

IOT based Home Automation using Raspberry Pi with Doorbell Security

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Abstract - In today's world Automatic systems are being preferred over manual system. Wireless Home Automation system(WHAS) using IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world. This system is able to control all home appliances from remote location such as light, fan, door etc. through mobile application or web based application. Raspberry Pi kit is a server system. PIR Sensor will be used as a motion detector to detect human. It is very useful for handicapped and physically disabled people. It uses face detection and recognition system. In face detection it detects whether it is human or animal, if it detects human it captures image and rings bell otherwise bell will not ring. In face recognition we are using LBPH algorithm using OpenCv recognize the captured image with image in database and provide information of captured image through alert message to owner's twitter account.

Key Words: WHAS, LBPH, OpenCv, PIR Sensor, Raspberry Pi

1. INTRODUCTION

1.1 Basic concept

The Internet of Things is the network of "things" which are connected to a common network path in order to

communicate, exchange data or control each other. The network path can be interconnected or interconnected with the "things" being either embedded software, hardware or any sensor [1]. It refers to the state where the things will have more and more data and information associated with them and have an ability to communicate, produce new information and become the integral part of the free world wide web [1]. It not only features internet connectivity but also features cloud and data management, security management and all other fields concerned with the era of internet.

Nowadays, there is a growing demand of automation and intelligent systems so that it leaves us with less human intervention and smart decision making devices [4]. With the growing demand, comes the growing competition which has forced the competitors to come out with more intelligent, efficient as well as user friendly models. This has made our lives easier from making our intelligent travel arrangements to our personal medical care. With a tap of your finger you can control your lights, with a single tap you can book your flight tickets, monitor traffic and weather and so on. It will refine our workflows, prioritizing tasks and projects based on ongoing assessments in real time of what is happening throughout our organization.

The Internet of Things will maintain our appliances and vehicles, determining when they are next due for service, cleaning, or – in the case of our refrigerators – restocking (and making appropriate arrangements, such as repair appointments

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and grocery orders). It will enable our cars to communicate with other cars on the road as they self-drive us to and fro. It will regulate our lights, heat, AC, and other home appliances and devices, turning them on and off as we enter and exit rooms and as they "learn" our schedule. And that's not all. Save money on energy use, while keeping your office or building comfortable. The cost of simply forgetting to turn off your classroom lights and electric appliances can really add up over time [4]. Controlling temperature and lighting based on time of day or occupancy can really reduce energy costs [4]. Automating your heating and lighting systems allows you to hand over the routine chores to a smart system and remove the cost of human error [3]. Have your systems set automatically, or override the main settings with easy controls - Touchscreens, is no longer just for greenies, with the typical family power bill has risen by 78% in less than an Internet, web-enabled phones, or even the office telephone [3]. Intelligent building efficiency is not just relegated to offices. As energy prices rise and incomes are squeezed, home automation systems will become a more enticing investment as their efficiency improves and costs decline due to innovation and scale.

1.2 The project includes

- Maintaining live status of appliances used in homes.
- providing security to home.
- Maintaining details of the services chosen according to customer convenience.
- Offering best quality services.
- Project is related to Home Automation System.

Main facilities available in this project are:

- It provides Administration Level-Owner management.
- It is very useful to control appliances from remote location.
- It send details of every person which come in front of door via notification
- This system is very useful for handicapped and physically disabled persons.

- Provides live status of appliances in home.
- Providing human detection light blow system.
- Smart doorbell.
- Image capturing.
- If human then ring bell otherwise bell does not ring.
- If owner is not there, then image and info will be forwarded to owner's number.
- Turn ON lights when human is enters in the house.

2. APPLICATIONS

- This project can be implemented in Hospitals by providing automatic light ON/OFF feature
- This project can be implemented in factories.

Face Detection

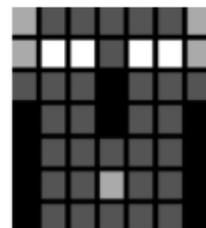
Face detection describes the process of locating one or many human-like faces in an image sequence. For a fast detection of faces the hair-like feature algorithm by Viola and Jones can be used [1]

Face Recognition

The next step after locating a face inside of an image is the recognition of it. The recognition is the process of identifying a face inside of a set of previously learned faces. For this purpose different algorithms like Eigen faces, Fisher faces or Local Binary Patterns Histograms (LBPH) can be used [5]. In this paper the LBPH will be covered.



