

Face Recognition with Smart Security System

¹Dalwinder singh, ²Manik Rakhra, ³Gurasis Singh

^{1,2,3}Asst. Prof. Department of Computer Science,
Department of Computer Science and Engineering
Lovely Professional University Phagwara, India

¹E-mail: Dalwinder.singh@lpu.co.in

²E-mail: Manik.23538@lpu.co.in

³E-mail: Gurasis.25051@lpu.co.in

Abstract

—Web-based innovation has improved definitely in the previous decade. Accordingly, security innovation has become a significant assistance to ensure our everyday life. In this paper, we propose a strong security dependent on face acknowledgment framework (SoF). Specifically, we build up this framework to giving access into a home for confirmed clients. The classifier is prepared by utilizing another versatile learning strategy. The preparation information are at first gathered from interpersonal organizations. The precision of the classifier is steadily improved as the client begins utilizing the framework. An epic strategy has been acquainted with improve the classifier model by human connection and internet based life. By utilizing a profound learning structure - TensorFlow, it will be anything but difficult to reuse the system to receive with numerous gadgets and applications.

I. INTRODUCTION

The face is an innovation fit for recognizing or checking an individual from a computerized picture or a video outline from a video source. There are numerous techniques where facial acknowledgment frameworks work, yet when all is said in done, they work by looking at chosen facial highlights from given picture with faces inside a database [4]. It is likewise portrayed as a Biometric Artificial Intelligence based application that can exceptionally distinguish an individual by breaking down examples dependent on the individual's facial surfaces and shape.

While at first a type of PC application, it has seen more extensive uses lately on versatile stages and in different types of innovation, for example, mechanical technology. It is normally utilized as access control in security frameworks and can be contrasted with different biometrics, for example, unique finger impression or eye iris acknowledgment frameworks [2]. Despite the fact that the precision of facial acknowledgment framework as a biometric innovation is lower than iris acknowledgment and Fingerprint acknowledgment, it is broadly embraced because of its contactless and non-intrusive procedure. As of late, it has likewise gotten famous as a business ID and promoting instrument. Different applications incorporate propelled human-PC association, video observation, programmed ordering of pictures, and video database, among others.

II. RELATED WORK

In the recent years [7], world has seen a dramatic Change in terms of Life Style. Applications replaced the conventional shopping methods, Food delivery is now done with the use of application, and Cartographers have become programmers for Google maps. Check in counters are converted into Turnstiles. To create a technology involved solution in the domain of security the proposed system was initiated. The conventional lock and key is safe but it comes with major drawbacks, losing the

key can be a major headache, the key needs to be physically transferred in such case [8]. With aid of machine learning and Artificial intelligence, such issues can be resolved without even lifting a finger. The current security systems primarily consist of manual Locking and Unlocking methods for any Physical security provision. When we talk about the use of machine learning and artificial intelligence, there are contemporary technologies involving Python.

The product persistently screens target zones to give the tally, sex, age and novel distinguishing proof of people after some time. This Facial Demographics Model is utilized to comprehend statistic varieties after some time for an assigned zone of the city, or to follow client examples, for example, stay time spent in lines or holding up regions of retail locations. It likewise encourages brands and publicists to evaluate socioeconomics or to target people for promoting [6]. It can identify and find human faces inside a picture, and returns high-exactness face jumping boxes. Face discovery is the initial step to investigating and handling faces. You can get face properties including age, sexual orientation, head present, eye status, and skin shading and so on. Exact ascribes empowers you to perform investigation dependent on face pictures.

True Face

Genuine face is a face acknowledgment organization that applies propelled PC vision^[1] innovation to camera film and pictures to empower organizations to settle on quick choices dependent on distinguished examples [1]. We accept that through the capable utilization of PC vision innovation, we can live in a more secure, more brilliant world.

