



Parshvanath Charitable Trust's  
**A. P. SHAH INSTITUTE OF TECHNOLOGY**  
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(Religious Jain Minority)

# **Smart Society Security System**

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# Abstract

Dynamic vehicle and human detection and tracking can provide essential data to solve the problem of society planning and road management. Using this model, we will obtain Human candidates, vehicle probabilities, vehicle number and their coordinates in real-time. The detection speed of our model will be fast enough to process streaming video. Our proposed model will be on real-time footage, accurate human and vehicle detection, making it ideal for computer vision application and safer for society.

# Introduction

- Scope of Smart Society Security System is basically notifying the vehicle owners about the check-in and check-out of their respective vehicle into their apartments.
- The product will work as a security system for vehicle parking.
- Proper Details of the outsider will be maintained.

# Objective

- The objective of this system is to develop an efficient and intelligent security system which everyone can afford and everyone can rely on it.
- To track and monitor all the suspects in the premises and classify them and store it for further consequences.
- After satisfying all these constraints the algorithm will generate the best possible log which can be understood at a ease. And will be globally acceptable as a benchmark for security.

Sr. No	Topic	Published	Description	Drawbacks
1	REAL-TIME VEHICLE DETECTION AND TRACKING USING DEEP NEURAL NETWORKS	2016	Dynamic vehicle detection using CNN. Trained using ImageNet dataset	Needs High processing power to run the get the output file. Includes less features
2	A New Approach For Vehicle Number Plate Detection	2018	Firstly Grayscale conversion of the footage and then CCA for segregating and then noise reduction. After this character is segmented and applied OCR for fetching number plate.	Suitable for detecting vehicles at fixed places only. Includes less features
3	Forward Vehicle Detection Based on Incremental Learning and Fast R-CNN	2017	Used CNN for re-training on ImageNet dataset. And recognized real-time traffic which including cars of all type.	Only the vehicles are detected. No case of storing identity. Includes less features

Sr. No	Topic	Published	Description	Drawbacks
4	Video Based License Plate Recognition of Moving Vehicles  Using Convolutional Neural Network	2018	Uses AlexNet for training the ImageNet along with OpenALRP for detecting number plates.	Needs GPU computation to run. Output varies on any funky stickers on number plate. Includes less features
5	A Hidden Markov Model for Vehicle Detection and Counting	2015	Tracking and counting number of vehicles. Used matlab for hidden line.	Using matlab is not that convenient for such task. Accuracy can be varied if the driver drives in half lane. Includes less features

# Literature Review

## Paper: 1

### REAL-TIME VEHICLE DETECTION AND TRACKING USING DEEP NEURAL NETWORKS

- ❖ Published in 2016
- ❖ Authors: Xiao-Feng Gu, Zi-Wei Chen, Ting-Song Ma, Fan Li, Long Yan
- ❖ Method/Algorithm Used: Dynamic vehicle detection using CNN. Trained using ImageNet dataset
- ❖ Drawbacks: Needs High processing power to run the get the output file. Includes less features



# Paper: 2

## A New Approach For Vehicle Number Plate Detection

- ❖ Published in 2018
- ❖ Authors: Sarthak Babbar, Saommya Kesarwani, Navroz Dewan, Kartik Shangle, Sanjeev Patel
- ❖ Method/Algorithm Used: Firstly Grayscale conversion of the footage and then CCA for segregating and then noise reduction. After this character is segmented and applied OCR for fetching number plate.
- ❖ Drawbacks: Suitable for detecting vehicles at fixed places only. Includes less features

# Paper: 3

## Forward Vehicle Detection Based on Incremental Learning and Fast R-CNN

- ❖ Published in 2017
- ❖ Authors: Kaijing Shi, Nan Ma, Hong Bao
- ❖ Method/Algorithm Used: Used CNN for re-training on ImageNet dataset. And recognized real-time traffic which including cars of all type.
- ❖ Drawbacks: Only the vehicles are detected. No case of storing identity. Includes less features

