International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 07 | July - 2022 Impact Factor: 7.185 ISSN: 2582-3930

User Behavior Impact on Ubiquitous Computing

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ABSTRACT

This paper provides an overview of ubiquitous computing research, which is a new field that integrates communication technology into everyday activities. This research paper organizes several aspects related to the ubiquitous computing paradigm. We provide common architecture concepts for ubiquitous systems and examine key components of context-aware ubiquitous systems in this study. In addition, this study proposes a unique design for a ubiquitous computing system as well as a survey of sensors required for ubiquitous computing applications. The study's goals are as follows: threefold:

i) serve as a guideline for research groups who already are unfamiliar to ubiquitous computing and want to contribute to the field, ii) provide a novel architecture of the system for ubiquitous computing systems A poll is conducted on how people utilise e-gadgets and the internet in this article. In this survey, user data is collected in order to forecast how long it will take to reach ubiquitous computing. This information can be used to show how users' internet with gadgets and electronic device usage has changed over the last decade. The major goal of this is to discover how the world can preserve as one network and connect as one platform.It is observed that due to the exposition of technology even kids are using it.

Keywords — Ubiquitous Computing, UBICOMP, Pervasive Computing

I. INTRODUCTION

Ubiquitous computing is a computing paradigm in which information processing is linked to each action or object encountered. It entails linking electronic equipment, as well as incorporating microprocessors for data communication. Mark Weiser [4] proposed the concept "ubiquitous computing" about 25 years ago. Mahadev Satyanarayanan[5] explored and reinforced the notion ten years later by publishing studies on components and architectures for Pervasive Computing (synonym of ubiquitous computing). Scholars [6] have already been paying a lot of attention to this computational paradigm since then. Markedly, recent decades have witnessed the spread of various[9] technologies that allow the application of pervasive[11] systems such as Relative To a reference and Destination Services. The use of ubiquitous computing in other knowledge domains is rapidly being investi- gated, including healthcare (u-health)[12] ,ac-cessibility (u-accessibility) [19] , education (u-learning)[15] [16], commerce (u-commerce) [13],and gaming (u-games) [20] This article examines the history[14] of interconnected devices and looks at some of its modern innovations. In addition, the text highlights current research problems that are regarded obstacles and, as a result, research possibilities. Studies on ContextHistories (also called as Trails[21]) and their application to support Profile Management[23] and Context Prediction [23], for example, have been considered strategic. Finally, the article summarises research trends in ubiquitous computing.The field of pervasive computing is both new and diverse. Mark Weiser, who famously popularized the phrase ubiquitous computing in a Scientific American article in 1991[4], is frequently cited in research publications in the field. This is considered the beginning of the research area, which has subsequently expanded to include a wide range of technologies. Envisioning a world wherein modern computers would be present in objects, settings, and people themselves. These gadgets would interact with customers in a natural way, unnoticed by the users. Mahadev Satyanarayanan[5], ten years later, reaffirmed the thesis in a famous article. Ubiquitous Computing has been covered in more recent works . Furthermore, advances in the adoption of information such as context aware computation , optimum efficiency , profile management and recommendation engines have made it easier to realize Weiser[4] and Satyanarayanan's goal[5]. In this way, ubiquitous computing has found use in a wide range of fields, including healthcare . commerce , competency management , education , transportation accessibility and games.The literature on pervasive computing applications is given in section II. Section III defines the objectives and scopes of the project.System architecture is diagram presented in section IV.The direction of ubiquitous computing in everyday life is discussed in Section V. A user behavior survey is taken in section VI. Future work in ubiquitous computing is defined in Section VII.The conclusion in section VIII is based on the survey. Acknowledgements and References are found in Section IX.

