



# SPIT DETECTION USING CONVOLUTIONAL NEURAL NETWORK

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**Abstract:** In today's world, all government officials are working around the clock to prevent the spread of Coronavirus. As a result, the system's goal is to focus on using the latest computer technologies to limit the spread of communicable diseases like the Coronavirus by imposing a strict restriction on public spitting, which is responsible for the virus's maximum replication, using artificial intelligence technique. This technology will be implemented by capturing video footage from public places. This information will then be transferred to the cloud, where it will be evaluated using the CNN model to detect public spitting. Local governments will be able to access the results using a Desktop interface. The individual can then be sanctioned by the authorities. As a result, this technology will aid officials in effectively managing and monitoring public spitting

**Index Terms - Artificial Intelligence, Image processing, CNN**

## I. INTRODUCTION

The pandemic is today's greatest challenge for humanity. COVID-19. The lives of humans have ground to a stop. Millions of people are affected all across the world. Despite this, some people do not take it seriously and continue with their unclean habits, endangering the lives of others. Spitting in public is one such activity.

Spitting is a common practice in India that contributes to the spread of diseases such as COVID-19, colds, flu, tuberculosis, and hepatitis. Even though spitting in public is now illegal under the Disaster Management Act, public spitting will increase once the lockdown restrictions are lifted, causing the greatest increase in the number of COVID-19 cases across India. To contain a pandemic, the proposed method employs cutting-edge technology to restrict this wrongdoing.

In public locations, people spit out water, saliva, and tobacco products with abandon. These types of activities transfer hazardous germs and viruses into the environment. The existing technique for dealing with this problem is purely manual and inefficient.

To overcome the shortcomings of present methods, this system takes input in the form of videos from CCTV/drone-based monitoring systems in public areas such as railway stations, bus terminals, and other locations to track and detect whether a person is spitting or not. Thus, punishing those who are discovered supporting such practices.

## II. PROBLEM STATEMENT

When people are caught, they often refuse to pay any fines and instead argue with the authorities. Sometimes, authorities have a habit of fining innocent people inadvertently. As a solution, the system comprises a range of splitting technologies such as Machine learning and Artificial Intelligence to analyze public spaces and send timely and predictive alerts to local authorities if someone is detected spitting. As a result, public littering will be reduced, making the environment cleaner and healthier.

### III. PROPOSED DESIGN

- This system accepts input in the form of a video. We're doing image processing on the system, therefore we're deploying four image processing modules: preprocessing, segmentation, feature extraction, and classification, all of which are the parts of our CNN module.
- The video dataset is first cleaned along with the removal of unwanted data, then extraction and detection of features take place. The dataset is then trained using the CNN module and then the final step of classification is implemented on the module
- In the last step detection takes place which gives the output of whether a person is spitting or not.

