



# **SOCIAL DISTANCE MONITORING SYSTEM**

**Department of CSE  
Jyothi Engineering College  
Thrissur**

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## Vision of the Department

- Creating eminent and ethical leaders in the domain of Computational Sciences through quality professional education with a focus on holistic learning and excellence.

## Mission of the Department

- To create technically competent and ethically conscious graduates in the field of Computer Science and Engineering by encouraging holistic learning and excellence.
- To prepare students for careers in Industry, Academia and the Government.
- To instill Entrepreneurial Orientation and research motivation among the students of the department.
- To emerge as a leader in education in the region by encouraging teaching, learning, industry and societal connect.



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## ABSTRACT

Recently, the outbreak of Coronavirus Disease (COVID-19) has spread rapidly across the world and thus social distancing has become one of mandatory preventive measures to avoid physical contact. This survey paper emphasizes on a surveillance method which uses Open-CV, Computer vision and Deep learning to keep a track on the pedestrians and avoid overcrowding.





## OBJECTIVE

1. To develop a system which keeps track of pedestrians
2. To calculate Euclidean distance between people in pixels
3. To avoid overcrowding in public places



## INTRODUCTION

- WHO Officials in a press conference held in march 2020, stated that:
- *"Since people can spread the virus before they know they are sick, it is important to stay away from others when possible, even if you—or they—have no symptoms"*
- In this project we present a pinpointing solution to monitor social distancing in public places



## EXISTING SYSTEMS

- In 2017, Dr. S Syed Ameer Abbas and his co-authors proposed a system for human tracking and head detection using raspberry pi and Open-CV





## EXISTING SYSTEMS

- In 2018, Sir Joel Joseph Joy and his co-authors proposed a system of traffic density identification which was based on image processing. The queue length and the traffic densities were recorded from the images taken from the camera



## PROPOSED SYSTEM

1. The proposed system helps to ensure the safety of the people at public places by automatically monitoring them whether they maintain a safe social distance
2. The key idea is to develop a real time social distance detector
3. It has the following main steps:
  - Data collection and pre-processing
  - Model development and training
  - Model testing
  - Model implementation



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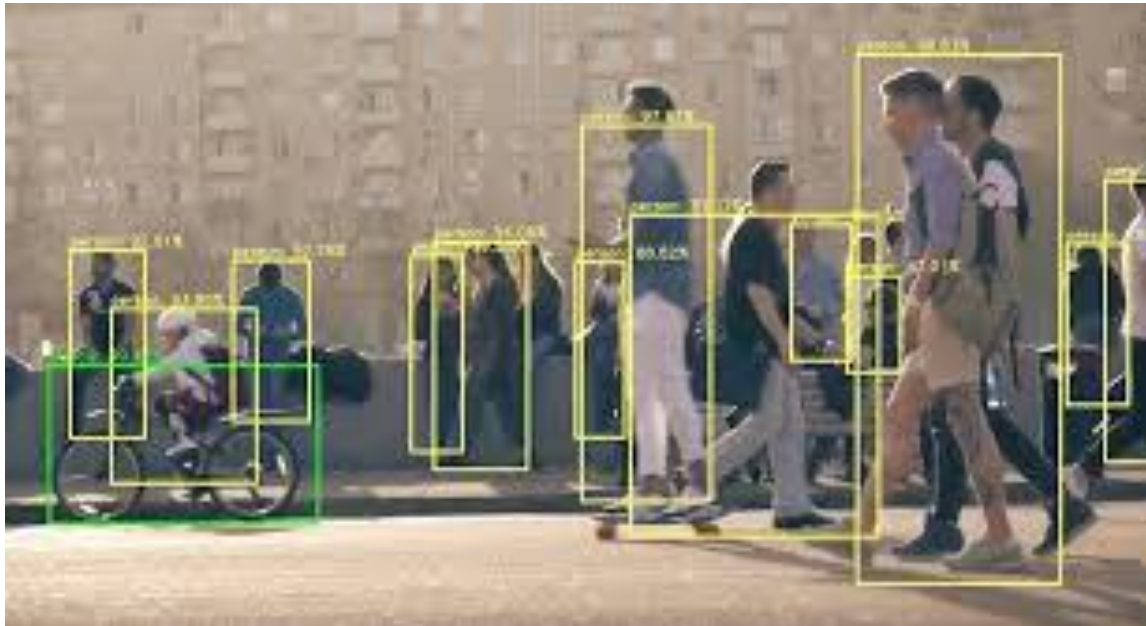
## CAPTURING VIDEOS FROM PUBLIC PLACES







