Human Computer Interaction

Title: Hands-free Mouse Cursor Control

Team Members:

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Need Finding

Problem Domain - Handsfree Mouse Cursor Control

- People find it difficult to do access computers without the help of mouse.
- The audience who are addressed involve ：
  - People regularly working with computers and not being able to use the mouse
  - Software engineers
  - People with disabilities (short-term / long-term)
- The intended application would allow a user to control the mouse cursor with facial movements.

Methodology

- Decide on the interviewee(s)
- Design the questions to be asked to the interviewee(s)
- Conduct the Interview process
- Analyze and formulate the insights gained from the Interviews

Interviewee - 1

- Mr Umesh Pai
  - He is a software engineer working in a private company.
  - He is 50 years old.

Questions

1. What Problems you face while working with a hand-held mouse ?
2. Would you use a touchpad as a suitable replacement ?
3. What do you do if u forget to carry your mouse ?
4. How do you remind yourself to carry a mouse?

Empathy Map

SAYS	THINKS
• "Sometimes, I forget to carry my mouse to work." • "I have used a hand-held mouse for most of my life. So, I find working with touch pads uncomfortable."	• I wish there were alternatives to a hand-held mouse or a touch pad. • I wish I could reduce the stress on my wrists
DOES	**FEELS**
• Request his peers for a spare mouse. • Assign some of his work that would require usage of a mouse to other peers. • Set a reminder to carry his mouse everyday	• I feel a lot of stress on my wrists

