SMART SPY SPECTACLES

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Abstract

SMART SPY SPECTACLES

This project is based on the concept of Head Mounted Device (HMDs). Improvement for Quality of Service (QoS) is of great necessity for the World due to its increasing demand day by day. Through this Device we have been able to generate a Real-time connection between two sources with the help of a hidden camera. These improved glasses provide availability of data to end users in a most efficient way. Present spying techniques depend upon audio transmission and Video Storage technology which are unintelligent. Through the Radio Frequency Modules we have been able to forward data (Video) via RF modules i.e. VHF Module and WIFI Module. Both Software and Hardware implementation are the part of this spying device project.

CERTIFICATE FOR CORRECTNESS AND APPROVAL

It is certified that the work contained in the thesis for SMART SPY SPECTACLES Muhammad Junaid, Saad Hassan and Moazzam Mohuiddin under the supervision of Asst Prof Waleed Bin Shahid for partial fulfillment of Degree of Bachelor of Electrical Engineering is correct and approved.

Approved by

Asst Prof Waleed Bin Shahid

Electrical Engineering Dept.
MCS

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DECLARATION

No portion of the work presented in this dissertation has been submitted in support of another award or qualification either at this institution or elsewhere.

DEDICATION

In the name of Allah, the Most Merciful, the Most Beneficent.
To our parents, without whose unflinching support and unstinting cooperation, a work of this magnitude would not have been possible.

ACKNOWLEDGEMENTS

We bow in gratitude to Allah Almighty for giving us strength and knowledge to accomplish this task as nothing happens without His will.

The group is indebted by the immense help and moral support given to us by our parents as it would not have been possible without their prayers.

The team also likes to thank our project supervisor, Asst Prof Waleed Bin Shahid, without his support and encouragement; it would not have been possible to complete this project.

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List of Abbreviation

Wifi	Wireless Fidelity
CMOS	Complementary metal-oxide semiconductor
HMD	Head Mounted Device
GPS	Global Positioning system
UHF	Ultra High Frequency
IP	Internet Protocol
TV	Television
SOC	System On-Chip
AR	Augmented Reality

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CHAPTER 1

INTRODUCTION

1.1 Background

Nowadays, technology is inevitable part of people's daily life. Many people are using smart phones or phone applications to assist them in their everyday life. One of the new trends is wearable technology. It includes a wide range of devices. These devices are worn by people, they are usually always on and communicating with the user.

Figure 1: Smart Devices

1.1.1 Wearable Computer

The wearable computers are the smart devices, which can be put on or in the human body. Those smart devices are able to integrate the most cutting-edge technologies like multimedia, wireless communication, micro sensors, GPS, biometric system and so on. Moreover, those smart devices are able to collect, process, share and feedback every information of the people at anytime and anywhere, through a combination of big data platforms, cloud computing, mobile Internet and so on.

1.1.2 AR

AR is combination of the real environment with virtually (2010, 1). AR can be used by all senses such as sight with the use of HMD, hearing with applying hearable devices or touching such as haptic feedbacks. So, wearable are a great medium to apply AR in daily life.

1.1.3 HMD

Head mounted displays (HMDs) have been an active area of research since the beginning of 1990's and it has since come a long way from the early. Xybernaut Corporation

produced one of the first commercial wearable computers with head-worn display. It was quite lightweight in comparison with other products and it had a see-through head-mounted display which enabled users to see the display and receive data in the field of view.

Figure 2: Head Mounted Devices

1.2 Devices that make wireless Communication possible

1.2.1 Computer Device

- Computer Devices, referred as clients, operate on a wireless network.
- Basically the end user systems.
- Generally, any computer device can communicate with others devices by using a wireless network.
- Computer's operating system runs the software needed to realize wireless network application.

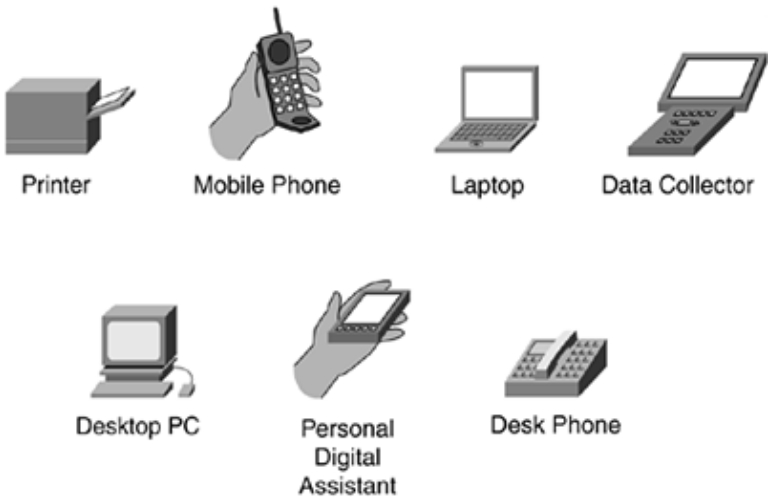


Figure 3: Computer Devices

1.2.2 Wireless Medium

- Air serve as a wireless medium for propagation of electromagnetic waves.
- Wireless medium flows information between computer devices and the wireless infrastructure
- Quality of service or transmission, however, depends on the number of obstacles present in the air which scatter the strength and range of the signal
- Air medium have been in use by the electromagnetic waves over more than 100 years.

