Smart Doorbell for Home Security using Raspberry Pi

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Declaration

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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Name of the Supervisor: Mr. B.H. Sudantha

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Dedication

I would dedicate this thesis to my beloved family members who have never failed to give me a tremendous support, for giving all not only throughout my project but also throughout my life as well. As well they teach me that even the largest task can be accomplished if it is done one step at a time,

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Abstract

In recent years, the crimes targeting household properties has grown considerably high. Therefore, it's necessary to come up with a proper solution to secure a household and to let house owners aware about the surrounding activities. The proposed system is a hardware device that combined with technologies like OpenCV deep learning based facial recognition and WebRTC. Further, PhoneGap is used to develop the application for hand-held devices which will interact with the client (house owner). To implement one-way video conferencing between the user (house owner) and visitor, WebRTC with Socket.io will be used. Apart from that, WebRTC with Socket.io combined technologies are responsible for streaming live feed of household environment. Motion detection and video capturing are done using PIR sensor, camera module, speaker and microphone. The system will initiate by turning on the camera when either a user presses on the doorbell 'bell' push button or PIR sensor detects motion. When the visitor presses the doorbell 'call' push button, visitor is connected to an one-way voice conference call with the home owner (House owner can see and hear the voice of the visitor through a hand-held device and visitor can only hear the voice of the owner through doorbell device.). Home owners can record a pre-defined message for known users as well. The camera module will perform facial detection by resolving a classifier in OpenCV. Afterwards, an image will be captured with a brief video. Facial information is saved in facial repository and video files are stored in the cloud. During the facial recognition if a match is found, the house owner will be notified with visitor details. For unknown users, house owner will be prompted to identify. The system can be improved and customized as a security system that can be installed in server rooms and also it can be enhanced to use as a student attendance recorder module.

Keywords – Raspberry Pi, WebRTC, PhoneGap, OpenCV

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