

SMART WIRELESS SURVEILLANCE MONITORING SYSTEM USING RASPBERRY PI

by

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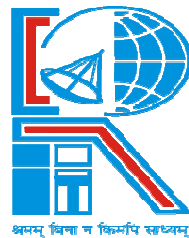
A comprehensive project report has been submitted in partial fulfillment of the requirements for the degree of

Bachelor of Technology *in* **ELECTRONICS & COMMUNICATION ENGINEERING**

Under the supervision of

Mr. Sujoy Mondol

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May, 2018

CERTIFICATE OF APPROVAL



This is to certify that the project titled “**SMART WIRELESS SURVEILLANCE MONITORING SYSTEM USING RASPBERRY PI** ” carried out by

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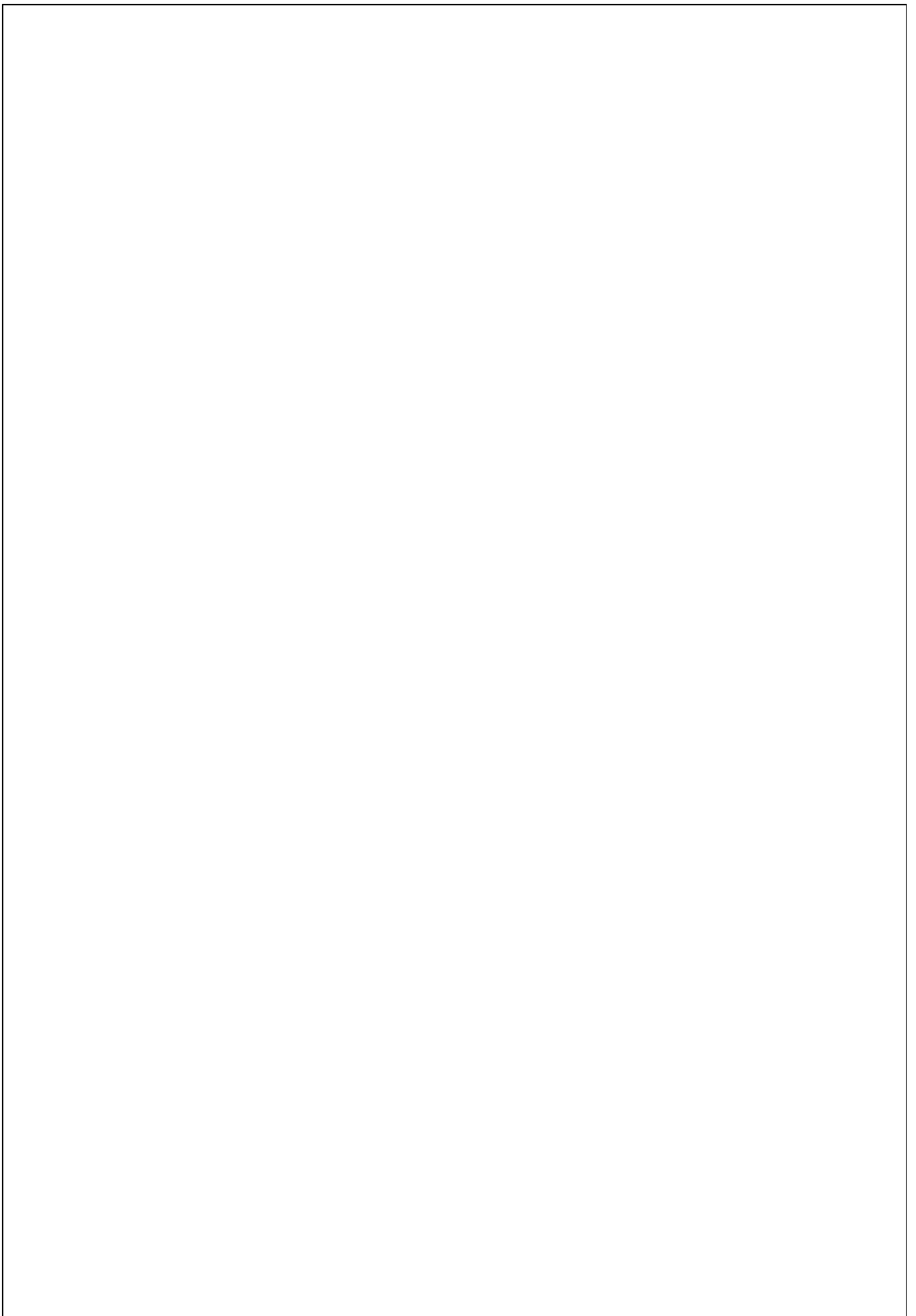
for the partial fulfillment of the requirements for B.Tech degree in **Electronics and Communication Engineering** from **Maulana Abul Kalam Azad University of Technology, West Bengal** absolutely based on his own work under the supervision of Mr. **Sujoy Mondol**. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