# Paper: 4

## Video Based License Plate Recognition of Moving Vehicles

### Using Convolutional Neural Network

- ❖ Published in 2018
- ❖ Authors: Sanghyeop Lee, Keum-Young Son, Byung-Woo Yoon, Jangsik Park
- ❖ Method/Algorithm Used: Uses AlexNet for training the ImageNet along with OpenALRP for detecting number plates.
- ❖ Drawbacks: Needs GPU computation to run. Output varies on any funky stickers on number plate. Includes less features

# Paper: 5

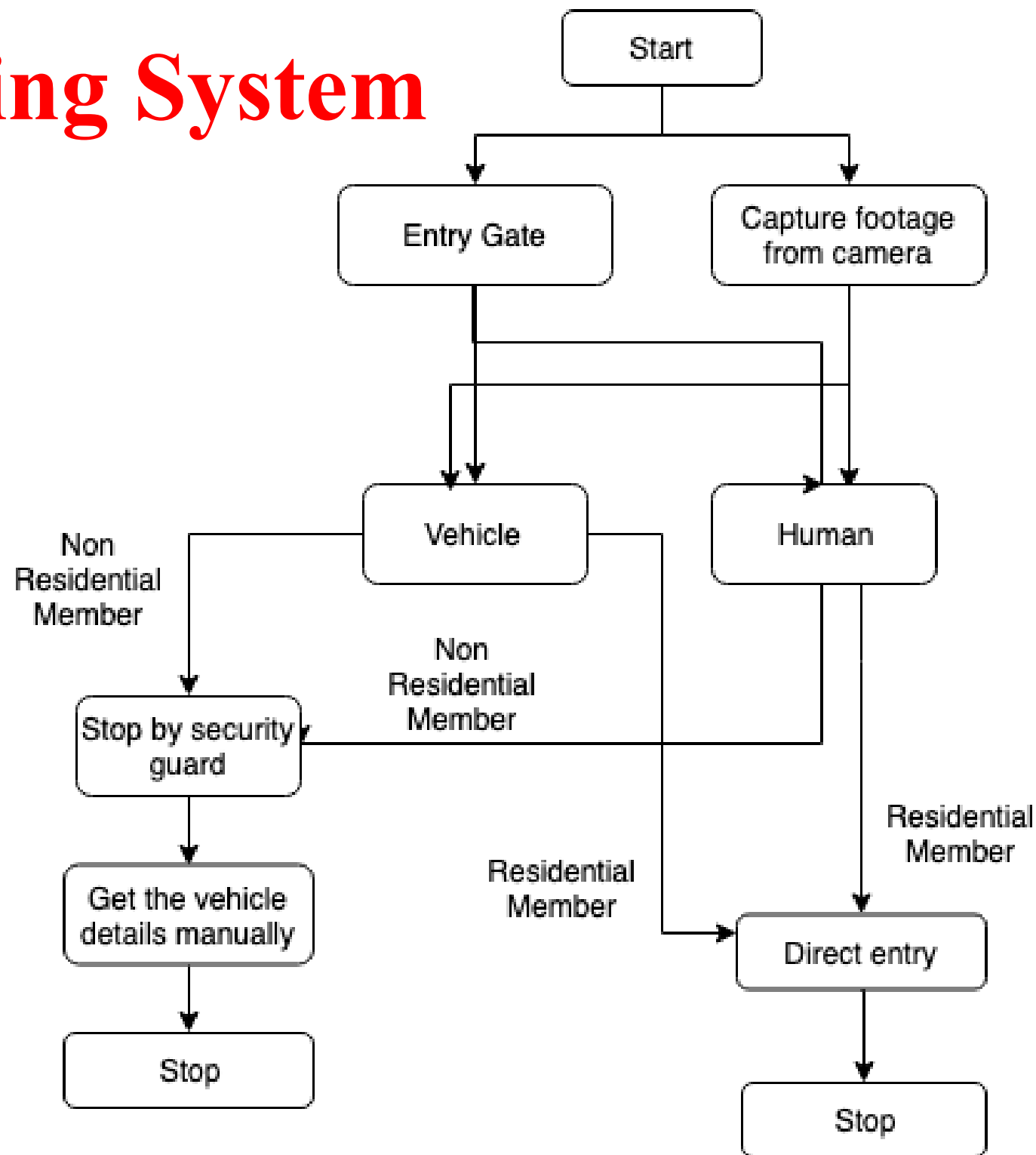
## A Hidden Markov Model for Vehicle Detection and Counting