II. LITERATURE SURVEY

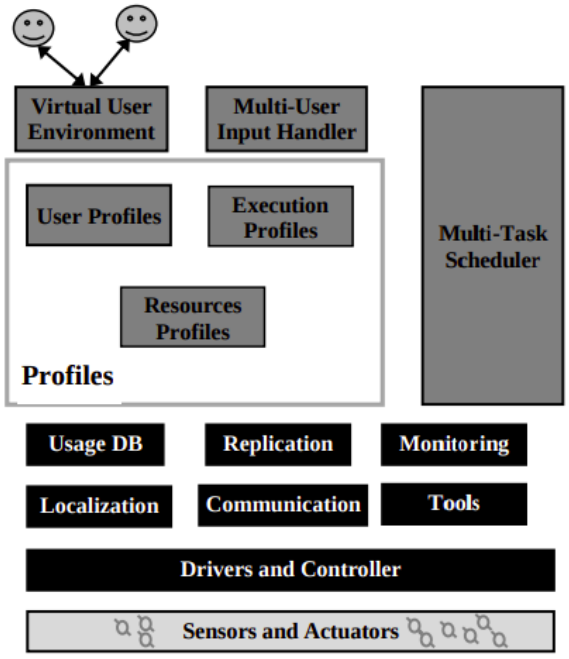
Living in a digital age that regulates[1] physical world. The growing popularity of wireless networks encourages users to use these digital devices[24]. Mobile gadgets[25], such as smart phones and tablets, are preferred over personal computers and laptops that is means the information and services can be available at any location worldwide[11]. This is referred to as ubiquitous computing.Pervasive computing applications are in growing, and their popularity has risen in recent years[26]. However, a sizable

portion of the population is uninterested in these advances.This drew the researchers' attention to the problem, which they linked to [27] system usability.Various paper were studied regarding usability of ubiquitous computing. The initial part of this investigation is to define ubiquitous and usefulness[27] . The second stage of this study is to arrange and classify the literature on the topic in order to make future work simpler.The resulting approach highlights progress in pervasive computing environments research usability studies and suggests future research areas.The scope of the objectives is provided in the next section.

III. OBJECTIVES SCOPE

Ubiquitous computing supporters envision a variety of scenarios in which computers are smoothly incorporated into people's life. A site visit is being conducted by a factory technician who has been recruited to bring an ageing manufacturing plant up to code. The screen of his Personal Digital Assistant lights up with documents and comments from past technicians about the eccentricities of the numerous equipment he passes as he moves across the unfamiliar manufacturing floor. Major technological corporations, such as Intel, are already working on research projects to allow the kind of technologies described above to become commonplace.Some proponents of ubiquitous computing see a world filled with wearable computers embedded in watches, hats, belts, and shoes. Some people believe that microchips should be used.The following are some of the features and capabilities that describe the breadth of its functionality: (i). Mobility and networking[25], which are now common in the real world. (ii). Themost defining and formative aspects of ubiquitous computing are contextual awareness and embedded systems. (iii).With the emergence of market-oriented applications, ubiquitous computing will be established gradually and step by step. (iv). Ubiquitous Computing Test Bed and UC Applications Design and Development (v)Multifunctional User Development for a Wireless Sensor Network for Real-Time Sensing And monitoring. The next section contains a diagram of the system architecture.

IV. SYSTEM ARCHITECTURE



V. IN THE DIRECTION OF EVERYDAY COMPUTING

As previously discussed daily computing, a new topic of interaction research that arises from studying the effects of growing ubiquitous computing over time. Providing continuous engagement transforms computing from a localised utility to a perpetual presence, much as shifting computing away from the traditional desktop significantly alters the interactions between humans and computers.Everyday computing arise from a desire to assist the unstructured and informal activities that characterise so much of our daily lives. These Activities are ongoing in nature, a steady ebb and flow of activity with no distinct beginning or conclusion. Organizing duties, connecting with family and friends, and organising information are all common instances.[32]

A. Multiple activities run at the same time:

These activities are ongoing, it is expected that context-shifting between them is required.Application User Interface can allow a user to monitor a background activity, supporting the user in determining when that activity should be resumed. Resumption may be opportunistic, depending on the availability of other persons or the timely receipt of necessary information.Users may, for example, desire to restart an activity depending on the number of relevant events that have occurred, such as reading messages in a newsgroup only after a suitable number of messages have been submitted before Interfaces should offer several degrees of "intrusiveness" in presenting monitoring information that fits the relative urgency and significance of events to design for background awareness. With several windows in a desktop interface, current desktop interfaces only go so far in resolving these challenges. With limited screen real estate, users must manage the multiple windows connected with a range of tasks by opening, shutting, and restacking them. Some desktop icons contain simple awareness signals, such as signaling that fresh email has been received, but there are limited capabilities for customizing notifications levels to fit varied awareness demands. The Rooms interface [Cardet al. 1999; Henderson et al. 1986] provided a compelling interface for spatially arranging documents and programmes in several permanent working areas.[33]

