

Pervasive Computing – Intelligence in the Environment

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In the overall population only 28% is aware of it and among them 68% has positive approach and rest of them define it as abstract. The term refers to the increasing integration of technology into people's lives and environments. Pervasive computing has many potential applications, from health and home care to environmental monitoring and intelligent transport systems. This paper provides an outlook of pervasive computing along with its applications in our lives today and tomorrow. It also explores the hidden feature of pervasive computing act together with human and his surroundings.

Keywords: Pervasive Computing, Intelligent Environment, M-learning, Education, M-commerce.

1. INTRODUCTION

To be everywhere is the need of the human today. In this world of machine and technology humans are becoming more and more backwards towards the awareness of surroundings. But who can rule Human, with constant effort of striving; the challenge is accepted and has been proved by Human that if we can't get the knowledge then the knowledge should come to us. For a Human to achieve seamless communication among distributed entities in heterogeneous environment he uses computing. As information sharing requires extensive communication so it is necessary to have a communication framework that can adapt communication depending on the situation and goal of the community. I propose Pervasive computing which is by its nature open and extensible, and must integrate information from a diverse range of sources. It doesn't require users to learn (or learn how to interpret) some new behavior, but share the credit on very familiar ones. In a pervasive computing scenario, nothing is bound to anything else. It is a virtual pool of resources, available to any task and as a result, any user, who needs it. The dynamics of this resource pool are constantly changing as the needs of the collective user-base change. It is the need of the day that essential computer skills are imparted to everybody to fine it easy to acquire proficiency in this latest technological invention of human endeavor.

Whenever we work on the computer we are in a world of machines but pervasive computing makes machine to exist and live in our world. With the growth of internet we can distribute computing capabilities in a bit way without losing scalability. Even though the internet does not encompass the real world of physical entities but it has become a starting point for pervasive computing.

2. COMPUTING IS EMBEDDED EVERYWHERE IN THE ENVIRONMENT

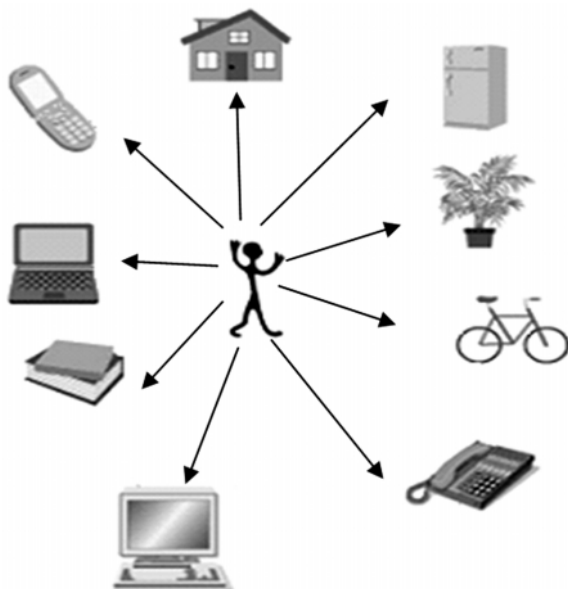
After revolutionizing the business industries the pervasive computing now will change the learning of humans. Earlier many people share one computer, then came the era of one person one computer and now it is the revolutionary thing happening that many computers serve one person, which is what a pervasive computing is. In spite of running here and there for learning the aim of pervasive computing is to be learned through online learning with "Everyone Every-time Everywhere" theme rather than "Anyone Anytime Anywhere". With this Just-In-time access to information and knowledge the collaboration and interactivity between students will be improved. Pervasive computing has become human-centric way of accessing information and systems by removing the boundaries of file and system incompatibilities and to present information to you in a timely and appropriate manner where ever you are. It is enabling educators to move from Chalk to Talk. From teachers to facilitators of computers and Internet-enabled learning, it is happening and spawning a new set of cartoon such as the recent one with the smug face of a kid saying, "Thank God I've found a way to outsource my homework". The biggest advancement has been seen to be in communication as students are more active members of more intellectual and co-curricular sub-communities. Communication between professors and students, and among students, is timelier, more frequent and more substantive. The bonds among colleague learners and professors hang around longer. E-mail is found as a method most frequently used to support teaching, where everyone is the part of the system. Pervasive Computing contributes to the development of innovative interaction between universities and companies to build a strong future on the basis of educating IT specialists. Podcasting is the latest in the web technology, and is creating waves in the e-learning world. Podcasts are basically digital audio programs that can be subscribed to and downloaded by listeners by RSS (Really Simple Syndication). It can be accessed on an array of digital audio

devices, like Mp3 players, desktop computer, laptops, mobiles etc.

Information Instantly Accessible Anywhere and Anytime is What Pervasive Computing is all about!

Use of mobiles is just a one component in pervasive computing which enables mobile computing, which is a subset of pervasive computer. M-commerce and M-learning are interesting area in the context of pervasive computing.

Now it is not just the educated professional but even farmer and milkmen are making effective and sometimes innovative use of mobile phones. Over the past ten years mobile learning has grown from a minor research interest to a set of significant projects in schools, workplaces, museums, cities and rural areas around the world. The M-learning community is still fragmented, with different national perspectives, difference between academia and industry, and between the school, higher education and lifelong learning sectors. With the use of PDAs which provide wireless connectivity through national and international carriers; smart phones and pocket PCs are beginning to merge in terms of features and functionalities; and tight integration between computing and communications is enabling seamless handling of voice, data email and text message services now being provided as well.

