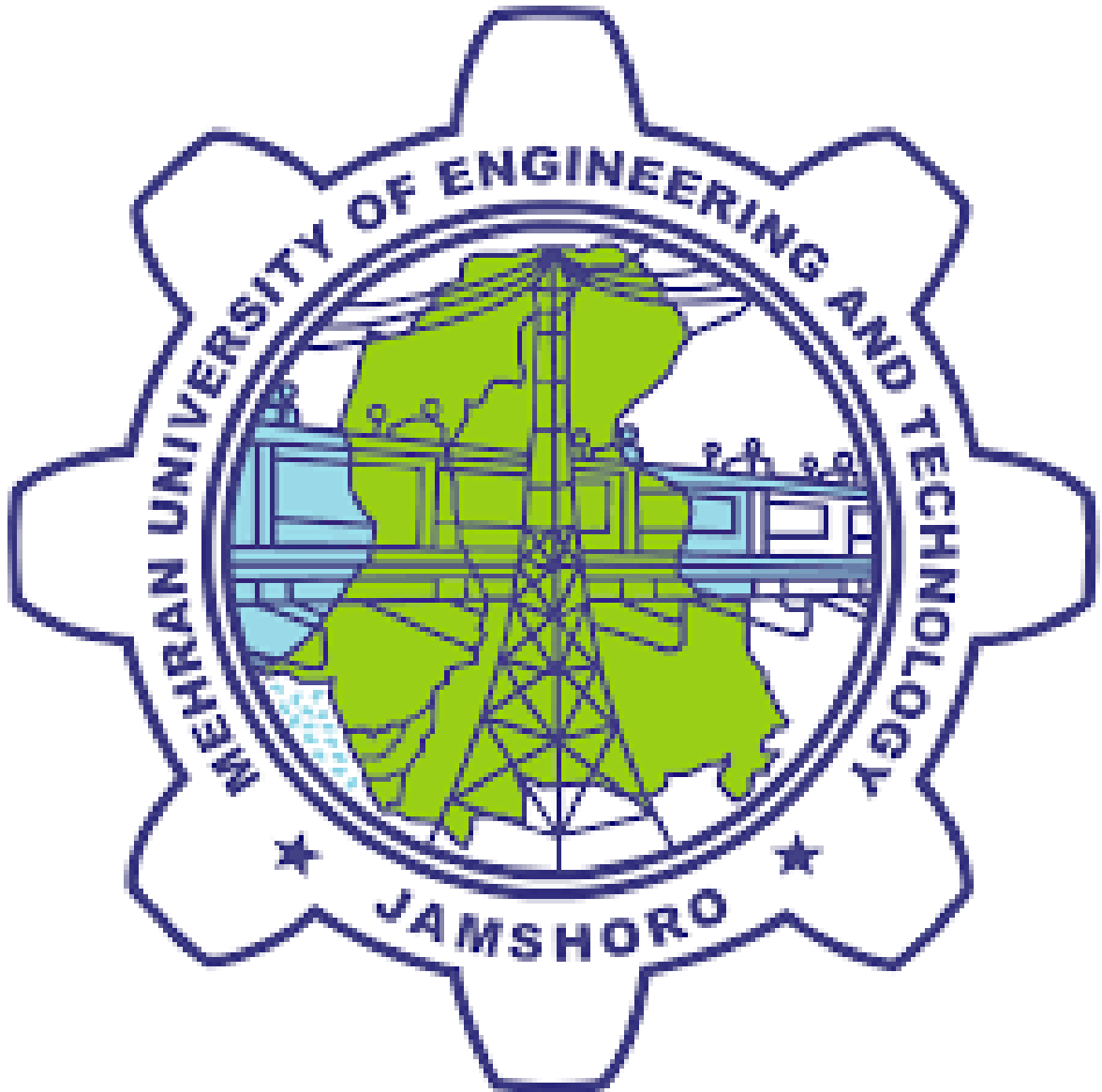NAME: ZOHAIB HASSAN SOOMRO

ROLL NO#: 19SW42

SUBJECT: HCI

Question #1:

Title: Research on Human-Computer Interaction Design of Office Chair Based on QFD Method

Abstract: Based on quality function deployment (QFD) and emotional design theory, the psychological needs of users are explored, and the interactive design system of office chairs is developed centering on users, thus solving the problems of space efficiency, office mode and human-computer interaction. First of all, through the relationship between the emotional concept and "function-behavior-benefit" in QFD method, from the perspective of emotional experience, the man-machine relationship is analyzed, and the principles and methods of contemporary office chair comfortable and healthy experience design are summarized. Secondly, based on the product structure and human-computer interaction design, the internal demand of consumers is transformed into the actual demand of products, and the QFD house of quality model is output to obtain the best design scheme. Finally, through design demonstration, the integrated application of emotional design and QFD method is feasible and effective, which can form a mapping relationship between product benefits and user needs, thus realizing the man-machine interaction design of multi-adaptive office chairs.

