JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

A REVIEW PAPER ON HUMAN MACHINE INTERACTION

Sarjil A Samad satware
Department of IT
GMVSC Tala
University of Mumbai

Farah A Samad Gothekar
Department of IT
GMVSC Tala
University of Mumbai

Muskan Nasir Bebal
Department of IT
GMVSC Tala
University of Mumbai

Swaliha Manzoor Khanzada
Department of IT
GMVSC Tala
University of Mumbai

Prof. Raghvendra Omprakash Singh
Assistant professor GMVSC & GMVIT
University of Mumbai

Abstract :-

Human–Machine interaction is research in the design and the use of computer technology, which focuses on the interfaces between people (users) and computers. HMI researchers observe the ways humans interact with computers and design technologies that allow humans to interact with computers in novel ways. A device that allows interaction between human being and a computer is known as a "**Human-Machine Interface** ".

As a field of research, human–machine interaction is situated at the intersection of computer science, behavioral sciences, design, media studies, and several other fields of study. The term was popularized by Stuart K. Card, Allen Newell, and Thomas P. Moran in their 1983 book, The pyscology of Human Machine Interaction. The first known use was in 1975 by Carlisle. The term is intended to convey that, unlike other tools with specific and limited uses, computers have many uses which often involve an open-ended dialogue between the user and the computer. The notion of dialogue likens human–machine interaction to human-to-human interaction: an analogy that is crucial to theoretical considerations in the field.

Keywords :

Artifacts, Emotional intelligence, Fidelity prototyping, Goals of Human Machine Interaction, Human Factor,Interactivity, Information systems,Resilence strategies, Technology, Younger participants.

INTRODUCTION

Humans interact with computers in many ways, and the interface between the two is crucial to facilitating this interaction. HCI is also sometimes termed *human–machine interaction* (HMI), *man-machine interaction* (MMI) or *machine-human interaction* (CHI). Desktop applications, internet browsers, handheld computers, and computer kiosks make use of the prevalent graphical user interfaces (GUI) of today. Voice user interfaces (VUI) are used for speech recognition and synthesizing systems, and the emerging multi-modal and Graphical user interfaces (GUI) allow humans to engage with embodied character agents in a way that cannot be achieved with other interface paradigms. The growth in human–computer interaction field has led to an increase in the quality of interaction, and resulted in many new areas of research beyond. Instead of designing regular interfaces, the different research branches focus on the concepts of multimodality over unimodality, intelligent adaptive interfaces over command/action based ones, and active interfaces over passive interfaces.

The Association for Computing Machinery (ACM) defines human–machine interaction as "a discipline that is concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them".An important facet of HMI is user satisfaction (or End-User Computing Satisfaction). It goes on to say:

"Because human– machine interaction studies a human and a machine in communication, it draws from supporting knowledge on both the machine and the human side. On the machine side, techniques in computer graphics, operating systems, programming languages, and development environments are relevant. On the human side, communication theory, graphic and industrialdesign disciplines, linguistics, social sciences, cognitive psychology, social psychology, and human factors such as machine user satisfaction are relevant. And, of course, engineering and design methods are relevant."

Due to the multidisciplinary nature of HMI, people with different backgrounds contribute to its success.

Poorly designed human-machine interfaces can lead to many unexpected problems. A classic example is the Three Mile Island accident, a nuclear meltdown accident, where investigations concluded that the design of the human-machine interface was at least partly responsible for the disaster. Similarly, accidents in aviation have resulted from manufacturers' decisions to use non-standard flight instruments or throttle quadrant layouts: even though the new designs were proposed to be superior in basic human-machine interaction, pilots had already ingrained the "standard" layout. Thus, the conceptually good idea had unintended results.

