LOW COST HOME SURVEILLANCE AUTOMATION

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PROBLEM STATEMENT

- Set up and monitor automated home surveillance with NodeMCU and OV7670 camera to optimize setup cost
- Providing live video feed of the surveillance footage through a mobile application for remote and easy access, integrated with Machine Learning model for face recognition

EXISTING SYSTEM

₹2,989.00

~~₹3,999.00~~

Mi 360° Home Security Camera 1080P l Full HD…

4.5 out of 5 stars 34,815

₹2,799.00

~~₹3,299.00~~

TP-LINK Tapo Wi-Fi Pan/Tilt Smart Security…

4.5 out of 5 stars 53,647

₹2,740.00

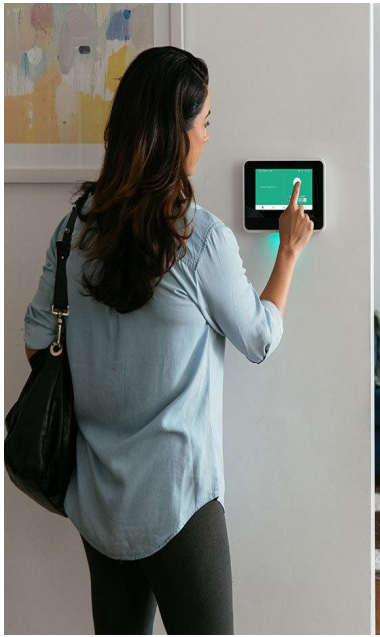
~~₹3,990.00~~

QUBO Smart Cam 360 | 1080p Full HD Wi-Fi…

4.0 out of 5 stars 1,245

EXISTING SYSTEM

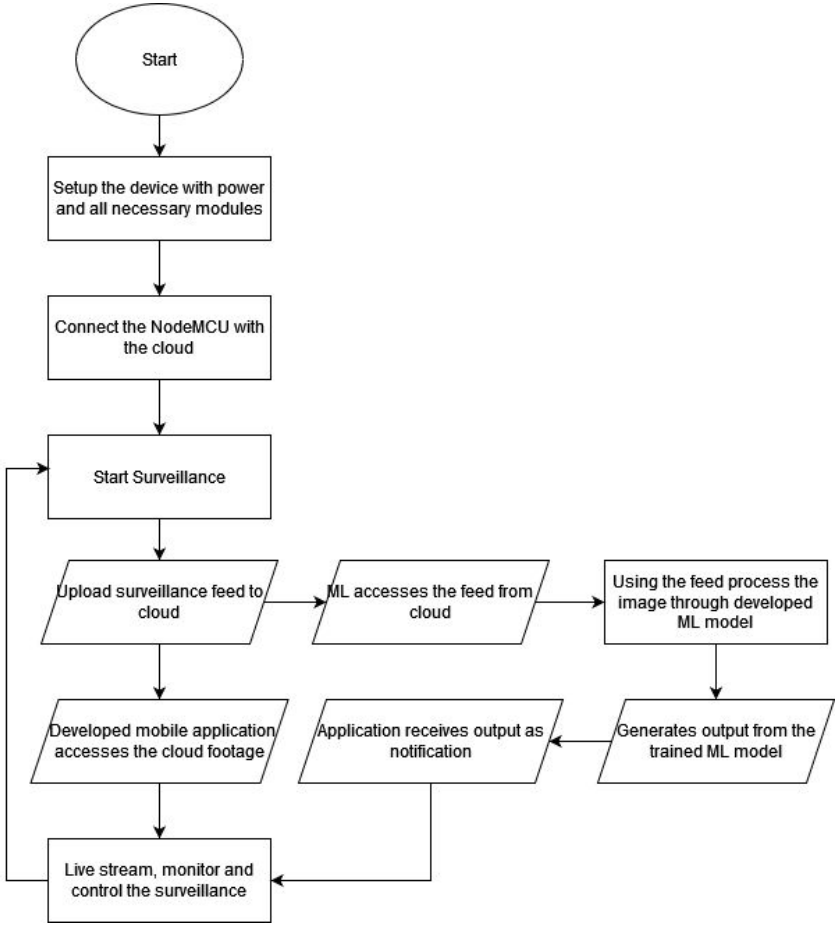
An average CCTV installation anywhere in India could range from **Rs. 7500 to a whopping Rs. 25,000** depending on the variant, brand, quality, and quantity of the CCTV dependent on the client's budget and necessity.



