

Object Tracking and Geo-localization from Street Images

PROJECT TITLE

Object Tracking and Geo-localization from Street Images

STUDY TIMELINE

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INVESTIGATORS

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VTRANS CONTACTS

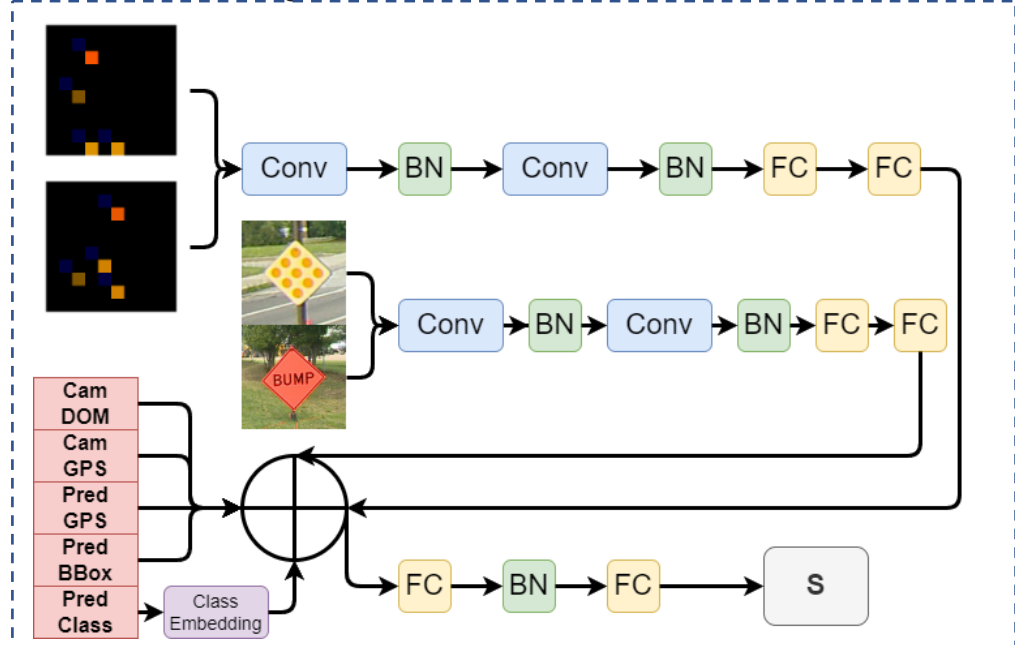
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KEYWORDS

Traffic Signs, Object
Geolocation, Deep Learning,
Computer Vision

Object Tracking and Geo-localization from Street Images

We leverage novel deep learning computational techniques to construct a system which detects, classifies, and geo-localizes traffic signs using roadside images as input. We have constructed a viewer widget which enables a user to view signs and their corresponding class and location on a GIS map.



Methodology or Action Taken

We have constructed a new deep learning architecture which uses a cascade of convolutional neural networks to predict sign classes and coordinates. We have built a new semi-supervised dataset containing over 100,000 images. To merge repeated occurrences of the same sign from separate images, we have constructed a “tracker” which consists of a neural network to compute a similarity score between detections, and match repeated signs using the Hungarian Algorithm.

Conclusions or Next Steps

We are working on semi-supervised learning algorithms to enhance the performance of our deep learning system. We are expanding the capabilities of our tracker to merge repeated sign detections across multiple years.

Potential Impacts and VTrans Benefits

Our research provides an automated system to construct a GIS map of signs from street-side images. We provide a widget which visualizes the output signs and allows the user to interact with them. These tools enable more efficient inventory assessments and maintenance plans. Additionally, the large dataset we have constructed will support future research VTrans may wish to perform in this field.

More information about the VTrans Research Program, including additional Fact Sheets, can be found at: <http://vtrans.vermont.gov/planning/research>