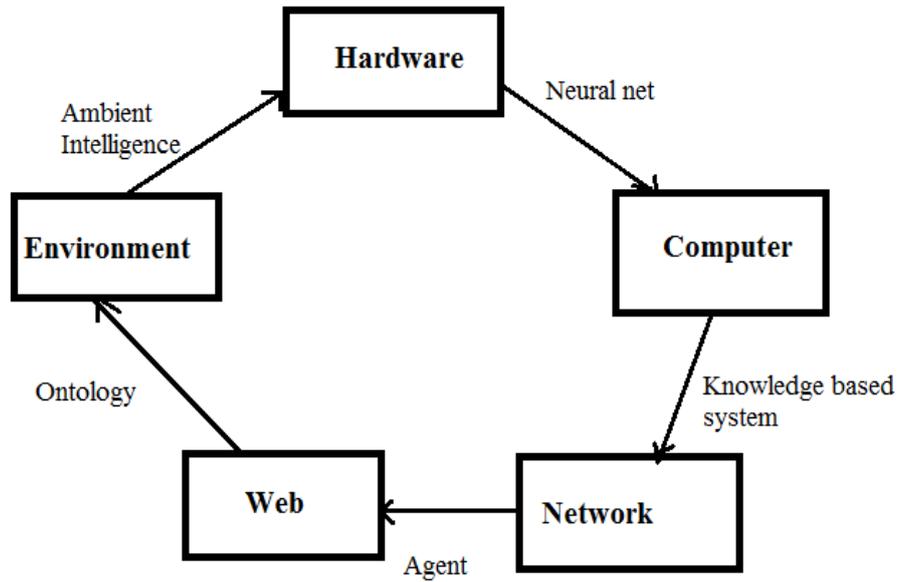


Fig.1. AI evolution

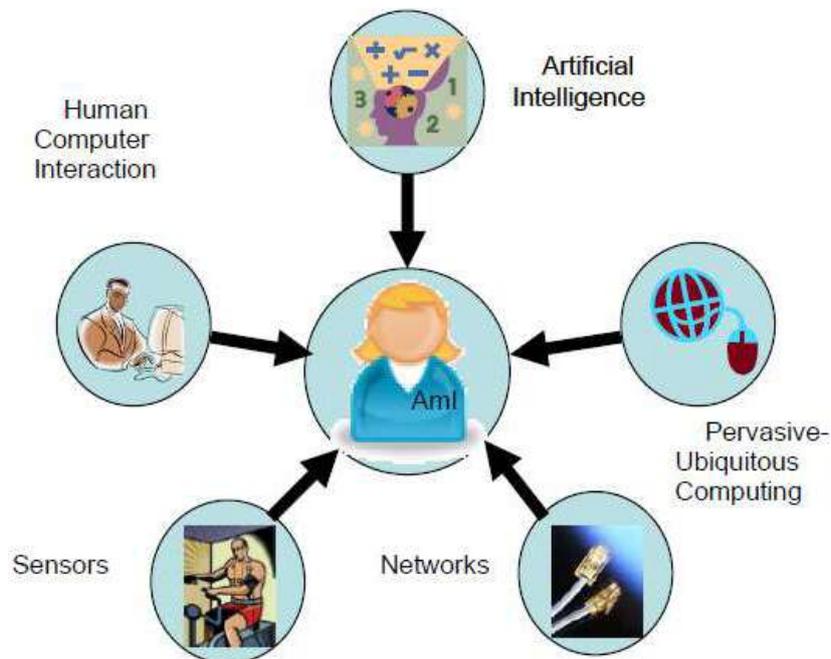


Fig. 2 Ambient Intelligence vision from AI perspective

The sensing devices and other information sources receive information from the environment, interact with the user, perform reasoning and perform action accordingly. Along with the automatic systems, there is a chance of change in environment state by a human which may lead to errors. To handle this

situation there are operational technologies like actuators, sensors in AmI. Also, Natural language, knowledge or reasoning based, expert systems, ontologies are the additional technologies of AmI as shown in fig 3.