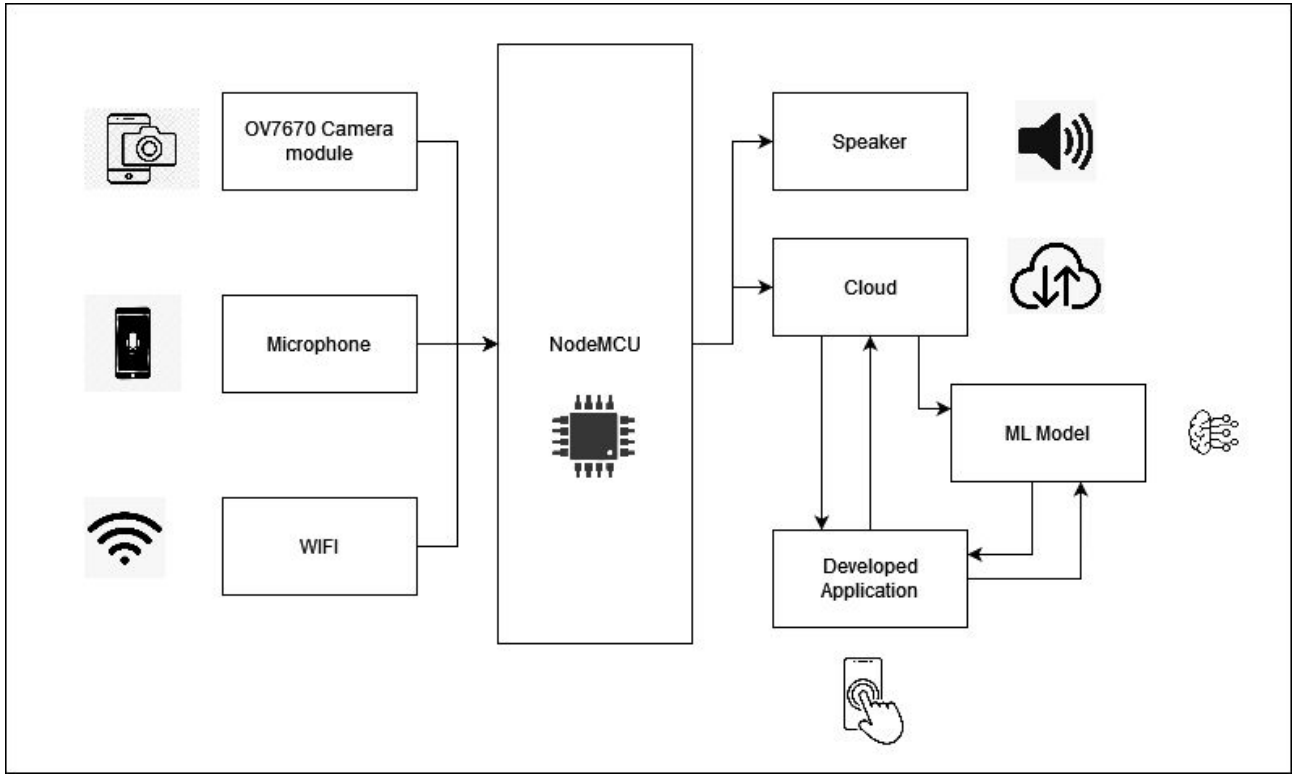
ABSTRACT

This project aims at building an automated home surveillance system with features like remote monitoring (live and recorded video feeds), ML integrated mobile application with image processing technology.

FLOWCHART


Start
Setup the device with power and all necessary modules
Connect the NodeMCU with the cloud
Start Surveillance
Upload surveillance feed to cloud
ML accesses the feed from cloud
Using the feed process the image through developed ML model
Developed mobile application accesses the cloud footage
Application receives output as notification
Generates output from the trained ML model
Live stream, monitor and control the surveillance

BLOCK DIAGRAM



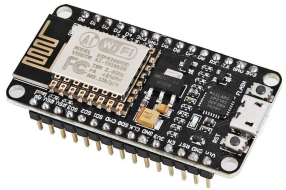
DESCRIPTION - BLOCK DIAGRAM

Application: (To be developed using Java)

- User Authentication
- Live feed
- Option to record the feed
- Integrated ML model

NODEMCU

- NodeMCU is an open source Lua based firmware for the ESP8266 WiFi SOC from Espressif and uses an on-module flash-based SPIFFS file system.
- NodeMCU includes WIFI module, Also called as NodeMCU WIFI development board
- Connected with Micro USB for power, programming and debugg
- 15-pin header with access to GPIOs, SPI, UART, ADC and power pins



NODEMCU SPECIFICATION

- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1; SPIs: 1 ; I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna

OV7670 CAMERA SPECIFICATION

- 640 x 480 ("VGA") resolutions, equivalent to 0.3 Megapixels.
- IO Voltage: 2.5V to 3.0V.
- Vision Angle: 25 degree.
- Max. Frame Rate: 30fps
- Photosensitive Array: 640 x 480.
- High sensitivity for low-light operation
- Low operating voltage for embedded portable apps
- Image quality controls including color saturation, sharpness

ML MODEL

- A Machine Learning model is to be developed which is to be used for facial recognition
- ML model will be developed using IBM’s Watson Studio and is connected to the cloud and the developed mobile application
- Developed model fetches input (video stream) from cloud and processes it, produces output as notification if any
- The output is sent to the mobile application

TOOLS TO BE USED

SOFTWARE COMPONENTS

- Things speak (Cloud)
- Android Java (Application)
- IBM Watson Studio (Machine Learning)

HARDWARE COMPONENTS

- NodeMCU
- ACROBOTIC OV7670 Camera Module
- Microphone
- Speaker
- Connectors

APPLICATIONS

Home surveillance - Remote monitoring (Low cost)

Prevention of theft

Child care

Parking lots

EXPECTED OUTPUT

- Complete set of remote surveillance camera with microphone access setup
- Live video feeds and storage unit on Cloud, accessible through an application
- Mobile application integrated with ML model which could send notifications based on Image processing output
- Recognize person at the doorstep and indicate the owner about the person’s information that are already feeded.

THANK YOU