Optional in case of External Supervisor

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 Designation and Department
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DECLARATION



“We Do hereby declare that this submission is our own work conformed to the norms and guidelines given in the Ethical Code of Conduct of the Institute and that, to the best of our knowledge and belief, it contains no material previously written by another neither person nor material (data, theoretical analysis, figures, and text) which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.”

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CERTIFICATE of ACCEPTANCE



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is hereby recommended to be accepted for the partial fulfillment of the requirements for B.Tech degree in **Electronics and Communication Engineering** from **Maulana Abul Kalam Azad University of Technology, West Bengal**

Name of the Examiner Signature with Date

1.

2.....

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ABSTRACT

This project deals with the design and implementation of Smart surveillance monitoring system using Raspberry pi. It uses wireless technology to provide essential security using surveillance system. The proposed security system captures information and transmits it via a WiFi to a static IP, which is viewed using a web browser from any smart device. Raspberry pi controls a video camera for surveillance. It streams live video and records the motion detected parts in the cloud and/or in the windows shared folder for future playback. The cameras automatically initiate recording when motion is sensed and the Raspberry pi device stores it in a secured folder.

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INTRODUCTION:-

High Definition Surveillance Camera using raspberry pi is set up in the area which we want to monitor.

Live streamed video can be accessed from anywhere by just entering the static IP assigned to the System in a web browser

ADVANTAGE OVER EXISTING SYSTEM :-

- 1.In CCTV systems there should be a dedicated PC for the module which is eliminated here
- 2.A PC can be hacked and the files can be erased while this system overcomes those problems.
- 3.In this system, authentication is required on the user side inorder to view the streamed video in the browser.
- 4.Very less expensive when compared to the other existing systems.
- 5.In this system, a wide area can be captured.
- 6.The camera motion can be controlled

COMPONENTS USED:-

1.RASPBERRY PI

A small credit-card sized computer capable of performing various functionalities such as in surveillance systems, military applications,

2.RASPBERRY PI CAMERA MODULE

- 5 MP Camera exclusively made for Raspberry PI
- Can take 1080p High Definition Videos
- Small in size and can be connected directly to the Raspberry PI Board.
- 1080p, 780p and also Still

3.SD CARD

- Raspberry PI has no storage on board.
- SD/micro SD Card stores the OS. The total memory of the SD card is about 8GB.

4.NETWORK ADAPTOR

- Wireless network connection is used for the process of data transfer.
- Wi-Fi USB Adaptor that supports speed of 150Mbps is used.
- Edimax is a commonly used Wi-Fi USB Adaptor.

5.POWER

- A micro-usb plug power supply that supplies at least 1A of power is used.

- It also runs on a battery.

6.SOFTWARES USED

- Raspbian OS

- PuTTY

OS Installation:-

At first,install the OS and software to the Raspberry Pi before mounting it all together.

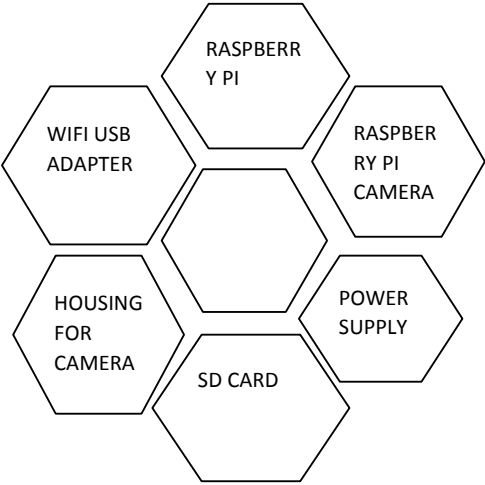
An OS is the basic operating system software that tells the Raspberry hardware what to do. Linux is perfect for this.