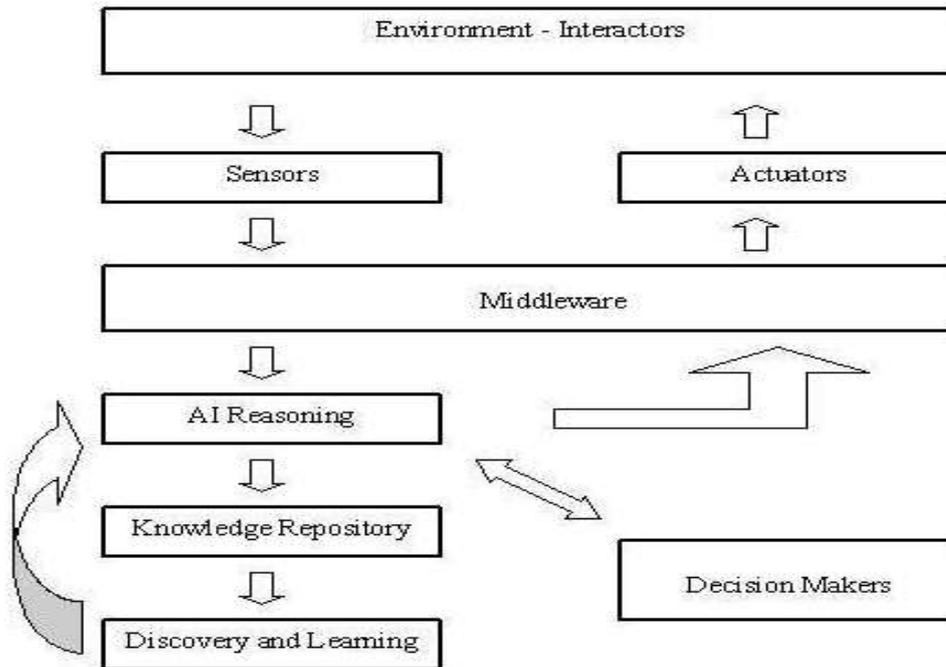


Fig.3. General architecture and Information flow of Aml system.

II. SYSTEMS BASED ON AMBIENT INTELLIGENCE

This section describes the systems which are implemented using ambient intelligence.

A. Home AmI

Smart home is an application of AmI in which home is made smart with the help of sensors to identify the presence of a person in home with the help of light switch on and off state. But sensors depend on movement and if a person is taking rest by switching off the light then it will confuse the system. The system will make wrong conclusion of absence of person in the room. Fig. 4 shows the layout of a smart house. However inclusion of such

items should be in a manner so that human friendly environment is not disturbed.

B. Vehicles and Transports AmI

Various prototypes of Autonomous Vehicle driving and assistance has been developed by Carnegie Mellon University [4]. Transport can be made more fluent and safe and efficient with help of Global Position Satellite (GPS)-based spatial location estimation which facilitates vehicle tracking. Currently cameras and vehicle identification with image processing software are also used. Speed Restrictions and automated license plate identification are a part of transport environment which are sensed roadside cameras.

