Assignment HCI-1

Title: Requirement Gathering

Problem Statement:

Identify specialized users and related facilities for a selected product/ system and make necessary suggestions for its improved accessibility design.

Learning Objectives and Outcomes:

❖ Understand what are specialized users and the problems they face.

❖ Capture functional and data specification requirements.

❖ Conduct a meeting with probable users (not necessarily all but representatives) and understand them.

Requirements:

Notepad and Pen, Questionmire (not compulsory), PC / Laptop, Reference for SRS.

Theory:

Star Model of Design and Implementation

Requirements Gathering.

What'll the system do?

- ❖ Techniques used in requirement gathering.
- ❖ Requirements gathering outcome
- ❖ Functional Requirements.
- ❖ Data Requirements
- ❖ Usability Requirements

Introduction

Help the designer

- ◆ Understand requirements of client from a software system.

- ◆ Analyse situations, work setting physical environment.

Clarify the client's needs and identify infeasible requirements, ambiguities, ammissions, etc.

Theory

Human-computer interaction (HCI) is the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings. HCI both observe the ways in which humans interact with computers and design technologies that let humans interact with computers in novel ways. HCI consists of three parts: the user, the computer itself, and the ways they work together.

User

By "user", we may mean an individual user, a group of users working together. An appreciation of the way people's sensory systems (sight, hearing, touch) relay information is vital. Also, different users from different conceptions of mental models about their interactions and have different ways of learning and keeping knowledge and in addition, cultural and national difference play a part.

Computer

When we talk about the computer, we're referring to any technology ranging from desktop computers, to large scale computer systems. For example, if we were discussing the design of a Website, then the Website itself would be referred to as "the computer". Devices such as mobile phones or VCRs can also be considered to be "computers".

Interaction

The communication between user and system is called interaction. There are obvious differences between humans and machines. In spite of these, HCI attempts to ensure that they both get on with each other and interact successfully. In real systems, the schedule and the budget are important, and it is vital to find a balance between what would be ideal for the users and what is feasible in reality.

Problem Statement

Design a Mouse Stimulator System. The user must be allowed to control cursor movements using a real-time camera and colour tapes.

Scope

- ❖ Dedicated gesture for blind humans to interact with computers.
- ❖ Removes the requirement of having physical touch.
- ❖ Real-time, user-friendly, reliable and helps provide settings to adjust sensitivity and motion control to the user's preference.

Description

The Mouse Stimulator system is designed for users of all age groups. The system shall allow users to control the cursor movements using a real time camera and is based on computer vision algorithms for the novel human computer interaction approach. It is useful in presentations and can be used to

reduce workspace. System consists of 3 modules: Centroid, flip matrix, mouse_sim module. Centroid module deals with needing the binary video for contour length calculation. Here the image is already grey which is a mask to provide the location of the cursor directional point whereas flip matrix imports the image and flips it on columns. The mouse_sim module detects and finally moves the mouse cursor to the given position of centroid using mouse dependency.

User Interfaces

The system is user-centred and the functionality or state change is initiated by the user. The user is provided with a simple and easy UI for detection and gesture recognition. Apart from this, use of 'colour' is done to differentiate between lighting and a variety of human races.

Hardware Interfaces

The Mouse Stimulator requires a basic computer that consists of camera and an object (I used a red pen).

Software Interfaces

System requires a Python or Jupyter Notebook.

Communication Interfaces

System requires cv2, numpy, flipmatrix libraries to be imported for the program to execute for machine learning purposes.

Designing for Disabled Users

Blind People: •

❖ Can be modified into a version by using high intensity ultrasonic waves to be used as navigation systems for geological variation.

❖ Be more alert about the obstacles and keep an efficient and secure system.

