Practical ML DL. Project Proposal

Lada Morozova, Rizvan Iskaliev, Daniil Igudesman

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Proposed Topic: Recognition of the American Sign Language alphabet

Description of the proposed project

The proposed project focuses on recognition of the American Sign Language alphabet. The project is based on a detection and classification pipeline. This project will use computer vision technology, such as neural networks, to identify the letter of American Sign Language from an image. The following steps are necessary to complete this project:

1. Finding data suitable for this project
2. Researching, transforming, and cleaning up the collected data
3. Selecting the necessary model architectures
4. Implementing the final processing pipeline (from the image to the post-processed neural network predictions)

Data

In order to succeed in this project, it is necessary to understand what data will be used in the process. Mainly two types of datasets will be used: hand detection and sign classification datasets.
Possible hand detection datasets:

- EgoHands: A Dataset for Hands in Complex Egocentric Interactions - detection dataset with only annotated hands.
- COCO-WholeBody - detection dataset, which contains the classes “left hand” & “right hand” annotated with bounding boxes. Images containing the following classes may be extracted from the dataset in order to improve variance in training data.
- Multi-Human Parsing - detection dataset which contains bounding box and instance segmentation annotations for each body part of the human. Images containing “left hand” & “right hand” classes may be extracted from the dataset in order to improve variance in training data.

Possible sign classification datasets:

- Synthetic ASL Alphabet - generated ASL alphabet classification dataset
- Synthetic ASL Numbers - generated ASL numbers classification dataset
- hand-sign-images dataset - ASL alphabet classification dataset
- ASL alphabet - ASL alphabet classification dataset
- American Sign Language Dataset - ASL alphabet and numbers classification dataset

Expected results

The expected output of the project is a small application that allows real-time identification of the letters of the American Sign Language. Technically, the result will be a pipeline of sequential hand detection and sign classification using pre-trained neural networks