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Creating a 4D Street View of Amsterdam from Historical Images

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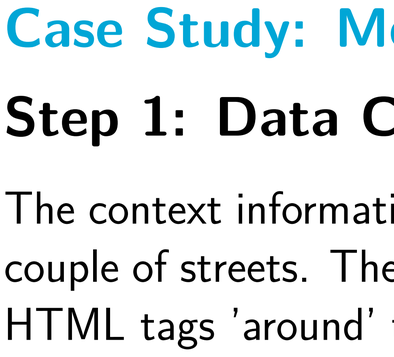
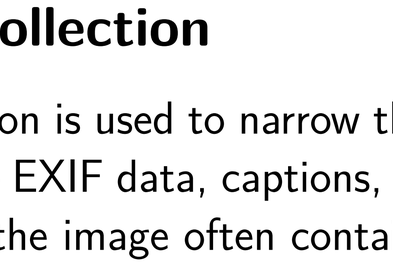
Motivation & Case Study

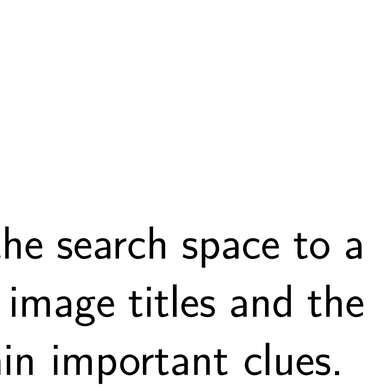
The **ArchiMediaL**[1] project aims to bridge between data science and researches on contemporary and historical built environments by developing state of the art AI algorithms for the automatic linking of available meta-data and image repositories. As a case-study we use the 360,000+ historical images from the Amsterdam Beeldbank[2] database.



(a)



(b)



(c)

Figure 1: Where are the locations depicted in these images?

- **Objective**: Place recognition for historic images (beyond photo representation), where commonly, geo-location tags are not available.
- **Task**: Images retrieval problem, where a given query image is matched with images from large geo-tagged gallery.
- **Challenge**: Domain disparity between the unlabeled test dataset (historic images) and the available labeled training dataset (Mapillary street view images).

Case Study: Method

Step 1: Data Collection

The context information is used to narrow the search space to a couple of streets. The EXIF data, captions, image titles and the HTML tags 'around' the image often contain important clues.

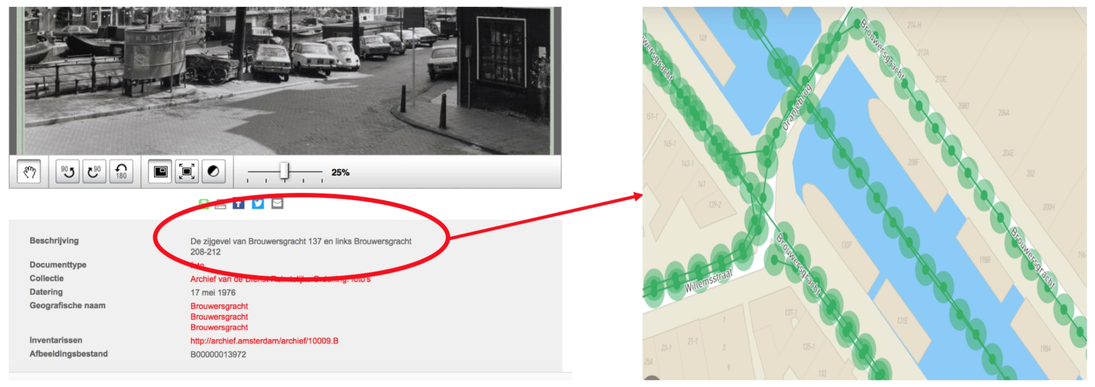


Figure 2: Screenshot Beeldbank image with meta data containing the title (left) and corresponding area in Mapillary (right)

Step 2: Image Matching

A deep learning algorithm is trained on available data, e.g. Mapillary street view images to find a match for the historic image (left image in Fig.2) with the gallery of street view images from Step 1(right image in Fig.2).

Figure 3: Object matching between two images from two different dataset. Left: historic photo taken in 1976 from Brouwersgracht in Amsterdam found in "Beeldbank" data repository. Right: New 360° photo obtained from Google street view images in 2016 from Brouwersgracht.

[1]http://archimedial.eu/
[2]http://beeldbank.amsterdam.nl/