

Anomaly Detection in Multimodal Data Leveraging Semantic Distance From Knowledge Graphs

Problem description:

The amount of data generated every year grows exponentially in multiple dimensions such as video, text, sensor data. With timely analysis this data can be used for improving situation awareness in various settings and allow for early action in preventing disastrous or undesirable effects.

The different modalities of the data introduce additional challenges in its analysis such as multimodal knowledge representation, alignment of the heterogeneous sources, data fusion and co-learning. Conventional machine learning and deep learning methods adhere to statistical characteristics of the data while missing the semantical aspect of it. The goal of the project is to leverage existing deep learning methods in combination with the semantic knowledge graphs and knowledge basis to identify anomalous content in the video.

Implementation goals:

1. Deep neural network for object detection in video (e.g. pretrained or custom-trained YOLO, Mask-RCNN)
2. Extract text information from video (e.g. with open-cv, ocr) as well as other available information depending on the dataset used for anomaly detection
3. Use semantic distance metrics (e.g. cosine distance, word2vec) to understand the similarity between the discovered entities
4. Identify the discovered entities in the knowledge graphs/bases (e.g. Concept.net) to measure the distance between the graph nodes and compare this approach with cosine similarity measurement

Questions/Comments Contact:

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