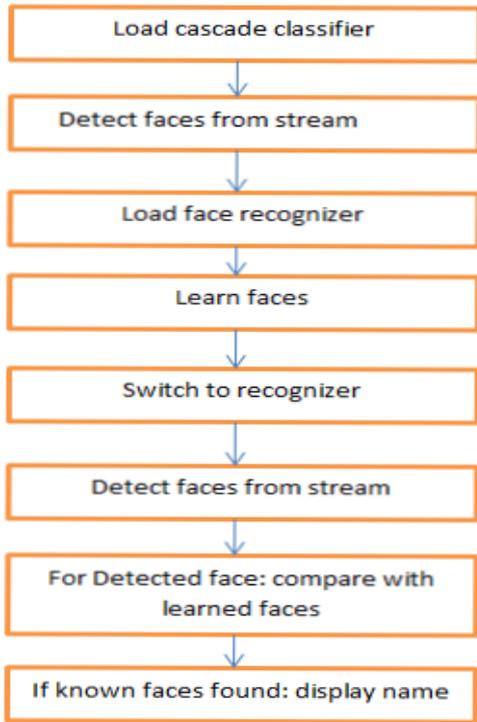
(a)



(b)

Fig 1: LBPH Analysis

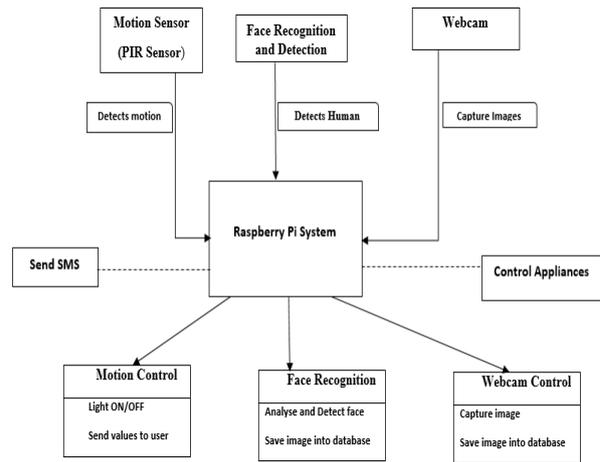
3. ALGORITHMS IMPLEMENTATION



This lead to a complete software which had to be developed with the following features:

- 1) Read in the video stream from a camera which is connected to the computer
- 2) Detect a face in the current frame of the image sequence
- 3) Allow to store the face and link a label to it (label = face name)
- 4) Recognize the stored face in another video stream and show the correct label a graphical representation of the implemented features and software architecture can be seen in fig. 2.

4. DATA FLOW MODEL



4.1 Door Sensor

The door sensor was designed with multiple requirement in mind. The requirement were

- Battery operated
- Long life on one battery(low power)
- Small form factor
- Easy to install

4.2 Power Switch

The power switch has similar requirements, with the additional critical requirement of switching load and rated current.

4.3 PIR Sensor

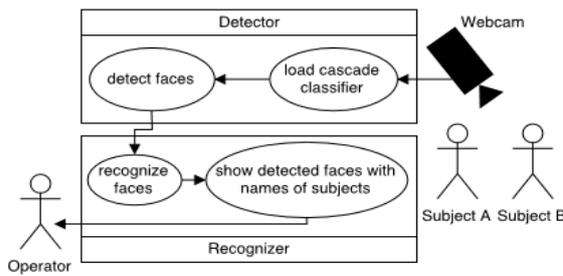
General Description

The PIR (Passive Infra-Red) Sensor is a pyro electric device that detect motion by measuring changes in the infrared levels emitted by surrounding objects. This motion can be detected by checking for a high signal on an I/O pin.

Application Ideas

- Alarm System
- Halloween Props

5. ARCHITECTURE



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6. EXISTING SYSTEM

Existing system only allows user to turn ON/OFF lights using sensors. Door security is provided with the help of webcam, which shows live image of visitor. Current home automation system sense the occupancy of the home using smart meters for light controlling system.

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7. RESULT

The Internet of Things are maintaining our appliances like AC, and other home appliances and devices, turning them on and off as we enter and exit rooms. And that's not all. It also helped to save money on energy use, while keeping your office or building comfortable. The cost of simply forgetting to turn off your home lights and electric appliances was making a high energy use and increasing cost. Controlling lighting based on time of day or occupancy can really reduce energy costs. Automating your heating and lighting systems allows you to hand over the routine chores to a smart system and remove the cost of human error.

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