Summary: A design of an interactive office chair built around the needs and requirements of the user which delivers value and solves the problems of space, office mode and HCI making Quality function deployment as its basis. Firstly, the relationship between man and machine is analyzed by keeping in mind the emotional impact that the machine leaves on the user's brain or the emotions that the user experiences whilst interacting with the machine and the principals and methods of an ideal, comfortable and healthy-experience design of an office chair are summarized. Secondly, The QFD house of quality model built to represent the actual product in demand and to obtain the best design for the product to be developed. At the end the customer needs are mapped to the product benefits and the design of an multi-adaptive office chair is implemented.

Question #2:

Title: On-the-Move and in Your Car: An Overview of HCI Issues for In-Car Computing

Abstract:

The introduction of computing and communications technologies within cars raises a range of novel human-computer interaction (HCI) issues. In particular, it is critical to understand how user-interfaces within cars can best be designed to account for the severe physical, perceptual and cognitive constraints placed on users by the driving context. This article introduces the

driving situation and explains the range of computing systems being introduced within cars and their associated user-interfaces. The overall human- focused factors that designers must consider for this technology are raised. Furthermore, the range of methods (e.g: use of simulators, instrumented vehicles) available to designers of in-car user-interfaces are compared and contrasted. Specific guidance for one key system, vehicle navigation, is provided in a case study discussion. To conclude, overall trends in the development of in-car user-interfaces are discussed and the research challenges are raised.

Summary:

This article puts light over the issues related to HCI systems that are being introduced inside the car. The System designer must take some factors into account that what are the different problems that are being faced while driving and navigation. Due to increasing technology these user-interfaces are compared and updated in order to resolve the upraising issues related to development of these systems.

Question #3:

Title: The Interactive Workspaces Project: Experiences with Ubiquitous Computing Rooms

Abstract: Ubiquitous computing embodies a fundamental change from traditional desktop computing. The computational environment is augmented with heterogeneous devices, choice of input and output devices, mobile users, and contextual information. The design of systems and applications needs to accommodate this new operating environment. In this paper, we present our vision of future computing environments we term User Virtual Spaces, the challenges facing developers, and how they motivate the need for new application design. We present our approach for developing applications that are portable across ubiquitous computing environments and describe how we use contextual information to store and organize application data and user preferences. We present an application we have implemented that illustrates the advantages of our techniques in this new computing environment.

Summary: Ubiquitous computing, unlike traditional desktop computing is universal and can be used at any time, at any location and in any format, this essentially makes computing a part of everything and a component of our environment where it just moves to the background and submerges itself in the environment. Different kinds of devices, choice of inputs and outputs is integrated in the computational environment. For this purpose, the systems, applications and devices must be designed in such a way that they could be easily incorporated in such an environment. This paper presents the concept of future computing termed as "user virtual spaces", the problems that are faced by the developers and how they inspire us to come up with application designs. The approach for developing applications that can be incorporated across

ubiquitous computing environment is presented and the description of how contextual information is used to store and organize application data to optimize user experience. At the end of the paper an application is presented shows the benefits of the methods incorporated in this new computing environment.

Question #4:

Title: Voice as a Design Material: Sociophonetic Inspired Design Strategies in Human-Computer Interaction.

Abstract: While there is a renewed interest in voice user interfaces (VUI) in HCI, little attention has been paid to the design of VUI voice output beyond intelligibility and naturalness. We draw on the field of sociophonetics - the study of the social factors that influence the production and perception of speech - to highlight how current VUIs are based on a limited and homogenised set of voice outputs. We argue that current systems do not adequately consider the diversity of peoples' speech, how that diversity represents sociocultural identities, and how voices have the potential to shape user perceptions and experiences. Ultimately, as other technological developments have influenced the ideologies of language, the voice outputs of VUIs will influence the ideologies of speech. Based on our argument, we pose three design strategies for VUI voice output design - individualization, context awareness, and diversification - to motivate new ways of conceptualizing and designing these technologies.

Summary: Despite having a newfound interest in voice user interfaces that let you speak to them and reply back using voice/speech, there is not much attention to the detail of natural these voice system sound or how easily they are understood. Based on the field of psychophonetics (the study of the social factors that influence the production and perception of speech), the highlight is made as to how the current VUI's all have a set of limited and similar voice outputs.IT is argued that in reality, the peoples' speech is much more diverse, which represents their social and cultural identities, and that voices and speech have the power to change how a person perceives and experiences something. The voice outputs of VUI's will have a profound effect on how speech is viewed. Three design strategies are presented the design of VUI voice output, namely individualization, context awareness and diversicfication.

Qno#5: Human Computer Interaction using Hand Gesture.