We have chosen Raspbian, as it's one of the most advanced OS for the Raspberry with loads of help and tutorials on the internet.

We need to prepare the SD card to be able to run Raspbian on the Raspberry

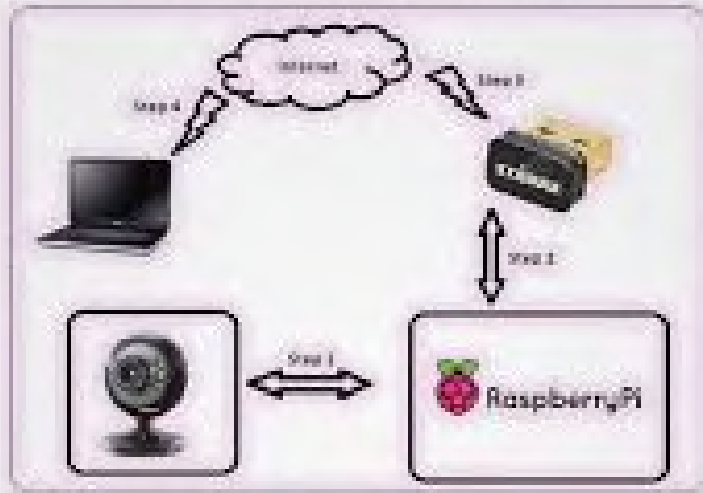
Insert the prepared SD card with the Raspbian installer on it and attach the power supply.

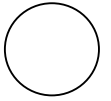
Now make sure your RPI is up to date.

