

NOVEL HOME SURVEILLANCE APPROACH USING PC TOPI COMMUNICATION AND INTELLIGENT CAMERAS WITH APP NOTIFICATION

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ABSTRACT

The popularity of home automation has been increasing greatly in recent years due to considerable affordability and simplicity through smart phone and tablet connectivity. To save money, homeowners sometimes decide to go with the basic package offered by a home security provider. Although you may pay less upfront costs, not covering all areas of your home can be costly in the long run. For instance, criminals may find an unprotected entry point into your home if you are only buying a front and backdoor sensor. By taking a tour around the perimeter of your home to spot any security weaknesses and order the required equipment pieces to protect all areas. Although installing more cameras may cost slightly more, you'll have the peace of mind to know your property is well protected. In this project we will arm our home with multiple Raspberry Pis that communicate among themselves to accomplish a common goal. We'll begin by building a case for security with an emphasis on the lack of flexibility of commercially available systems that's where we bring in Raspberry Pis to the rescue. Our interoperable system will involve PC and a Raspberry Pi and all the concepts listed in the objects section. Our solution is flexible, affordable, and interoperable with otherIoT devices and services that are worth paying for.

EXISTINGSYSTEM

In the existing system, a novel dynamic range-Doppler trajectory (DRDT) method based on the frequency-modulated continuous-wave (FMCW) radar system is proposed to recognize continuous human motions with various conditions emulating real-living environment. This method can separate continuous motions and process them as single events. Range-Doppler frames consisting of a series of range-Doppler maps are obtained from the backscattered signals.

PROPOSED SYSTEM

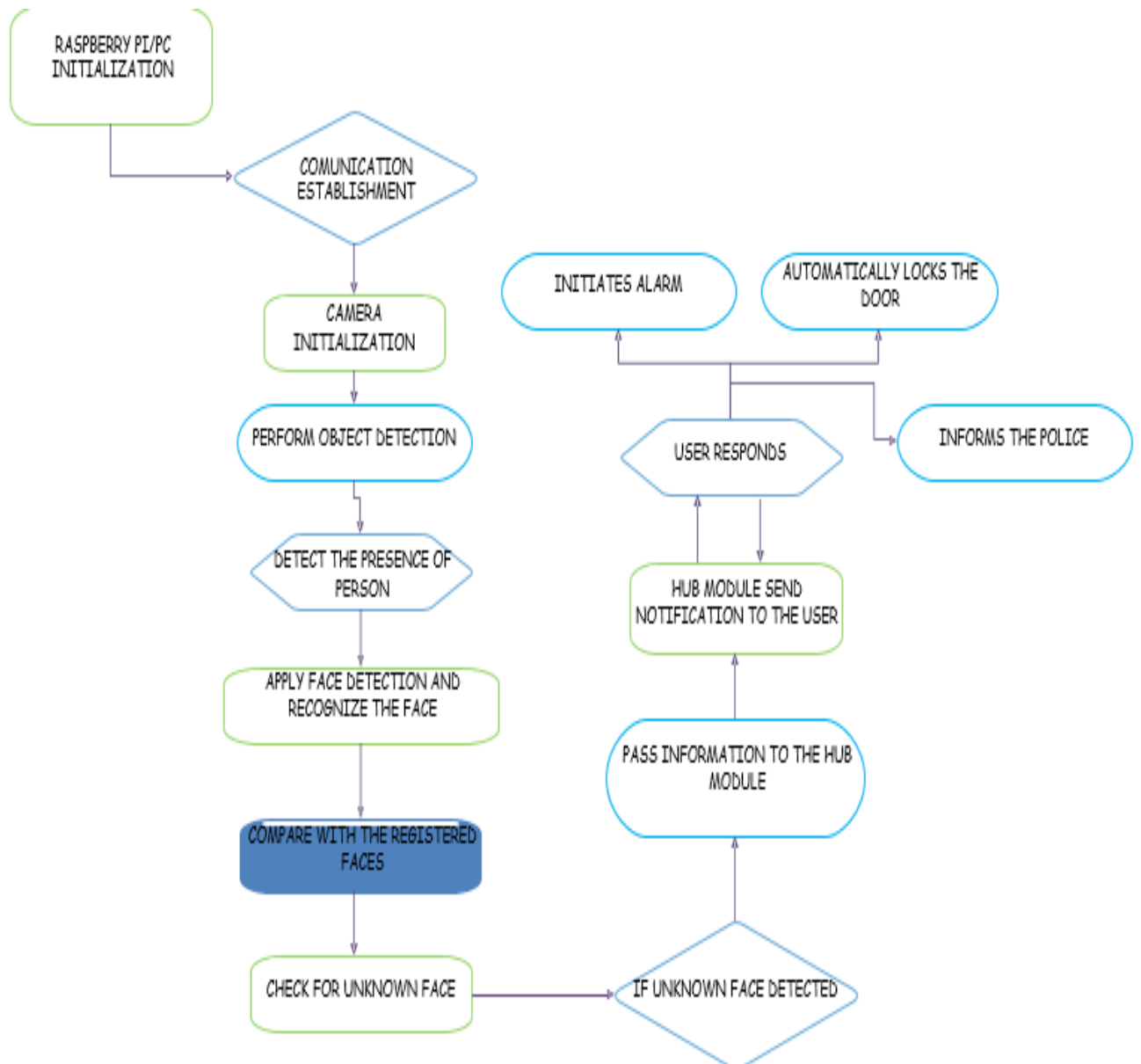
Our system has the goals of monitoring our driveway outside the house for motion and people/vehicles .Performing face recognition and alerting the home owners if someone shouldn't be inside (i.e. not you or your family members). We can accomplish this proof of concept IoT case study system with a minimum of a PC and a Raspberry Pi with a camera A mobile app will be developed by which the user can be notified automatically. Alarm can also be initiated when intruder gets detected.SMS option can be implemented for emergency option.

