Highway Incident Detection and Classification

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Abstract

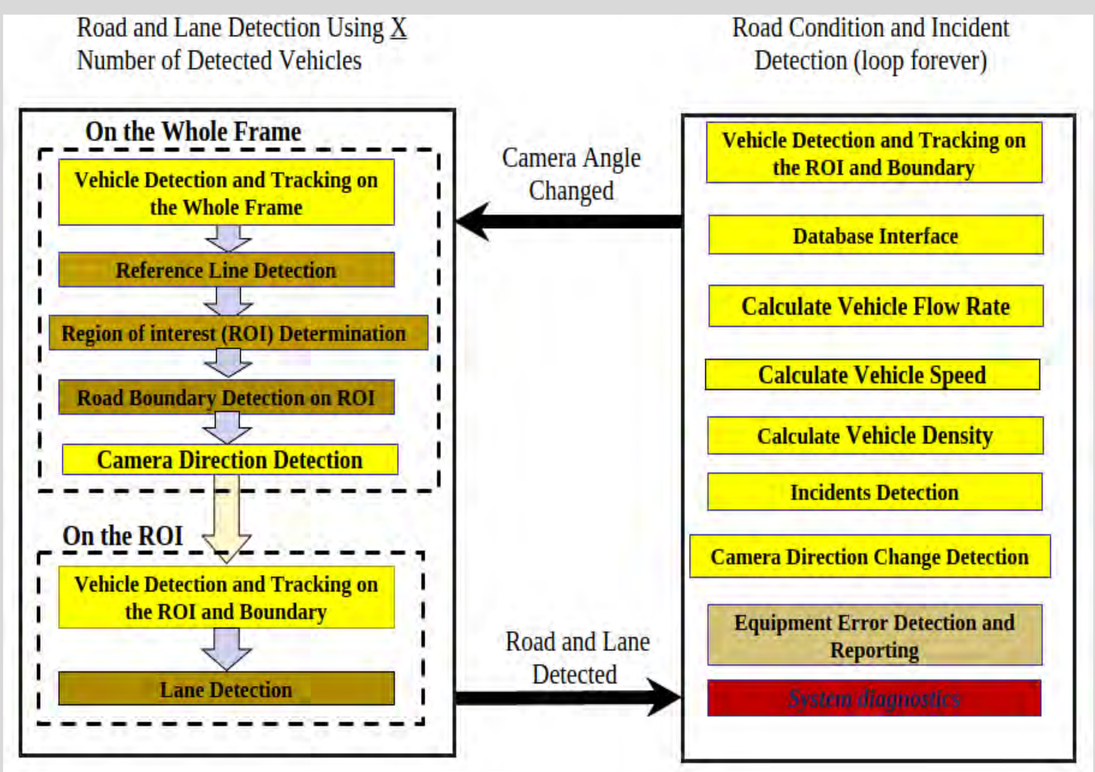
INDOT has installed hundreds of cameras on Indiana highways to monitor the traffic conditions. Currently the camera videos are monitored by several INDOT operators. This project is to develop an automated and intelligent traffic condition monitoring system that will (1) automatically detect the traffic density, flow rate on each lane at all locations observed by the cameras, (2) identify the number and type of vehicles passing through each road, (3) detect start and end locations of traffic jams, (4) detect accidents, (5) prioritize the importance of different incidents and notify the traffic monitoring operators for all traffic incidents and (6) provide tools to the traffic monitoring operators to quickly gather the information of the incident scene. Future extension of this project will be to detect hazardous road conditions, such as black ice, snow accumulation by using the same system from this research.