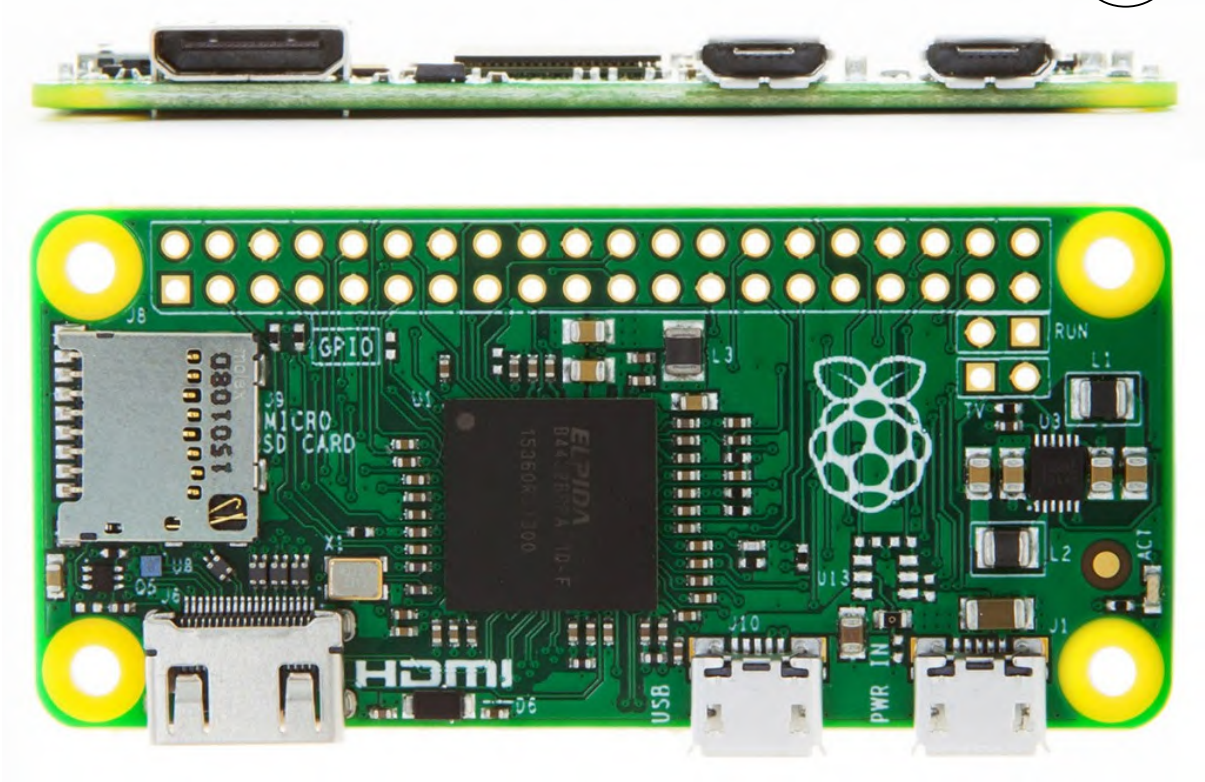


COMPONENTS USED IN THIS PROJECT ARE PRESENTED
DIAGRAMATICALLY

BLOCK DIAGRAM



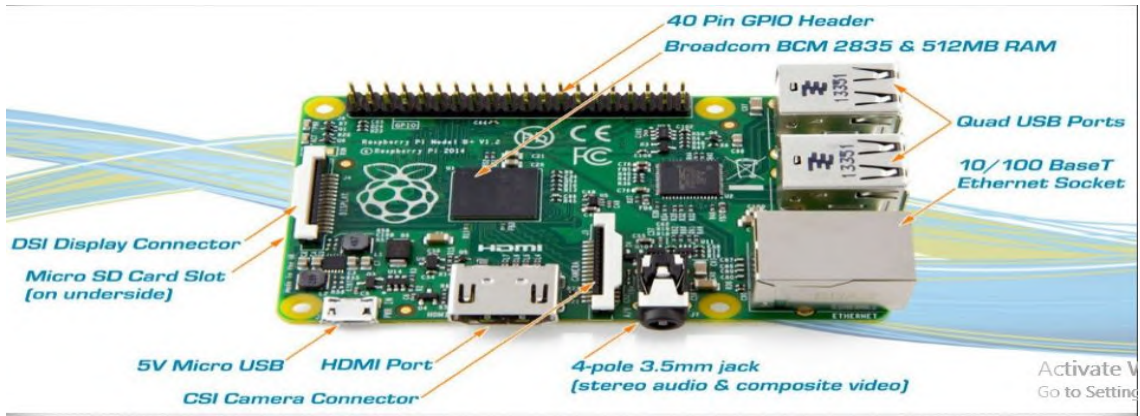




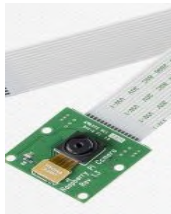
RASPBERRY PI ZERO MODEL



RASPBERRY PI CAMERA MODULE



ULE



**FIG-1.2
(PI-CAMERA)**



**FIG-1.3
(SD-CARD)**



**FIG-1.4
(NETWORK
ADAPTER)**



**FIG-1.5
(POWER SUPPLY)**

- Because having a CCTV camera with a keyboard and HDMI screen hanging off it is wildly impractical, we want to start accessing and controlling the Pi remotely as soon as it's been successfully updated. This is possible via SSH (short for Secure SHell protocol), which is installed by default with Raspbian.

- To access the Pi remotely from a Windows PC, we need to download an SCH

- Once the .exe. file has downloaded to your Windows PC, place it somewhere convenient, such as on your desktop. When we launch it, we have to enter the IP address of your Pi into the Host Name (or IP address) field and click Open.
- To save time later, you might want to click Save first and give the connection a relevant name – we've chosen RPi. We can find the Pi's IP address by either finding it in your router's management web page (you might also like to ask the router to assign the Pi a static IP address while there, if the option is available) or else type 'ip addr show' into the Pi.
- Once we have the IP address you'll be able to log in to the Pi via PuTTY with the default pi and raspberry user name and password, and once you have remote control of the Pi you can unplug its keyboard and screen.

