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MODEL DEVELOPMENT FOR AUTOMATIC PARKING SIGNS RECOGNITION

"Due to the predictable development approach, Intetics provided a detailed analysis and estimates for every step of the project and ensured all expectations would be met."

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OBJECTIVE

Develop a web application to automate the collection and entry of parking data

CHALLENGE

The Client approached Intetics with a need for accurate detection of parking locations, restrictions and time limits.

The detection was based on roadside imagery covering the area of a city. No less than 90% of signs had to be identified correctly.

Parking signs are not standardized. This complicated the recognition process, as it is based not on the sign itself but the actual text on the sign. To solve this issue, an object detection supported by image classification was used.

Due to the method of roadside data collection, some signs were present on several photos. That required the additional task of grouping data for one parking sign and determining the exact location.

The algorithm also had to deal with poor image quality, different types of weather, light conditions, time of the day, seasons, fog, and other distortions.

SOLUTION

To identify a specific parking sign, several steps were involved: identification of an image with a sign on it, detection of the parking sign on the image, and recognition of the text within the OCR component using basic NLP. Machine learning was based on the TensorFlow framework and Keras library.

The project started with the analysis of data and sources and resulted in an estimate for the data processing phase.

The next stage included data labelling and data transformation. Semi-supervised active learning techniques were used and saved up to 70% of the time spent on manual data labelling.

To eliminate errors associated with different distortions, all types were identically distributed over labelled datasets: training, development, and testing. A script for the automatic data transformation was also developed during this stage to reduce the data to a single format (color, rotation, tilt, etc.)

The next stage covered iterative development and initial training of the Machine Learning model. Here it was possible to give a precise prediction of the

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accuracy that can be achieved with sign recognition and time for training the model.

Within the postprocessing stage, sign location clarification and same sign association problems were solved.

RESULTS

The algorithm was successful in identifying 85%+ of signs on the streets in the city and 90%+ of the signs were identified correctly. All the ML and data processing algorithms were implemented in a single web application and supported with a detailed description of model and project documentation.

The client received a solution that automates parking sign detection and reduces the workload significantly.

QUICK FACTS

- *Semi-automatic data labelling*
- *Recognition of unstandardized parking signs with texts*
- *90%+ accuracy of recognition*