

**FEATURE EXTRACTION TECHNIQUES FOR DETECTION OF RULE  
VIOLATION(S) ON HIGHWAY AT TOLL CENTRES USING RASPBERRY  
PI HARDWARE**



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**IN**

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## ABSTRACT

Across the globe, vehicle collision results in the death/ disabilities of people(s). In India, People losing their lives in road accidents due to traffic rule violations, compared to naxal violence or natural disasters. People can follow traffic rule but by disobeying the traffic rule during driving they put their life in danger. In most of the cases, ignorant lane crossing and use of mobile gadgets are the foremost cause of road accidents. Further, these road accident death leads to substantial monetary burden to the people concerned and also to the government. Government is spending a lot of money to create awareness and encourage people to follow traffic rules and organizing lots of awareness program to educate people to follow the traffic rules and save lives. Now-a days, traffic rule violation detection is manually by traffic police. It is time consuming activity , hectic and also possibility of corruption by traffic police which may lead further traffic rule violation. Lot of research has been investigated over last 20 years in traffic management system where sensor based approach has been used to track these violations, but at the cost of infrastructure requirement. Here, we have presented a machine vision based approach how feature extraction technique can play role in smart traffic rule violation detection on roads and highways by extracting significant features/descriptors of the images and use of classification/matching algorithms using low cost Raspberry Pi hardware. Feature extraction based system for lane and traffic rule violation detection and tracking using low cost Raspberry Pi hardware. We have performed several rule violation detection using SIFT ,SURF, ORB, KAZE, AKAZE, BRISK, ROOTSIFT , grab cut, haar cascade and hough transform on test image dataset to identify traffic rule violations. Brute-Force and FLANN-Index matcher to detect and identify traffic rule violator without wearing helmets and seatbelt and haar cascade for mobile usage detection in test image data set using low processing capacity hardware.

The experimental work suggest that, Grab cut and Hough transform techniques performs better on test image dataset to identify vehicle lane on highways. Further, combination of RootSIFT with Flann-index matcher has produced an superior results (accuracy of 95.3%), compared to other feature extraction and matchers on given image dataset for feature detection and matching for violation detection and tracking of vehicles. Therefore, mentioned results took an average computation time of 0.13s. Further, Haar-cascade algorithm was used to detect mobile phone usage while riding vehicle and achieved 91% accuracy on collected dataset on Raspberry pi 2(B) hardware and further vehicles detected in traffic rule violation like helmet or seat belt or wrong lane crossing or mobile usage undergoes for license plate detection and challan creation to arise penalty on vehicle owners.