Introduction

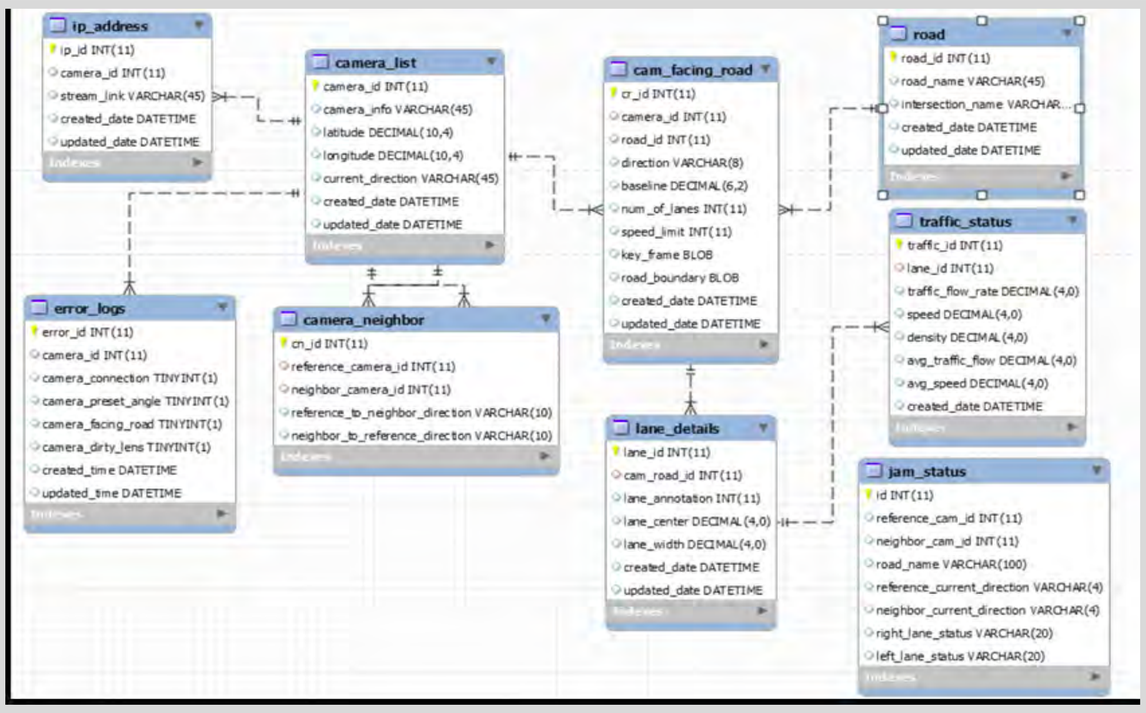
- INDOT installed many cameras and radars on Indiana's highways to monitor traffic conditions
- Currently, all these cameras are observed by human operators
- There are potentials to automatically obtain traffic information using machine vision and pattern recognition techniques, including:
  - Traffic flow rate & speed on each road & lane
  - Starting point of the traffic jam
  - Location of incidents
  - Causes of the traffic jam

