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

Report 1

Introduction

The main goal of this project is to drastically reduce the amount of e-waste we generate and to personalize the machines we use. We've realized that focusing on how this e-waste is produced is critical to our mission's success. After doing extensive research on the internet, reading published articles, and having personal experiences, we discovered that the fundamental weakness lies inside ourselves. The majority of us purchase modern electronic devices not to enjoy the benefits they offer, but to mask our vulnerability. We purchase the most recent innovation to prove to ourselves that we need it in order to live comfortably. The above response is not the real answer we need to find in this decade.

With just the most simple technology at our disposal, we could live comfortably. To watch a movie or listen to music on the internet, we don't need a phone with 10 GB of RAM or more. Writing a letter or interpreting a data chart does not necessitate a super-fast machine. The software industries exaggerate the overwhelming need for high specifications. This is the stage at which our idea begins.

The Basic Idea

The aim of the project is to create eyewear that will assist you in completing the majority of the tasks you attempt to complete on your phone or computer. In a futuristic style, our device will be able to play music or video, type any material, participate in a video conference, and much more. For the time being, the eyewear will allow you to perform a wide range of tasks, with the exception of those that involve high-performance systems, such as Adobe Editors, high-end programming, video games, and so on. We've formulated three strategies to help us achieve our goal.

The Three Approaches

1st Approach

We intend to create eyewear using the XR method. This eyewear will allow us to perform basic functions both inside and outside of it, as well as over the internet. The internet could easily satisfy a lot of our needs. From buying a bottle of water to putting together a presentation for a new business idea, anything is possible. It's possible that the goggles will be able to do anything. Augmented reality is the main technology behind eyewear. The eyewear will project the screen in front of the consumer. Using hand gestures, the user could access the device. He could complete every one of the tasks from any place.

2nd Approach

The next plan is to create an augmented reality headset with cell phones. We can realize the first approach's idea through this approach. The device would be designed with a slot that would hold the user's mobile phone. Our app would be installed on the phone, and it would include the required resources for completing the tasks.

3rd Approach

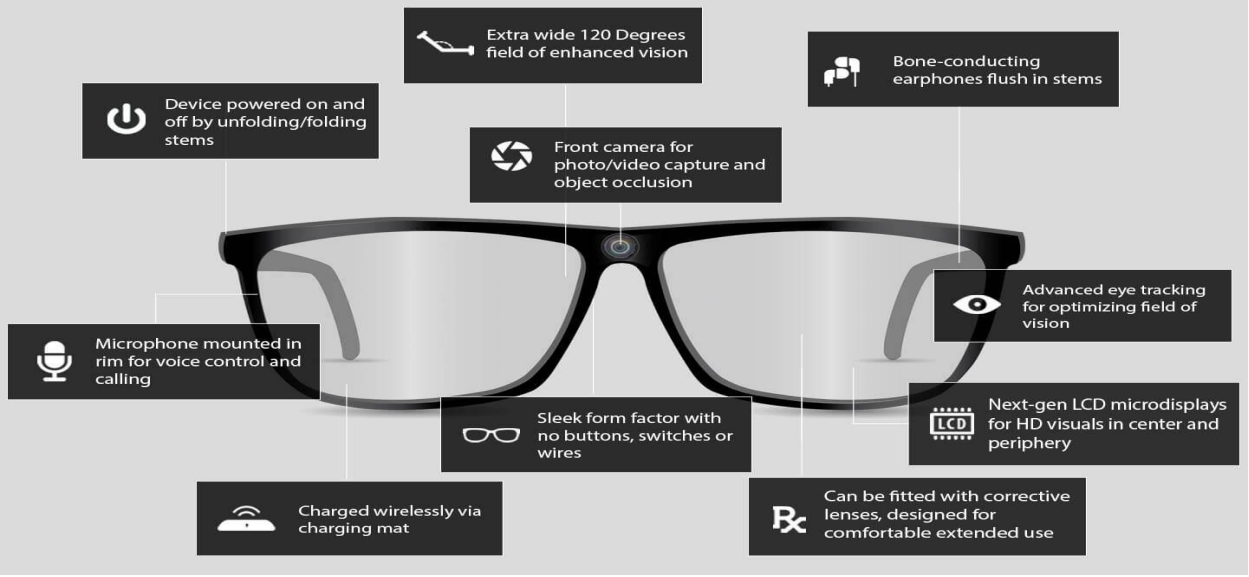
The final strategy would be to add our augmented reality application on an AR headset, which would allow the user to complete the tasks outlined.