1.2.3 Wireless Network Infrastructure

- Interconnects the wireless users and the end systems.
- Mostly consist of base station or a distribution system to enhance the wireless communication and also fulfill basic necessities for specific applications.
- Generally, Network infrastructure consist of access controller which use to reduce the smart access points by providing plans for authentication and authorization.
- It uses a server which validate the identity for the systems

1.2.4 Wireless Antenna

- A transducer that converts the radio frequency waves into alternating current or vice versa.
- There are both capturing and transmitting antennas used in the networks.
- Some wireless network have built in antennas and some have a choice to place the antenna which is required for specific application.
- Most commonly used antenna is the omnidirectional antenna which sends a signal equally in all directions around it.

1.2.5 Application Connectivity Software

- Many applications like email and web surfing perform well over wireless network
- All it takes is a software or a browser on a client device.
- Application connectivity software is necessary as an interface between the end systems and user computer device.
- It is also important in addition to enable the access points and controllers to communicate between the user's computer device and the application software located on centralized server.
- Software also provides all functionality and control with central server.

1.2.6 Wireless Repeater

- Regenerates/amplifies a digital signal while transferring it from one node to another
- It also restores the signal to its original shape.
- The basic characteristic of a repeater is that whatever it receives, it transmit to the other delegated receiver.
- Generally, Repeaters are used to extend the range of transmission.

Figure 4: Wireless Repeater

1.3 Future of HMDs

- The future is never easy to predict
- After the first boom in the world of Head mounted devices in early 90's, HMDs have been attracting much more attention recently.
- Ever since the increasing adoption of augmented reality (AR) and virtual reality (VR) technologies, making it better, more efficient, reliable, faster and more secure.
- As this technology comes in action very late but still it is under consistent progress. HMD has an enormous potential to be incorporated into a large number of applications including education, Healthcare, military application and industrial prototype.

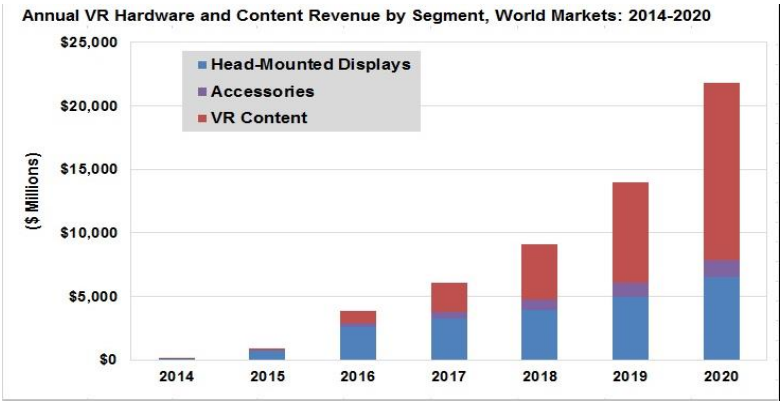


Figure 5: HMD and VR Revenue compared to other accessories

- HMDs headset increasing in the gaming applications because of their lightweight.
- We get to hear new terminologies of HMDs as smart glasses which were never heard of before. Many industries and companies are focusing to manufacture a smart HMD as video see-through and video transmitting displays.
- These HMDs targeting medical, entertainment and social market to fulfill their requirements.
- HMD is going to be the next big thing in the future because there are a lot many other HMD's which are set to launch this year.

Figure 6: Growth Rate of HMD

- Making HMD's portable with the smart phone is the main area of focus to make it more popular and economical.

1.4 Problem Statement

Wearable technologies are in the early stage of development and adaptation so there is a lot to explore on social acceptance and key use cases. In case of HMDs, It use totally different form factors for input and output of the device. So, use of such new systems may bring out several social and cultural issues.

1.5 Proposed Solution

HMDs in form of Smart Glasses are the newest in technology that are no longer science fiction, but entering a rapid development period and becoming the new wave of the mobile Internet which enables

- Live Transmission
- Wide Range Communication
- Auto/ Manual Activation

To achieve the objective, first is to integrate it on an analog technology which is UHF frequency band

- This technology previously used for broadcasting TV signals and vice versa.
- A UHF frequency band is very much capable of transmitting video signal worldwide depending upon the antenna used and also power supply.
- UHF frequency band is an analog technology which required all analog components because of that CMOS camera will be used which is mainly used in wired security surveillance.
- As it is a past technology version so required camera and battery is a little bit big in size which will cause an increase in the size of the glasses.
- Because of the unavailability of the required size of Glasses, solidworks software will be used to design the glasses and print will be taken by the 3d printer.
- An analog Television will act as a receiver as it catches the signals and with the help of tuner, TV will be tuned to desired frequency.

Analog is the past technology, so as an upgrade version, same project will be implemented on 2.4 GHz band which is Wifi.

- An IP camera will be used with some specific components.
- The wifi antenna will be able to hotspot its signal so that it cannot only receive the surrounding wifi signals but also transmit its own wifi.
- An android application will be used to operate the IP camera which is normally use for IP surveillance system.
- A glasses will be design according to components in solidworks software.
- An android mobile phone will be act as a receiver which will show the live transmission.

1.6 Limitation

Analog HMD will have certain limitation

- Small Range
- Tuning Issues
- Small Battery Life

Which is due to

- Increased Interference
- Freuency Variation due to atmospheric factors
- Analog has high Consumption components

1.7 Organization of Thesis

Chapter 1 It has already covered a brief overview of smart HMD Device. The problem statement and its solution that Smart glasses has come up with.