1. Initially, video streams are converted to frames
2. Secondly, object detection is applied to detect humans in each frame





## But wait, how humans are detected?

- **OpenCV** is one of the most widely used libraries for Computer Vision which has a built-in method to detect pedestrians
- It has a pre-trained **HOG(Histogram of Oriented Gradients) + Linear SVM model** to detect pedestrians in images and video streams

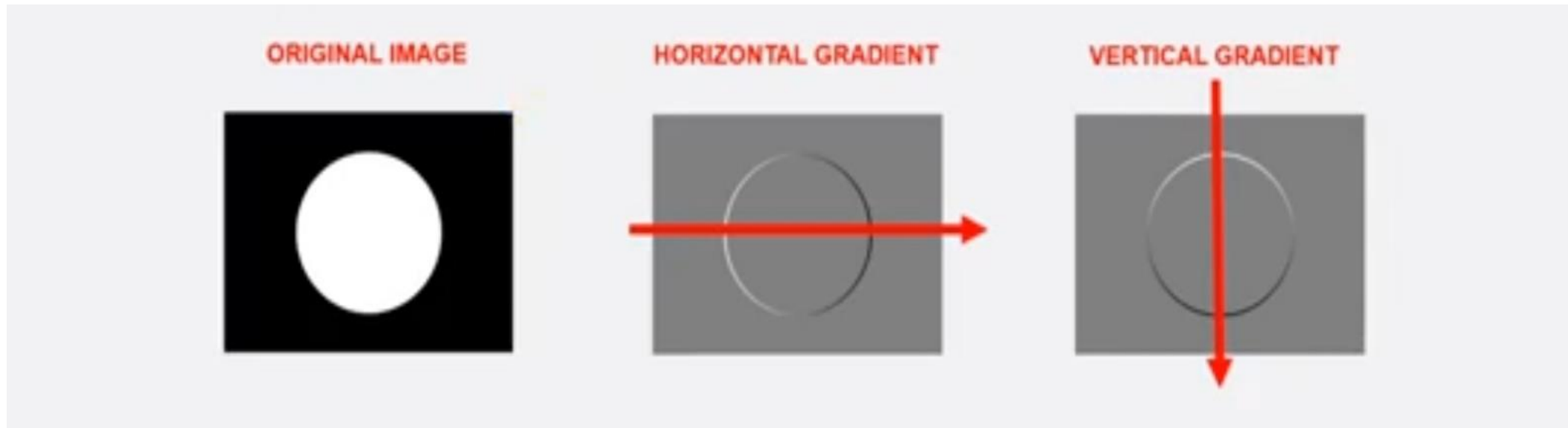
### Image Gradient

- An **image gradient** is a directional change in the intensity or color in an image
- The **gradient** of the image is one of the fundamental building blocks in image processing.





## Image Gradient





## Histogram Of Oriented Gradients (HOG)

- This algorithm checks, directly surrounding pixels of every single pixel.
- The goal is to check how darker is the current pixel compared to the surrounding pixels