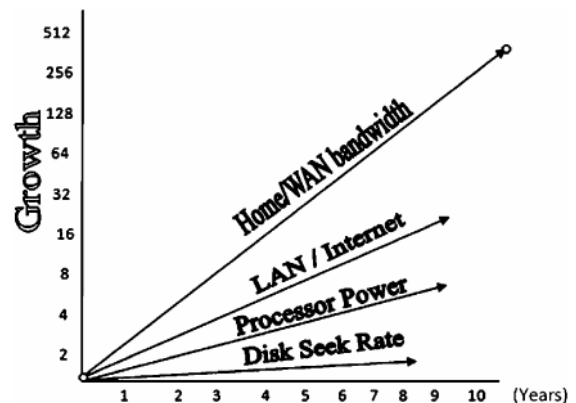


Distributed computing marked the next step toward pervasive computing by introducing seamless access to remote information resources and communication with fault tolerance, high availability, and security. The concept of ubiquitous or pervasive computing that makes wireless so attractive is also being extended to Global Positioning Satellite(GPS) technologies, wireless cash registers and Radio Frequency Identification (RFID) system. Logistics firms running delivery operations across vast geographies

are able to schedule and service customer needs better and faster using GPS, while retailers and manufactures can track supplies and inventory across the supply chain using RFID. The day is not far when all these fiction dream of locating a restaurant, making a reservation, finding the lowest pricing and paying without cash are all available to completely transform the day to day processes of working and living to make this world a Smart World. The popularity of mobile Internet access, third-generation wireless communication, handheld devices, and Bluetooth has made pervasive computing a reality.

Pervasive computing goes beyond the traditional user interfaces, on the one hand imploding them into small devices and appliances, anon the other hand exploding them onto large scale walls, building and furniture.

As the basis of the pervasive or ubiquitous computing it shares a vision of small, inexpensive, networked processing devices distributed at all scales throughout everyday life. The multitude of different pervasive devices with their different sizes of displays and interaction capabilities represents another challenge. For example: line a Nano-monitor chip which when a patient is being treated for diabetes monitors the blood-sugar levels and passes on the information to the device outside of the body which instructs the external semiconductors chip that acts as the drug delivery system, to release the right amounts of insulin into the blood, thus causing less or no side effects to the patient. By blending into the physical world, a ubiquitous service bridges the gap between the end-user and his surrounding.



Rate of Change in Need of Technologies

By the graph we can see that the change in the need of the technologies in past years have been increased and the user is now more concerned with the Home and WAN bandwidth in spite of the processor speed, LAN or internet speed and disk seek time or storage space.

Pervasive computing provides improved methods to monitor the environment. In-Spite of harsh environmental conditions (such as heat, cold and humidity) it will allow

for continuous real-time data collection and analysis via remote, wireless devices and to create Smart Environment. This aims to satisfy the experience of individuals from every environment by replacing the hazardous work, physical labor, and repetitive tasks with automated agents. Even though the motivation for several cases differs, the some keywords flexibility and self organization are repeated. Where flexibility means in the sense that system behavior is achieved through the way the systems are organized that is the system responds to its environment. Pervasive computing will allow the user to create environments saturated with computing and communication capability and gracefully integrated with them. It will allow the user to enable effective use of smart space where there will be automatic adjustment of heating, cooling and lighting levels in a room based on an occupant's electronic profile.

Inputs for computing will change so to avoid the keyboard and mouse and to use a talking pen, which can translate words and help with math's and spelling, to use voice, gesture and vision(head and eye movement) which in turn makes the whole technology invisible with minimal user distraction. It will allow users to take the data out of environment, leaving behind just an enhanced ability to act.

The potential use of pervasive computing in the human life will be that the car recognizes its driver, hone configures itself when it is touched, Kid's wear with game console on the sleeve, integrated GPS-driven locators etc. with the explosion of pervasive computer User interfaces are becoming larger and larger. User has moved from Mainframe to Mini, Mini to PC, PC to Internet and last but not the least from Internet to Pervasive computing. The goal of Pervasive computing is to crate a system that is always enveloped in the environment, completely connected, effortlessly portable, and constantly available.

Pervasive computing environments of the near future will involve the interaction, coordination and cooperation

of numerous, casually accessible, and often invisible computing devices. Not so far just in the near future computing will become so naturalized within the environment that people will not even realize that they are using computers. The mobile phones in your hand will be converted to a print on your wrist. The man will become a chip-man with chips integrated in his body with which the lifeless objects will also start work together with him and will be surrounded with the things-that can think- wherever he is present.

The ability to effectively configure a pervasive environment and compose virtual services is not just a matter of adding useful functionality: without such a capability, many people will find the technology so invasive that they won't want anything to do with it. If we look at successful computing technology, however, it is not the case that a single application has driven critical-mass recognition and consumption. There are many applications, different for each person. The real goal for pervasive computing is to provide interactions together for promoting a unified and continuous interaction between humans and computational services.

In all cases, pervasive applications will physically disappear by dissolving into the environment.

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