XR-OS Wearable - Reduce E-waste & Personalize Computer

Report 2

Introduction

The project's main aim is to significantly reduce the amount of e-waste we produce while also personalising the devices we use. We've realised that focusing on the production of this e-waste is vital to the success of our project. We discovered that the fundamental vulnerability lies inside ourselves after doing extensive research on the internet, reading written papers, and getting personal experiences. The majority of us buy modern electronic devices to hide our insecurity rather than to enjoy the benefits they provide. We buy the latest gadget to prove to ourselves that we need it to live comfortably. The argument presented above is not the real one we need to pursue in this decade.

We could live comfortably with only the most basic technologies at our disposal. We don't need a phone with 10 GB of RAM or more to watch a movie or listen to music on the internet. A super-fast computer is not needed to write a letter or interpret a normal data map. The software industry exaggerates the pervasive need for high requirements. This is where our concept takes shape.

The Basic Idea

The project aims to develop eyewear that will help you complete the majority of the tasks you attempt on your phone or computer. Our system will be able to play music or video, type any content, participate in a video conference, and much more in a futuristic style. For the time being, the glasses would allow you to perform a wide range of tasks, except those

requiring high-performance programmes, such as Adobe Editors, high-end programming, video games, and so on. We've devised three tactics to assist us in achieving our objective.

The Three Approaches

1st Approach

The XR approach will be used to produce eyewear. This eyewear will allow us to perform basic functions both inside and outside of the gadget and online. Many of our needs could be conveniently met by using the internet. Anything is possible, from purchasing a bottle of water to putting together a presentation for a new business concept. The goggles would likely have unlimited capabilities. The core technology behind eyewear is augmented reality. The screen will be projected in front of the consumer by the headgear. The user could control the system with hand gestures. He can complete all of the tasks from any place.

2nd Approach

The next step is to develop a mobile phone-based augmented reality headset. This method allows one to enact the concept of the first approach. The unit will have a slot for the user's cell phone. Our software would be downloaded to the phone and would provide all of the tools needed to complete the tasks.

3rd Approach

The final strategy would be to use an AR headset to run our augmented reality browser, which would enable the user to complete the tasks mentioned above.

Implementation

Head-mounted displays are the newest craze sweeping the city. We've seen a variety of wearable displays, like the holo lens, Google Glass, and augmented reality systems

including the Oculus Rift. Video sharing, navigation, searching, and reading are all popular uses for head-mounted displays.

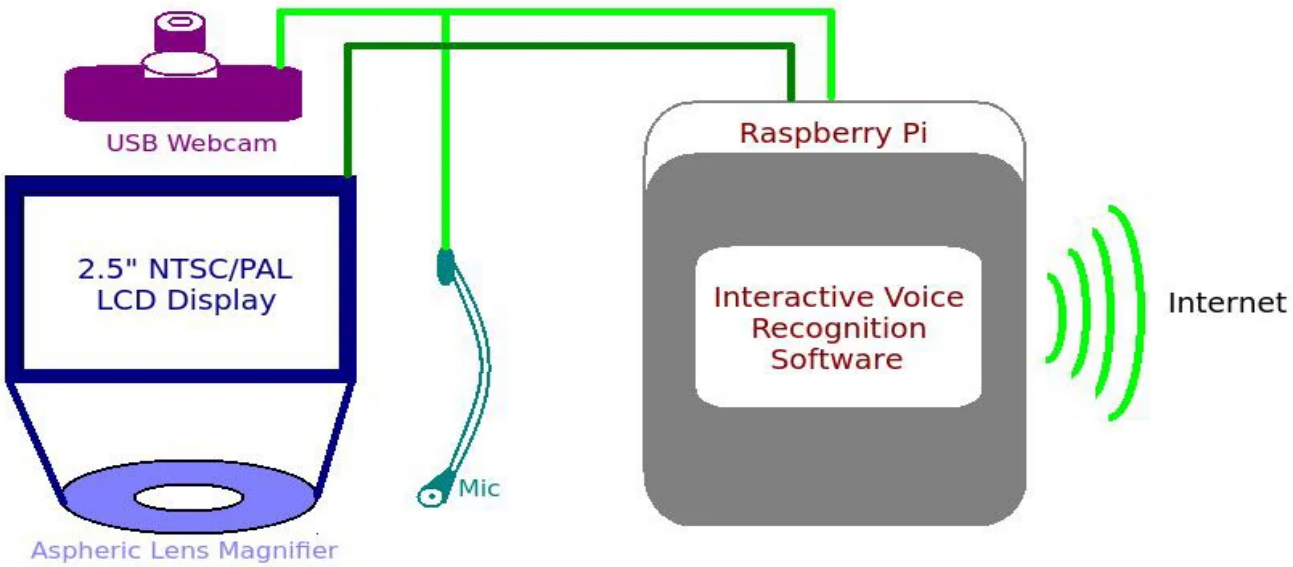
Since other advanced hardware is either costly or unavailable, we are attempting to build a head-mounted gadget using the Raspberry Pi as the primary hardware part. Based on our previous studies, we have come to this conclusion, and we are continuing with this concept.