Chapter 2 It deals with the brief overview of the components and their specification as per the requirement and existing literature of this technology which shows the current work done in this field.

Chapter 3 Different approaches i.e. Analog and Digital (Wifi Based)

Provide overview of design and explain in detail the workdone i.e. hardware processes, software processes

Objectives covered by this project

Chapter 4 Discuss its various application and fields which will be enhance by this project

Chapter 5 Shows the required Resources in tabular form

Chapter 6 Shows the references used.

Chapter 7 Contains the bibliography of the projects and related technologies and devices which related with this project.

At the end of the document, appendixes which give the additional relevant details.

CHAPTER 2

BACKGROUND STUDY

2.1 Project Domain

The scope of undertaken this project is to “Design and develop a hardware HMD device that fetches run-time feedback of surrounding and sends it wirelessly to the receiving end in a spying way. Accordingly, the project falls under the broad umbrella of HMD, wireless transmission, surveillance and RF domain. The domain itself have a wide scope and quite promising.

The overall demand for HMDs have rapidly growing in recent years in terms of run-time functionalities, connectivity and a number of applications.

2.2 Existing Literature

Smart glasses are the computer glasses that add information alongside or to what the wearer sees. Like other computers, Smart Glasses can collect from internal or external sensors. Early models were able to perform the capturing of image or voice recording type of basic tasks. It may support wireless technologies like wifi, Bluetooth and GPS. Currently wireless glasses that utilizing wireless technologies have capability to receive calls, act as handsfree that can communicate with the internet and function as portable media player. Some smart glasses, also feature full tracking capability.

Epiphany Eyewear made the basic and initial model of the smart glasses which records video. After that a new device is introduced as EyeTap that is worn in front of an eye and has ability to capture the scene available to the eye as well as a display to superimpose computer generated imagery on the original scene available to the eye.

In 2016, Snap Inc manufactured a new spectacles dedicated to recording short videos for snap chat. It has a manual button to record the video and then transmit it to mobile phone via Bluetooth. They were made for image messaging and the initial step to make smart glasses as wireless smart glasses.

2.3 Problem Formulation

Some amount of work has already been done in different countries with diverse features such as use of picture capturing, recording videos and use it as a media player. The proposed project aims at making the smart glasses is to start research in new technological ground. This technological development will be mainstream. It is currently being

introduced as a storage device. Our aim is to transform it into a full duplex communicating device containing live transmission with manual activation. It will capture the image by a hidden camera which will be transmitted to the receiving circuit.

2.4 Onboard Components

2.4.1 UHF Video Transmitter

A simple UHF transmitter consist of a simple circuitry and a wired antenna of 50 cm approximately. The basic function of this transmitter is to send the video signal in the range of almost 50 meters and any TV which tuned on its frequency can catch this signal.

2.4.2 Camera

A camera without audio, is shown below has a very small size and only 5/8 square. The camera is .79" × .79" × 0.6" deep, or slightly more than 1/3 cubic inch, with a 0.2" lens protrusion. The camera uses a CMOS sensor, like the AM camera, which work ok with adequate lighting.

Figure 7: Analog CMOS Camera

2.4.3 IP Camera

IP Camera mostly used closed- circuit television (CCTV) cameras, is a digital video camera mostly used in surveillance and is able to transmit or receive data via internet. The term is mostly used only for surveillance cameras. It has resolution from 0.3 to 29 megapixels. Its hacking is a bit difficult because of its connection with secure network.

Figure 8: IP Camera

2.4.4 WIFI Module

WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application. Mostly used wifi module is ESP8266 WiFi. Each ESP8266 module comes pre-programmed with an AT command set firmware, which means, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers.

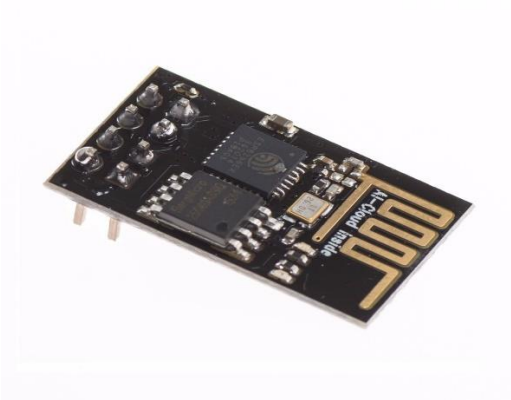


Figure 9: WIFI Module

CHAPTER 3

DESIGN

3.1 Working Points

The proposed project works on the following fronts:

3.1.1 Part 1

- Development of high-speed, hardware accelerated systems by reviewing literature provided by various open source platforms.
- Development and integration of hardware circuits with camera which act as UHF frequency transmitter
- Development of UHF transmission medium
- Design a glasses with solidwork software according to the components and print it with the help of 3d printer.
- Framing the circuitry with the glasses.
- Tuning the Tv which act as a receiving device, to the desired frequency.

3.1.2 Part 2

As an improvement in part 1 and shift the project from analog to digital, same project will be implemented on wifi technology which will have a world wide access and also faster and have less interference as compare to UHF circuit. Here the working points of this part:

- Development and Integration of Hardware Circuits with IP Camera and Wifi module.
- Designing of the glasses with the help of solidworks according to the components.
- Framing of the circuitry in glasses.
- Connection of an android application with the wifi for receiving live streaming.
- Android cell phone will act as a receiver and it will operate the android application.