OBJECTIVE

Cheap and effective solution for home surveillance Provides alert to the home owner in case of intruder detection A proof for police department for finding the thief Automatic SMS

option for emergency situation Report generation when the intruder enters App notification to the user.

ARCHITECTURALDIAGRAM



Module description

- Object Detection Module
- Face Detection Module
- Face Recognition Module
- Image ZMQ for Pi to Pi Communication
- Mobile App Module.

SSD (Single Shot Multi-Box Detector) algorithm is used in Object detection model. It's generally faster than Faster RCNN. A typical CNN network gradually shrinks the feature map

size and increase the depth as it goes to the deeper layers. The deep layers cover larger receptive fields and construct more abstract representation, while the shallow layers cover smaller receptive fields. Objects and deeper layers to predict big objects, as small objects don't need bigger receptive fields and bigger receptive fields can be confusing for small objects.

Face Detection Module

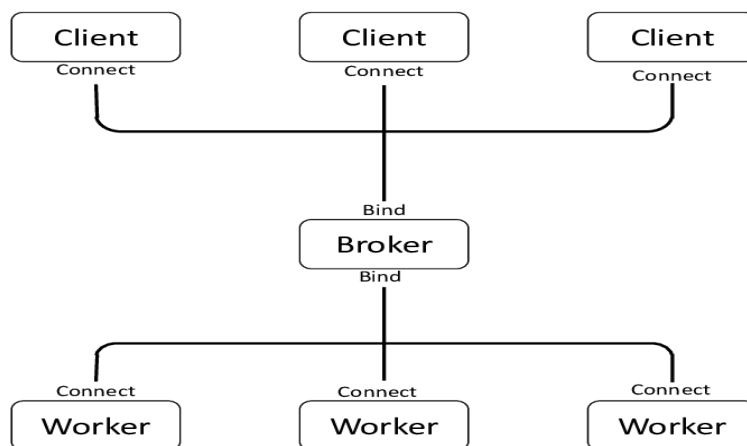
Here for face detection we use Ultra light detector system. This model design is a real-time ultra light weight universal face detection model designed for edge. There are two versions of the model, version-slim (slightly #faster simplification), version-RFB (with the modified RFB #module, #higher precision). Provides pre-training models using wider face training at 320x240 and 640x480 different input resolutions to better work in different application scenarios.

Face Recognition Module

For Face Recognition module here we using Mobile facenet algorithm Mobile Face Nets, which use less than 1 million parameters and are specifically tailored for high-accuracy real-time face verification on mobile and embedded devices. Mobile Face Nets achieve significantly superior accuracy as well as more than 2 times actual speedup over MobileNetV2. The fastest one of MobileFaceNets has an actual inference time of 18 milliseconds on a mobile phone. For face verification, MobileFaceNets achieve significantly improved efficiency over previous state-of-the-art mobile CNNs.

Image ZMQ

Imagezmq is an easy to use image transport mechanism for a distributed image processing network. ImageZMQ is used for video streaming with OpenCV. It detects motion caused by the spinning of the water meter needle. It sends only the images where the needle starts moving or stops moving, which is only a small fraction of the images it captures. Then the images are passed via imagezmq to the central computer for more complex image processing like image tagging, text extraction, feature recognition, etc.



RASPBERRY-PI

The Raspberry Pi is a series of small single-board computers. Raspberry pi 3b+ It is a modified form of its predecessor Raspberry Pi 3 B that was introduced in 2016 and came with CPU, GPU, USP ports and I/O pins.

CPU is 64 bit with 1GB RAM (random access memory)

Contains Broadcom BCM2837B0 chipset

Comes with 1.4GHz Quad-Core ARM Cortex-A53, 4 cores

Consists of 40 pin header (26 GPIOs)

Stereo audio and composite video is supported by 3.5mm jack connector

4 USB 2.0 ports

USB CAMERA

A webcam is a video camera that feeds or streams an image or video in real time to or through a computer to a computer network, such as the Internet. Webcams are typically small cameras that sit on a desk, attach to a user's monitor, or are built into the hardware. Working Voltage: 5v Resolution: 25 Megapixel

APPLICATIONS

This project helps in saving people property and money as well as automates the records which helps to punish the thief . Implementation of this project also gives rise to many applications such as provide in bank lockers, etc. Mainly its used in home for home security purpose.

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