IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 3, January 2026
Impact Factor: 7.67

Vision-based Intelligent Traffic Light System

Dnyaneshwari Vilas Sonawane, Tejal Rajaram Patil, Arpita Sandeep Namde, Sneha Ramesh Chavan, Mrs. Priya Unde
Department of Computer Engineering
Pimpri Chinchwad Polytechnic, Nigdi, Pune, India
Corresponding Author: Dnyaneshwari Sonawane

Abstract: *Traffic congestion has become a serious problem in urban areas due to the rapid increase in the number of vehicles. Traditional traffic signal systems operate on fixed time intervals and fail to adapt to real-time traffic conditions, resulting in unnecessary delays, fuel wastage, and increased pollution. To overcome these limitations, this paper presents a Vision-based Intelligent Traffic Light System that dynamically controls traffic signals using real-time video processing.*

The proposed system uses a camera to monitor traffic density on each lane. Computer vision techniques implemented using OpenCV are applied to detect and count vehicles. Based on the detected vehicle density, traffic signal timings are adjusted automatically. The system also includes pedestrian crowd detection for safe crossing, emergency vehicle prioritization, and accident detection with automatic alert generation. An Arduino UNO is used to control traffic lights based on commands received from the processing unit. The proposed system aims to improve traffic flow efficiency, enhance road safety, and provide a low-cost and scalable solution for smart city traffic management.

Keywords: Computer Vision, Intelligent Traffic System, OpenCV, Machine Learning, Arduino UNO, Traffic Density

DOI: 10.48175/IJARSCT-30963