Abstract:

In this modern age the advancement in ubiquitous computing has made the use of natural user interface very much required. The presence of computers and making use of the facilities of

human computer interaction in our societies will obviously bring and mark a positive impact on our societies. Either it was the day when the technologies had not been so advanced or todays when the technologies have been advanced so much that we spent most of our times to communicate, play, do our jobs with the machines and many more, even then human beings had used and are still using a broad range of gestures to communicate or interact with each other. Human gesture is a mode of non - verbal interaction medium and can provide the most intuitive, originative and natural way to interact with computers. Our main goal is to make the interaction between human and computer as natural as the interaction between humans. The objective of this paper is to recognize the static hand gesture images (i.e frames) based on shapes and orientations of hand which is extracted from input video stream recorded in stable lighting and simple background conditions. We can use this vision based recognized gestures to control multimedia applications (like Windows Media Player, Windows Picture Manager, VLC Player etc.) running on computer using different gestural commands.

Summary:

Decades ago, we had to interact with computer machines by means of different hardware systems, but now in modern times, we have modern ways to interact with machines. We can communicate with machines and can instruct them with hand signs and gestures. So, the hand gestures and hands' orientation are recognized by the system with camera or any video processing and input is extracted. This hand signs can be made to operate various apps i.e video players (VLC Player).

Qno#6: Design and Development of Hand Gesture Based Virtual Mouse.

Abstract:

The technique of establishing a process of interaction between human and computer is evolving since the invention of computer technology. The mouse is an excellent invention in HCI (Human-Computer Interaction) technology. Though wireless or Bluetooth mouse technology is invented still, that technology is not completely device free. A Bluetooth mouse has the requirement of battery power and connecting dongle. Presence of extra devices in a mouse increases the difficulty to use it. The proposed mouse system is beyond this limitation. This paper proposes a virtual mouse system based on HCI using computer vision and hand gestures. Gestures captured with a built-in camera or webcam and processed with color segmentation & detection technique. The user will be allowed to control some of the computer cursor functions with their hands which bear colored caps on fingertips. Primarily, a user can perform left clicks, right clicks, and double clicks, scrolling up or down using their hand in different gestures. This system captures frames using a webcam or built-in cam and processes the frames to make them track-able and after that recognizes different gestures made by users and perform the mouse

function. So, the proposed mouse system eliminates device dependency in order to use a mouse. Therefore, it can be proved beneficial in order to develop HCI technology.

Summary:
At first, we had wired mouses, but these days, we have wireless or Bluetooth mouses as we see technology is improving day by day it still needs to be improved a lot. As we see there is still some hardware attached to Bluetooth mouse.
This article suggests a virtual mouse that can be operated via hand gestures and these will be captured through cameras. User will be able to perform all actions with virtual mouse that he is able to do with physical one e.g: left click, right click, double click. This will eliminate device dependency and space.

Qno#7: Tangible user interface for digital Museum applications.

Abstract:

Virtex is the acronym for VIRTUAL Exhibit. It is an innovative approach for museum storytelling, based on a tangible interface. This article illustrates how the Virtex and Virtex Light systems have been integrated in the international exhibition Keys to Rome and how tangible interfaces can be used to enhance visitor experience in the museum.

Summary:

This article is about providing the visitors of museum with a tangible user interface that increases their accessibility while exhibiting various things along with the visitors going through visual impairments. using this tangible media technology as an exhibitor for samples. The results showed that the interaction with the interface pleased the visitors and that it has application space within geological exhibitions.

Qno#8: Embedded Speech recognition system for intelligent robot

Abstract:

Automatic speech recognition (ASR) is a task that requires high computation capability and enough memory, which is difficult to work in the embedded devices. We have successfully developed an embedded speaker-independent speech recognition system. Specifically, we have also successfully designed a hardware module that can be embedded into the toy robot. We evaluated the speech-controlled robot and the recognition performance was quite good.

Summary:

Automatic Speech Recognition or ASR, because it's acknowledged in short, is the generation that permits people to apply their voices to talk with a computer interface in a manner that, in its

maximum state-of-the-art variations, resembles everyday human conversation. As the technology is evolving so customers wished an extra effective and pleasant interface via which they are able to educate the gadget with the assist in their voice however the trouble changed into that it changed into now no longer viable to increase a speech reputation machine in a small, embedded tool because it calls for excessive computation functionality and sufficient memory. In this article, we've correctly advanced an embedded speaker-unbiased speech reputation machine. We have additionally designed a hardware module which may be embedded right into a robotic which offers customers with the capacity to educate the robotic the use of speech and as we evaluated the speech-managed robotic and the robotic changed into capable of understand the speech.

Qno#9: Sandscape exhibit a hit with Wonder lab visitors.

Summary: Sandscape is very interactive sandbox that uses augmented reality. Visitors experience different scenarios as they are doing it for real e.g: carving rivers, building mountains.

It is super fun! for kids of age 6 or more. In the museum, it is located on the second floor of gallery.

One can pour rain down over the biomes with rain sticks in that box and this is because of the projected lights over them. When the desert appears so the water evaporates.