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Composition of Processing Workflows for Deep Learning in Artificial Vision

Context

The deep learning approach relies on the use of large data sets as examples, to train multiple structured layers of non-linear processing units or separate neural networks, which embed low to high level data representations. Such hierarchical, distributed and rich engineered data are obtained through a complex process that requires suitable extensive training, multiple parameters setting, large memory and computation time requirements. To cope with these issues, several strategies like model reuse, combination of feature extractors, parallelization, and visual processing environments among others, are being currently developed. The objective of the project is to determine which of the existing deep learning tools is likely to be implemented for artificial vision, particularly for similar image retrieval.

Requested work

This project is organized to include four parts. It will start by a summary of the state of art of available deep learning tools intended to simplify its application, underlying their interest for artificial vision. Depending on results, most suitable tools will be identified according to a compromise between appropriateness and easiness of use. Selected tools will then be tested and programmed to compose a processing workflow of deep learning for an application of visually similar image retrieval. Results will be thoroughly analyzed independently and compared.

A prototype application will be developed for each selected tool in C, C++, Java or Python, depending on the student's programming experience and the selected tool application programming interface.

Key words: data engineering, machine learning, data mining, processing workflow composition, visual similarity.

Duration: 5 – 6 months (subject proposed on July 5th, 2016).

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