Current Progress

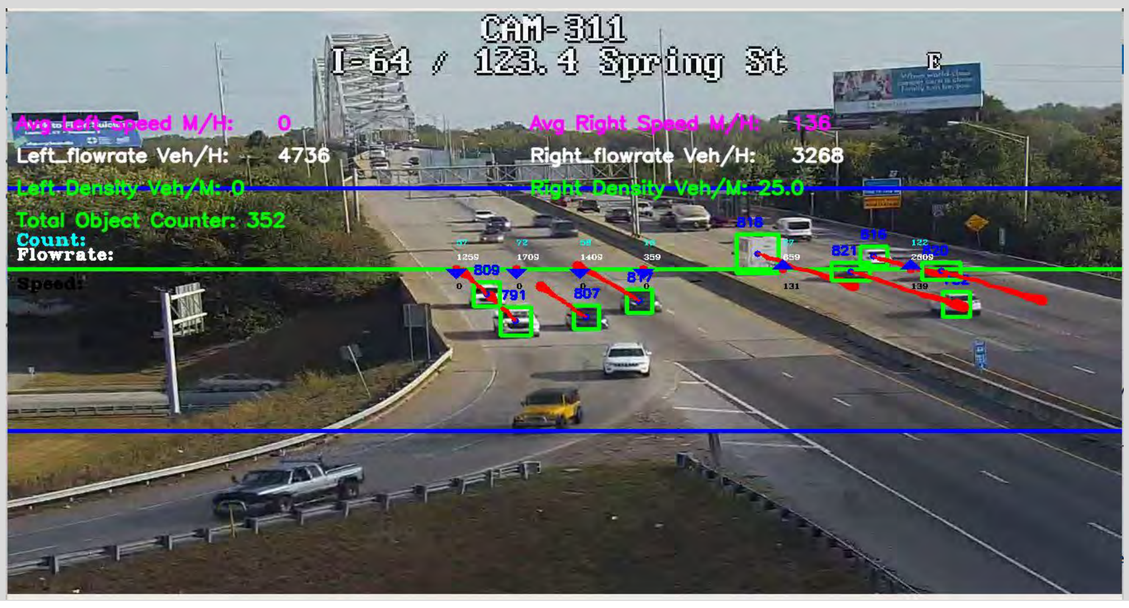
System Framework



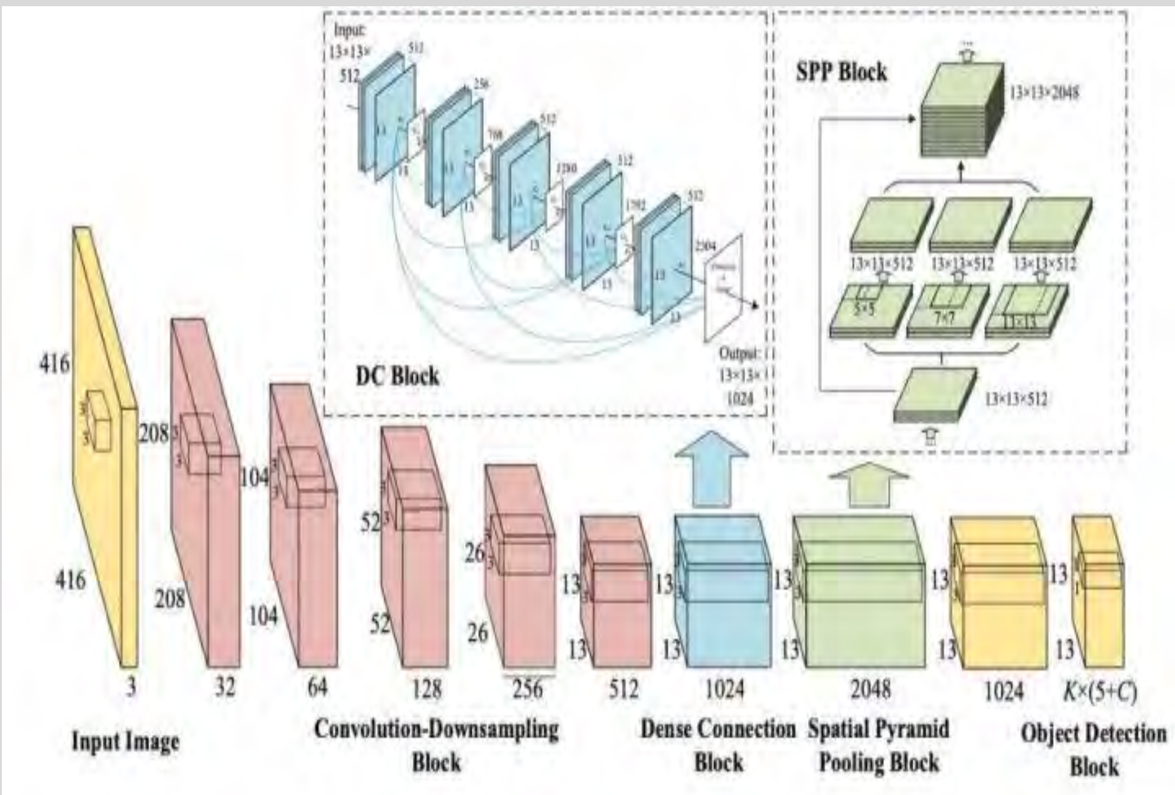
Database Development



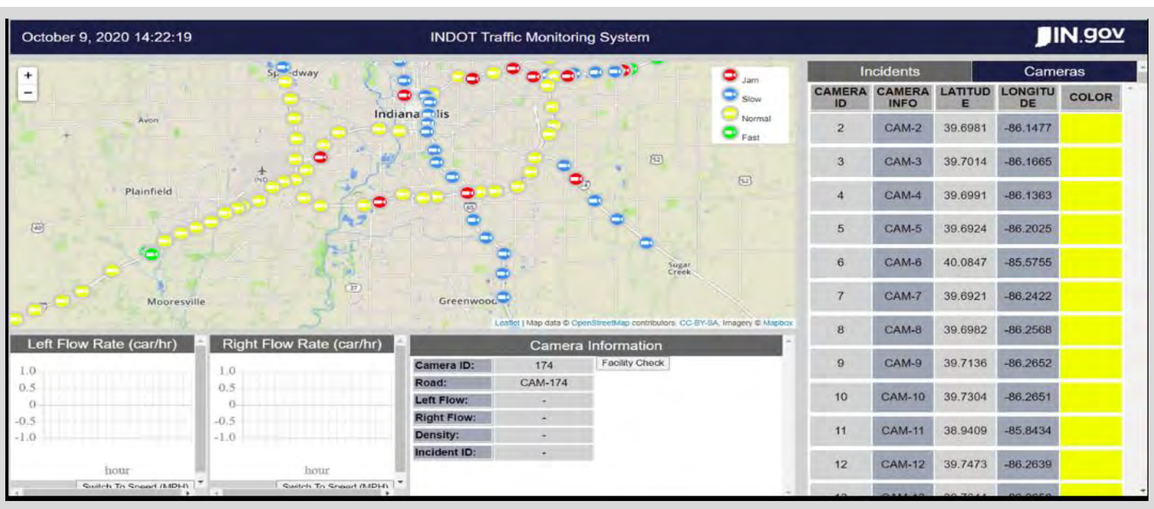
Real-Time Flow Rate Calculation



AI Model



Web based User Interface



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