- ❖ Published in 2015
- ❖ Authors: Nicholas Miller, Mohan A. Thomas, Justin A. Eichel, Akshaya Mishra
- ❖ Method/Algorithm Used: Tracking and counting number of vehicles. Used matlab for hidden line.
- ❖ Drawbacks: Using matlab is not that convenient for such task. Accuracy can be varied if the driver drives in half lane. Includes less features

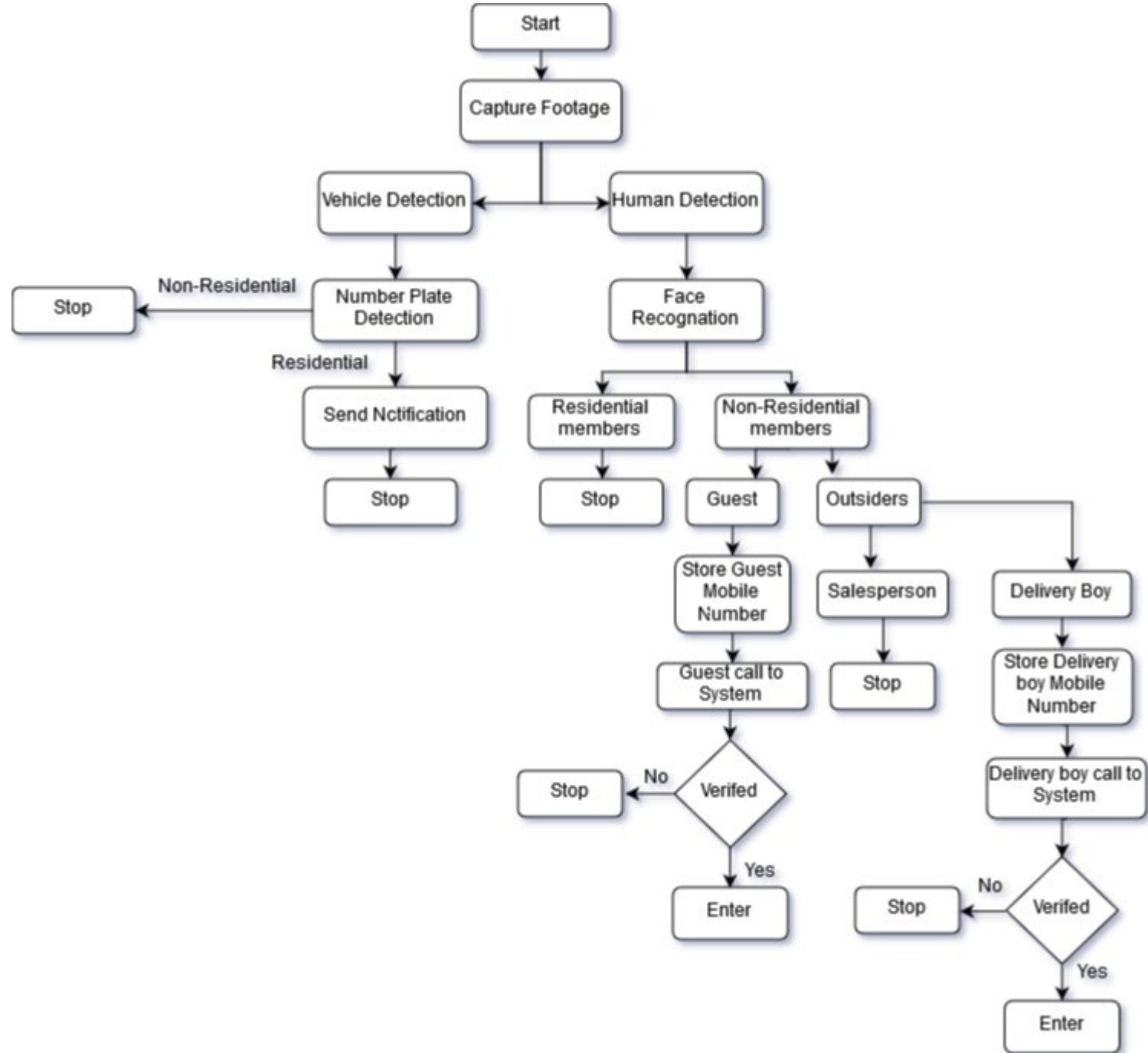
# Problem Statement

1. Security is one off the major problem faced in societies
2. Boundaries of the society are less secure.
3. Many outsider/salesman enter without permission.
4. IN and OUT of the residential vehicle needs to be managed.
5. No more information of the outsider is available.
6. Many society face problem of illegal vehicle parking.
7. Current technologies that have the similar functionality are costlier and not that capable.