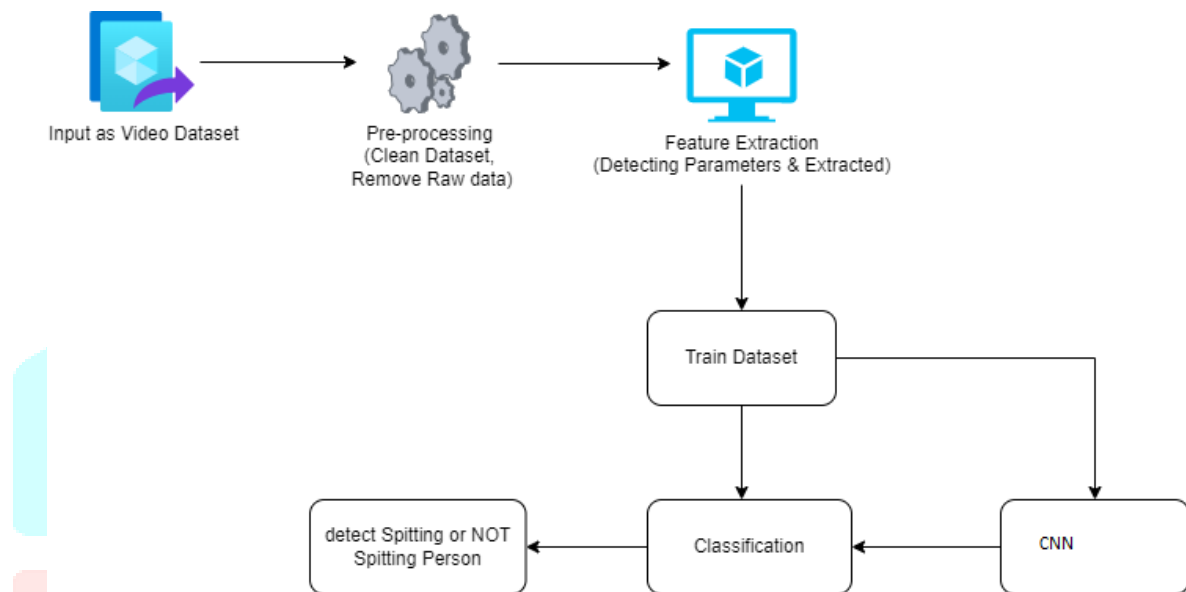


Fig: Proposed Structure

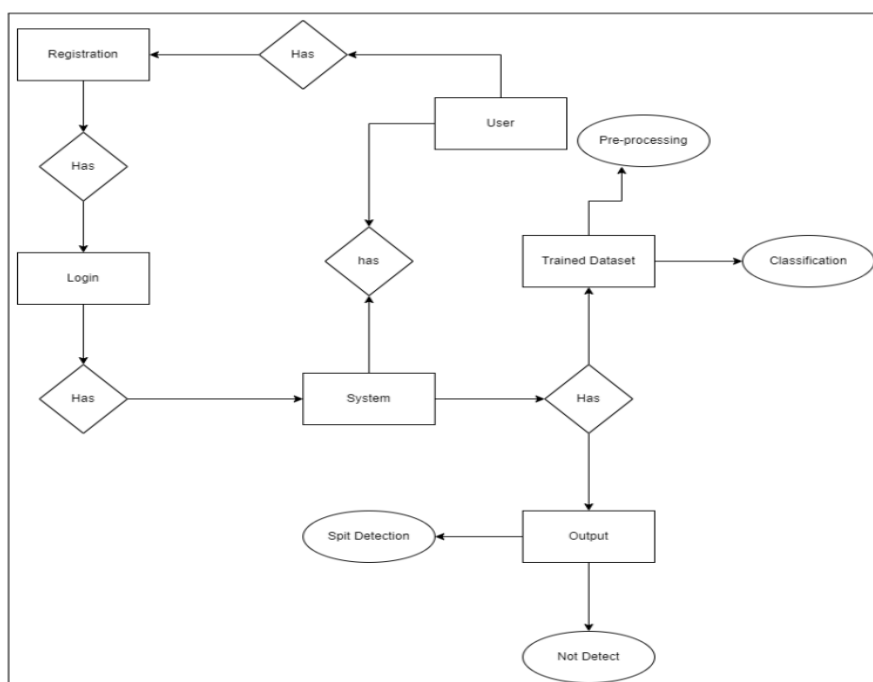


Fig. E-R Diagram

#### IV. APPROACH:

##### A. Registration and Login:

In this step, the user has to register in the user database. General information like Name, Mobile Number, and Email Id is stored in the database. With the help of all the registration information stored in the user database, the user can then log into the system using the right credentials.

##### B. Providing Video Input:

In the second step, video is provided in the form of input. Various processing is then applied to the video like preprocessing, segmentation, feature extraction, and classification.

##### C. Processing Video:

First Input as a Video Frames, then preprocessed the Frames dataset (pre-processing step is clean the dataset and RGB to Gray to Binary conversion) After that, the Frame image is separated into small pixels in the segmentation section, and then the system extracts the geometry-based characteristic of the Video frame(image) in the extraction section.

Then, in classification, where we utilize our CNN algorithm to classify and detect, we give these geometry-based features of Spit detect to the classification to be organized and predicted, and then it detects the Spitting or not Spitting Person.

A convolutional neural network is one of the main categories to do image recognition, image classification, object detection widely used.

- CNN image classification takes the input image, processes it, and classifies it.

The computer sees an input image as an array of pixels depending on the image resolution.(h\*w\*h)

- After this feature extraction takes place which comprises the convolution layer and pooling layer.

Then the final stage of classification takes place where fully connected layer and output layer is produced