Design in detail

Hardware

The Hardware Components	Specifications Required(Important)
Spectacle	Fibre or Plastic
USB webcam	Resolution of 480p and above, In-Built Mic
Headphone	High Quality with mic
Aspheric Lens Magnifier	Magnification of 5X
LCD/OLED Screen	2” - 2.5” SPI TFT LCD / OLED
Raspberry Pi 4 Model B	4GB Ram

We want to create a head-mounted display in the combination of a spectacle or a hat. It will be a single-eyed interface (i.e., the user will be able to see the device display with his right/left eye). A Raspberry Pi, micro LCD/OLED monitor, USB webcam with a built-in mic, Headphone with mic, and loupe magnifier with the aspheric lens are among the hardware components. This monocular wearable display, as seen in the image below, is powered by a Raspberry Pi.



The LCD monitor functions in the same way as any other PC display. When certain voice commands are used in conjunction with the device, the system displays the relevant results or data in front of your eyes. Email, maps for navigation, Google search, YouTube, webcam recording, and first-person viewing of other cameras are only a few examples. To perform these functions, the Raspberry Pi integrated with this head-mounted display must be connected to the internet.

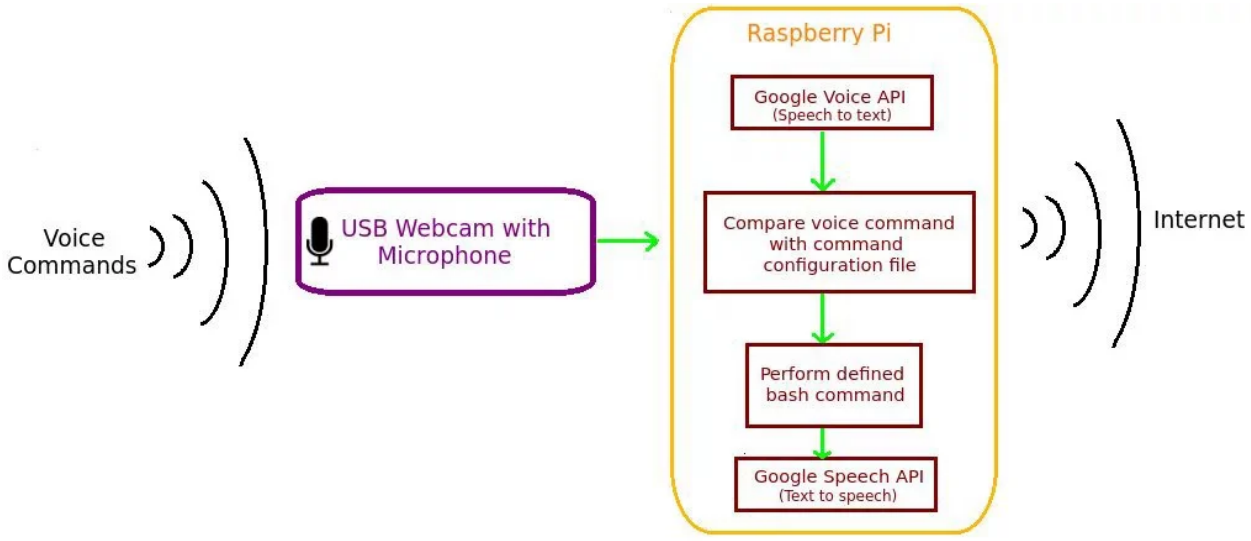
Finally, the whole machine will work together to create a tiny computer right in front of your eyes.

Software

We're working on developing voice recognition software for the Raspberry Pi in the software section. Google Voice and speech APIs are used in the applications defined here. The user's voice command is picked up by the microphone. The Google voice API is then used to translate this to text. The text is then compared to the other commands in the commands configuration file that have already been identified.