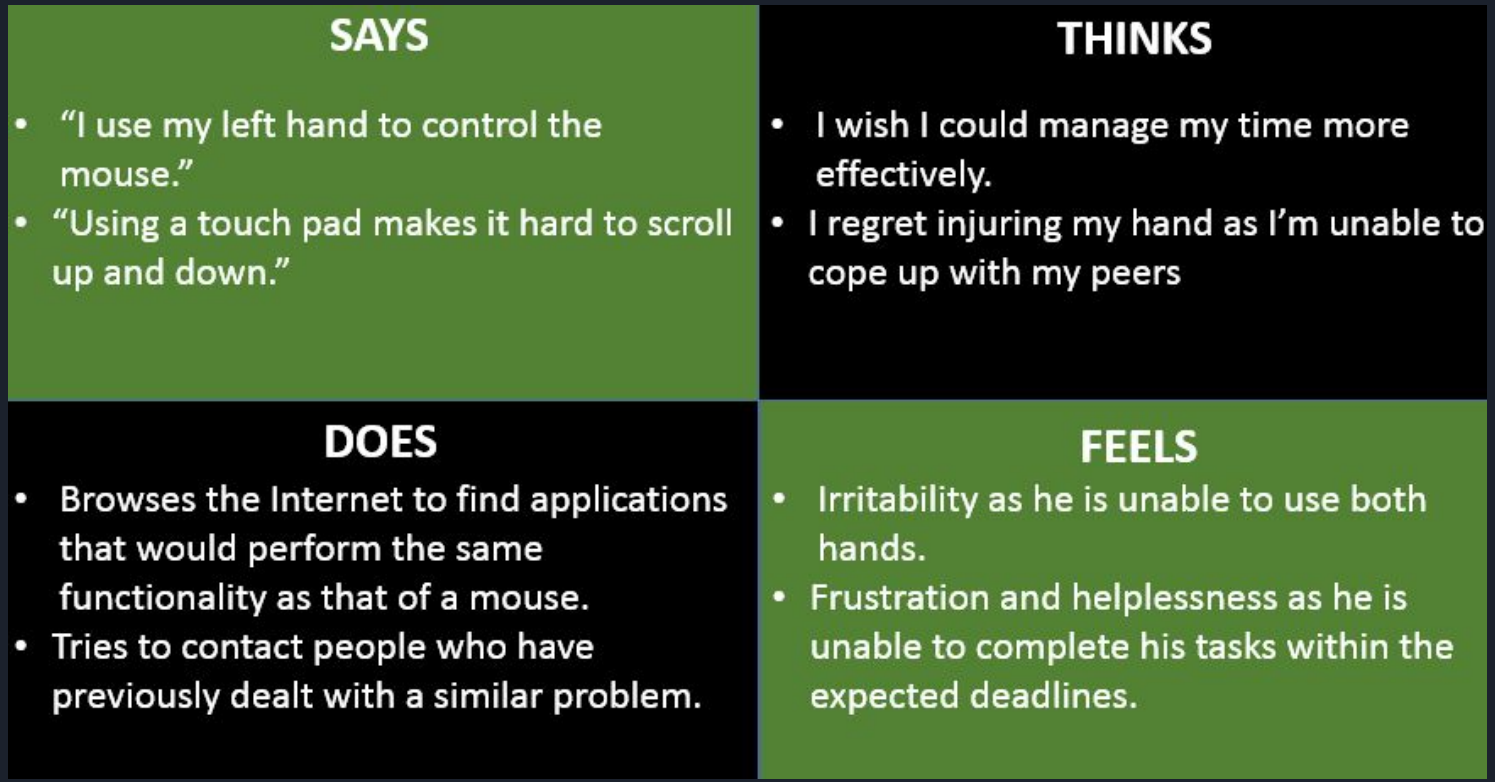
Interviewee - 2

- Akshay Hegde
  - He is a student of Rashtrotthana Vidya Kendra school , currently studying in Class 10.
  - He is 15 years old.

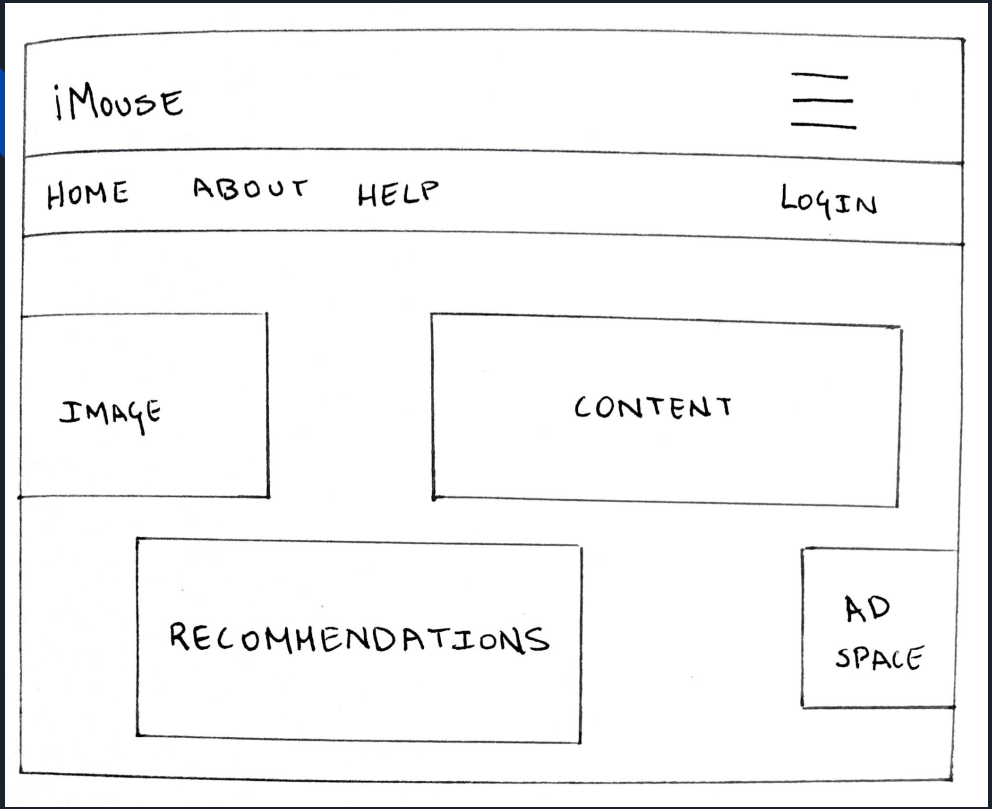
Questions

1. What is the experience of operating a mouse ?
2. Would you prefer using a touchpad?
3. What have you done to cope up with the situation

