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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-DS

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TITLE OF THE PROJECT – ACCIDENT DETECTION AND ALERT SYSTEM USING ML
DOMAIN OF THE PROJECT – Machine Learning
BATCH NUMBER – 07
DEPARTMENT NAME- CSE - (DATA SCIENCE)
YEAR & SECTION - 4 year – B section

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ABSTRACT –

Accident Detection and Alert System leverages deep learning and computer vision methodologies to enhance road safety and emergency response. The system integrates a fine-tuned Convolutional Neural Network (CNN) model, trained on a custom accident dataset, to classify video frames captured from surveillance cameras, dashcams, or traffic monitoring systems. The preprocessing pipeline employs techniques such as CLAHE for contrast enhancement and noise reduction to improve detection accuracy. Real-time frame analysis is conducted using Python-based tools (OpenCV, TensorFlow, Keras), enabling the model to detect anomalous vehicular behavior indicative of collisions. Upon detection, the system triggers automated alerts via SMS using Twilio API, providing timestamped incident details to emergency contacts and authorities. The architecture supports both live feed analysis and batch video processing, ensuring scalability and integration with smart city infrastructure. The system demonstrates high classification accuracy (92%) and low latency, with modules for segmentation, post-processing, and visualization to assist operators in incident validation. The system can be enhanced through integration with Internet of Things (IoT) sensors for multi-modal data fusion, deployment of advanced CNN architectures like EfficientNet or Vision Transformers for improved accuracy, and utilization of edge computing to reduce latency in critical environments. Further, integration with autonomous vehicles,AI-based crowd severity analysis,and drone-assisted monitoring can provide proactive accident prevention and real-time situational awareness,supporting large-scale smart city implementations.

KEYWORDS: Real-time monitoring, Deep Learning, Computer Vision, CNN, OpenCV,TensorFlow, IOT integration, Edge computing, Keras, Twilio API.

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HOD – CSE (DATA SCIENCE)