3.2 Working

3.2.1 Part 1

Integration of wireless video UHF transmitter on the board for the development of transmission medium.

The proposed working is as follow

3.2.1.1 Hardware Circuitry of Transmitter

Block diagram of wireless UHF video transmitter consists of as follows.

The connection process is as follows:

- An oscillator consist of a NPN transistor is connected with a video camera.
- A wire antenna will directly connected to oscillator.
- Operating frequency can affect by changing the values of L1 and C1.
- Circuit need a supply voltage of 5-12V.
- Complete circuitry will be framed in the glasses with appropriate measurements.
- Decoupling Capacitors 100n should be close to the transistor and electrolytes 100uF in parallel to them so that 50 Hz to hundreds of MHz frequencies can be blocked.

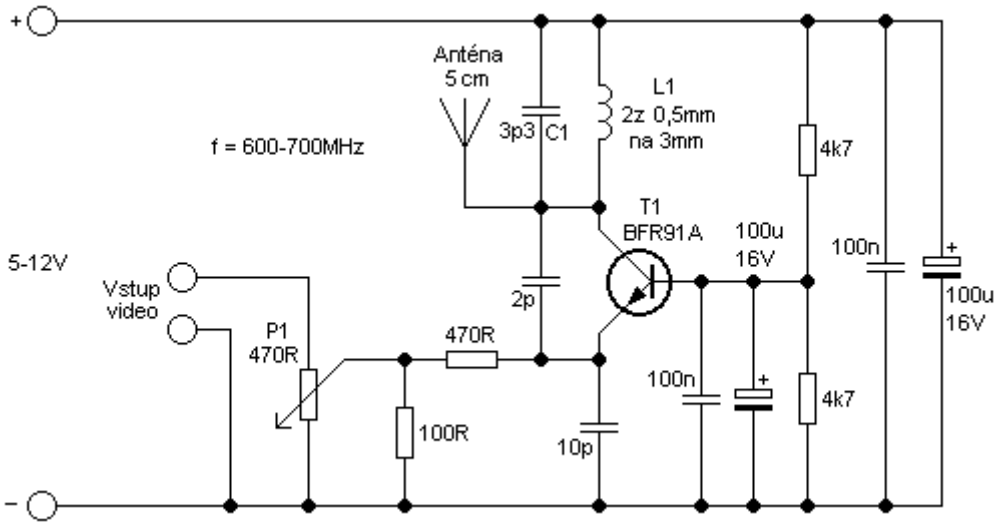


Figure 10: UHF Transmitter Circuit

3.2.1.2 Hardware Processes

The process is as follow:

- UHF band operates on frequency of 470-855 MHz.
- The frequency can be determined by the values of the components L1 and C1.

- Oscillator uses high frequency NPN transistor which is BFR91A having transition frequency of 6 GHz.
- Carrier frequency is amplitude-modulated by the input video signal where video signal can be used by any security camera or camera with video output.
- The transmitting signal can be tuned by any analog TV with UHF band.
- Fine tuning can be achieved by stretching or shrinking turns of L1.
- This transmitter can transmit any signal, for example PAL (50Hz) or NTSC (60Hz).
- At output side, with the help of manual tuning, the signal can be tuned which will be around 600-700 MHz.

The Analog TV required for this is very rear so it is a bit difficult to tune the desirable channel with the new version of analog TV because some TVs with auto-tuning can skip the desired video signal so it is better to search manually. Potentiometer affect the quality of image transmitted by the UHF transmitter because potentiometer P1 sets the modulation path. Too deep modulation gives too much contrast in the image quality and too low modulation level the image has low contrast and horizontal and vertical synchronization may fail because of it.

3.2.1.3 Software Processes

Software processing done by the 3d Printer software is as follows;

- The spy goggles will use surface modeling to generate their thicken shape. Sweeps, trims and lofts create the initial surfaces that are then made thickened to form the glasses.
- The very rarely used Mid-Surface feature is going to be used so that a complicated parting line can be easily define.
- Complexity of the design is set as moderate.
- Most important features of glasses are lofts, mid-surface, surface fill and thicken which are defined in the feature manager.
- The most basic element of SolidWorks model is Part. Parts consist of any primitive geometry and features such as revolutions, lofts, sweep etc.

- Then according to design an assembly and drawing case will be set.
- Property manager will be set to adjust the various entities either when it is created or during construction.
- Configuration manager will allow to set different view configuration as 3d view sections. It mostly used once the design is created.
- Dynamic toolbar will be used for accessing the frequent commands in solidworks.
- Task pane will be used to view specific task such as geometry, view palette.

As after defining various elements define above now sketching will be carried out which start from a pencil design and will need dimensions according to components going to fit in the frame. Then after sketching an arrow will be used to modify thickness and depth of the design, this arrow will create the solid piece of our design.

3.2.2 Part 2

Analog technology becomes rear nowadays, so as an upgrade, wifi module will be used so that system becomes digitalized.

3.2.2.1 Hardware Circuitry of Transmitter

- An IP camera will be used as shown in the figure.
- All these components are easily available and circuit is simple to integrate.
- Circuit need a supply voltage of 3.7V.
- Complete circuitry will be framed in the glasses with appropriate measurements.