The bash command associated with it will be executed if it matches either of them. You can also use the Raspberry Pi as an interactive voice response device by having it respond to your commands through speech. This is accomplished by converting the text into speech

using the Google Speech API. Here's a block diagram of how the voice recognition app for Raspberry Pi works in general.



The Present Work done - 02/05/2021

The community was divided into two sections. The one is focused on software creation, while the other is focused on hardware. Adarsh and Nandagopan are in charge of software development, while Andreas and Praveena are in charge of hardware development.

The progress of each group is defined as follows:

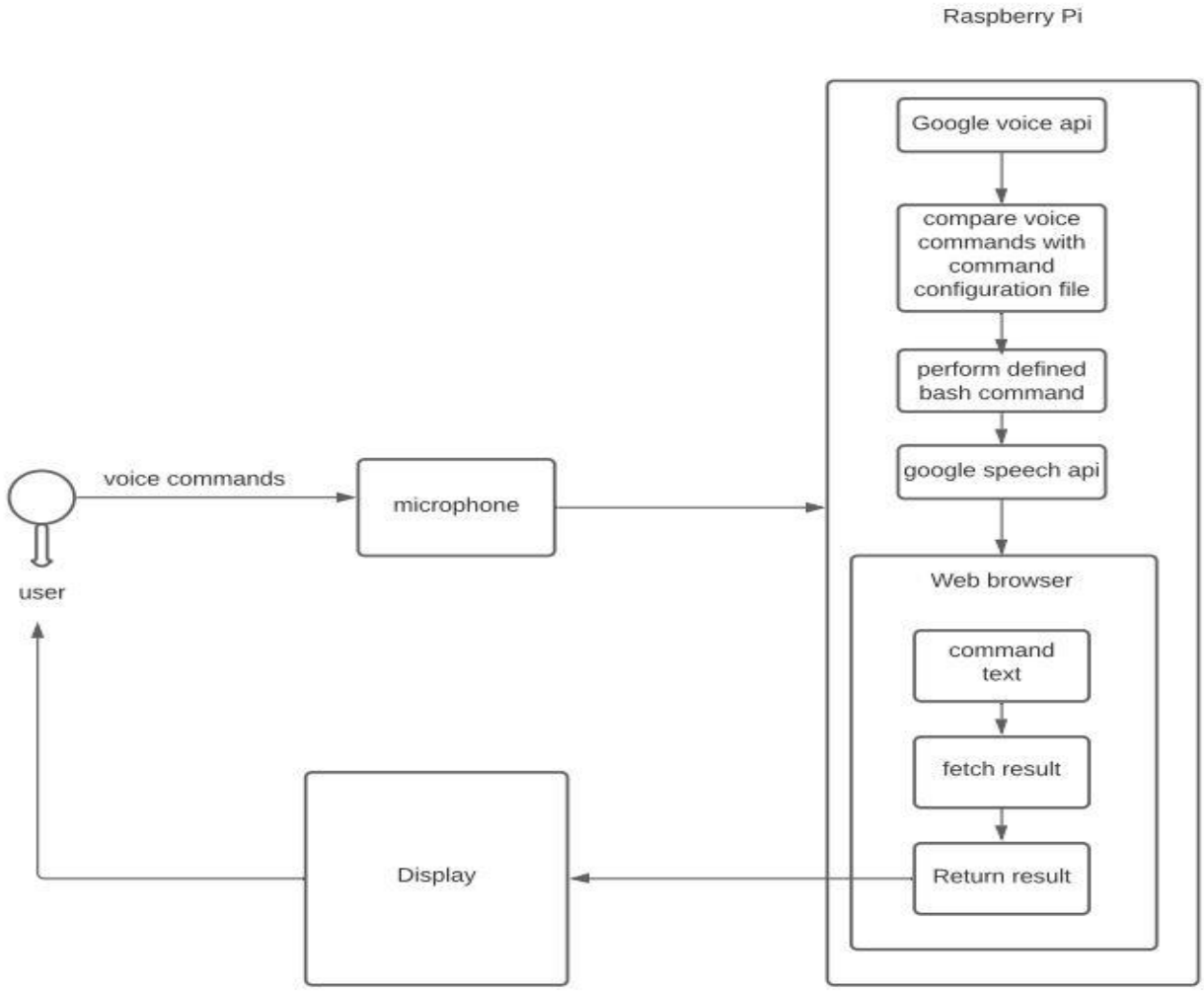
Software Development:

The Google voice and speech APIs are being used to build voice recognition applications for the Raspberry Pi. Our team is working on it, and we recently ordered the Raspberry Pi, so further development and software testing of the hardware is needed. We're currently testing it on a Raspberry Pi emulator.