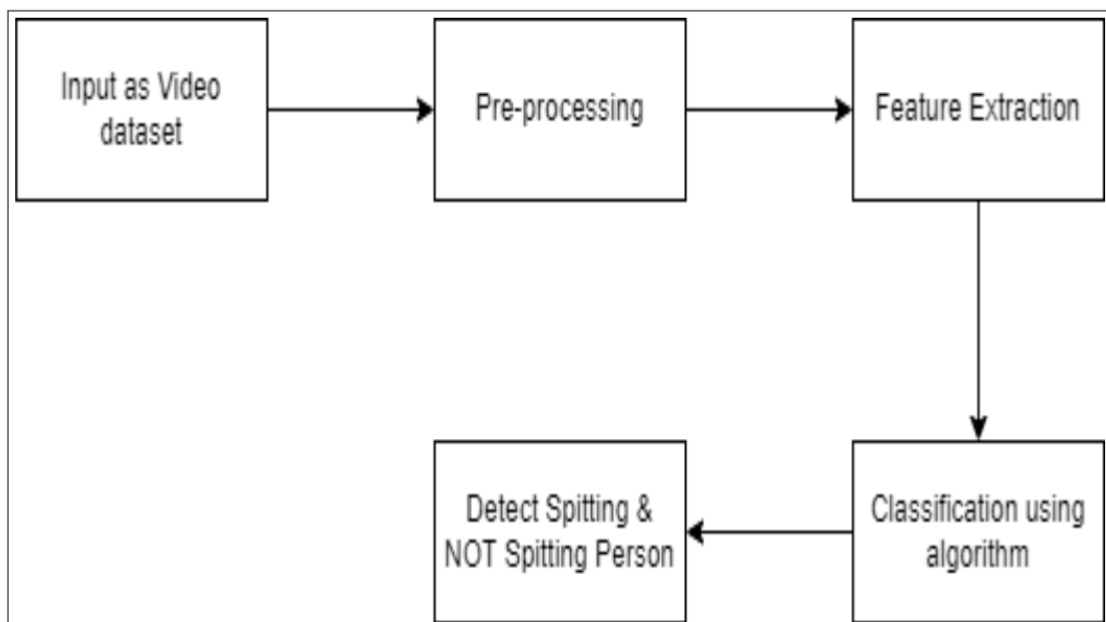


Fig. Processing

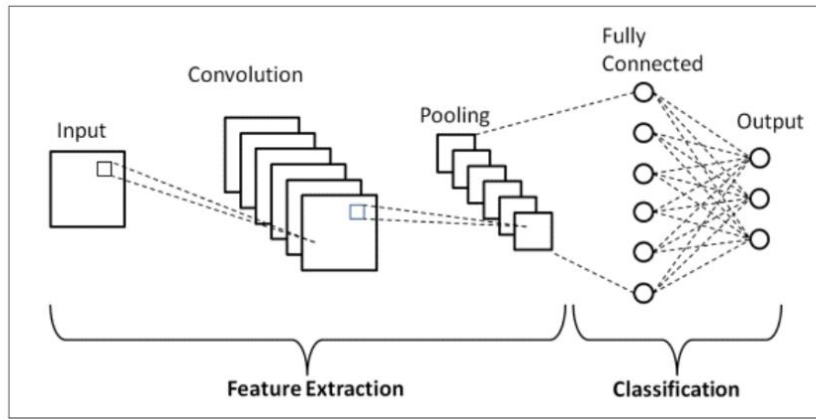


Fig CNN Algorithm

**D. Resulting Output:**

In this final stage, the person is detected for whether he is spitting or not spitting.



Fig: Person detected spitting

Fig: Person detected not-spitting

## V. GOALS AND OBJECTIVES:

- To detect human spitting in public places and punish those who are found guilty.
- To minimize the chances of spread of covid.
- Use of Convolution Neural Network(CNN) to detect whether a person is spitting or non-spitting.
- To keep the environment clean and healthy.

## VI. CONCLUSION:

Covid-19 is a pandemic that has to date claimed approximately 43,123,801 lives across India and 2.05M lives all across the globe. This count is still rising up and will continue to rise until the chain is broken by inhibiting the spread of the virus. Hence, the system uses many recent techniques such as Artificial Intelligence, and Machine Learning which have the capacity of monitoring the public areas and giving timely and predictive alerts to the local authorities in case a person is found spitting. This will ensure curbing of public littering in the majority of the public area thereby making the surroundings cleaner and healthier.

## V. REFERENCES:

- [1] Xiang Yao, Wei Zhang, Wei Cui, Xu Zhang, Ying Wang and Jiale Xiong "A Method Based on Data Fusion of Multiple Sensors to Evaluate Road Cleanliness"
- [2] COVID-19 India <https://www.covid19india.org/>
- [3] Shubhi Jain, Naman Gupta, Ashish Khanna, Ankita Gupta and Deepak Gupta "Detection of Garbage Disposal from a Mobile Vehicle Using Image Processing"
- [4] Xiang Yao, Wei Zhang, Wei Cui, Xu Zhang, Ying Wang and Jiale Xiong "A Method Based on Data Fusion of Multiple Sensors to Evaluate Road Cleanliness"
- [5] Wei Cui, Wei Zhang, Juli Green, Xu Zhang and Xiang Yao "YOLOv3- darknet with Adaptive Clustering Anchor Box for Garbage Detection in Intelligent Sanitation"
- [6] Chen Zhihong, Zou Hebin, Wang Yan, Wang Yanbo and Liang Binyan "Multitask Detection System for Garbage Sorting Base on High-order Fusion of Convolutional Feature Hierarchical Representation"