Methodology

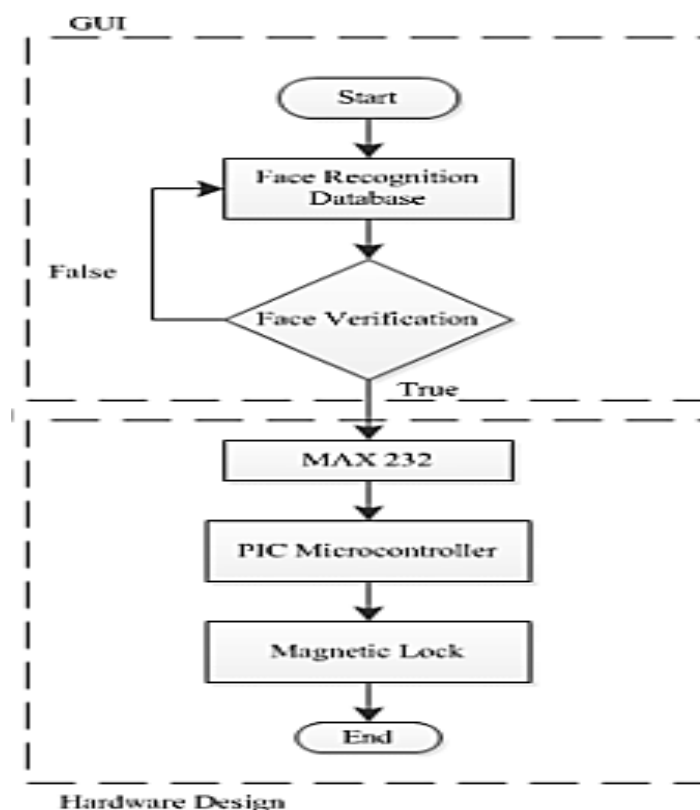


Figure.1:AN OVERVIEW OF OURSYSTEM

The Developed System would make use of front face camera and detect the face. The system will then be trained to recognize and compare the faces with the stored database of preexisting face image and if found matched will enable the unlocking of the door, the door will remain locked in case the image is not matched [5]. The Product will consist of a Training module where the system will be trained for recognizing the face and then it will be able to store the data in a device. The user will use the front face camera to enable the detection of its face, once done the system will then match the detected face with the existing one and when found to be aligned; it will enable the user access the door[11].The required resources for the system to work are minimal, Power supply is easily available and the system requires the presence of a front face camera, which is also easily available. In order to make this process remote [3], the user will need to provide constant connectivity to the internet through a router, which then should be connected to the remote device capturing the image

I. OBJECTIVES

- The main purpose of proposed system is to help the development team in having a clear idea regarding the software required to design the system, the necessary man power and the input/output feature of the system.
- The face detection security system with the help of Machine Learning is used to identify the person authorized to enter a particular place and then allow him to do it in a hands free manner.
- The output of the proposed system helps the user in getting a hands free experience in ensuring the security of home without having a lock and key as a hardware. The technology will enable the prevention of major issues that arise when a person has to do with the system.
- Utilization of face as a resource in making the security system hassle free.

II. GENERAL DESCRIPTION

• SmartDevices

The software comes with a technology with enables the Creation of data set which is Hassel free and the ease of access is very beneficial for the user in terms of getting to use the application.

The interface is fairly simple and allows the user to get done with it very quickly.

For starters, it takes the pictures of the user using the front face camera and then utilizes it to build a roaster of datasets to enable the user, ease of access.

• User Interface

The home screen encloses multiple buttons, namely, Data Record, Model Train and Door Unlock.

Each button serves their specific purpose, For instance, Data Record is used to capture multiple pictures and Creation of data set. The Model Train button allows the system to train itself to learn the utilization of the available data set. The last but not the least is called Door Unlock button. This button enables the User to match the current face with the pre-existing dataset and Implement the algorithm to open the Locked Door.

III. GENERAL DESCRIPTION

Product Perspective: The Face detection technology for security system is software which is an automated system as against the present systems that provide the user a hands free method to unlock the door [9]. The system does require an external support which is the front face camera. It is an independent system.

