Identifying elements in a non-Euclidean space

RESEARCH PROPOSAL

The Big Data Company, in collaboration with Locatus, develops custom retail intelligence software. They specialize in geospatial analysis using videos captured by a GoPro camera with a fisheye lens. These equirectangular images help map the geospatial location of storefronts. The goal is to create a robust model with reduced training data by using a non-Euclidean representation model. The goal is to automate the qualification process of shopping streets by accurately mapping business locations and linking this data with geo location. Other objectives include determining the type of retailer, payment methods used in stores, and estimating the attractiveness of a property. The project uses tools like Bash/Linux, VSCode, Python, Jupyter Notebooks, PyTorch, and SURF Cloud.

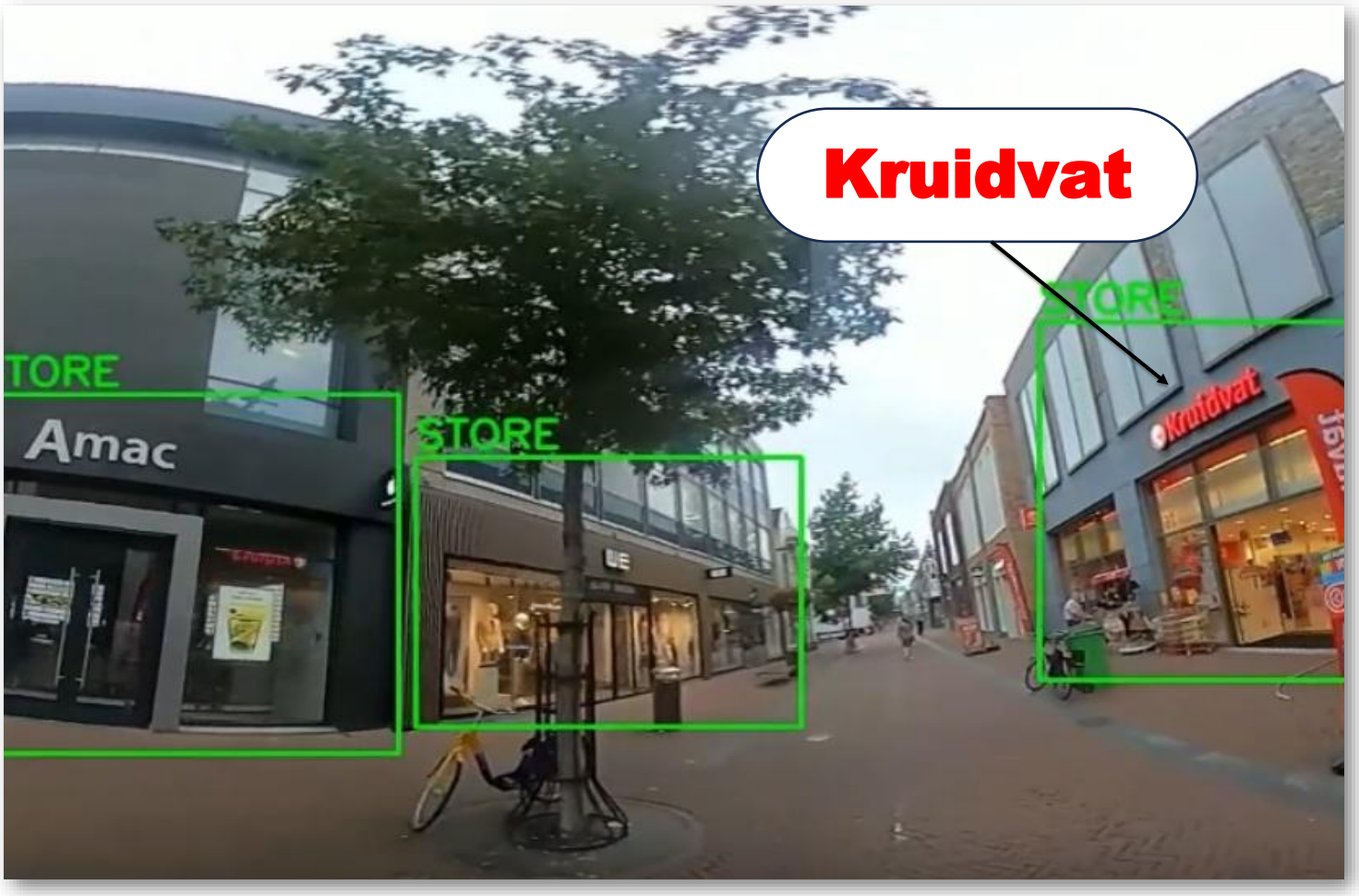

Fig. 1 Example of classifying buildings as business premises in an equirectangular image.

INTRODUCTION

The evaluation of storefront qualifications using equirectangular projected video images represents a cutting-edge approach in the field of geospatial analysis and retail intelligence. The Big Data Company, a leader in developing custom retail intelligence software, is spearheading this initiative in collaboration with retail data processor Locatus. This project leverages video footage captured by a GoPro camera equipped with a fisheye lens to efficiently record both sides of a shopping street. These equirectangular images are then analyzed using recognition models to pinpoint the geospatial locations of storefronts and displays.

A key innovation in this project is the use of a non-Euclidean representation model, which is expected to significantly reduce the amount of training data required for developing a robust model. This reduction in annotated examples allows for more resources to be allocated towards enhancing annotation accuracy. The objective of the project is to automate the precise mapping of business locations based on images and link this data with existing information about those locations.

METHODOLOGY

Literature study: Gain insights of the domain of image recognition and image formats, especially for 3D images.

Data definition and collection: Collection of the fisheye images and define the structure of these images.

Existing model evaluation: Compare existing models to evaluate the accuracy of detecting storefronts and brand names in equirectangular images.

Model improvement: Implementation of improvement to the model to be able to improve the accuracy of recognizing storefronts and brand names in equirectangular images.

Evaluation: evaluating improved model

PRELIMINARY CONSIDERATIONS

This research can lead to a better understanding of recognizing objects in images, in both normal and equirectangular images. Therefore, it could also contribute to recognizing objects in images with less training data required.

Fig. 2. Example of an equirectangular image.

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