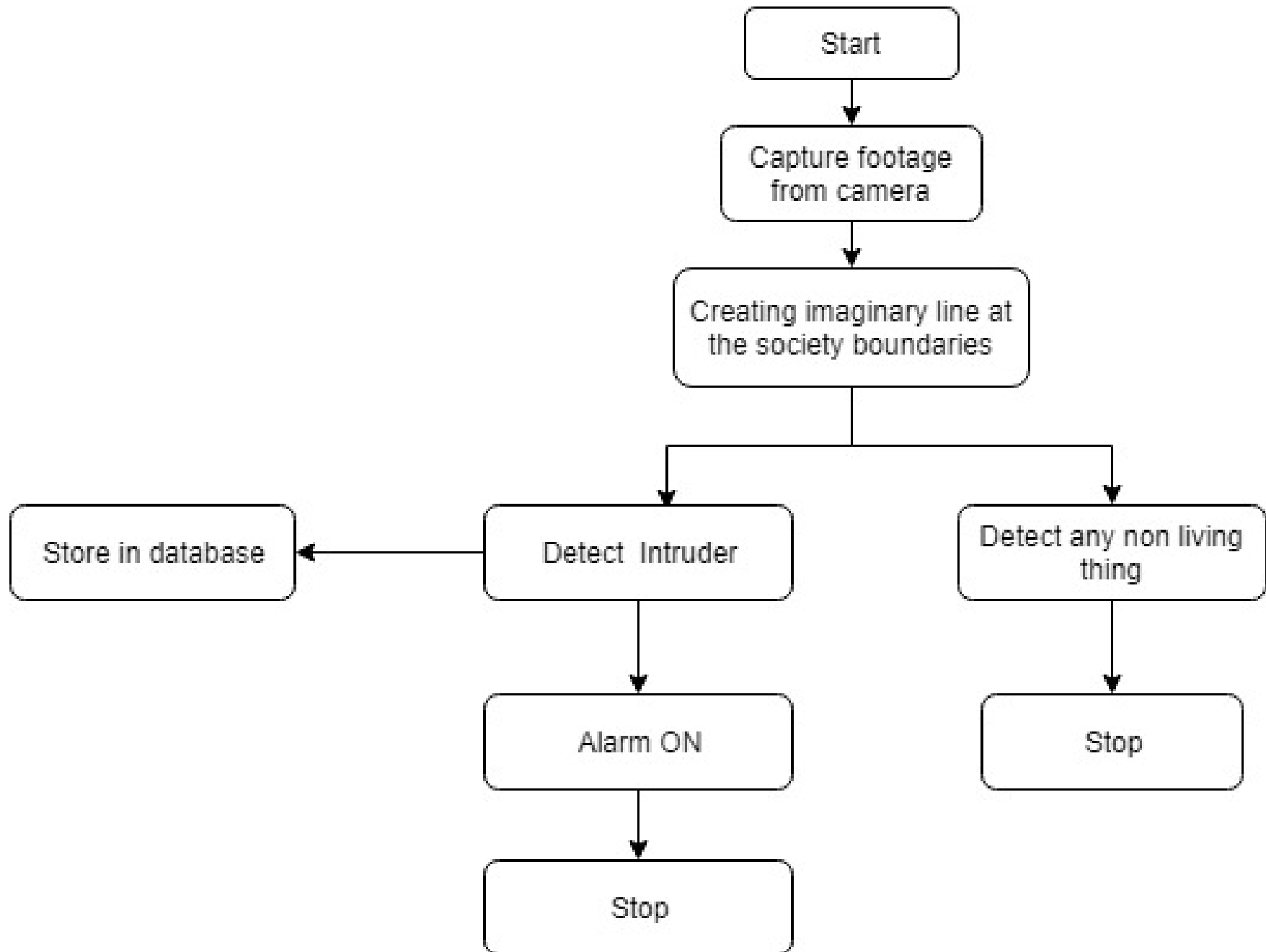
# Existing System



# Proposed System



# Imaginary Line





# Scope of the Project

1. Detect residential and non-residential vehicle through vehicle number plate.
2. Send a message to owner about his vehicle actions.
3. Need of watchman will be overcome.
4. Detect residential and non-residential member through face detection.
5. Any intruder penetrating wall will be captured

# Project Limitations

1. If a residential member suffering from viral disease will be triggered as a non-residential member.
2. Multilingual number plates would not be recognized.

# Project Estimation



Monitor  
Rs. 2,700



Keyboard  
Rs. 250



Camera  
Rs. 999



DVR  
Rs. 1,775



GSM Module  
Rs. 1,500



Mouse  
Rs. 250

**Approx.  
Rs. 8,000**

# Technology Stack

## **Hardware Requirements**

- Laptop or PC with minimum 4GB of RAM.

## **Software Requirements**

- Machine Learning(Python)
- Neural Networks(RCNN)