User Interface: The software comes with a technology which enables the Creation of data set which is hassle free and the ease of access is very beneficial for the user in terms of getting to use the application.

The interface is fairly simple and allows the user to get done with it very quickly.

For starters, it takes the pictures of the user using the front face camera and then utilizes it to build a roster of datasets to enable the user, ease of access.

IV. SPECIFIC REQUIREMENTS

Architecture

It is the strategy of depicting the development, parts, modules, interfaces, and information for a framework to fulfill indicated prerequisites. One could comprehend it as the requesting of frameworks hypothesis to item advancement. There is almost get together with the orders of frameworks examination, frameworks design and frameworks building.

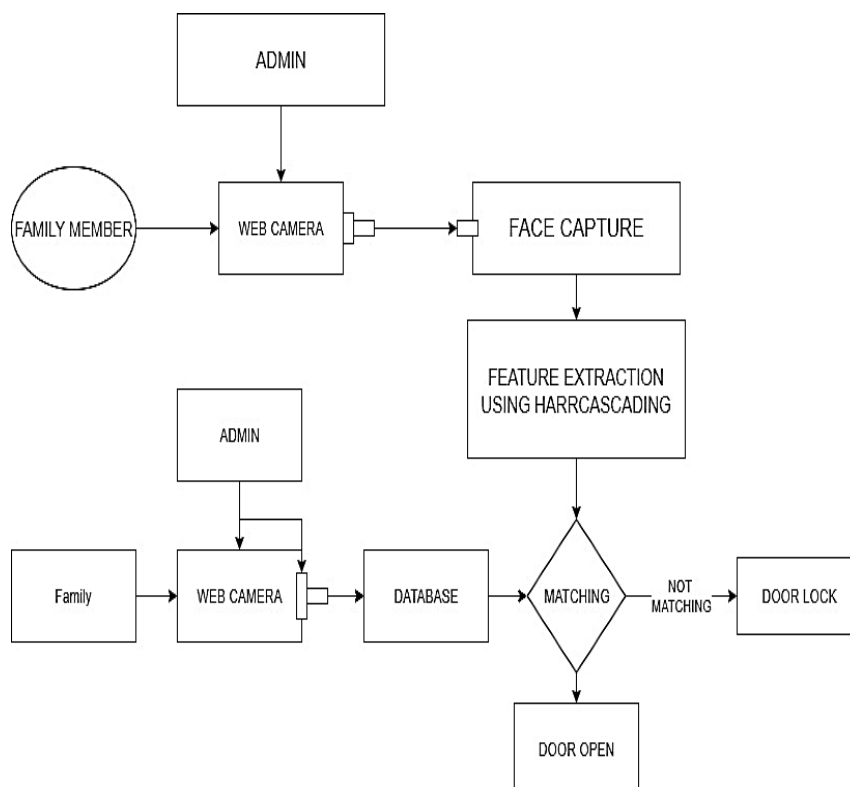


Figure2: System Architecture

V. Analysis

The Software building procedure can be seen as a winding. At first, framework designing depicted the job of programming and prompted programming prerequisite examination where the data space, capacities, conduct, execution, limitations and approval criteria for programming were built up. Moving inside along the winding, we came to plan lastly to coding. To create product, we went on winding in along sections that decreased the degree of deliberation on each turn. Unit testing started at the vertex of the winding and spotlights on every unit of the product were executed in source code [4]. Testing developed by moving outward along the winding to restoration testing, where the focus was on the plan and the development of the product engineering. Talking another turn on outward on the winding we ran over approval testing where necessities built up as a component of programming prerequisites investigation were approved against the product that has been developed. At last, we went to a framework testing, where the product and other framework components were tried.