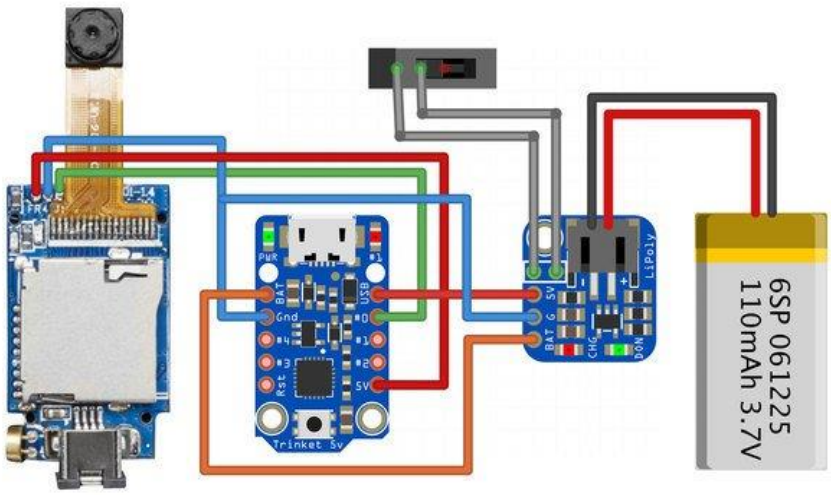


Figure 11: Wifi Transmitter Circuit

3.2.2.2 Hardware Processes

The process is as follow:

- Wifi band operates on frequency of 2.4 GHz.
- The simple circuit consist of a battery, SD card slot, trinket backpack and an IP camera.
- Trinket backpack has a predefined code uploaded in it which have a function of capturing image and recording video.
- It also allow recharging of the battery.
- The signal will be transmitted in form of hotspot and any android cell phone can capture its signal.
- This hotspot range will be 5-10 meter but if it catches any wifi signal then it will directly connected to wifi and transmitted its signal to worldwide.

- In order to connect it to Wifi device, we need to define the device user name and password in its SD card so that it can detect and connect to it.
- Any android cell phone can be its output screen but as security only those cell phone can access it which knows the exact username and password of wifi device which associated with transmitter.

3.2.2.3 Software Processes

Trinket backpack is use to be available with predefined code to capture and record video so there is no need to go in details of code. Code is available in Appendix A.

Software processing for designing the frame will be same as used in part 1 but with a slightly different design according to dimensions.

3.3 Objectives

The objectives can be sub divided into academic and industrial objectives.

3.3.1 Academic Objectives

During the course of this project we have developed sound knowledge and technical skills in the fields of:

- Data Transmission
- RF Based Networking
- UHF Frequency and their antenna knowledge
- Android application knowledge
- IP Based Transmission
- 3d designing and printing

The developed skills are both hardware and software in nature.

3.3.2 Industrial Objectives

Industrial objectives includes visual application providing live transmission. It is specifically designed to capture, record and transmit efficiently worldwide and put a incremental step in HMDs technological world.

3.4 Special Skills Required

- Antenna Knowledge
- Expertise in integrating circuits
- RF knowledge
- IP based Transmission knowledge
- 3d Designing

3.5 Work Done

3.5.1 Part 1

3.5.1.1 Hardware

Hardware implementation of the project has been completed, which includes proper UHF based transmitter circuit. This circuit was designed on the PROTEUS. The UHF transmitter circuits will operate on frequency of 600-700 MHz and components were soldered onto the board.

The Components used in the hardware include:

- BFR 91A
- 4 turns Coil
- 9V Battery
- CMOS Analog Camera
- Wire Antenna
- Remote tuner for TV

3.5.1.2 Hardware Circuitry

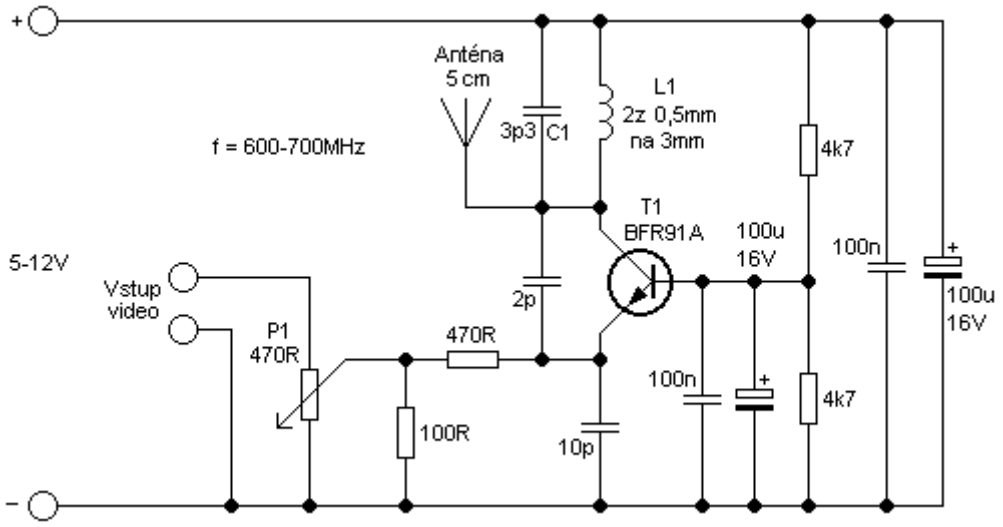


Figure 12: Hardware Circuit diagram

3.5.1.3 Camera Configuration

Camera consist of an image sensor and 8v to 5v conversion board. It is marked with V801CV28. Notable components include image sensor 1/3″ Color CMOS, 380 lines sensor in a 48-CLCC package rated for 5 volts. On the back of the board there's a 14.318 MHz (NTSC sampling frequency) crystal. Voltage conversion is done via 75L05 5v voltage regulator and a 10 uF, 5v capacitor.