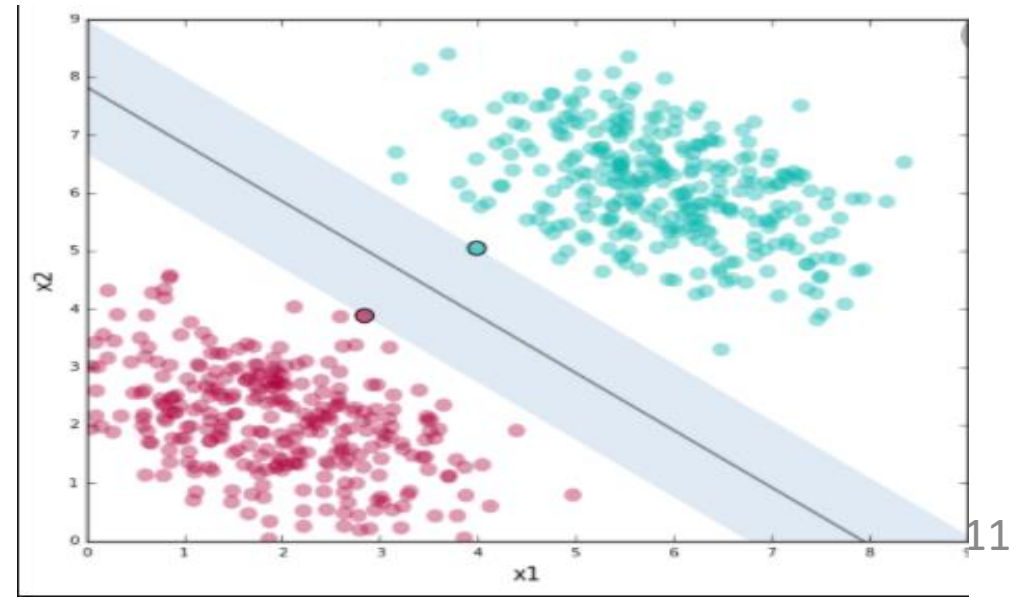


Why these lines  
are weird?



## Support Vector Machine (SVM)

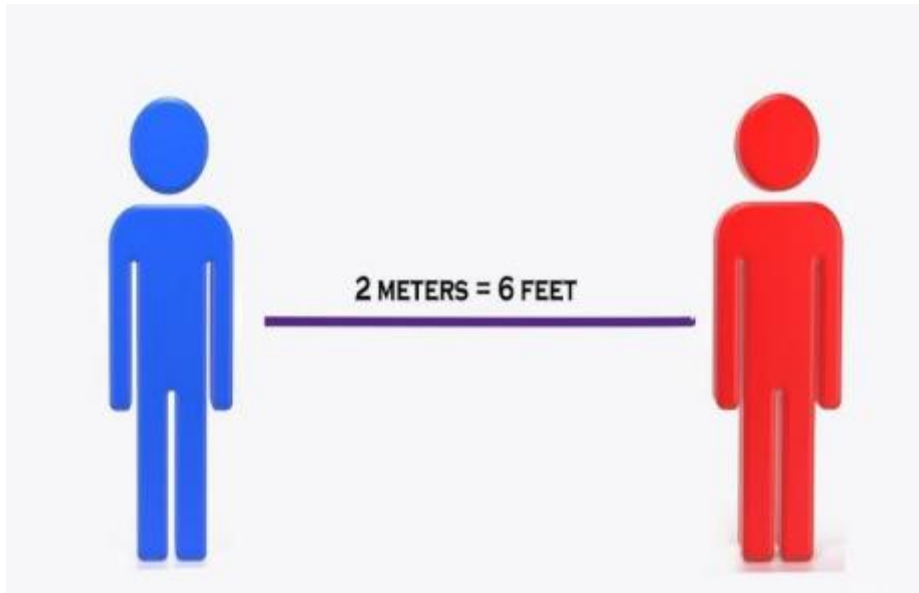
- In machine learning, support-vector machines are **supervised learning models** with associated learning algorithms that analyze data used for classification and regression analysis
- In this analysis **Support Vector Machines (SVM)** are used to train a model to classify if an image contains humans or not