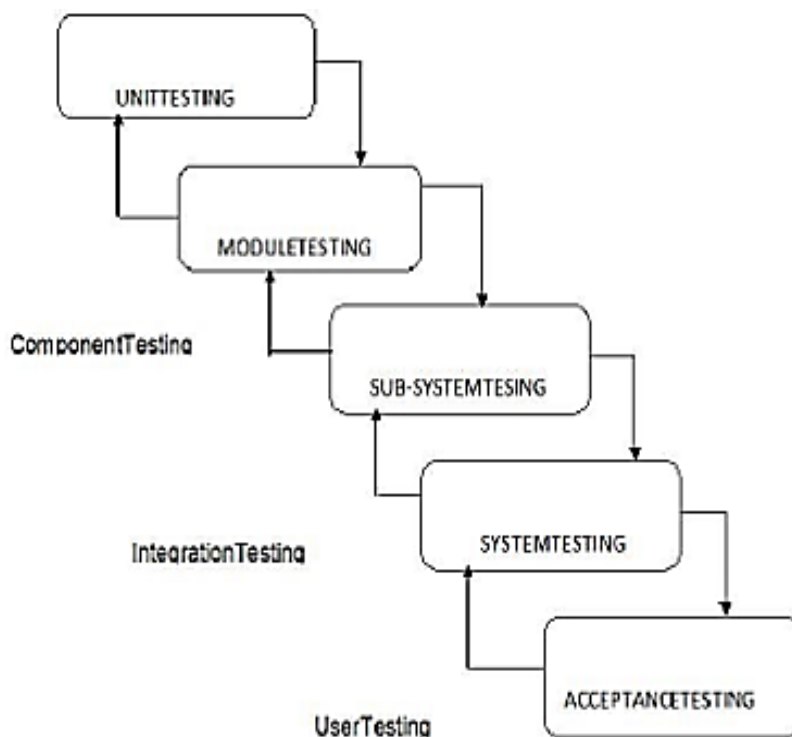


Figure 3: Flow chart of Analysis

VI. IMPLEMENTATION

VI.1 IMPLEMENTATION OF THE RESEARCH

Here in authors have implemented this research work by keeping in mind that it will satisfy all our customer need. While implementing this proposed system there had been a lot of issues in design and coding phase, to resolve this issue we had to prepare number prototypes such that there will be no further problem in later phases. We performed various feedback based on different sexuality and

different age group of people. We asked them for what can be included and what can be omitted from the software to make it more responsive and user friendly.

As per the feedback we worked to develop our product and make it available to customers.

VI.2 CONVERSION PLAN

There had been many a time when we need to change our plans. Sometimes we thought of something, but we ended up doing something else. This change is because of the following reasons:-

- i) Non availability of the proper resources.
- ii) Lack of knowledge in some of the field.
- iii) Difficulty in integrating some of the module in project.
- iv) Non-corrective error in some module.
- v) When we tested modules in different environment, it again shows error or bug.
- vi) Function in the module was not responding accordingly. So, we rewrite the code.
- vii) Based on the feedback and of the people we redesigned the software.
- viii) At the end, we accomplished our proposed system by just keeping those functionalities which are mostly important.

VI.3 POST-IMPLEMENTATION AND SOFTWARE MAINTENANCE

Before implementation, we have designed different prototypes of the required software. Based on the user requirement we also designed different test cases that might be required during the testing phase. Software maintenance strategy and tactics were developed before the implementation of the system

VII. PROPOSED SYSTEM LEGACY

VII.1 CURRENT VIEW

This proposed system is now in working stage, all the possible errors has been omitted. Now we need to expand the functionality of software such that it can be as much useful as possible. Web application has been tested and verified for its responsiveness and user-friendly environment[10]. We are still working to expand the database storage capability so that it can store the data of as many users as possible.

VII.2 REMAINING AREA OF CONCERN

The major area of concern is that the software may get crashed and as it is newly developed not all the security major has been included so it is still vulnerable to some threats. As software is developed in latest technology environment it may not support older versions of technologies.

