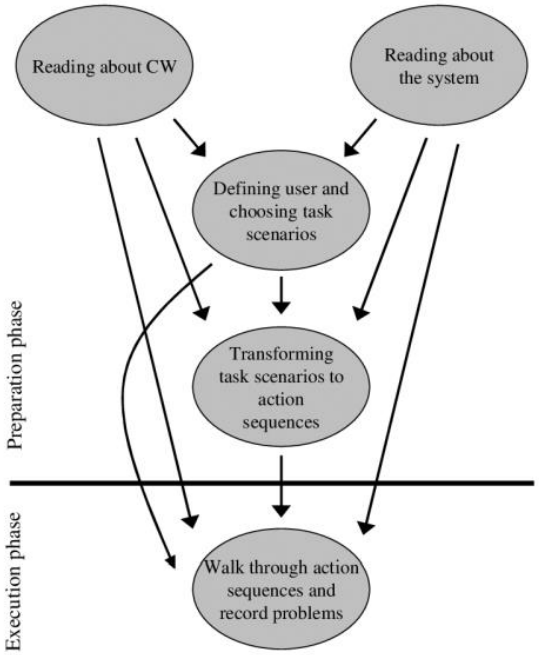
PART 6

Evaluation Plan: The last task is to develop an evaluation plan that validates the utility of your proposed AT. Testing may include comparison to other commercial AT using a House of Quality based on typical engineering design criteria, user-based interviews, usability measures, cognitive walk-throughs, GOMS, task performance measures, estimated cost analysis, quality of life, or other methods. You should describe at least three assessment tests with anticipated results.

This document should be about 6-8 pages long (30 points). Grading criteria: Depth of assessment strategy 15 pts., Relevance of assessments to proposed AT solution 10 pts., technical writing skill 5 pts

We will be describing multiple assessments with their respective results.

TEST 1: COGNITIVE WALK-THROUGHS:



Cognitive walk-throughs are a usability evaluation method that involves a team of experts walking through a series of tasks using a product or system and analyzing how well it supports the user in achieving their goals. The goal of a cognitive walk-through is to identify any issues or areas for improvement in the user experience. During a cognitive walk-through, the experts will evaluate the product or system from the perspective of the user, and consider factors such as the clarity of instructions, the availability of relevant

information, and the ease of use of the various features. This method can be used to evaluate both physical products and digital systems.

Step 1: Choose a user:

The user we will be asking as a reviewer would be Joseph Leach, who is the main reason for this idea and its implementation. The reason we chose someone with visual impairment so that the individual can themselves see and feel the difference.
Since the user is well educated and wanted to have technological advances on his smart glasses, they have shown keen interest in developing this product.

Step 2: Choosing the task:

Primary Goal:

- Ease in movement and be safe around the environment.
- Easy adaptable features and better comfort.
- Fulfil the tasks the consumer wants to finish such as getting stuff from shops and moving around in the labs and university campus.
- Accurate obstacle detection and face and object detection.

Step 3: Walkthrough of the task and documenting the experience:

- Does the user understand how to start the device and use it:
  - Yes, the user has been well informed regarding all the features of the new device and their constant involvement during the development of the device with the help of the user's insights has given us our result so fast.
  - The user being from a research background in science and technology has made it easier for them to understand the features and the process of using the technology.

- Are the controls conspicuous:
  - There are not much of any controls apart from on and off bottom.
  - There is a charging port, but it is using the same adapter charging as of a smartphone.
  - The output feedback will be in the form of vibration and audio.

- Will the users know the control is the correct one:
  - The idea behind this smart glass is very basic. The user doesn't have to do much while using it. The user will be well informed about the feedback and will be trained before using it individually.
  - For example, a user has to move from home to their university and the entire route is walking. The main point of the user is to avoid obstacles and take the shortest path possible and in advance goals, detect the faces of the known people.

- When they reach their destination, they will get an output signal in the form of haptic as the task has been completed or you are in your desired location.

- What was the experience and constraints:
  - One of the most important limitations that we faced while developing the device was the output time frame. It used to take longer time when we put more accuracy, but our goal is to get an output in less time and more accuracy.
  - Through extensive research and feedback, we got our desired accuracy and time but even during the cognitive walkthrough there has been a bit of lag in the output signals.