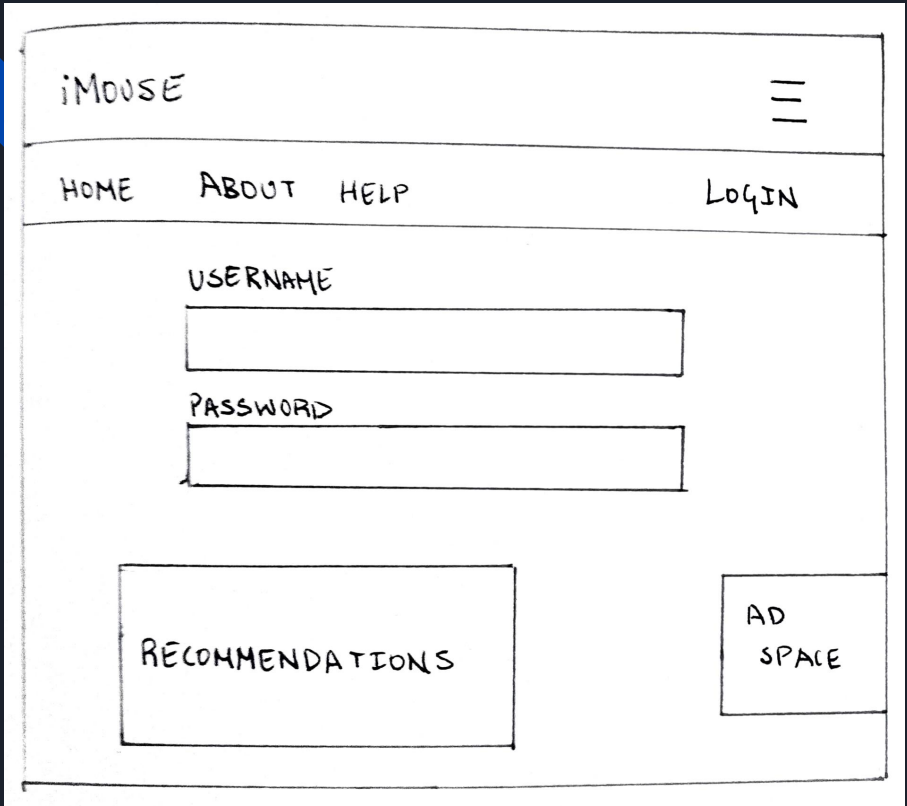
Empathy Map


SAYS
• "I use my left hand to control the mouse."
• "Using a touch pad makes it hard to scroll up and down."
THINKS
• I wish I could manage my time more effectively.
• I regret injuring my hand as I'm unable to cope up with my peers
DOES
• Browses the Internet to find applications that would perform the same functionality as that of a mouse.
• Tries to contact people who have previously dealt with a similar problem.
FEELS
• Irritability as he is unable to use both hands.
• Frustration and helplessness as he is unable to complete his tasks within the expected deadlines.