B. Bringing the physical and virtual worlds together

People move between two worlds: the virtual world of email, documents, and Web sites, and the physical world of face-to-face conversations,books, and paper files. Human action, on the other hand, is coordinated across these two areas. Despite efforts dating back to the Digital Desk [Wellner 1993], there is still a lot of work to be done in understanding how to blend data from different locations to better fit how individuals envision their own undertakings.[31]

C. ICT Devices that are Connected

Networked computers are pervasive computers. They provide services that may be accessed both locally and remotely. Weiser saw ubiquitous access via transparent interconnection of wired and wireless networks as an unresolved challenge in 1991. However, both the Internet and wireless cell phone networks have evolved since then to provide virtually ubiquitous network connectivity. In terms of range, power,content, topology, and design, a variety of communication networks exist to facilitate UbiCominteraction.[29]

D. Human-Computer Interaction That Isn't Visible (iHCI)

Many human-device interactions are built to facilitate explicit human-computer interaction that is articulated at a syntactical low level,such as activating special rules in a specific order. Furthermore, as more jobs are automated,the number of devices available grows, and more devices must work together to complete tasks. Users might be quickly disrupted, distracted, and overwhelmed by the sheer volume of explicit engagement. Interactive systems must be built to accommodate higher levels of implicit human-computer interaction, or they will fail.[28]

E. Ultising Smart devices

Smart devices, such as a home computer or a mobile phone, are multipurpose ICT gadgets that serve as a single gateway to access a variety of popular multiple application services that may be hosted locally on the gadget or remotely on servers. Smart gadgets come in a variety of shapes and sizes. Smart devices are often personal gadgets with a designated owner or user. The self - control and user interface in the smart device model is the smart device.The following are the primary features of smart devices: mobility, dynamic service discovery, and intermittent resource access(concurrency,upgrading,etc.).

However, the system's openness to maintain(upgrade) hardware components and offer more dynamic, flexible run-time interoperability suffers as a result. [30].The user survey behaviour is discussed in the next section

VI. USER BEHAVIOUR SURVEY

The survey was conducted in order to obtain statistics on user behavior while using electronic devices and the internet. The goal of this excercise is to estimate how many years it will take to connect the entire planet to a network that will enable ubiquitous computing.To represent data in graphical mode,pie chart that shows all statistics of data from which one can see how user behavior has changed over the previous decade and anticipate how long it will take us to attain ubiquitous computing (world as one network). There are 7 questions in the summary.

A. Is there any increase in use of internet from 2005 compare to 2022 ?

As depicted in Fig.2,users have begun to consume a large amount of internet over the last decade, with 100 percent of users increasing their internet usage from 2005 to 2022. This is an encouraging reaction to the goal of ubiquitous computing.

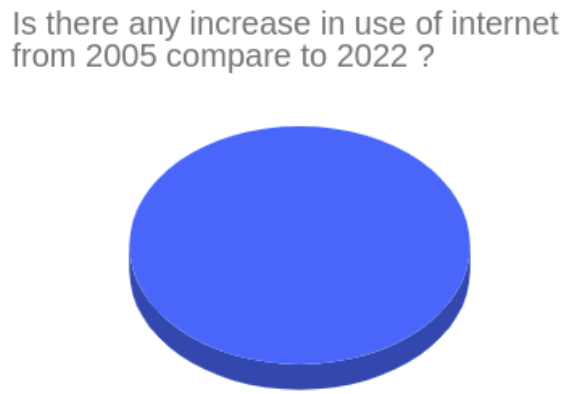


Fig. 2. Is there any increase in use of internet from 2005 compare to 2022

B. Have you ever used your phone as a single-user operator?

Establishing ubiquitous computing will take longer if there are more users per mobile phone because this question is specifically tailored for how consumers utilise their phones.As shown in Fig.3,86 percent of the users utilise mobile as a single user, according to the report. To put it another way, the number of mobile phones is equal to the number of users. Users share their phones with 14 percent of the time.

