Project 4: Video Search

Problem description

- Video search engine
- YouTube does not use visual content
- Input: visual query as text (innovative)
- Output: List of links with specified time

Method

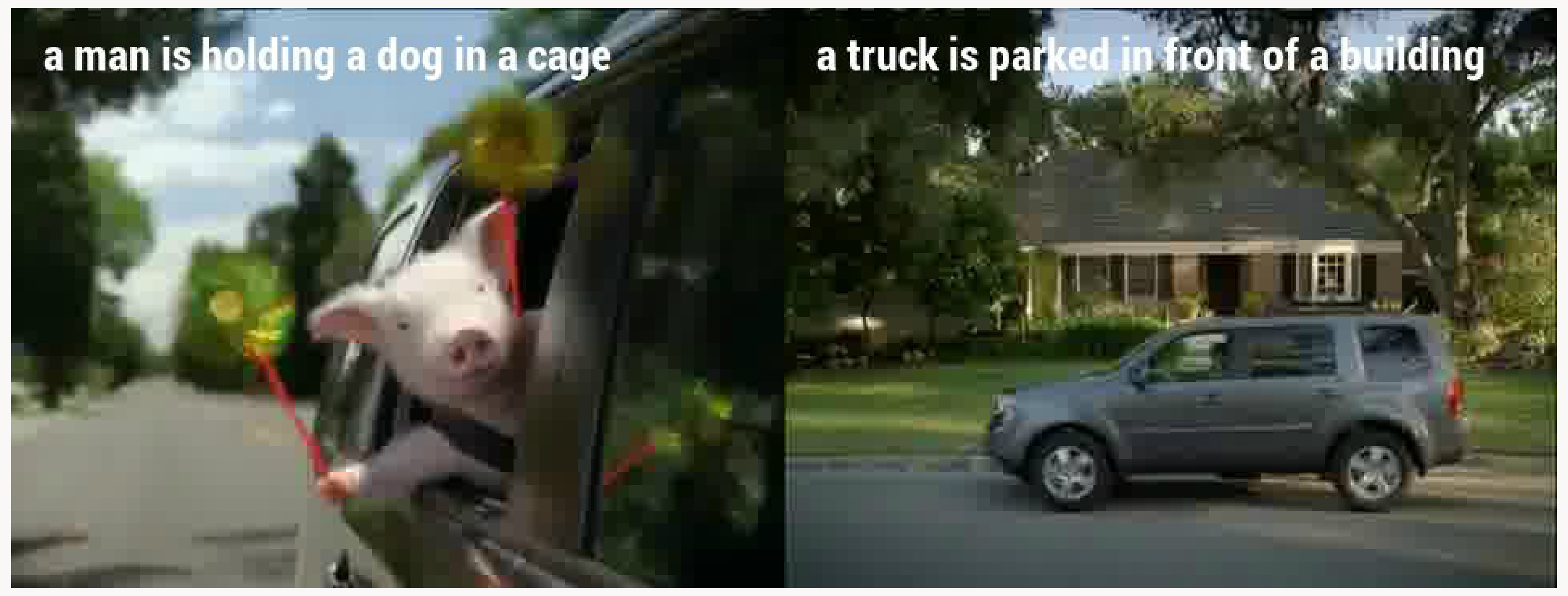
- First step: Mapping video to text.
  Metadata Collect data around the videos e.g. title, description, likes, etc.
  Captions Neural description of video frames - description of visual content.
  Expansion Expanding human-like neural description with WordNet hypernyms and hyponyms.
- Second step: Getting a "good" search engine on those special text documents
  Requirements: high precision and recall, fast and ergonomic

