Learning Geo-Socio-Visual Attention Patterns in the City of Rome

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Social media is a valuable source of data for gaining insights about individual behaviors, including socio-cultural dynamics in space. Geotagged datasets from social media are used for solving broad scope of tasks dedicated to exploring the meaning of and interaction with places. Cities and urban spaces reflected through mobile phones [1] and social media [2] have been studied in general, and focusing on the study of places on a smaller scale, including national parks [3] and shopping streets [4]. Meanwhile, distinct cultural venues, including museums, landmarks, and emerging urban tourist hot spots, are still left under-explored [5]. Here we study temporal patterns and trends of socio-cultural attention on a large geotagged dataset of Flickr photos tagged in the city of Rome. We collected 1,517,502 posts (Fig. 1a) for the time period from 1 January 2005 to 31 December 2022 using the official Flickr API with the help of Python programming language. A single post from Flickr contains rich heterogeneous data, including the photo itself, the aspects of location, and a caption.

We found regular sinusoidal activity patterns in different places (Fig. 1b). These patterns reassemble the activity rhythms described in [6]. In the next step, we utilize spatial features to extract meaningful clusters of images (Fig. 1c). Combining this approach with the deep learning model ResNet50 [7], we are able to distinguish indoor and outdoor photos as well as photos taken in different parts of the location. Using computer vision for object detection and classification, we will be able to get more insights into what draws the most attention from visitors and how people interact with the place. This information can help to explain trends and outliers presented in the data.

We expect that by combining spatial and temporal analysis with statistical methods, we will be able to reveal new knowledge about places and exceed state-of-the-art works dedicated to studying places.

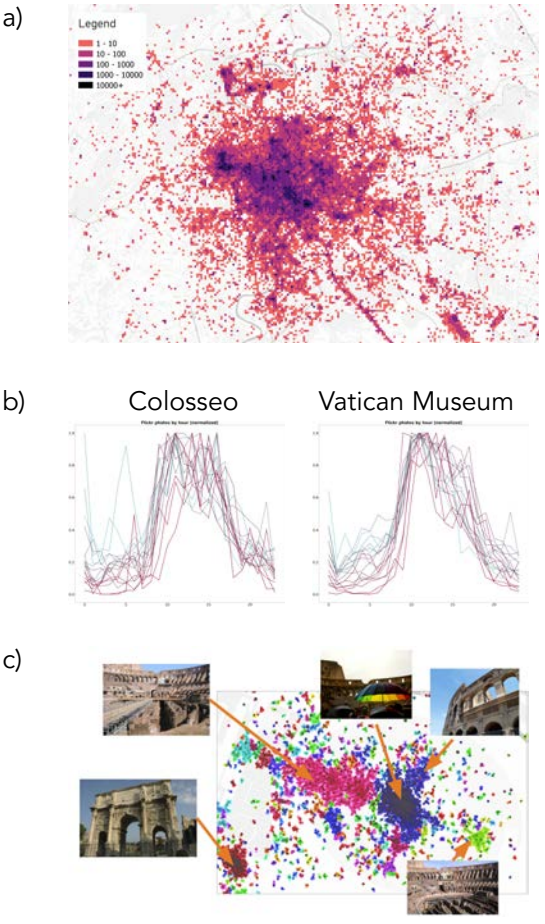

Figure 1. a) Coverage of Rome by Flickr photos b) Normalized hourly Flickr activity for Colosseo (left) and Vatican Museum (right). Values indicate the mean number of posts per hour for each year. Each line corresponds to a year from 2005 to 2022. c) Spatial clusters and exemplary photos for Colosseo.

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