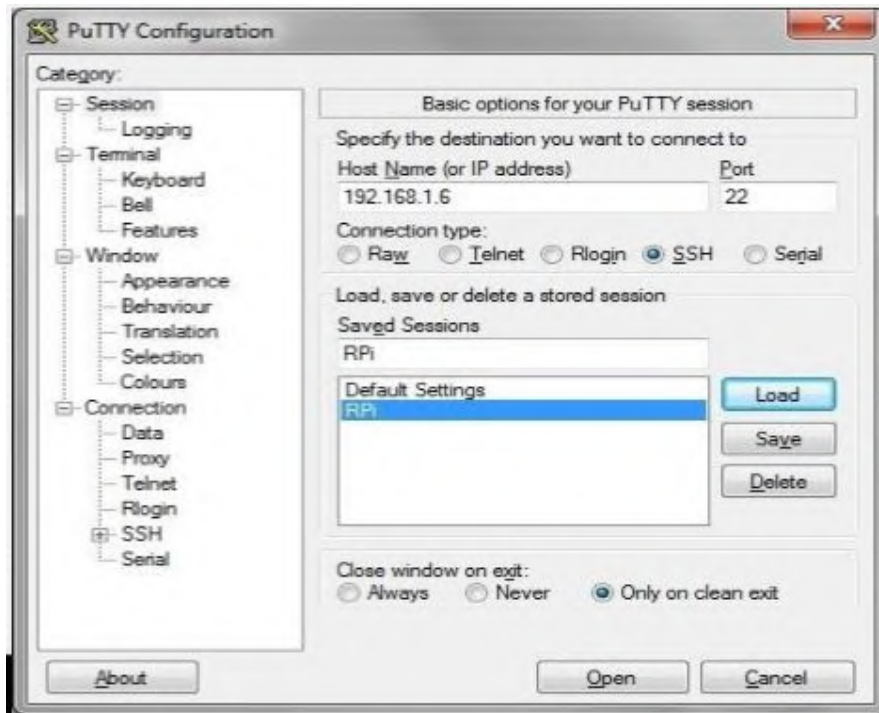


FIG-1.7(PUTTY CONFIGURATION SCREEN)

ENABLE WIFI

- If we want to run this camera with a WiFi USB dongle we will need to do some quick additional steps to make WiFi work on the Raspberry: From the console (PuTTY window), edit the network properties of the Raspberry:
 - `sudo nano /etc/network/interfaces`
 - Now add these lines at the end of the file (or change existing lines to match these):
 - `allow-hotplug wlan0`
 - `iface wlan0 inet dhcp`

- wpa-ssid "YOUR NETWORK SSID" • wpa-psk "WIFI PASSWORD"
- (Fill in the SSID and password for your WiFi network)
- Then Reboot the Raspberry with this command and see if it correctly connects to your WiFi network: • sudo reboot

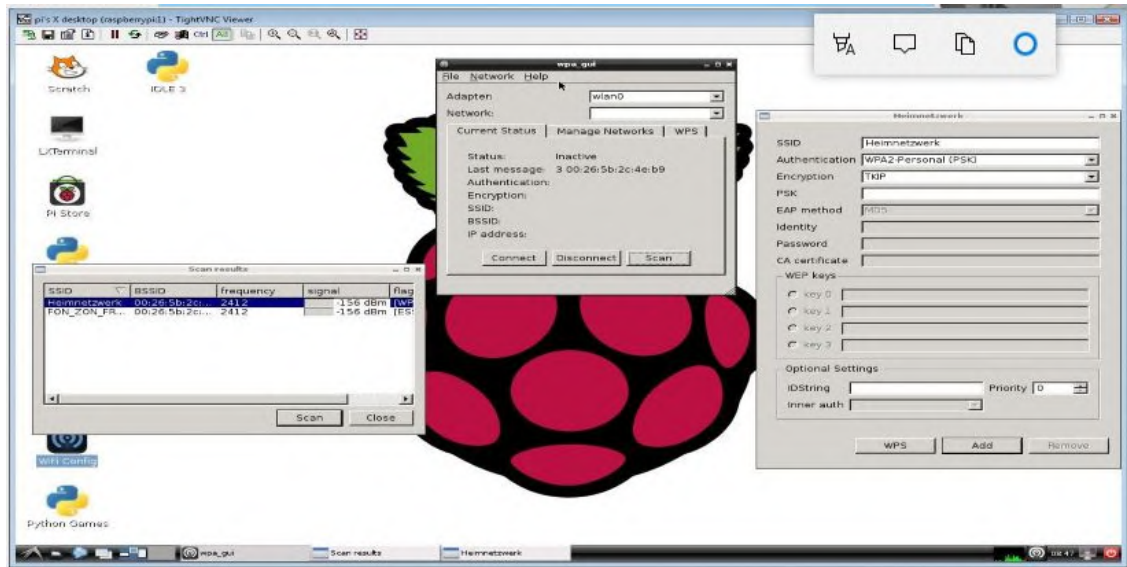


FIG-1.8(WIFI CONFIGURATION)

