

# Augmented Reality Glasses for Capturing Images

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**Abstract:-** From the past few decades, a large chunk of research in the sphere of Digitalization, AI, and IoT has some noteworthy contributions to AEC industries. One such contribution is augmented reality. The objective of Augmented reality is to connect the real world with a virtual world i.e. with the digital world. This paper aims to introduce the working mechanism and design of an AR Glass which is operational in capturing the images without making use of hands but as an alternative by a blink of eyelids for a described amount of period. The paper idea can be embodied in a prototype with image processing, IR sensors, Arduino Nano, Bluetooth connection. This project aims to capture an image of visible surroundings at that instant of time and send it to the device/mobile over Bluetooth connection to the AR glasses. Concerned with the future aspect of this idea, this idea aims to reduce the time requirement and tedious processes to capture an image that would be difficult with a normal mobile.

**Keywords:-** Arduino Nano, Bluetooth, IR sensors.

## I. INTRODUCTION

Digitalization and automation are the growing types of reforms going on in the modern world to ease our day to day life. The usage of cloud storage has increased rapidly with the advent of 4G technology and cloud computing. Capturing pictures, important notices with mobile is a tedious process instead if we could capture the things just by our hand gesture, and automatically storing it in the cloud would ease our job. The use of AR glasses plays an important role in this issue, already use in most of the fields. This can be effectively implemented using IoT. This technology provides a safe, automatic, and easy way to capture pictures just with hand gestures.

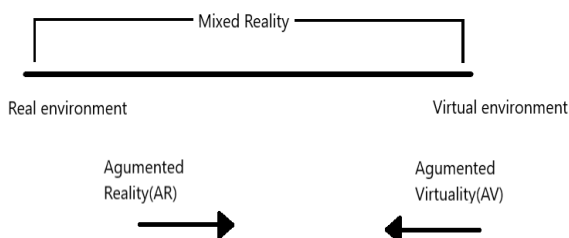


Fig. 1 The Reality-Virtuality continuum

## II. LITERATURE REVIEW

Nowadays there is a massive growth in the field of Artificial intelligence, microcontrollers, microprocessors, etc. which are the soul parts in the building Augmented Reality (AR)glasses. The first glimpse of the technologies

was given by Ivan Sutherland in the 1960s. He mainly enhanced his research in the field of MARS (Mobile augmented reality system).AR technologies are used in various disciplines like engineering, aerospace, entertainment, military, automotive industries, etc. The AR technologies are still in the stage of research, the potential and the ability are yet to be achieved. Moreover, there is also a need for particular application areas for the types of AR. Earlier AR was used only in the fields of construction sites for progress and monitoring of defect detection. The current trend is all based upon the wireless network technologies and is gaining more influence in recent years, and the blend of AR and these wireless technologies make way for research in the future. The main objective is to replace the complexity of the current technologies of capturing the uncertain situation with the AR glasses.

## III. METHODOLOGY

- A. Connection or Pairing: The device is first tuned and connected to the available shown devices or the device you want to connect with. Once the device is connected to the system, it automatically stops scanning.
- B. Sensor: Whenever there is a need to capture the images that left side of the eye is closed for a particular period of time the IR sensor senses the input based upon the obstacle (i.e. binary analog system 0 and 1). when the eyes are closed IR sensor senses the obstacle and output is one and when the there is no obstacle it gives output has zero.
- C. Image sharing: when the IR output is 1, the image captured. This image saved in the temporary memory. This memory can be accessed directly through our computer and other devices. But when the memory gets filled the images are automatically sent to the Bluetooth connected device and again the RAM is empty and set to capture the new images. If the images are confidential or it requires to access secured cloud database as a safety measure, we can install fingerprint scanner to Secure our data.

## IV. WORKING MECHANISM

AR Glass design contains two cameras one each at the upper outer ends of the left and right part of the front frame as shown in Fig.2. The frame of the AR glass will provide structural stability to both cameras so that they adhere to their positions and cause fewer vibrational disturbances while capturing an image. One side of the glasses contains an Infra-Red sensor which acts as command input for capturing the image.

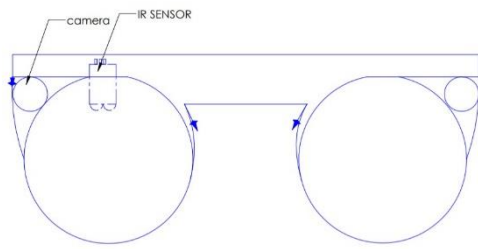


Fig. 2 Front view of AR Glasses design

The temples are the long arms on the side of the frame that fit over your ears for a comfortable fit. These temples contain the processing units and circuit and all the assisting components of the AR Glasses.

The left temple, refer Fig. 3, includes a power button, charging port, LiPo battery, and Bluetooth adapter within it. The power-on button is used to power on and off the AR Glasses, at off state the glasses will behave as a normal spectacle or eyeglasses. A rechargeable LiPo battery is used to power up the glasses, which are efficient as well as lightweight. Bluetooth adapter is added for wireless communication between the AR glasses and a mobile. Both the devices are paired for data exchange.