HUMAN –MACHINE INTERFACE

The human–machine interface can be described as the point of communication between the human user and the computer. The flow of information between the human and computer is defined as the *loop of interaction*. The loop of interaction has several aspects to it, including:

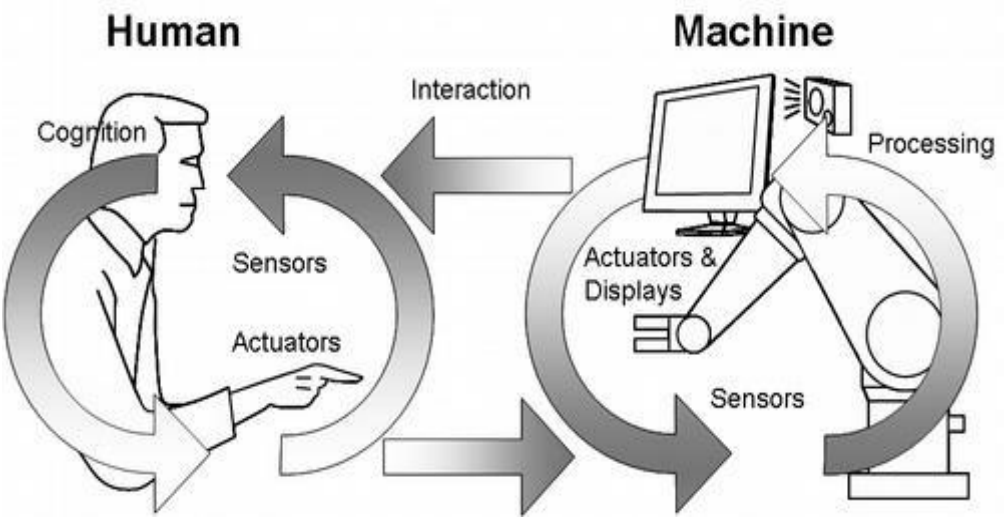
- **Visual Based**: The visual-based human– machine interaction is probably the most widespread human–computer interaction (HCI) research area.
- **Audio Based**: The audio-based interaction between a computer and a human is another important area of HCI systems. This area deals with information acquired by different audio signals.
- ***Task environment***: The conditions and goals set upon the user.
- ***Machine environment***: The computer's environment is connected to, e.g., a laptop in a college student's dorm room.
- ***Areas of the interface***: Non-overlapping areas involve the processes related to humans and computers themselves, while the overlapping areas only involve the processes related to their interaction.
- ***Input flow***: The flow of information begins in the task environment when the user has some task requiring using their computer.
- ***Output***: The flow of information that originates in the machine environment.
- ***Feedback***: Loops through the interface that evaluate, moderate, and confirm processes as they pass from the human through the interface to the computer and back.
- ***Fit***: This matches the computer design, the user, and the task to optimize the human resources needed to accomplish the task.

GOALS ON HUMAN MACHINE INTERACTION

Human–machine interaction studies the ways in which humans make—or do not make—use of computational artifacts, systems, and infrastructures. Much of the research in this field seeks to *improve* the human– machine interaction by improving the *usability* of computer interfaces. How usability is to be precisely understood, how it relates to other social and cultural values, and when it is, and when it may not be a desirable property of computer interfaces is increasingly debated.

Much of the research in the field of human– machine interaction takes an interest in:

- Methods for designing new computer interfaces, thereby optimizing a design for a desired property such as learnability, findability, the efficiency of use.
- Methods for implementing interfaces, e.g., by means of software libraries.
- Methods for evaluating and comparing interfaces with respect to their usability and other desirable properties.
- Methods for studying human– machine use and its sociocultural implications more broadly.
- Methods for determining whether or not the user is human or computer.
- Models and theories of human–computer use as well as conceptual frameworks for the design of computer interfaces, such as cognitivist user models, Activity Theory, or ethnomethodological accounts of human–machine use.
- Perspectives that critically reflect upon the values that underlie computational design, computer use, and HCI research practice.