Data

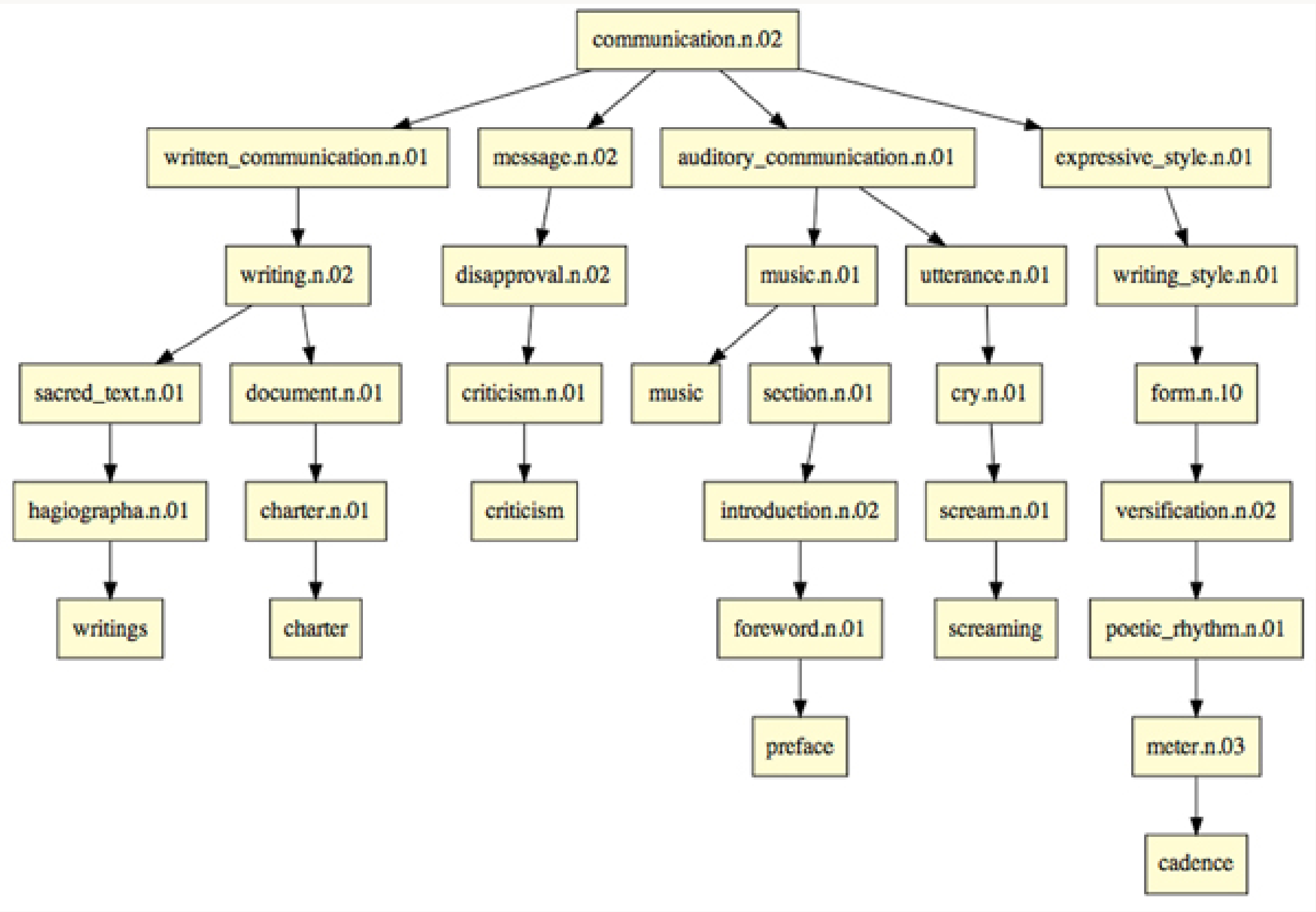
- Generated Video-captions
- Meta-data
  - Title, Description
  - Views, Favorites, Votes, Comments

Visual content to text mapping

- Generated human-like neural descriptions.


a man is holding a dog in a cage
a truck is parked in front of a building

- Expanded descriptions.



Experiments

Evaluating search engine with three queries:

- Large airplane
- Playing with a dog
- Man on a bench

For each query:

- Precision and recall at 1, 3, 5, 10, 20, 30
- Area under the precision-recall graph

Results

Choice of:

- Language model for text mapping

Search	CNN_S	ILSVRC_16
Q1	0.150	0.404
Q2	0.500	0.092
Q3	0.185	0.45
Average	0.278	0.315

- Retrieval model → ranked retrieval using tf-idf and popularity.