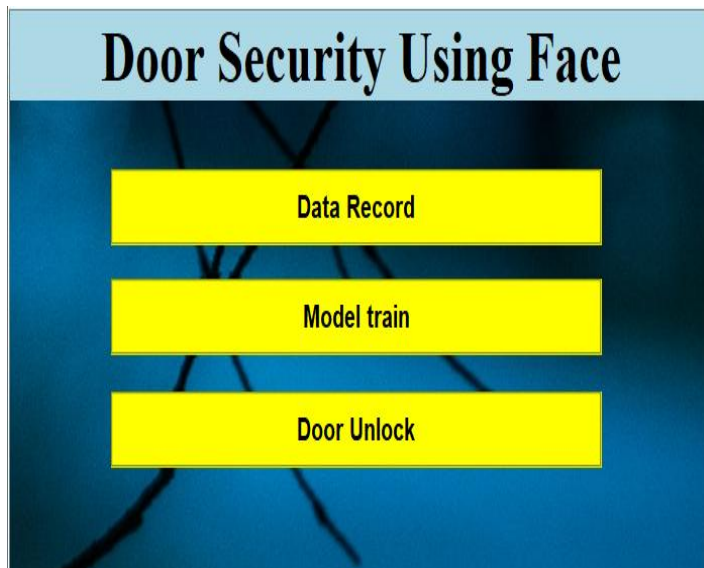
VII.3 TECHNICAL AND MANAGERIAL LESSON LEARNT

This proposed system helped us a lot in learning new platform of developments, applying security majors, gathering the prerequisite that is required to develop any new software performing different test cases, and finally integrating and maintaining the whole software..

VIII.DETECTION AND AFFINE TRANSFORMATION

A. CameraNode

This is home page of our proposed system .All the functionality of this proposed system is explained as below:



The following log has been framed as a sequential lesson, to enable the easy access to the user and for the complete understanding. The Breakdown of the steps is in the following order.

Data Record

Model Train

Door Unlock

Following is the detailed explanation of how the system works.

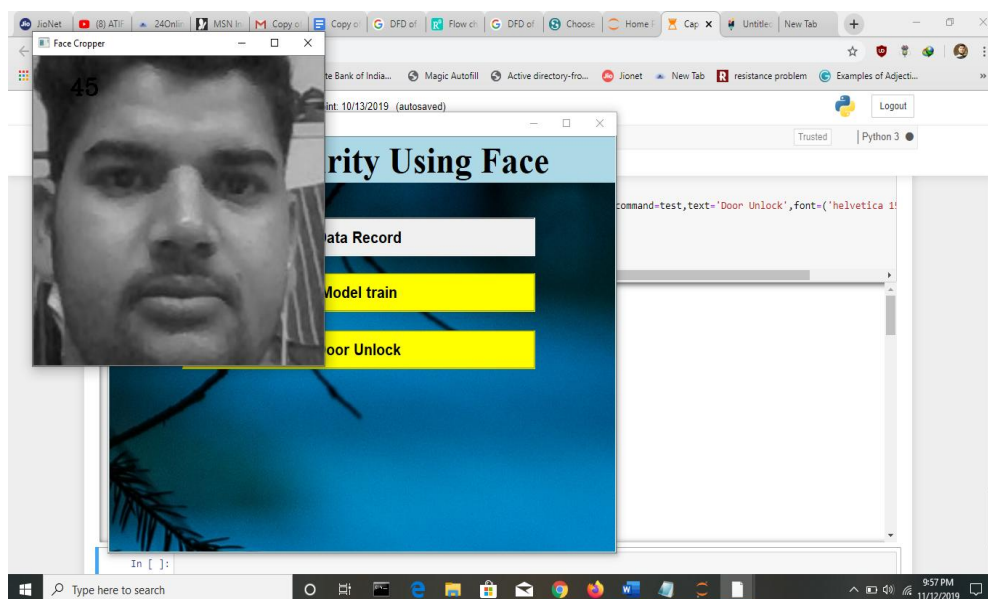


Figure 4: Camera node processes.