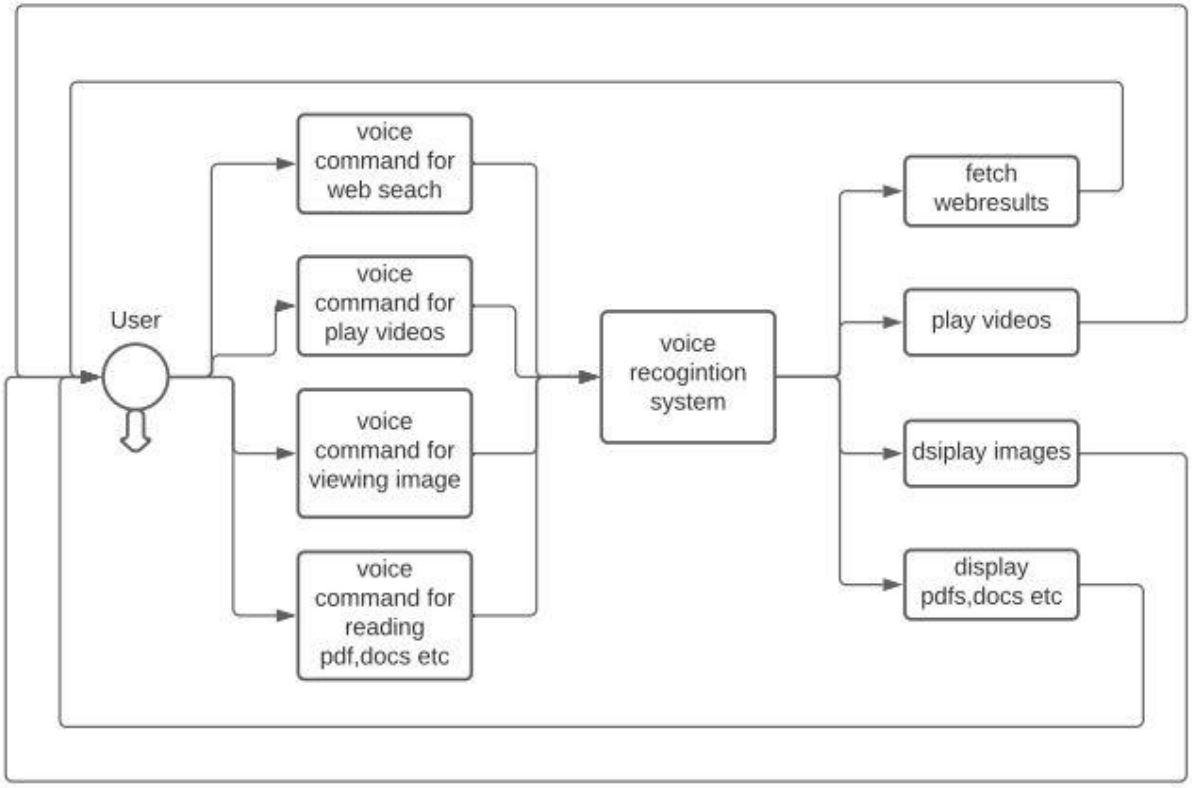
Hardware Development:

We just recently ordered a Raspberry Pi and other sub-components, so the development process has yet to begin. We'll be using a Raspberry Pi 4 as the platform and Linux/Raspberry OS as the operating system. We'll be able to use the Raspberry Pi to add some components that are intended for use in eyewear. As soon as we receive the materials, we will begin assembling and constructing the hardware. The Raspberry Pi 4 Model B has arrived, and the remaining components are scheduled to arrive on or before May 8, 2021. Unless the pandemic turns out to be much worse than it is now.

The Working Diagram



User Case Diagram



Schedule

Work to be Completed	Date
The preparation of Raspberry Pi 4 Model B and installation of voice commands	10-05-2021
Overlaying the windows over the video feedback	17-05-2021
Final Build	24-05-2021

Team

- **Software**
  - Adarsh
  - Nandagopan

- **Hardware**
    - Andreas
    - Praveena
- **Guide**
    - Sri Ahammed Siraj