# Conclusion

The proposed system will avoid security concerns in the real-time scenario. Boundaries of the society will be free from intruders. IN and OUT on the vehicles will be notified to the owner. Detailed information of all the non residential members will be stored. Will reduce the chances of illegal parking. Our system will be cost effective that every society can afford.

# Reference

- 1.Wang W, Gee T, Price J, et al. Real time multi-vehicle tracking and counting at intersections from a fisheye camera[C]//2015 IEEE Winter Conference on Applications of Computer Vision. IEEE, 2015: 17-24.
- 2.H. Saghaei, “Proposal for Automatic License and Number Plate Recognition System for Vehicle Identification,” arXiv preprint arXiv:1610.03341, Oct 2016.
- 3.Zhang Quanfa,et al. "Engineering vehicle inspection based on HOG feature and machine learning." Computer system application ,2013:104-107.
- 4.Ala Mhalla, Thierry chateau, Sami Gazzah, Najoua Essoukri Ben Amara, “A Faster R-CNN Multi-Object Detector on a Nvidia Jetson TX1 Embedded System,” Proceedings of the 10th International Conference on Distributed Smart Camera, pp. 208-209, 2016.
- 5.Girshick,Ross."Fast R-CNN."IEEE International Conference on Computer VisionIEEE Computer Society, 2015:14401448.

Thank You...!!