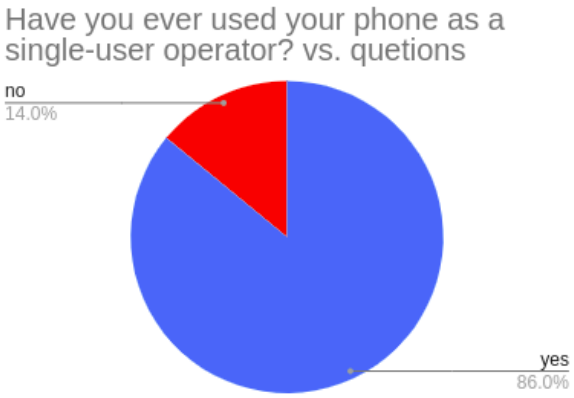


Fig. 3. Have you ever used your phone as a single-user operator?

C. after AI trends are there any changes in electronic wireless device?

From Fig.4,it is noticed that after AI trends and pandemics, the use of electronic devices has increased aggressively, with features also increasing in recent years. after lockdown use of electronic device increases , that approximately 90 percent of people believe that AI trends have led to improved electronic devices, which has a direct effect on internet usage in lockdown, as usage increase many company step in provide

good products so we can say that ubiquitous computing will benefit from AI trends.

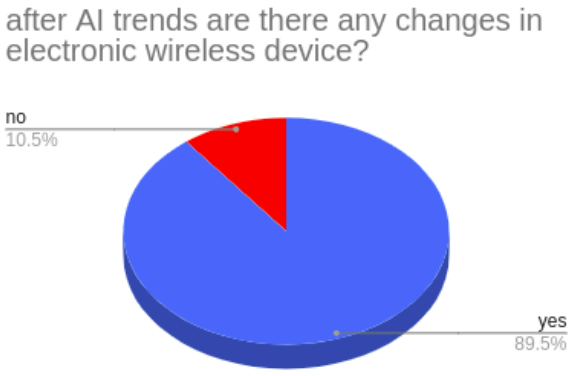


Fig. 4.after AI trends are there any changes in electronic wireless device?

D. Did you utilise the electronic item as a stand alone device (not connected to the internet)?

Fig.5 states that,54.4 percent use electronic devices with internet connections, while the remaining 45.6 percent use electronic devices without internet connections, indicating that more than

half of users utilise the internet, which is a promising sign for ubiquitous computing.

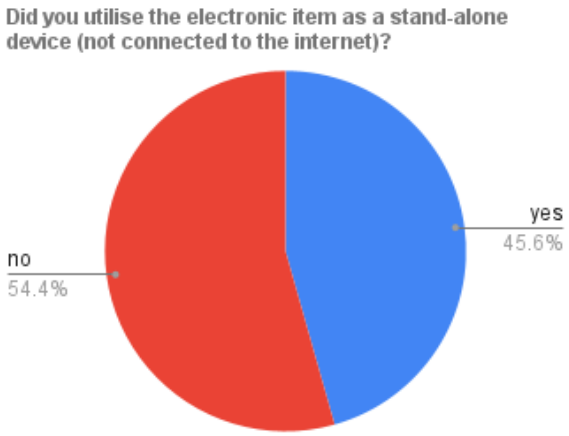


Fig. 5.Did you utilise the electronic item as a stand-alone device (not connected to the internet)?

E. what do you think in upcoming year AI device will grab your entire lifestyle?

The use of AI technologies has increased in recent years, and as humans become more reliant on them, and tendency to become addicted to them is sparked. as we can see now a days use of smart watch, smart helmets, smart dapper wallets etc. Humans gain greater features as a result of adopting this, making them sluggish and dependant on such devices. As many device comes human become more addict to this. According to Fig.6, 80.7 percent believe that AI will take over their entire lifestyle in the coming year.so that we can see that how many among us are using such smart devices already they have given positive reply on other hand 19.3 percent of people avoid the use of devices.