The Approaches in Detail

1st Approach

This is the technique we're attempting to execute. The eyewear concept could be broken down into two parts: hardware and software. In terms of applications, we're attempting to build an AR web browser in addition to the standard AR apps that can be installed on the device. The browser would allow the user to access the internet, where they could easily accomplish a great deal. When using the internet to complete a mission, we don't need

many of the device specifications. The development of mail, presentations, playing video and music, small scale programming, and other tasks can all be done in the browser since the work is performed on a separate server rather than on the machine. The number of tabs that can be opened, as well as a few other features, will be determined by the system's efficiency. In addition, gesture control is used to manage the computing environment. Overall, it would help us to design eyewear that would allow us to carry out our daily tasks with ease and style. Well-designed eyewear will only need a few software upgrades over the course of several years before being replaced with a better version. As a result, we were able to accomplish our key goal of reducing e-waste. The product will be more appealing and useful to most people than the unnecessarily cumbersome system or laptops they already use to perform basic tasks. Only a web browser and a file explorer are included with the setup. As a result, the user would be able to configure the system to meet their specific needs. As a result, redundant software may be removed from the system, making it more user-friendly and easy. The perfect eyewear is as follows:



2nd Approach

Our smartphones have far surpassed the computing power of our desktop computers. This method tries to make better use of this function. The development of an augmented reality headset will enable us to use our smartphones as its primary operating system. The AR app will transform the phone into AR eyewear, along with the headset. It would carry out all of

the functions of the first method. This would remove the need for the first approach system's construction material. However, this will also promote the use of newer smartphones. While the value of such a smartphone with our application isn't significant because the majority of our work is done on servers, it does make a difference. Nonetheless, it would allow us to reduce other e-waste produced by tablets, laptops, and other devices. This method has advantages and disadvantages, but the concept can be implemented.

3rd Approach

This system creates the highest amount of e-waste among the three. We're attempting to apply our design to existing AR headwear in this project. The common functions could be done with ease, but different manufacturers would have different objectives in mind for the device and therefore would have different features and system components. Which may or may not be necessary for the implementation of our concept. As a result, the product's price will increase. As a consequence, the general public will continue to seek out less expensive high-tech solutions, resulting in a rise in e-waste and wasteful equipment generation. The idea's implementation on a less complicated AR headset will allow the idea's overall value to shine.

The Present Workdone - 02/04/2021

The group was split into two sections. One is concerned with software creation, while the other is concerned with hardware. Software development is handled by Adarsh and Nandagopan, while hardware development is handled by Andreas and Praveena.

The following is a description of each group's progress:

Software Development:

The group is currently working on creating a web browser. We're going to use Linux as our operating system. The team is both learning and improving the browser. For the time being, they're working on a prototype to gain a better understanding of the fundamentals of web browser creation. Almost all HTTP requesting codes have been established and checked by the team. They're still debating whether to use swig or gtk as the user interface.

Other specifics, such as multiple protocols feature request and response, as well as multiple forms of request method support, are being debated. By April 9th, the team aims to have a standard web browser. Later in the project's development, the team hopes to move from a traditional web browser to an AR-compatible one.

Hardware Development:

The construction phase has not yet started. We'll be using Linux as the operating system and we'll be using a Raspberry Pi 4 as the device. The Raspberry Pi will allow us to incorporate several components intended for use in eyewear, such as bone conduction. With two solutions in hand, the displaying process is actually in a quandary. The first option is to create a computer that superimposes the show over our usual viewing area. The other choice is to make a screen that superimposes the computer screen over the front view. The latter has the downside of dangling a display over one's eye and seeing the whole world through it. The first choice is the best, but it has a variety of implementation choices. The first and best choice is to use a holographic waveguide display as a form of implementation. This approach has a range of benefits, including a high brightness of up to 2000 nits, high transmittance of over 85%, and so on. The implementation of such a display is the issue with this choice. These types of displays produced by Sony are currently not in production, and those that are seem to produce require a request of massive quantities to manufacture. Other waveguide methods can be used to incorporate our idea, but holographic waveguide is the best in comparison.

Aerial imaging via retro-reflection is another choice, in addition to waveguide display. The picture form seems to be the source of the problems. The photos that could be created using this process, as well as their accuracy, clarity, and other factors. In contrast, the less expensive alternative tends to be this one. Aside from that, there is a normal reflection method in which the screen is mirrored to a semi-transparent small solid structure. This structure would serve as a projection surface for the projector. We use a specialized magnifying lens to position the screen over the usual focal point of near vision of the human eye in order to trick the brain into finding the above image superimposed to the users viewing area. The AR display will be created by combining these elements.

The more simplistic method for implementing the display over a screen on the eyewear that is to be put over the eye may be considered to some degree, as long as the camera

and screen reaction times are within an acceptable range, then screen viewing is a viable option.

Conclusion

The ideas outlined above were developed as a result of the study. As the availability of materials and the time period to produce the whole product are considerations to consider, the best way to step forward has yet to be decided. The team is re-examining the contents in order to correct the issues and move forward with the construction. The team expects to finish a significant portion of the project by the end of April.

Team

- Software
    - Adarsh
    - Nandagopan
- Hardware
    - Andreas
    - Praveena
- Guide
    - Prof. Ahammed Siraj K K