



# AI Powered Traffic Management and Signal Monitoring System

Prof. Sonali T Benke<sup>1</sup>, Snehal Bhujbal<sup>2</sup>, Mangesh Damdar<sup>3</sup>, Rutuja Gadakh<sup>4</sup>

Professor, Department of Computer Engineering<sup>1</sup>

Students, Department of Computer Engineering<sup>2,3,4</sup>

Sir Visvesvaraya Institute of Technology, Chincholi, Nashik, Maharashtra, India

**Abstract:** *In response to the escalating challenges posed by the increasing number of vehicles and the consequent rise in traffic congestion globally, this paper introduces an innovative solution— an AI-powered traffic management and signal monitoring system. The prevalence of frequent traffic jams at major junctions not only disrupts the flow of vehicles but also leads to a substantial loss of man-hours. Recognizing the pressing need for an efficient traffic management system, our research focuses on implementing a smart traffic control system that utilizes real-time video processing techniques to measure traffic density. The core objective is to present a significant advancement over the existing manual traffic control systems. By dynamically assessing traffic conditions through artificial intelligence algorithms, our system aims to optimize signal timings in real time, thereby reducing congestion and saving valuable man-hours lost in traffic jams. This research represents a noteworthy progress towards developing a more adaptive and responsive traffic control system that can positively impact the efficiency of transportation networks.*

**Keywords:** Gaussian mixture model, Shortest Job First, Initialize Foreground Detector, Detect Cars in an Initial Video Frame, Threshold, Traffic Density

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