COMMANDS

- "raspistill" is a command line application that allows you to capture images with your camera module. Below is an example of this command in use.
 - To capture an image in jpeg format, type "raspistill -o image.jpg" at the prompt, where "image" is the name of your image
- "raspid" is a command line application that allows you to capture video with your camera module. Below is an example of this command in use.
 - To capture a 10 second video with your Raspberry Pi camera module, run "raspid -o video.h264 -t 10000" at the prompt, where "video" is the name of your video and "10000" is the number of milliseconds

FIG-1.9(COMMANDS FOR THE CAMERA)

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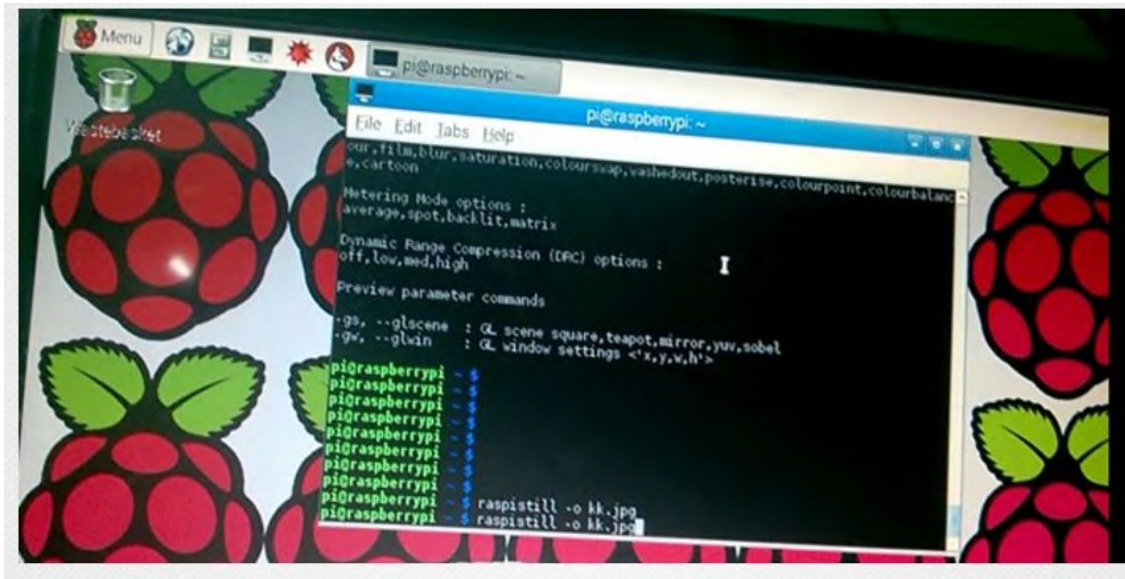
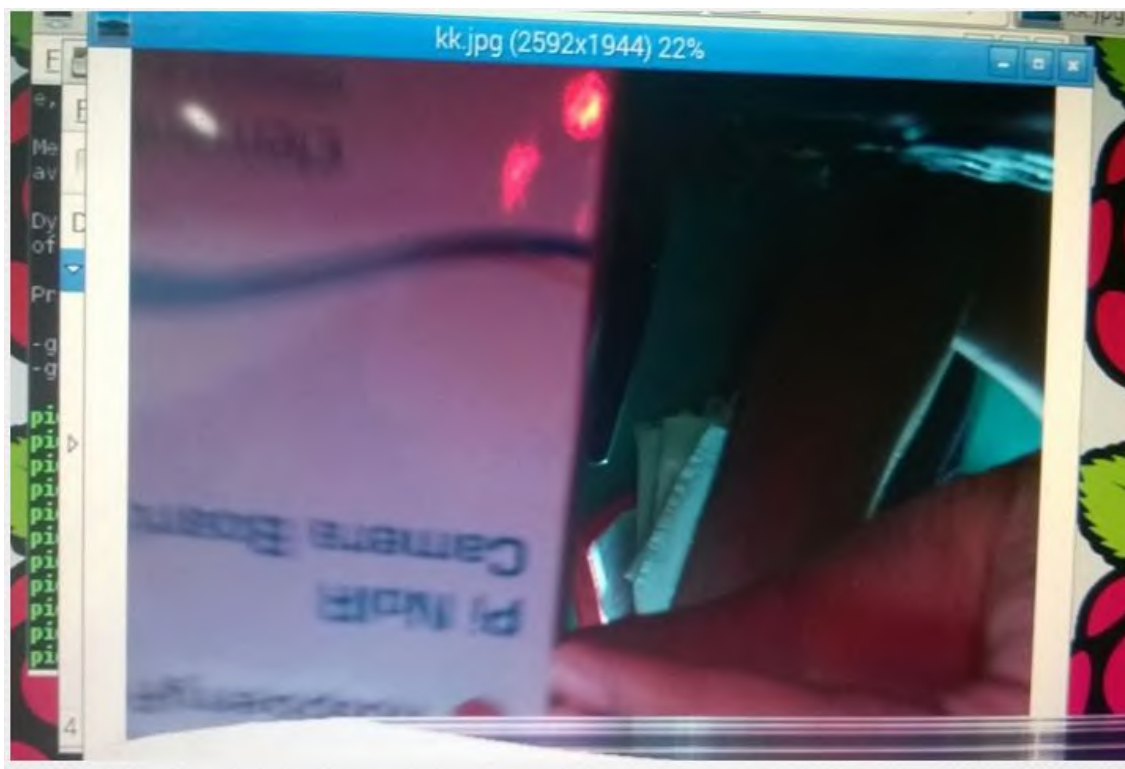