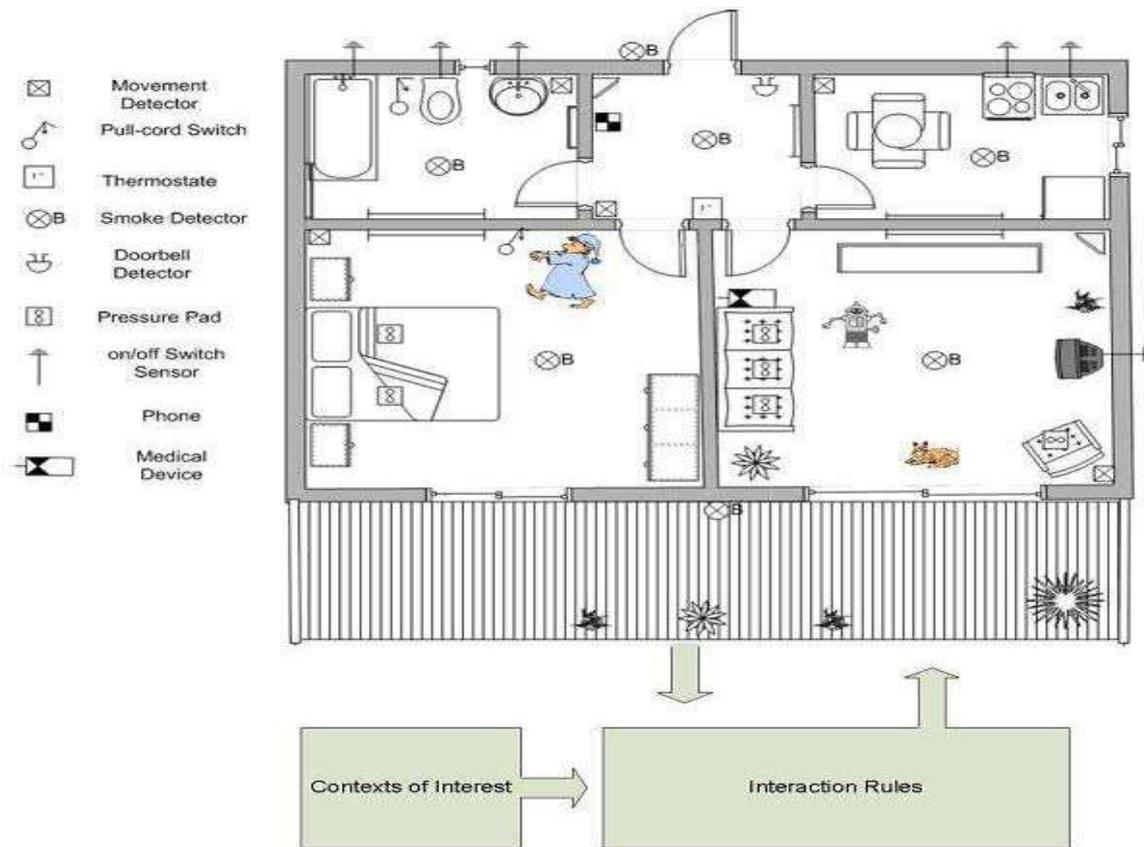


Fig.4. Layout of Smart Home

C. Health Care AmI

Aging of population is a problem during the next decades. In future it would be difficult for hospitals to maintain the patients for their health problems. So, Ambient intelligence is a clear method for the care of the patients intelligently. The smart devices may be embedded in clothes to collect information through sensors like temperature. Patients can be monitored at long distance [5].

D. Tourism and Cultural Heritage AmI

Ambient Intelligence is growing in cultural heritage and tourism industry. An example is Immersive tour post[6]. A user friendly virtual guide is MEGA to guide visitors in the Parco Archeologico della Valle del Temple in Agrigento[7].

E. Education AmI

Nowadays, Computing, parking, lecture rooms and library facilities are accessed with smart card technology in Universities and higher education institution. Also the same technology can be used for tracking students progress and monitor attendance.

F. Emergency Services AmI

Fire brigades and ambulance are safety services which can improvise their response time to by accurate GPS based location and by finding short routes using appropriate traffic signals. A hazard situation can be handled in a better way by locating the hazard place immediately by the prison and police service.

III. CONCLUSIONS

This paper gives a vision of Ambient Intelligence applications in real world. This vision specifies the future scope of Ambient intelligence. Ambient intelligence is impossible without AI. AmI emphasises to reach and serve humans in order to reduce time and increase efficiency of the system.

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