3. In the next step, Euclidean distance between people is found out

4. According to WHO, 2 meters or 6 feet is the minimum safest distance



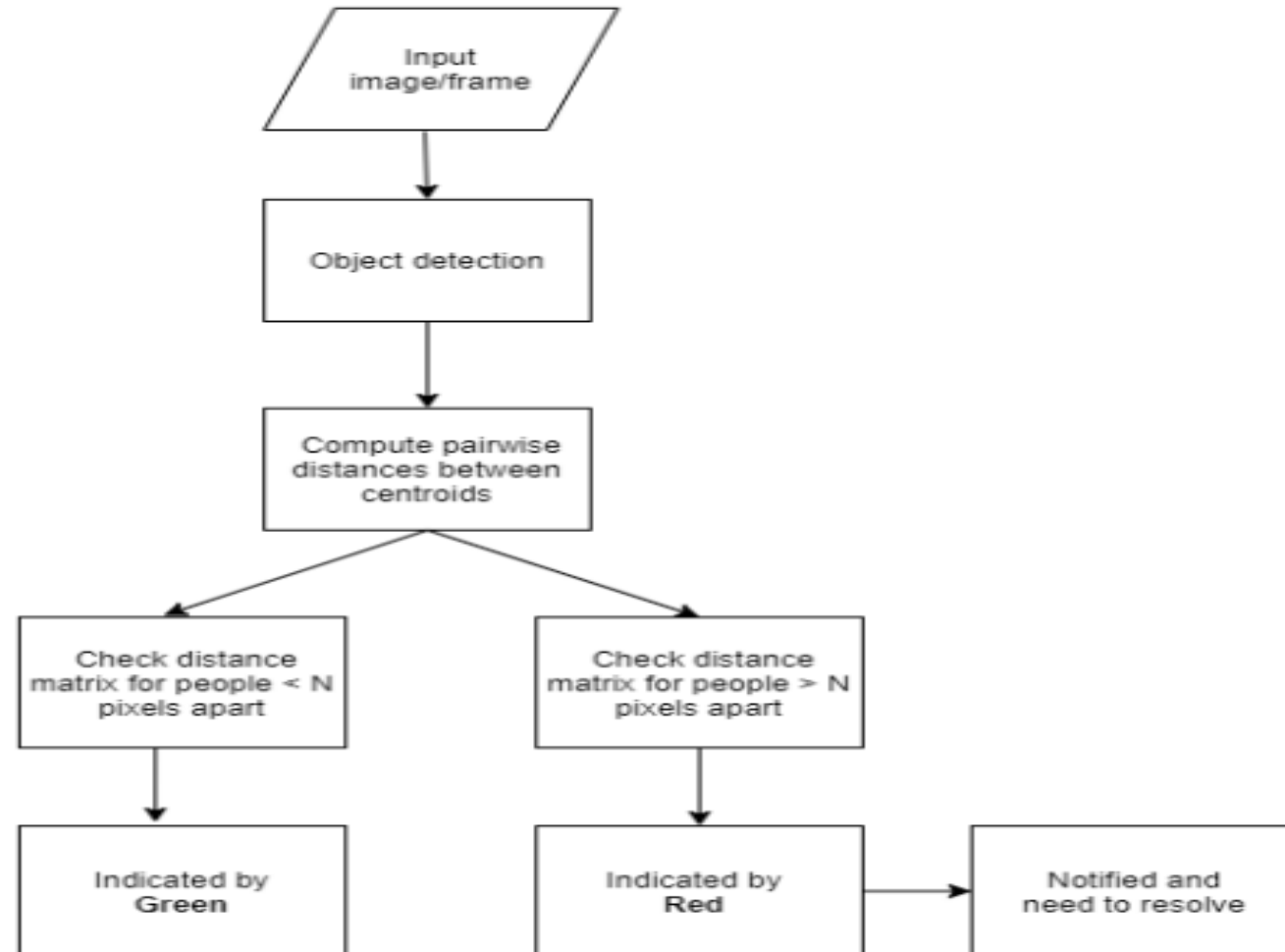


5. Finally these Euclidean distances are compared with the standard distance(3 m)
6. If the distance is greater than the safe distance, the person will be shown in Green
7. Else in a Red frame, representing a warning sign





## ALGORITHM





## RESULT

1. As we can see, people keeping safe distance are put under Green frames and others in Red frames
2. Once this Red count exceeds the threshold, notification can be given to police authorities





## CONCLUSION

1. Thus, implementing this idea can reduce the on-ground efforts of the police
2. They can entirely focus on supervising conditions exclusively on those areas where conditions are unfavorable and thus, they can utilize time wisely and save energy for equitable situations.



## REFERENCE

1. [1] Dr. S. Syed Ameer Abbas, Dr. P. Oliver Jayaprakash, M. Anitha, X. Vinitha Jaini, “Crowd Detection and Management using Cascade classifier on ARMv8 and OpenCV-Python”, Mepco Schlenk Engineering College, Sivakasi, 2017 International Conference on Innovations in Information, Embedded and Communication systems (ICIIECS).
2. Joel Joseph Joy, Manali Bhat, Namrata Verma, Milind Jani, “Traffic Management Through Image Processing and Fuzzy Logic”, D.J. Sanghvi College of Engineering, Mumbai, India, Proceedings of the Second International Conference on Intelligent Computing and Control Systems (ICICCS 2018), IEEE Xplore Compliant Part Number: CFP18K74-ART; ISBN: 978-1-5386-2842-3.
3. Base Paper: Monitoring Social Distancing for Covid-19 Using OpenCV and Deep Learning





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*Thank  
You*