F. Have you ever preferred a wireless network to a wired network?

We notice from Fig.7 that users prefer wireless networks to wired networks. 85 percent choose wireless because it is more convenient, whereas 15 percent prefer wired because it allows them to work more efficiently.

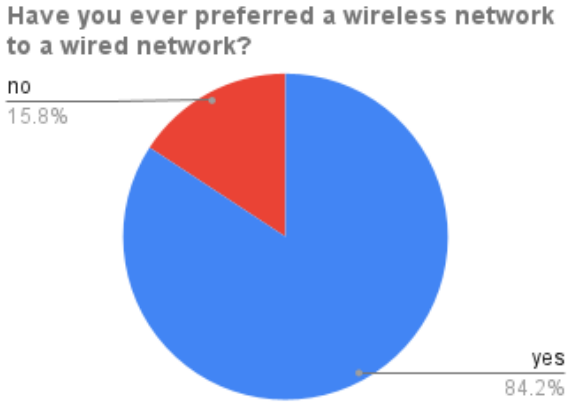


Fig. 7. Have you ever preferred a wireless network to a wired network?

G. what do you think in upcoming 10-15 year will human going to archive whole world as one network?

The major goal of this survey is to determine whether ubiquitous computing will be realized in the next 10-15 years, at which point the entire globe will become one network, with all users converging on one location to do all tasks. In Fig.8, 87.7 percent of respondents said yes to this. This is a positive sign for computing vision.

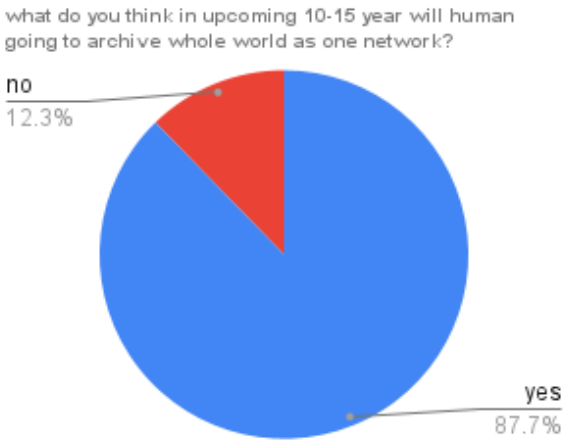


Fig. 8. what do you think in upcoming 10-15 year will human going to archive whole world as one network?

VII. FUTURE WORK

Despite the fact that ubiquitous computing is a fanciful dream come true, there are several challenges and unanswered concerns that must be overcome in order to use this technology. Furthermore, important reforms that pave the way for nomadic computing are pending in a country like india.Setting up smart cities and integrating future technologies is a challenge since basic requirements of the people have yet to be met and there is still a long way to go regarding future possibilities of ubiquitous computing in the globe with a unique scenario for India, keeping these variables in mind. Overall, there aren't likely to be any severe rebound effects from ubiquitous computing, which would cancel out or even nullify its good advantages.The conclusion is included in the next section.

VIII. CONCLUSION

Emerging technologies like Artificial Intelligence and machine learning are the way of the future, but during the last decade, there have been significant changes in how technology is used and implemented. Many e-devices have been launched in recent years, and people (users) have had a positive response in terms of using such gadgets, so the network has grown and strengthened, which will help to achieve the aim of ubiquitous computing. as technology get advances, things change faster than we imagine, as evidenced by the fact that Google AI has increased by 149 percent in the last four years from 2019 to 2022. This observation states that the lockdown has a greater impact on the use of electronic devices and the internet, which will make it clear that it is possible to achieve the goals in the coming decade,allowing all people to connect on the same platform. It will also aid in the development and growth of rurarl areas. As a result, the kids are also participating in the use of E-gadgets that will assist them in achievingn a brighter future.acknowledgements is given in next section

IX. ACKNOWLEDGEMENTS

We are pleased to present the research paper 'User Behaviour impact on ubiquitous Computing' as part of the 'Master of Computer Application' curriculum. We express our deepest gratitude to our research paper guide Dr. kirti Muley with patient guidance, enthusiastic encouragement, and the useful criticism of this research work.

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