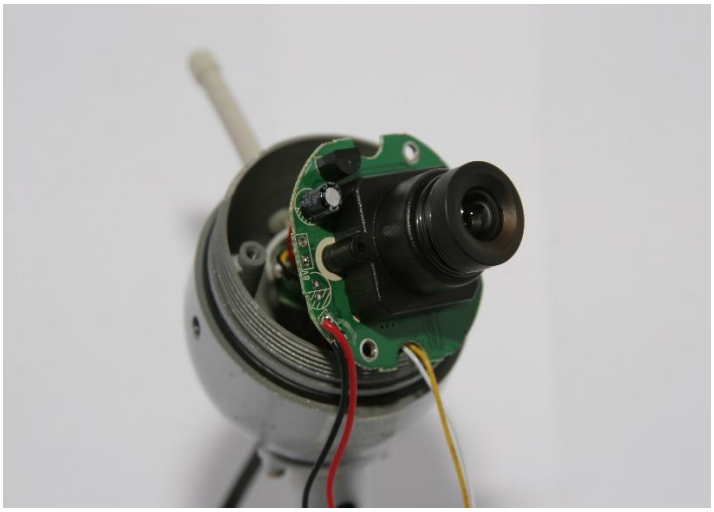


Figure 13: CMOS Camera Configuration

3.5.1.4 Hardware Implementation

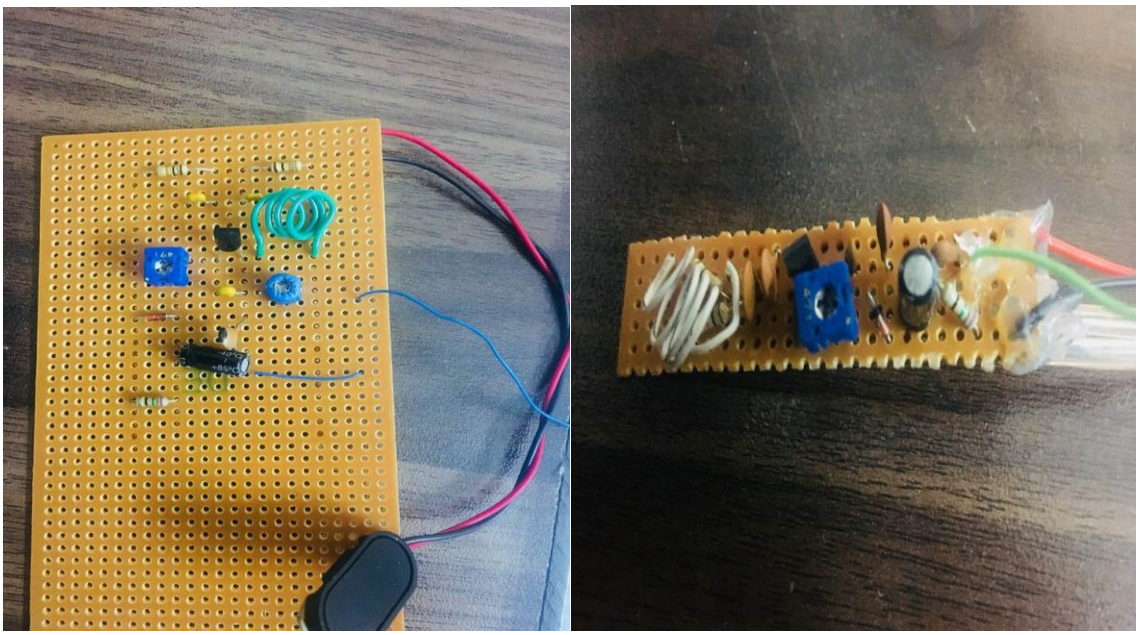


Figure 14: Implemented Analog Circuit

3.5.1.5 Software

The software requirements of the project were completed through the

- Solidworks

Solid works was used for the designing of the frame required as per the size of circuitry. Solid works provides platform to construct a solid design and print it via 3d printer. The thickness level of the frame is set as 2mm.

3.5.1.6 Results

The working can be seen by the following images

Ser.	Indication	Implication	Display
1	Initializing	Initial mode of Analog Television when it Switch on.	
2	Tuning	Initial mood of tuning when circuit is connected with battery and start transmitting its signal	
3	Connecting…!!	Television is just going to capture the frequency on which circuit is operated.	

4	Connected!!!	So!! Television got tuned on the desired frequency but with a little interference of surrounding.	
5	Final Result	At last result is obtained with a little interference which is because of low power batteries.	

Table 1: Analog Circuit Results Display

3.5.2 Part 2

3.5.2.1 Hardware

Hardware implementation of the Wifi based project has also been completed, which includes proper Wifi based transmitter circuitry. The Wifi normally operate on frequency of 2.4 GHz.