FIG-1.9(COMMANDS FOR THE CAMERA)

OUTPUT IMAGE CAPTURED



MOTION SOFTWARE

- We shall now install motion, which is the motion detection software that we shall utilise.
- `sudo apt-get install motion`

- As the current version of motion does not (yet) support the Raspberry camera module, we need to download and install a special build with support for this camera module.
 - `cd /tmp • sudo apt-get install -y libjpeg62 libjpeg62-dev libavformat53 libavformatdev libavcodec53 libavcodec-dev libavutil51 libavutil-dev libc6-dev zlib1g-dev libmysqlclient18 libmysqlclient-dev libpq5 libpq-dev`
 - `wget https://www.dropbox.com/s/xdfcxm5hu71s97d/motion-mmal.tar.gz`
 - And now you need to unpack the downloaded file to the /tmp directory: • `tar zxvf motion-mmal.tar.gz`

Config. file

- Motion has a hundred options to fiddle and play with in its lengthy configuration file; there are some we'd almost always change, some we might change if we had a certain task in mind, and others we might fiddle with if we had plenty of spare time and a very specific aim.
 - Make sure that motion is always running as a daemon in the background: • `daemon on`
 - We want to store the logfile in /tmp instead (otherwise autostart user won't be able to access it in /home/pi/ folder):
 - `logfile /tmp/motion.log`
 - As we want to use a high quality surveillance video, we've set the resolution to 1280x720: • `width 1280 • height 720` • We don't need real-time video, 2 pictures per second are totally ok for our needs: • `framerate 2`
 - This is a very handy feature of the motion software: record some (2 in our configuration) frames before and after the motion in the image was detected: • `pre_capture 2 • post_capture 2`
 - We don't want endless movies. Instead, we want to have max. 10 minutes slices of the motion videos. This config option was renamed from `max_movie_time` to `max_mpeg_time` in motion. If you use the motion-mmal build, this one will work. If you get an error 'Unknown config option "max_mpeg_time"' either change this one to `max_movie_time` or make sure to really use the motion-mmal build as shown above. • `max_mpeg_time 600`
 - As some media players like VLC are unable to play the recorded movies, we've changed the codec to `msmpeg4`. Then, the movies play correctly in all players: • `ffmpeg_video_codec msmpeg4`
 - Enable access to the live stream from anywhere. Otherwise only localhost (= the Raspberry device) would be allowed to access the live stream: • `stream_localhost off`
 - If you want to protect the live stream with a username and password, you should enable this: • `stream_auth_method 2 • stream_authentication SOMEUSERNAME:SOMEPASSWORD`
 - After your changes to the motion.conf, reboot the Raspberry: • `sudo reboot`

CAMERA LED

- This has the advantage that the "tech" of the camera is not visible anymore. If you like the camera recording led to be visible, don't cover it. Whenever the camera is detecting any motion or is recording, the led light will glow in a very bright red.
- You can also turn off the camera red LED by adding this line to /boot/config.txt:
disable_camera_led=1