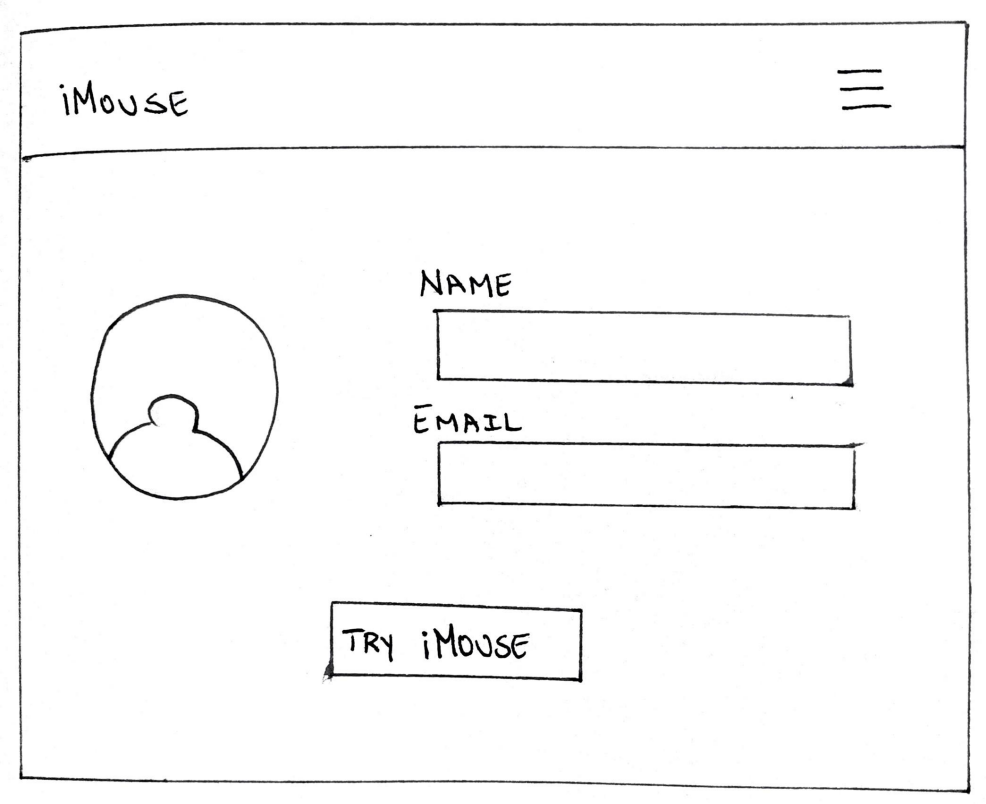
Low - Fidelity Prototype



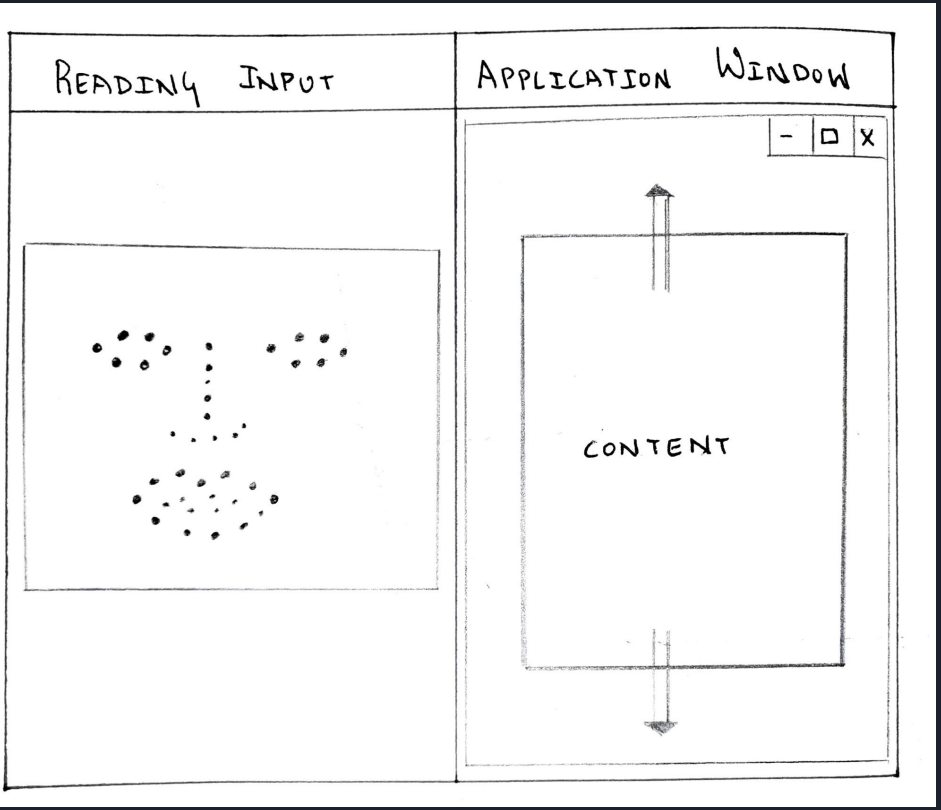
- This is the home page of our web application. It is menu-driven along with sections such as image, content, recommendations and an ad-space.
- Help section provides detailed documentation for the users of the application.
- It provides seamless flow between the different sections.
- Login section redirects to a new page where required credentials are to be filled to use the application.
- Recommendation section gives various recommendations on how to use the app in an enhanced way.
- Ad-space is used to facilitate advertisements for our application.