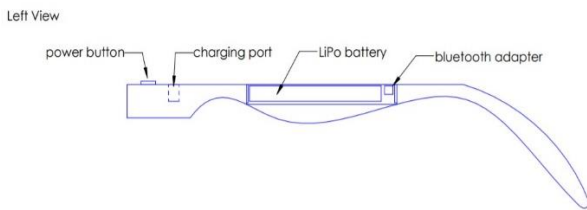


Fig. 3 Design of the left temple of AR Glasses

The right temple, refer Fig. 4, includes all the processing units, an Arduino Nano board, and a LED bulb which displays the state of AR Glasses, different colours of LED indicate the different state of AR glasses e.g. standby mode, capturing the image, sending the image. A fingerprint reader can also be added for security purposes.

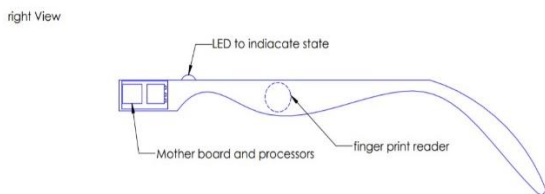


Fig. 3 Design of the right temple of AR Glasses

All the components are impregnated into the frame so that they do not upset the ease of the user. Fig. 4 will represent the internal circuit of this proposed system.

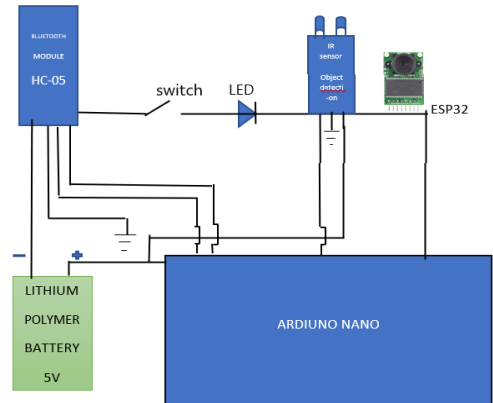


Fig. 4 Represents the circuit of proposed AR Glasses

A power button interfaced with the processing unit is pressed to power on the AR Glasses, otherwise, it behaves as usual glasses. Once the power-on button is pressed AR glass is powered up and waits for the command. The command is given, AR glass will capture the image of surroundings which the user is seeing at that instant, which is also what the camera's field of view can cover. After capturing the image, the image is sent to the device which is connected via Bluetooth. The receiving device can be a mobile phone Android or IOS, it can be a desktop over Bluetooth connection.

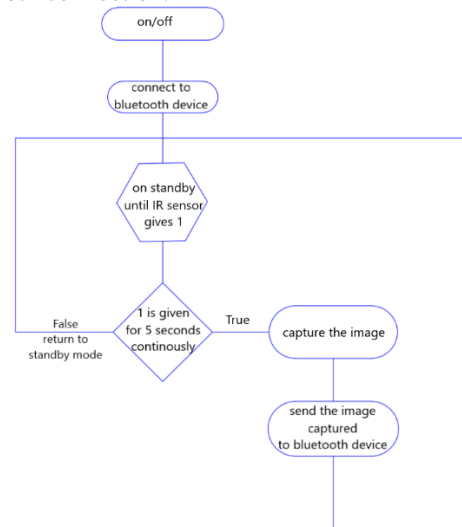


Fig. 5 Flow chart for working mechanism of AR Glasses

IR sensor will operate as input receivers for the command to capture the image. IR sensor works based on the presence of obstacle in front of it. If any obstacle is present in front of IR sensor, returns a 0, else gives 1. If an obstacle is present its colour is sensed to be as white and absence of an obstacle is sensed to be black i.e. if a white colour is kept in front of the IR sensor it gives 0 if anything with black colour is placed then IR sensor will give it as a 1. In the model of AR Glasses given in this paper IR sensor is attached to the frame is placed such that it is on the right eye such that it superimposes with the Sclera of the eye. When eye is open sclera of the eye is exposed to the IR sensor, which is white hence the command 0, no action will be taken. Once the

eyelids shut IR sensor senses black colour and pass one. As one is passed Arduino Nano will capture the image and send it to the Bluetooth device connected. Generally, a person blinks his eyes for 10 times per minute, this would result in 10 undesirable images every second hence Arduino Nano code is tuned to capture an image if and only if the eye is closed for 5 seconds. If eye is kept closed continuously for 5 seconds then 1 is sent to the processors by IR scanner continuously for 5 seconds hence the image is captured and sent to the devices connected via Bluetooth. Fig. 5 clearly displays the working mechanism in a pictorial manner using flow chart.

As an extra feature Image is saved in the temporary memory. This memory can be accessed directly through our computer and other devices. But when the memory gets filled the images are automatically sent to the Bluetooth connected device and again the RAM is empty and set to capture the new images.

Logical and processing work can be done with an Arduino Nano board but to implement this idea in a prototype, processors can be tuned to do this job and can be impregnated into the AR Glasses.

## VI. CONCLUSION

This paper aims to propose a system that is compact which can be fitted into wearable glasses easily. The system works on a wireless Bluetooth connection which makes it uncluttered and organized hence easy to work with. Access to the internet can also be provided to AR Glasses so that the captured image can be stored in cloud storage, at this point to access your cloud storage fingerprint reader, on the right temple may be helpful. With good graphical designs, a nice aesthetic look can be given and made into a fashionable one. Having a chargeable battery is advantageous as it can be charged and the glasses can be carried to any place according to one's will. In further development hand gesture recognition system can be implemented which allows the user to perform more operations concerned with the images, like cropping the image, capturing only a part of the view, capturing things in a particular field of view and at a particular distance to the field of view, etc.

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