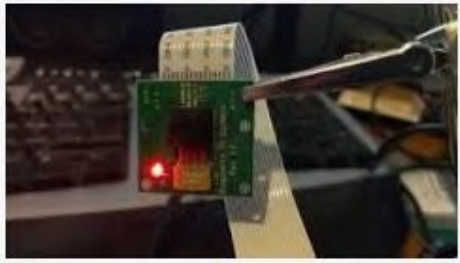
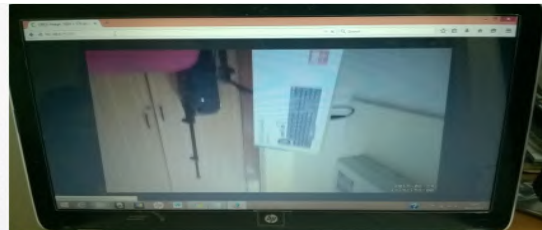
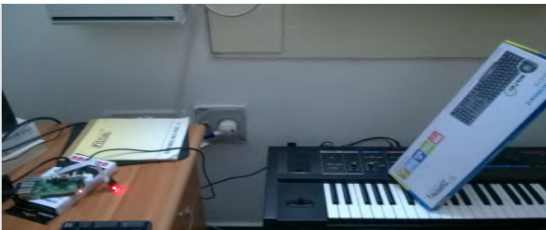


FIG-1.10(CAMERA LED)

FIG-1.11(THE FINAL SETUP)



ACCESSING THE LIVE STREAM

Now we can access the live stream from the camera from any browser via the url <http://IPADDRESSOFRASPBERRY:8081> , where 8081 is the port that we've configured for our stream in the motion.conf file.

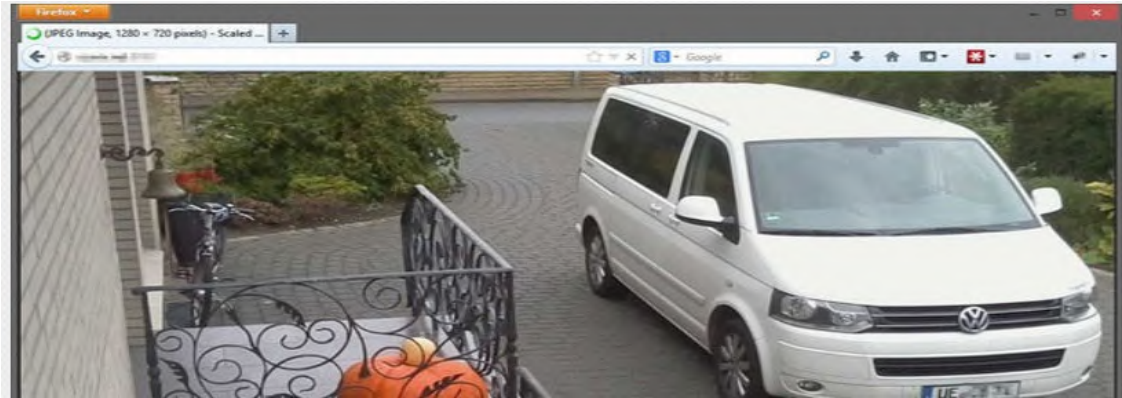


FIG-1.12(LIVE STREAMING)



DECLARATION:-

I declare that the work presented in this project titled “SMART WIRELESS SURVEILLANCE MONITORING SYSTEM USING RASPBERRY PI”, submitted to the Name of the Department, Faculty of ELECTRONICS AND COMMUNICATION ENGINEERING, MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, Bareilly for the award of the **Bachelor of Technology** degree in **ECE**, is my original work. I have not plagiarized or submitted the same work for the award of any other degree. In case this undertaking is found incorrect, I accept that my degree may be unconditionally withdrawn. All information furnished are true to my knowledge and view.

DATE:

SIGNATURE:

PLACE: KOLKATA

CONCLUSION:-

The Raspberry Pi is a powerful little beast and a great platform for building low-cost, but highly capable, embedded systems. The interfaces built into its GPIO connector make it easy to bolt on modules using simple low-cost electronics and a bit of configuration to create very functional and flexible systems. The inclusion of a dedicated camera interface and networking interfaces give you everything you could possibly need for an Internet-connected home security system.

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3. GROUP MENTOR
4. YOUTUBE