HUMAN MACHINE INTERACTION INCLUDES:

Social computing

Social computing is an interactive and collaborative behavior considered between technology and people. In recent years, there has been an explosion of social science research focusing on interactions as the unit of analysis, as there are a lot of social computing technologies that include blogs, emails, social networking, quick messaging, and various others. Much of this research draws from psychology, social psychology, and sociology. For example, one study found out that people expected a computer with a man's name to cost more than a machine with a woman's name.[] Other research finds that individuals perceive their interactions with computers more negatively than humans, despite behaving the same way towards these machines.

Knowledge-driven human machine interaction

In human and computer interactions, a semantic gap usually exists between human and machine understandings towards mutual behaviors. Ontology, as a formal representation of domain-specific knowledge, can be used to address this problem by solving the semantic ambiguities between the two parties.[23]

Emotions and human– machine interaction

In the interaction of humans and computers, research has studied how computers can detect, process, and react to human emotions to develop emotionally intelligent information systems. Researchers have suggested several 'affect-detection channels'. The potential of telling human emotions in an automated and digital fashion lies in improvements to the effectiveness of human–computer interaction. The influence of emotions in human–computer interaction has been studied in fields such as financial decision-making using ECG and organizational knowledge sharing using eye-tracking and face readers as affect-detection channels. In these fields, it has been shown that affect-detection channels have the potential to detect human emotions and those information systems can incorporate the data obtained from affect-detection channels to improve decision models.

Brain– machine interfaces

A brain–computer interface (BCI), is a direct communication pathway between an enhanced or wired brain and an external device. BCI differs from neuromodulation in that it allows for bidirectional information flow. BCIs are often directed at researching, mapping, assisting, augmenting, or repairing human cognitive or sensory-motor functions.

Security interactions

Security interactions are the study of interaction between humans and computers specifically as it pertains to information security. Its aim, in plain terms, is to improve the usability of security features in end user applications.

HUMAN FACTORS

Human Factors basically focus on the way people interact with various jobs; machines and the environment with the consideration have capabilities and limitations. A human factor comes under
property of an individual or social behavior which is particular to humans and impact of the human environment equilibriums and as well as functioning of technological systems. Human factors also impact the way people communicate with computers and its applications. There is a problem because in the software development life cycle (SDLC) methods forsake to take human factors in consideration in the design stage of the user interface a cognitive or physical.

Resilience means the capacity to recover quickly from difficult situations or toughness. There are five pillars of resilience and from these pillars resilience is made up: awareness, mindfulness, positive relationships and purpose, self-care, by strengthening these pillars, we in turn, become more resilient. It's just a concept, which is implanted in social psychology and psychotherapy, ecology and material science and these all branches are the “toughness” of the systems.

In Resilience strategy the first step is to understand the needs of the organization in order to provide services at the time of unpredicted events and also find solutions to those problems when that problem comes at any point of time. Resilience strategies should be planned according to make able the system to face any type of problems which come at any point of time. Like when a person is ill then the strategy of resilience is to how and from which way they can easily and less amount of time that person will be healthy.

Conclusion

Nowadays research in Artificial Intelligence is going on and this is the most global research topic and in this also human computer interaction concept is used. Human computer interaction design makes important changes world-wide. To analyze behavior of humans at a deeper level so for this purpose their various components of human-computer interaction technology are used in this. Computers basically work according to the users instructions. And also got the results according to the instructions which are provided by the computers after some processes. In the coming days human-computer interaction will bring big changes in the world. It's basically easy to use always for humans and also the communication between the human and the computers totally depends on what instructions are fed to the system by the human. The term resilience has been applied to everything from economy, to the real-state, sports, events, businesses, psychology, and many more areas where resilience helps in difficult situations. The main of this study, with various other perspectives, was to gain information from us as much as possible, by using various methods of research, and after that, analyze the technologies and existing information systems to develop all possible solutions in order to force resilience on either employee at the time of training or performance improvement of the users. The Human machine Interaction design approach applied to user technological interfaces design, using different research methods, contributed to satisfying both parts: the user and the organization. The output was mainly the promotion of the use of knowledge and methods for users in particular, and for the organization, in general; the understanding of guidelines and models, to solve encountered problems and, the technology analyses of people in both individuals and organizational contexts.

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