- Login section has a username and password specific to the application.
- Only the users who know the respective credentials can log-in and use the application.
- Recommendation and ad-space sections are same as from the previous section.



- After providing the required credentials, the user is asked to provide the name and email in order to keep track of total number of users using the application.
- The custom message will be mailed to the user for using the web application.
- Try iMouse button is used for real-time hands free mouse cursor control.



- The real-time hands free mouse cursor control consists of 2 windows.
- The first window is face monitoring where the face features are being tracked.
- The second window shows the respective cursor movement on the application window as suggested from the facial feature tracking (first window)
- Moving left, right, up and down are the 4 ways of cursor movement allowed on the application window.

HEURISTIC EVALUATION

Shneiderman's Eight Golden Rules Will Help You Design Better Interfaces

1. Strive for Consistency

- Consistent sequences of actions should be required in similar situations; identical terminology should be used in prompts, menus, and help screens; and consistent commands should be employed throughout.

- We have consistent user-interface for all the pages of the application. Identical terms in menu helps in navigating between all the pages.

  Ex: Confirmation of closing the application

2. Enable frequent users to use shortcuts

- As the frequency of use increases, so do the user's desires to reduce the number of interactions and to increase the pace of interaction. Abbreviations, function keys, hidden commands, and macro facilities are very helpful to an expert user.

- A user once logged in , will be logged in throughout his session until he closes the application. Alongside clicking on login Keyboard key (ENTER) can be used to confirm the login credentials and email confirmation for using the application.

3. Offer informative feedback

- For every operator action, there should be some system feedback. For frequent and minor actions, the response can be modest, while for infrequent and major actions, the response should be more substantial.

- Error messages are expressed in plain language (no error codes), precisely indicate the problem, and constructively suggest a solution.

- If there is any mismatch in the credentials for logging in to the web application, the respective error messages will be displayed.

- Ex: A bad example we often see is when an error message shows an error-code instead of a human-readable and meaningful message.

4. Design dialog to yield closure

- Sequences of actions should be organized into groups with a beginning, middle, and end. The informative feedback at the completion of a group of actions gives the operators the satisfaction of accomplishment, a sense of relief, the signal to drop contingency plans and options from their minds, and an indication that the way is clear to prepare for the next group of actions.

- Respective dialogue boxes indicating custom made success or failure messages during credential/email confirmations are used

5. Offer simple error handling

- Design the system in such a way that the user cannot make a serious error.
- If an error is made, the system should be able to detect it and offer simple, comprehensible mechanisms for handling the error.

- If the user face is not clearly captured in the camera, we indicate with an alarm to properly orient his/her face.
- If the eye-tracking fails due to out of range eye coverage we indicate the error using the same above mechanism.

6. Permit easy reversal of actions

- This feature relieves anxiety, since the user knows that errors can be undone; it thus encourages exploration of unfamiliar options.
- The units of reversibility may be a single action, a data entry, or a complete group of actions.

- Users can revert back to previous pages upon error messages, if their login credentials are not appropriate they can reverse their actions by re-entering the details.
- If there is a slight chance of the application mal-functioning the user can login once again and restart the application afresh.

7. Support internal locus of control

- Design the system to make users the initiators of actions rather than the responders.

- Users will be in full control of the application, because only when they provide their credentials they will be able to access the application.
- The entire application is based on their eye-movements which clearly indicates that it is in the users' control.

8. Reduce short-term memory load

- The limitation of human information processing in short-term memory requires that displays be kept simple, multiple page displays be consolidated, window-motion frequency be reduced, and sufficient training time be allotted for codes, mnemonics, and sequences of actions.

- The above web application being a minimalistic design takes only username and mail-id as user credentials in order to keep track of the number of users using the application.
- Hence the user need not remember information from one page to another.

Thank You