Conclusion:

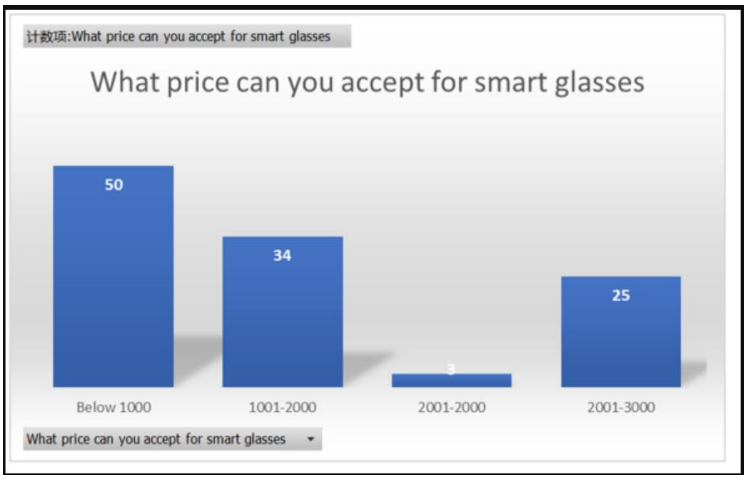
The result we got from the cognitive walkthrough is very positive, i.e., the user was happy with the device. We are hoping to increase the spread of smart glasses to people with visual impairments and give them ease of movement and daily activities.

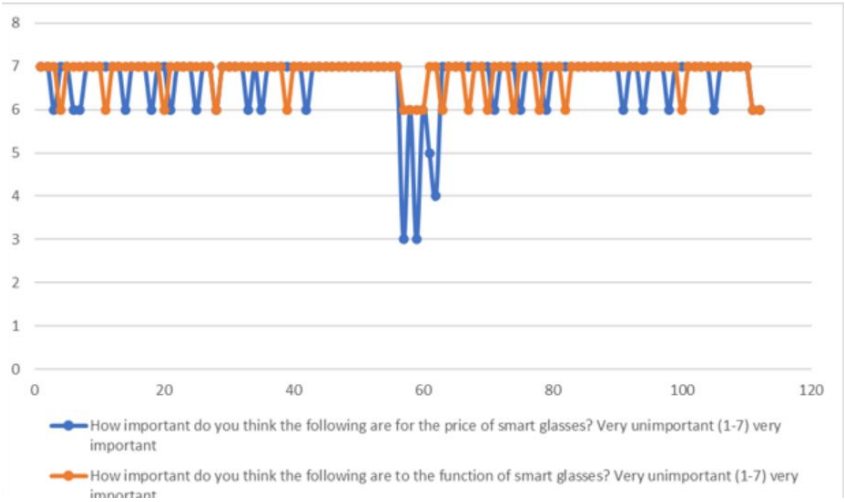
TEST 2: USER BASED SURVEYS:

So, some of the questionnaires that we have been asking our users are:

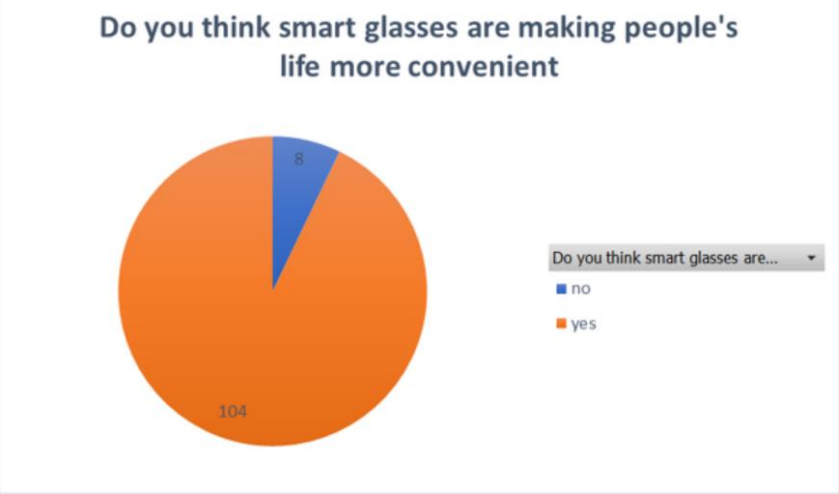
- How important is the design, weight, and appearance matter to the users?
  - All the consumers or testers who have tried smart glasses attach a great importance to the appearance and design of the smart glasses.
  - Even though the consumer market can still grow, we can already see the positive results. It can really guide a user and enhance a user's experience in their day-to-day life.
  - Weight concerns by the user have been taken off by this design as this device is very lightweight.

