International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 08 | August - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

Real Time Monitoring of Vehicles During Pandemic

Tessa Paul [1], Sreshta John Antony [2], Sanjay Sony [3], Surya Ratnam Cherian [4], Mr. Uday Babu P [5]

[1,2,3,4,5] *Rajagiri School of Engineering and technology*

Abstract - This paper investigates how a tracking system can be implemented using biometric techniques (facial detection) and a mobile application. Most of the existing solutions for a tracking system using biometrics only use image segmentation or line detection methods. Thus this project focuses on pre-training the system with available and newly introduced weights mentioned in literature[2] and operating the application based on the image outcomes produced by the system with the pre-trained datasets.

Key Words: Image segmentation, biometrics, pre-trained datasets

1.INTRODUCTION

The demand for alerting vehicle users/the frontline workers(police) during a pandemic is growing at an alarming rate. Since the advent of the pandemic tracing and alerting the authorities, the movement of the public has been a troublesome task for the health and the police department, thus the most common alerting technique can be done using biometric detection. Facial recognition is the technique that has been implemented in the project.Our project aims at monitoring vehicles using facial mask detection.The current pandemic crisis has proved that the lives of the front line workers are at high risk. This system helps them to monitor the crowd in an effective manner as mentioned in literature [1]. camera modules, software, and other technologies for the purpose of connecting and exchanging data with the application and local systems over the Internet or bluetooth.

2. Proposed Innovation.

Face recognition can be done instantly or automated by any system software[2]. In the proposed idea not just face detection is done, the faces are also classified to good and bad images based on whether the person is wearing a mask or not using face and pixel/line detection[1,2], along with the mask detection the number of faces without masks are also calculated[3]. The performance of the detection system depends on how accurately the system has been trained. To train the system we are using algorithms of YoloV5 and roboflow to process[4], annotate and segregate good and bad images. These segregated images are then sent to a local system and are transferred to the database (firebase) as values, where these images are processed for the application to access and generate the fine and process the passes.

3. Proposed Innovation

3.1 Camera Module

As soon as the vehicle engine is started the camera module is also powered by the engine. The camera module then captures a wide angle image. This image is taken to the server/local database. The arduino then takes the image to the local server or the local database where the image is then processed using the algorithms (yoloV5 and roboflow)[4]. Since the system is already pre-trained using a certain number of datasets[5], when the image is received in the local host, the number of faces and faces with and without masks are detected and are stored in the database with reference to a unique number (reg. no/car no. etc). This reference number is then accessed by application.

After the database encounters the reference/unique number with a faulty value and then is taken care of by the application.

3.2 Application Module

Assumption : The application should be made mandatory and be installed in all phones registered with corresponding mobile numbers as the vehicle number.

The application is developed in angular web framework and consists of a user side and admin side interfaces. The admin side can only be altered by the official authority. Once in the database a corresponding vehicle/reference number is detected faulty, then the corresponding user is generated with a fine as shown in the figure below. A new user is also registered to the database by the authority incharge and is reflected in the list of users in the applications.

4. Methods

4.1 Data generation and partitioning

As soon as the camera captures the image, it is classified and categorised into masked and no masked values represented with 1 and 0 respectively and is stored as a text file. Now, this text file with the number of faces in the image and vehicle number is updated in the database. As soon as the database encounters a value representing no mask, the corresponding file is registered to another table where the fines need to be verified and a certain amount is added to the current value. The fine generated can be viewed on the website when they log in and can only be closed by the official authority once the payment is done.

4.2 Data Augmentation

The system is trained with different sets of data with faces seen and covered. The training/augmentation is done approximately with 1600 data sets. All the data is then stored in a separate folder with a folder named as trained images. They contain the XML, jpeg and .txt files containing the information of each image from different angles, trained in such a way that the system is able to detect the image when transferred to the trained system.

4.3 Development of user interface

The application/website was developed in angular is ionic. Ionic Angular is an open-source front-end framework for creating dynamic, modern web apps and mobile applications. Two different interfaces were developed for the user as well as the admin. Thus the access and the reachability of the user is maintained and also made sure that the user will not be able to do any malpractices in altering the fine. The system is built fool-proof so as to benefit the authority and the frontline workers. The application receives the information and the generation of fines for each user is updated or produced solely based on the data obtained from the database. The database contains 2 tables one for the user and the other for the authority in-charge. Each time a new user is enrolled the table is updated and altered. Similarly, when the fines are verified by the officials, again the tables in the admin as well as the user side are altered. Thus the number of fines generated in a day can be tracked.

5. Results and outcome

The proposed system was trained and tested on 3 different platforms, given the input images from various sources.This way of tracking the law-breakers is an efficient and effective method in reducing the load on the frontline workers as well as digitising the fine system.This model has also been tested on faces with background noise and worked considerably well.

6. Conclusion

An Efficient system to generate fines and get hold of people not wearing masks is proposed here. Existing methods do not provide a system to generate passes and also calculate the fine. This system also provides a platform for the frontline workers (police department) to access and keep track of people who disregard the rules. The future scope of this proposed model is, it can be integrated with location tracking from the GPS module and biometric surveillance systems to identify suspects from real time visuals by giving the captured image as the source image and it can be used for face authentication purposes as well.

REFERENCES

1. **Horizon detection** - S. Fefilatyev, V. Smarodzinava, L. O. Hall and D. B. Goldgof, "Horizon Detection Using Machine Learning Techniques," *2006 5th International Conference on Machine Learning and Applications (ICMLA'06)*, 2006, pp. 17-21, doi: 10.1109/ICMLA.2006.25.
2. **Facial Mask Detection** - T. Meenpal, A. Balakrishnan and A. Verma, "Facial Mask Detection using Semantic Segmentation," *2019 4th International Conference on Computing, Communications and Security (ICCCS)*, 2019, pp. 1-5, doi: 10.1109/CCCS.2019.8888092.

3. **Multi person tracking** - A. Shehzed, A. Jalal and K. Kim, "Multi-Person Tracking in Smart Surveillance System for Crowd Counting and Normal/Abnormal Events Detection," *2019 International Conference on Applied and Engineering Mathematics (ICAEM)*, 2019, pp. 163-168, doi: 10.1109/ICAEM.2019.8853756.
4. **Helmet detection** - F. Zhou, H. Zhao and Z. Nie, "Safety Helmet Detection Based on YOLOv5," *2021 IEEE International Conference on Power Electronics, Computer Applications (ICPECA)*, 2021, pp. 6-11, doi: 10.1109/ICPECA51329.2021.9362711.
5. **Pre-training**- M. Owhadi-Kareshk, Y. Sedaghat and M. Akbarzadeh-T., "Pre-training of an artificial neural network for software fault prediction," *2017 7th International Conference on Computer and Knowledge Engineering (ICCKE)*, 2017, pp. 223-228, doi: 10.1109/ICCKE.2017.8167880.