Extracting Architectural Patterns from Web Data

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Abstract

Knowledge about the reception of architectural structures is crucial for architects or urban planners. A vast amount of structured and unstructured data describing architectural structures has become available publicly. This includes information about the perception and use of buildings (for instance, through social media), and structured information about the building's features and characteristics (for instance, through public Linked Data). We present the first step towards the exploitation of structured data available in the Linked Open Data cloud, in order to determine well-perceived architectural patterns.

Approach

➤ *Influence Factors* for the perception of architectural structures.

➤ Automated ranking of buildings based on Influence Factors and data gathered from the Social Web (metadata from Flickr images, tweets from Twitter, News articles & Blogs from Google).

➤ Correlation of *Influence Factors* with structured data.

➤ Mining quantitative and qualitative *architectural patterns*.

➤ Dataset consisting of bridges, churches, halls, airports, and skyscrapers.
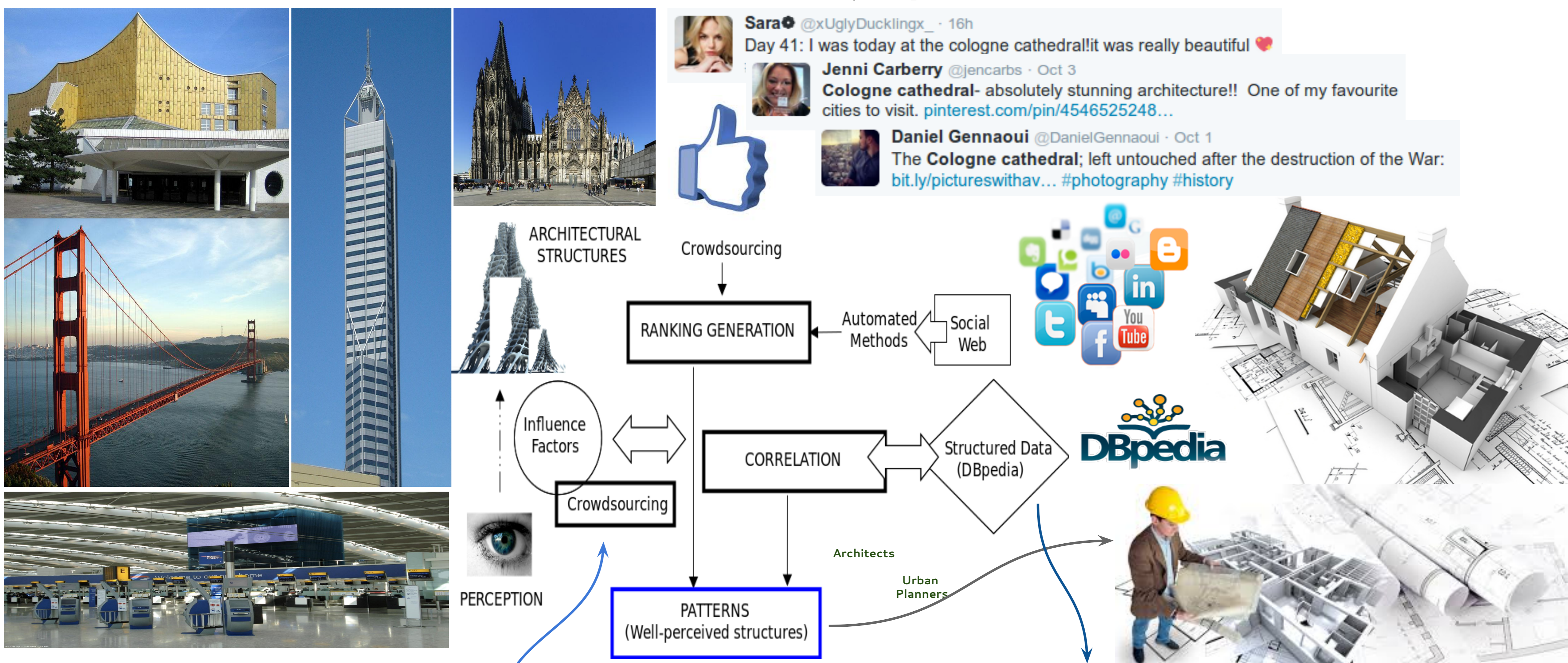
Influence Factors

For bridges, churches, halls, skyscrapers :
  ➤ History associated
  ➤ Built Environment/Surroundings
  ➤ Materials Used
  ➤ Size
  ➤ Personal Experiences
  ➤ Level of Detail

For airports :
  ➤ Ease of Access
  ➤ Efficiency of Movement
  ➤ Design & Appearance
  ➤ Choice/Availability
  ➤ Miscellaneous Facilities
  ➤ Size

Table 1: DBpedia properties that are used to materialize corresponding Influence Factors.

Airports	Bridges	Churches	Halls	Skyscrapers
dbpedia-owl: runwaySurface, dbpedia-owl: runwayLength, dbprop:cityServed, dbpedia-owl: locatedInArea, dbprop:direction	dbprop:architect, dbpedia-owl: constructionMaterial, dbprop:material, dbpedia-owl:length, dbpedia-owl:width, dbpedia-owl:mainspan	dbprop: architectureStyle, dbprop: consecrationYear, dbprop:materials, dbprop:domeHeightOuter, dbprop:length, dbprop: width, dbprop:area, dbpedia-owl:location, dbprop:district	dbpedia-owl: yearOfConstruction, dbprop:built, dbprop: architect, dbprop:area, dbprop:seatingCapacity, dbpedia-owl:location	dbprop:startDate, dbprop:completionDate, dbpedia-owl:architect, dbpedia-owl:floorCount

Preliminary Results

Most well-perceived churches in Germany :
  ➤ Gothic Revival
  ➤ Romanesque
  ➤ Gothic

Future Work : Multidimensional Architectural Pattern Mining

Buildings with u **size**, v **uniqueness**, … and z **materials used** are best perceived.

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