- How has the pricing of the smart glasses have been for the users and their thoughts?
  - According to the users, the price of the smart wearable glasses is directly proportional to the degree of function of respondents.
  - There have been interviews where most consumers generally accept the price of smart glass to be less than 1000 dollars, some are willing to go above 1500 dollars whereas the most requested users are willing to go up to 3000 dollars.
  - Generally, students or people with lower income can request the government or their respective companies for the device's funding.
  - Since it is a one-time investment, people are willing to invest in this device.





- Do you think smart glasses are making people's lives more convenient?
    - The current use of smart glasses is convincing more and more forward-thinking companies to get on board with the development of smart glasses.
    - Even though smart glasses need more awareness among the individuals with severe visual impairments, smart glasses have found valuable areas of operation, development, and growth.
    - The ease of movement and the confidence for the individual to walk by themselves has increased.
    - The device is very user friendly so anyone with a bit of training can use it efficiently.



- What other functions do you want smart glasses to have?
    - Introducing Augmented Reality into the technology.
    - More accuracy with the time lag.
    - More accurate with object detection and face recognition.
    - Proper vibration and audio output.
    - More aesthetic design.

- Do you think the technical team and the training team has a contribution to the introduction of the user's smart glasses?
    - Almost all the members who took part in the beta testing believe that without a technical team, it would be a bit confusing for an individual to understand everything by themselves at a fast pace.
    - We have gotten very good reviews for our technical and training team.
    - They have been happy about our care support and our concern for their feedback and our keen interest in the advancement of the device.

- What feature has been the greatest strength of the new device?
    - The most important challenge for any individual with visual impairment will be moving by themselves. So, the most important feature has been the obstacle detection by our ultrasonic sensor and laser sensor.
    - Secondly, the device has given strength, confidence, mental support, and motivation to the user to explore their environment all by themselves.
    - They don't have to wait for any guide, or friends, or someone to take them out to a new place.
    - Another very important thing has been the path planning and its combination with the GPS is something that has done wonders in the user's life. Now they don't have to rely on others to go to very far places or places with multiple routes and to wonder which one to pursue.
    - Object and face recognition has been a very important strength for the users who lost their eyesight after an accident or sometimes later in life. That way they can use the feature of detection to figure out the object and the person for a certain distance. It has given joy to our users.

TEST 3: QUALITY OF LIFE:

The degree of quality of life is calculated on the following basis:

- Easiness in the movement for the patient.
- Efforts to be put into daily activities.
- Comfort in experiencing things and their expressions.
- Work and school scenario.

There are certain set of parameters that are tailored to the set of devices:

- With the use of the new device, how much safer does the user feel when they do their daily activities?
    - The users who are using smart glasses gained more confidence with each use.
    - They don't feel vulnerable as they are confident that they can finish their tasks at their own pace.
    - Their motivation to explore more and more tasks everyday has increased exponentially.

- How much control does the user have over their daily activities?
    - Once they started to use the devices, the user is free to move all by themselves, can do all normal activities like going for grocery, buying garage stuff and household stuffs. People who are in agriculture or who are into physical activity jobs can do that without feeling low in their motivation.
    - They don't have to wait for anyone to guide them and can finish their respective tasks at their own wish without any help from someone.
    - They have total control over their day-to-day life activities.

- How much more do the users take part in the activities that they like?
    - There have been many recreational activities that a visually impaired person can take part in.
    - There has been a steep increase in the number of participants who started using smart glasses as they have gotten more confident and want to enjoy life like the rest of us.

- How painful it is for the user to do their daily activities?

    - Since it is a perceptive assistive device, there hasn't been any change in the energy required by the user to finish a particular task, but the stress or the energy crash caused by stress has been significantly low.
    - It takes significantly less time to decide or to go from one place to the other or to fetch something in the lab or in the house.
    - Because of less wandering for unimportant tasks, that object detection has helped the user to finish early, the user has been less tired as compared to before giving them enough time to pursue recreational activities.