

# AI for Traffic Sign Identification

Automated identification of traffic signs from roadway images using artificial intelligence provides a “paradigm shift” in infrastructure asset identification that can be integrated with existing data collection and management solutions.

Traffic signs are an important part of the road infrastructure and are needed to ensure smooth and safe traffic flow. A well-managed inventory of all traffic signs on a road network is beneficial to agencies responsible for maintaining and managing the transportation assets. A comprehensive inventory for traffic signs with an efficient mechanism for updating it could reduce the potential for liability associated with outdated, inappropriately placed, or missing signs.

## State-of-the-Practice

Traffic sign inventory management is a manual process which requires significant level of effort to identify and classify signs for required asset management. Transportation agencies employ partially automated data collection methods utilizing image and LiDAR (Light Detection and Ranging) data for collecting asset inventory information. However, the process to identify specific assets from these data sources is still a manual and time-consuming process.

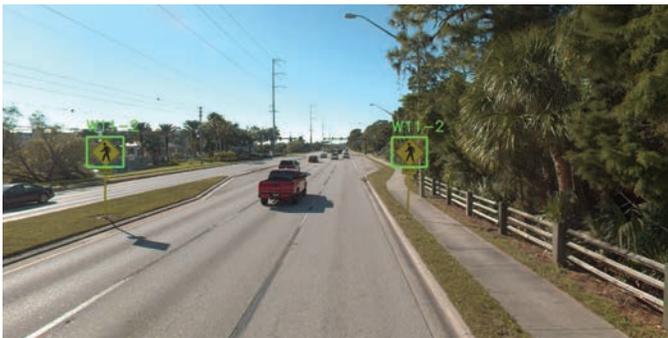
## Process Modernization

Artificial Intelligence (AI) can eliminate the need for manual data processing for asset inventory. In particular, AI can provide a fully automated mechanism for traffic signs identification based on the Manual on Uniform Traffic Control Devices (MUTCD) standard for streets and highways. A combination of computer vision and deep learning techniques can offer real-time, fast, and accurate image processing for sign detection and classification requiring no manual effort.



## Technology Innovation

Our technology is based on the latest research and utilizes the regression method for object detection as compared to the legacy classification approach. iENGINEERING has optimized the AI technology by modifying the most recent version of YOLO (You Only Look Once) neural network. The optimized YOLO network packaged in our technology increases mean Average Precision (mAP) of the model by 11% with improved Intersection over Union (IoU) as compared to traditional YOLO.



The traffic sign identification results can be delivered in various file formats including JavaScript Object Notation (JSON), Extensible Markup Language (XML), and Comma-Separated Values (CSV) format. The results include MUTCD sign types and localization information in the form of pixel coordinates against each detected sign with a confidence score. The confidence score can be used by

the neural network to improve itself through adaptive learning techniques.

Our AI technology can be enhanced to provide additional information about lane detection, area segmentation, road marking classification, and other infrastructure assets. It also supports edge devices for plug-and-play integration with cameras, drones, and other offline data collection systems to bring real-time AI capabilities such as autonomous navigation, 3D tracking, scene understanding, and asset detection.



Our technology is available as a Software as a Service (SaaS) solution that can be used by the transportation agencies to process their image and LiDAR data with minimum upfront investment. It can also be integrated with existing commercial asset management systems and services currently used by the transportation agencies.

For more information about the services and solutions offered by iENGINEERING, please get in touch with us using the following contact information.

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