The data recording button is available on the launch window of the program. Click on the “Data Record” button and Face the front camera. This will enable the system to take user’s multiple pictures for the easy recognition of the user. The system stores multiple pictures of the user as a database for reference while making the decision.

Training the model is the button which can be used to train the system to recognize a particular kind of structure, since on a broad perspective, a person’s face is the most influential factor in determining the difference, and the model is trained on identifying faces.

The Door unlock button deals with the matching and comparison of the live picture from the stored database.

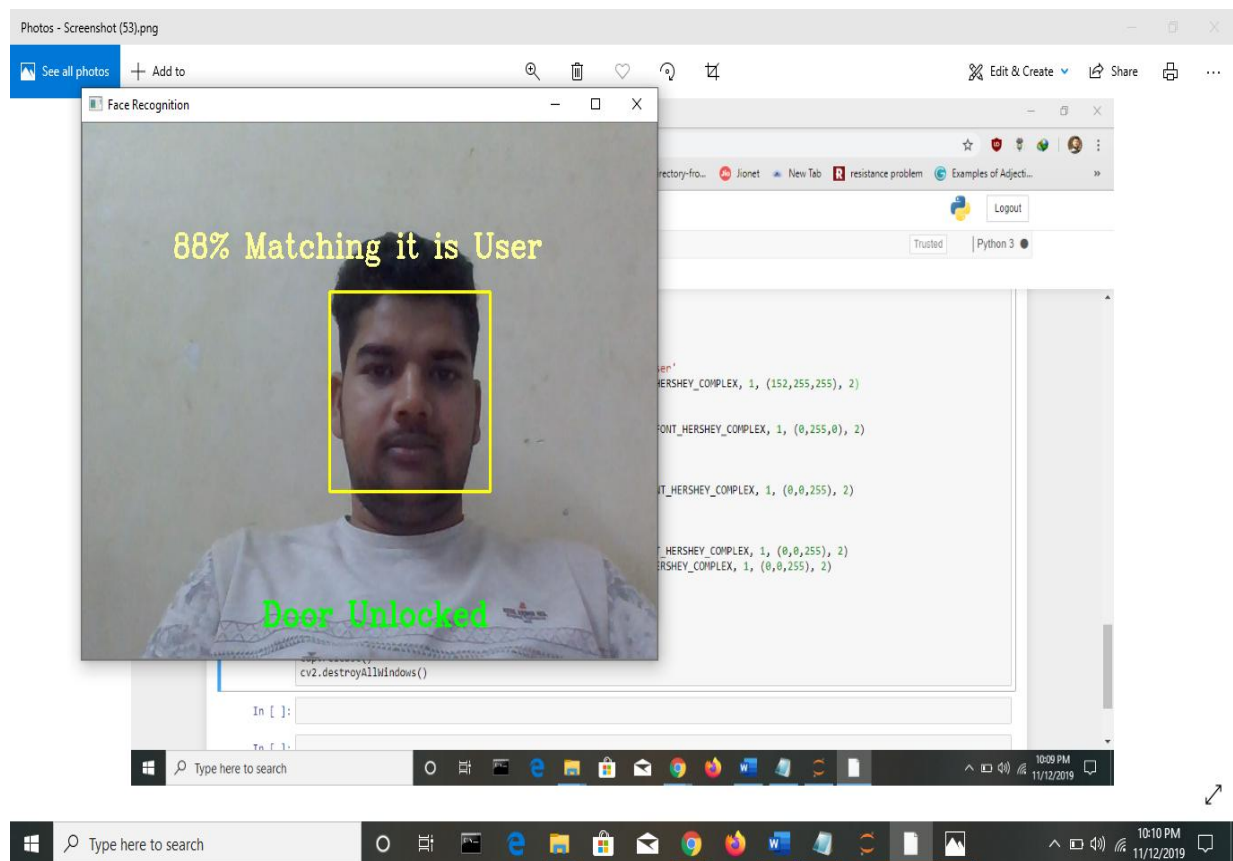


Figure 5: Cropped and Affined data.