Search	Boolean	Ranked
Q1	0.178	0.404
Q2	0.23	0.092
Q3	0.323	0.45
Average	0.246	0.315

Table: Size of the area under the curve according to the retrieval model and the query considered

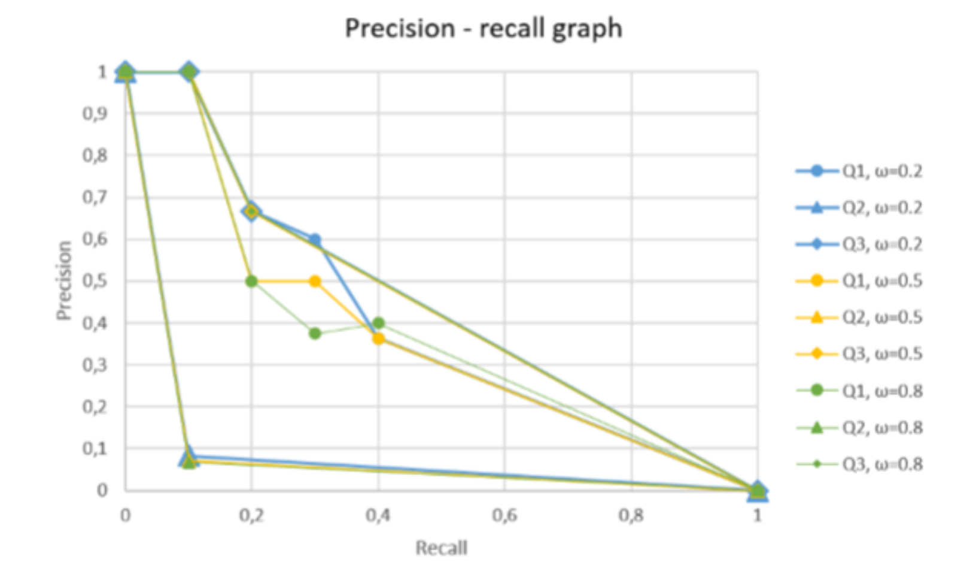
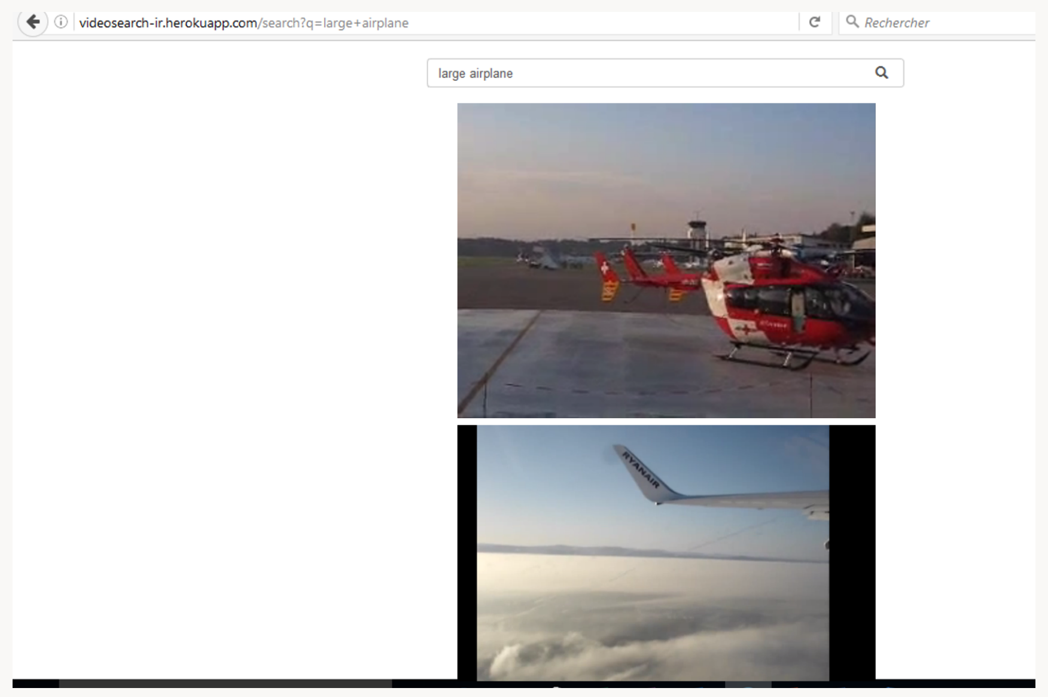


Figure : Precision - recall graph using different weights for the popularity compared to the tf-idf.

Conclusions

We provide users a video search engine available online:

- Fast and ergonomic.
- Precision: generally high for top 3 results, then very low


videosearch-ir.herokuapp.com/search?q=large+airplane

large airplane

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