The Components used in the hardware include:

- Wifi Hotspot Antenna
- SD card Slot chip
- Trinket backpack
- IP Camera
- 2x 3.7V Battery
- Android Mobile
- Wifi Device

3.5.2.2 Hardware Implementation

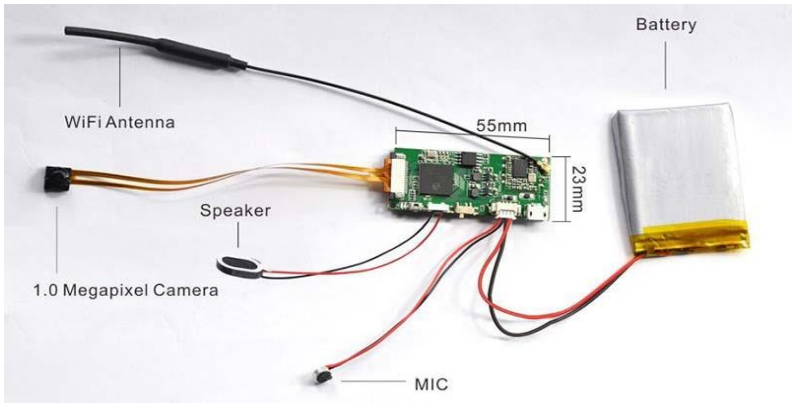


Figure 15: Implemented Wifi Circuit

3.5.2.3 Software

The software requirements of the project were completed through the

- Solidworks
- Hdminicam

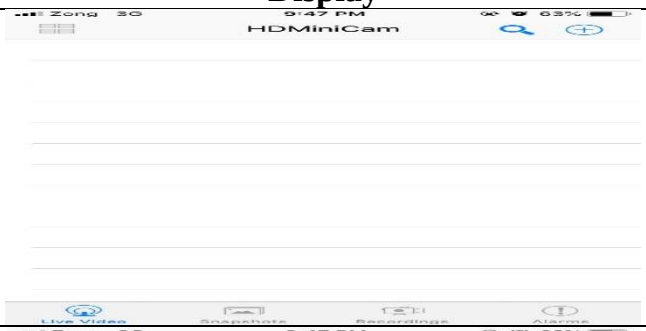
As solid works software is providing same application as designing of glasses frame but with different dimensions. Thickness level of frame is again set as 2mm.

Hdminicam is basically a Chinese application mostly use to operate IP cameras for security purpose. Same application will be used to operate the spy glasses as it works on android cell phone. This application will act as output station on cell phone The data sent by the smart glasses will be processed by this application and will be shown on mobile screen. The data consist of

- Video
- Audio

3.5.2.5 Results

The working can be seen by the following images

Ser.	Indication	Implication	Display
1	Initializing	Opening screen of the application "HDminicam".	
2	Adding Device	To add the Camera device to monitor	
3	Searching	Searching for the camera.	

4	Connected!!!	So!! It get connected with the glasses	
5	Final Result	At last, result is obtained .	

Table 2: Analog Circuit Results Display

3.6 Deliverables

- The live transmission will be implemented on UHF frequency and will be a completely new revolution in wearable technology's world.

Figure 16: Final Analog Hardware

3.6.1 Reflective Comments of 1st Part

- The completed project is able to work to its full capacity as a wireless Glasses as well as a spying HMD device and can standalone act as it.
- The device is working at a minimum load level, requiring very less amount of power.
- The device is able to transmitting video signal via the build circuitry and have a range of about 50 meters.
- The transmitted video signal is received by any analog Television which is operating on VHF frequency and working within the range of transmitter.
- It is less secure because it can access by any person who is using the same frequency generated by the circuit.

As an upgrade same work is going on wifi glasses which will be operated by an android cell phone.