Detail explanation about matching & Unlock process

The process of Matching and unlocking is a conditional one, the live pictures should be matching the existing database up to a particular extent for it to be able to be matched and then the door is unlocked otherwise it remains locked.

The first step is to create the data set with the use of python Jupiter.

The second step involved the training of model; this step is for making the system aware of Understanding the image. The following image consists of the source code for training the image.

The third step is to match the available Dataset with the help of trained System.

The following Image contains the source code for the respective function of matching with dataset.

IX SYSTEM WORKING AND COLLECTING DATA

The following manner encloses the way system stores the database, it takes multiple pictures of the individual and then is trained for memorizing the picture and be able to match and identify.



CONCLUSION

In this paper, we introduced a new method of obtaining data for training a security system from social media and human interaction. There are abundant interesting projects which are leading in Artificial Intelligent and Deep Learning developed in Tensor Flow with huge support from Google. In addition, computation in parallel mode will dramatically drop the training time. By using the method mentioned in the Faenetpaper, we succeeded in reaching a robust accuracy comparison with other. More importantly, the accuracy is improving as long as the system is used with new data from social media and human interaction. Second, collecting data from social media is also a beneficial move since social media is the largest public data such as Facebook with around 1.7 billion

active users. With the publication of Facebook, we can easily collect the necessary data. We can also collect data from other social networks such as Instagram, Weibo. One interesting direction for future work is to collect the data from the owner's smartphone such as captured images and videos and to train the network automatically. Another direction for future work is to detect fake-face by using gait speed and eye tracking.

REFERENCES

- [1] Federal Bureau of Investigation United States Department of Justice. Crimeintheunitedstates,2015,2015.
- [2] Martin Abadi, Ashish Agarwal, Paul Barham, Eugene Brevdo, Zhifeng Chen, Craig Citro, Greg S Corrado, Andy Davis, Jeffrey Dean, Matthieu Devin, et al. Tensorflow: Large-scale machine learning on heterogeneous distributed systems. *arXiv preprint arXiv:1603.04467*, 2016.
- [3] Duy Tran, Ha Manh Do, WeihuaSheng, He Bai, and GirishChowdhary. Real-time detection of distracted driving based on deep learning. *IET Intelligent Transport Systems*,2018.
- [4] Ha Manh Do, Minh Pham, WeihuaSheng, Dan Yang, and Meiqin Liu. Rish: A robot-integrated smart home for elderly care. *Robotics and Autonomous Systems*, 101:74–92,2018.
- [5] Ha Manh Do. Developing a home service robot platform for smart homes. Master's thesis, Oklahoma State University,2015.
- [6] ADT. Security systems, home automation, alarms and surveillance, 2016. [Accessed:2016-09-09].
- [7] VivintSmart Home Security Systems. Smart home security solutions., 2016. [Accessed:2016-09-09].
- [8] Protect America. Affordable home securitysystems for everyone.,2016. [Accessed:2016-09-09].
- [9] KDenmead.Netatmoistheweatherstationfortherestofus.Wiredmagazine.[online]. [http. archive. wired. comgeekdad/2013/02/netatmo/](http://archive.wired.com/geekdad/2013/02/netatmo/). [Accessed 2014-04-02],2013.
- [10] Jeffrey S Coffin and Darryl Ingram. Facial recognition system for security access and identification, November 23 1999. US Patent 5,991,429.
- [11] J Shankar Kartik, K Ram Kumar, and VS Srimadhavan. Security system with face recognition, sms alert and embedded network video monitoring terminal. *International Journal of Security, Privacy and Trust Management (IJSPTM) Vol, 2*,2013.
- [12] Matthew Turk and Alex Pentland. Eigenfaces for recognition. *Journal of cognitive Neuroscience*, 3(1):71–86,1991.