Use Case Diagram
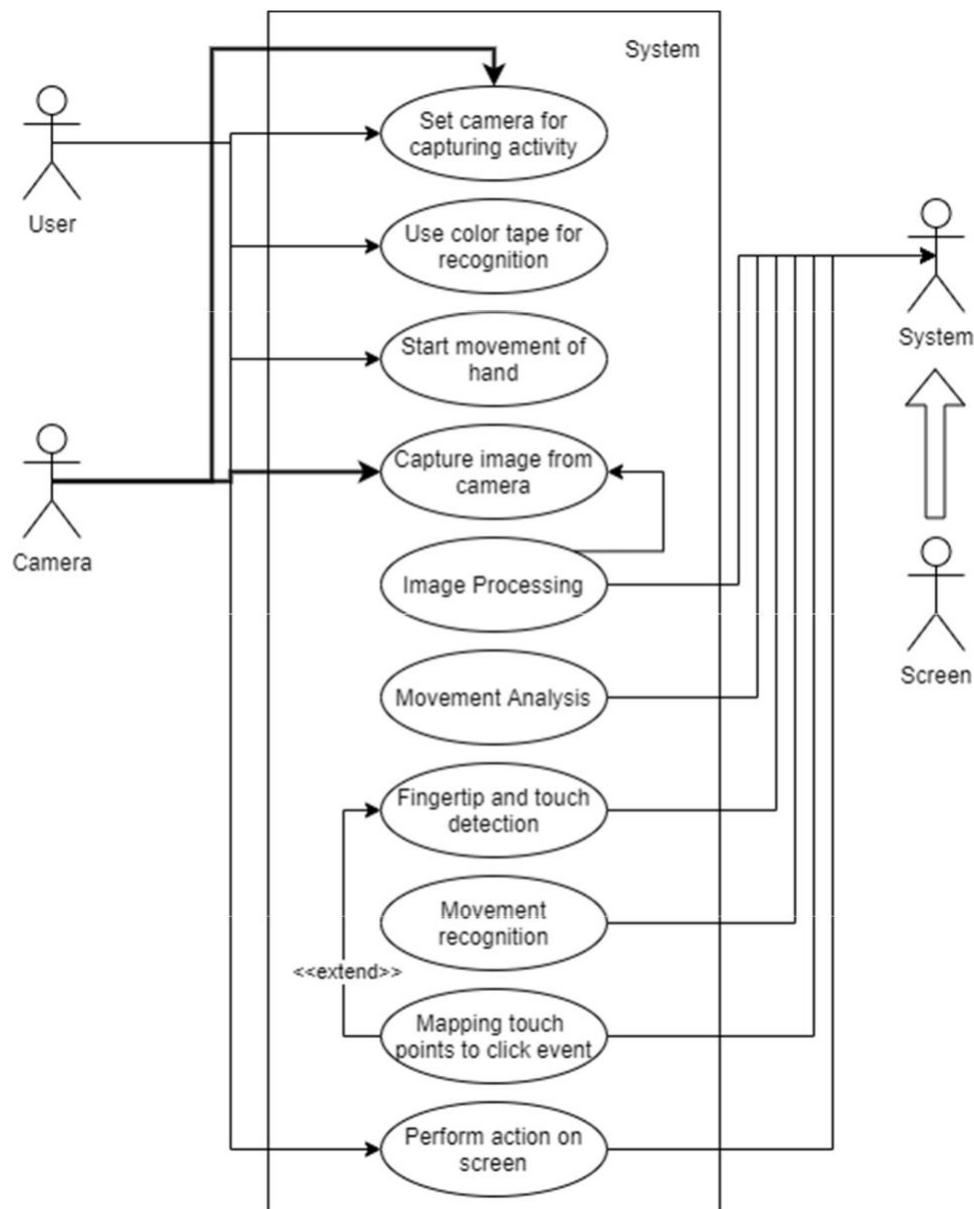
Techniques used in Requirements Gathering

Interviews and Questionnaire

❖ Discussions with commissioning client

❖ Interview or questionnaire do:

❖ end users

❖ relevant professional

❖ other interactive designers...

Observation

❖ In natural work seting to understand organizational and serial characteristics

Document Analysis

Task analysis techniques for existing products.

Prototyping can help in requirement gathering.

Functional Requirements

- ❖ In HCI. context functional requirements specify both what the system and user must do.
- ❖ Cannot be gathered completely at start of process.
- ❖ Often specified with charting techniques eg. dataflow diagram.
- ❖ Constraints must be specified
    - ◆ System Constraints
    - ◆ Development process constraints.

Data Requirements

Specify meaning and structure of data.

Data analysis established
- ❖ What data is required?
- ❖ How it's structured?
- ❖ How it's Ingically stored?

Use of entity relationship diagrams and data dictionary.

Gathered using interviews, observations, document analysis, etc.

Usability Requirements

To be tested, usability is expressed in terms of:

- ❖ learnability: Time and effort to reach a specified level of user performance
- ❖ throughput for tasks - speed of task execution and errors made(ease of use)
- ❖ Flexibility: Multiplicity of ways user and system exchange information
- ❖ attitude: Positive attitude created in users by the system.

Conclusion

With this assignment SRS for mouse stimulator is prepared.

Star Model of Design and Implementation.

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┌──────────────────┐              ┌──────────────────┐
│ Implementation.  │              │ Task & functional│
└──────────────────┘              │ Analysis         │
        \                        /└──────────────────┘
         \                      /
┌──────────────┐    ┌──────────────────┐    ┌──────────────────┐
│ Prototyping  │────│   Evaluation     │    │ Requirement      │
└──────────────┘    └──────────────────┘    │ specification.   │
                           │                 └──────────────────┘
                    ┌──────────────────────┐
                    │ Conceptual & functional│
                    │ Design               │
                    └──────────────────────┘
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