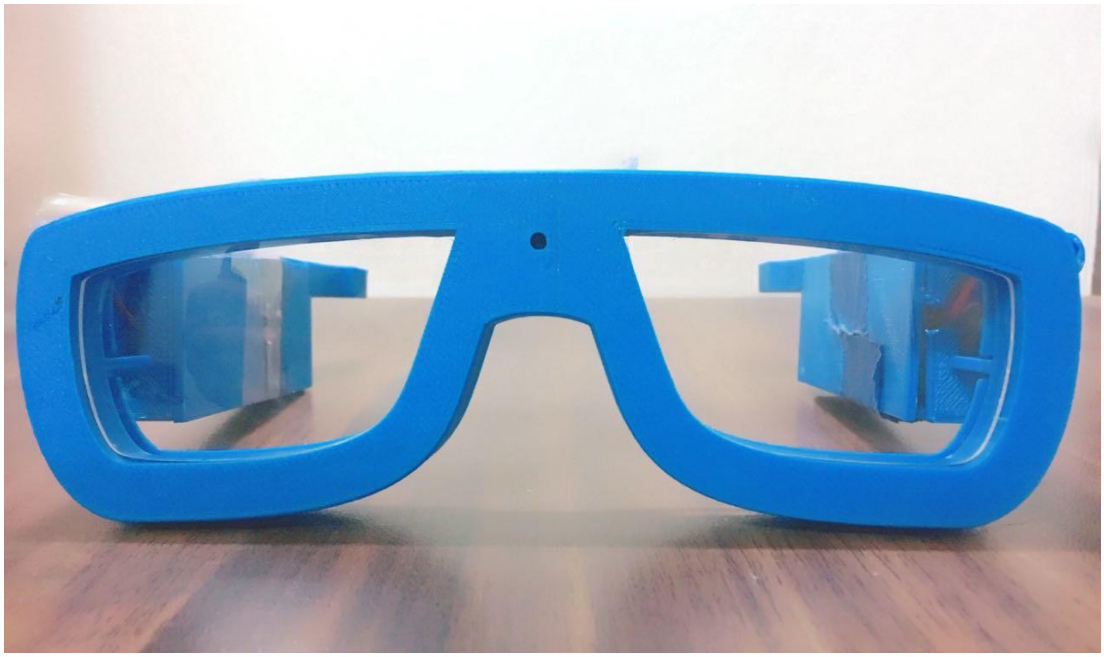


Figure 17: Final Wifi Hardware

3.6.2 Reflective Comments of 2nd Part

- The completed Wifi Based project is also able to work as a wireless Glasses and a spying HMD device.
- The device is working at a minimum load level, requiring very less amount of power.
- The device is able to transmitting video signal via the build circuitry and will be accessible worldwide.
- The transmitted video signal is received by any android cell phone which is connected to the internet world and have knowledge of security keys of the wifi associated with spy glasses.

3.7 Future Work

A project like smart spy spectacles can be customized easily in a large number of daily life activities. Its demand in today's world is increased. Some enhancements which can be made in this project in future to enhance its features is discussed below.

3.7.1 Control on Wireless Transmission

As this wireless device transmit its signal openly in both analog and Wifi case. In Analog device, Any TV which is operating on its frequency can catch the signal and in Wifi device, who so ever is using the HDMINICAM application and know the Wifi password associated with the device can open the live transmission of device. In order to control the transmission, in Analog, a unique carrier can be used to secure transmission and in Wifi Device, new application can be designed so that only authorized users can receive its signal or an encryption or password can be added in device or in transmitter so that no one can access the transmission except the authorized user.

3.7.2 Reduction in Size

Main purpose of this device is spying. In order to upgrade it, It size can be reduced by using micro components in future. Its future can be spying lenses which will be its peek future.

Figure 18: Future Spying Lens

3.7.3 Implementation in Security Agencies

Implementation of this device in agencies and operational area will also increase the degree of success in operations. With the help of device, a live feedback and live condition of the borders will be easily possible to observe and suitable actions can be taken in appropriate time.

3.7.4 Separate Receiving Device

As Receiver of this spy glasses is a smart phone which can be turned into a personal receiving device in future which will provide confidentiality, secrecy and authorization. It

will become more secure. This receiving device can be anything depending on the application or work taken from glasses. A best receiving device can be glasses itself which have feature of hologram in it and it will be optimized future of this glasses.

Figure 19: Glasses with Hologram

3.7.5 Compatibility

Analog devices are going to be obsolete in future and digital devices are the future. Wifi Spy Glasses can be further improved so that it can compatible with Windows. It will increased its demand and functionality. Also it can be upgrade in networking as well so that it can work on 3G and 4G in future.

CHAPTER 4

APPLICATIONS

4.1 Applications

4.1.1 Surveillance

It will be helpful for surveillance as well. By enhancing these glasses with the time it will be able for streaming video and audio which will be helpful for surveillance. It will detect accident and inform the respective department about the query.

4.1.2 Security

Using these glasses security will enhance in a manner that we get warn before the time. Not only solve security issues but also helpful in overcoming the security issue.

4.1.3 Media

Social Media will enhance in internet world with the help of live transmission through smart glasses. The entertainment industries (and military) play an important role in funding research.

4.1.4 Education

Sophisticated simulations for training. Virtual Classroom will be the future of these glasses.

4.1.5 Covert Operation

Improvement towards bandwidth congestion and distribution of traffic over multiple paths can improve the availability of networks.

4.1.6 Network Monitoring Device

The upgraded glasses will enhance the success rate in a manner that we get timely feedback in battlefield and also have an eye on each step of enemy. Armed operations will be improved with the help of this technology.

4.2 Conclusion

HMD forms the base of our project. In order to achieve good quality of transmission along with reliable and protected use of VHF and wifi secure network we implemented the spying glasses with RF and Wifi modules where a user can catch the live moments and can transmit them to the other side and analyze the video. We have been able to overcome the interference problem with the help of high power batteries but still tuning is causing a issue on receiving end. Completely tuned channel a bit difficult to obtain. But upgraded version

of this HMD is full secure and with a very interference. Android application study is the current issue which is under process and soon will be completed.

CHAPTER 5

RESOURCES REQUIRED

Ser. No	Item Required	Quantity	Estimate Cost (Rs)
1	VHF Transmitter Circuitry	1	3500
2	Mini CMOS Camera	1	3000
3	Analog TV	1	6000
4	Wifi Module	1	2000
5	IP Camera	1	5000
6	Wifi Hotspot Antenna	1	2000
7	SD card slot	1	800
8	SD card	1	500
9	Frame	2	8000
		Total	30,800

CHAPTER 6

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CHAPTER 7

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Appendix A

Trinket Backpack code

```
int trig = 0;

int led = 1;

void setup() {

  // initialize the digital pins as output.

  pinMode(led, OUTPUT);

  pinMode(trig, OUTPUT);

  digitalWrite(led, HIGH);

  digitalWrite(trig, HIGH);

}

// Hold HIGH and trigger quick (<250ms) LOW to take a photo. Holding LOW and trigger HIGH starts/stops video recording

void loop() {

  digitalWrite(trig, LOW);

  digitalWrite(led, HIGH);

  delay(50);

  digitalWrite(trig, HIGH);

  digitalWrite(led, LOW);

  delay(5000);

}
```