PREDICTIONS OF URBAN QUALITIES IN THE CITY OF ZURICH

Jakub Lichman, Philippe Schlattner, Florian Koch

Department of Computer Science
ETH Zurich
Zurich, Switzerland

ABSTRACT

We should do as the last one.

1. INTRODUCTION

Huge predicted increase in number of world urban area residents from 54 to 66 percent in 2050 brings many challenges which every successful city has to overcome. Cities of the future has to ensure contiguous improvements of their services despite growing population. Since it is infeasible for a city to excellent in all services, authorities have to reach compliance about the subset of prioritized ones. For instance, this year's Mercer's Quality of Living index takes into account economic and political environment, infrastructure, public transport, health, recreation and housing, to decide which cities are most desirable.

2. BACKGROUND

TODO: Write about smart cities etc.

3. RELATED WORK

TODO: Cite few similar papers

4. DATA

To begin with, we evaluated data downloaded from the open data initiative of the city of Zurich [1]. Furthermore, we used maps from the Geographic Information System of the canton of Zurich GISZH [2] to get an idea of potentially interesting areas. These two sources were used, since we believed that data published by institutions of the government is in general more reliable than that published by individuals. In addition, the data is considered to be of better quality and cover more of the area. This initial trust has been partially disappointed by finding quite a few data sets with only few points. As we wanted to predict the best living areas within Zurich, we also need data that covers more

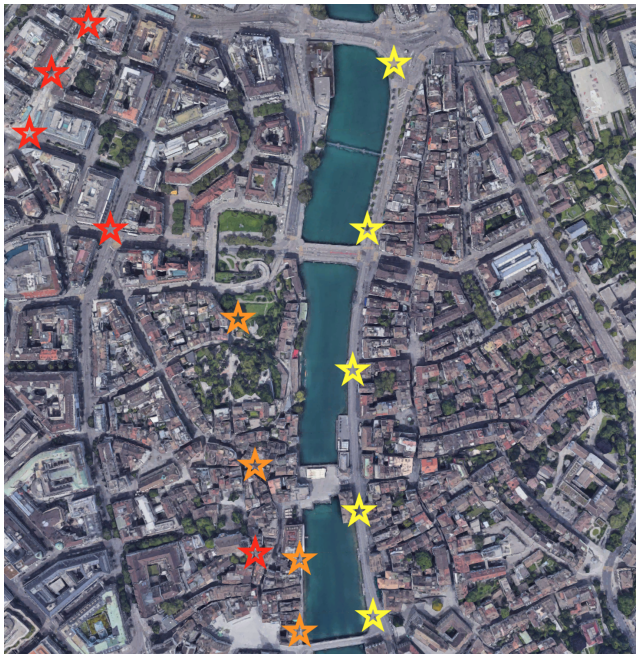

Fig. 1. Locations of question points along the path

or less the comlete area of Zurich in order to avoid bias towards certain regions, which are better covered by the data sources. Therefore, we ommited data sets with subjectively too few entries, which we initially wanted to use due to their potential

5. GREENERY DETECTION

TODO: I will write few sentences about greenery detection and maybe some data mining out of it...

Greenery has always played crucial part in the construction of cities. The need for green spaces has been present since ancient times. City parks are traditional place of recreation and relax for all kinds of people in their spare time. Current trends in architecture brought new ways of connection between buildings and greenery such as roofs with green surfaces or terraces with tree pots. These trends are consequence of natural human inclination towards nature. Therefore we have decided to take greenery as a significant indicator of urban quality.

In order to predict user preferences partially based on greenery, we needed to acquire data about it. There are two basic ways how to detect trees, parks or grass areas on a map. First approach relies on a snapshot of a satellite view [3]. It is simple to implement and yield accurate results. Detection of green areas is via pixels with RGB values that lie within specified intervals. The only crucial requirement in order to obtain precise detection is to find high quality satellite view of the selected area. Second approach is to detect greenery from Google Street View (GSV) [4]. Xiaojiang Li et. al. detected greenery by examining street pictures taken from GSV. With this method they were able to explore greenery inside the cities in great detail. Idea behind second method is in general more accurate since it can detect trees shadowed by taller buildings or shelters. However, its precision highly depends on availability of street view and algorithms, which are in our view still not accurate enough. That is the reason why we have decided to use the first method.

We have developed python script which does greenery detection similarly to the first approach mentioned above. It detects green pixels and marks them with RGB value (0, 255, 0). Snapshot of selected location was taken from Google maps satellite view which satisfies our quality requirements.

6. URBAN QUALITY PREDICTION

TODO: This should be "core" chapter of our paper. Philippe here you can describe whole procedure of data visualization + correlation matrix etc.

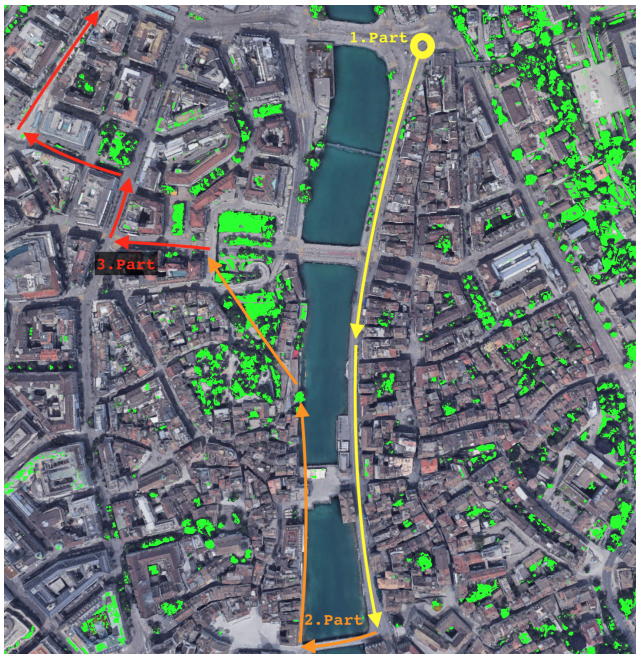

Fig. 2. Greenery detection in the area of our path.

7. PREDICTIONS EVALUATION

TODO: Florian you can write this chapter.. Content should be like we have created questions, locations, why we have pick these locations + photos of walking and measured results (table or graph). I can help you with this chapter.

8. DISCUSSION

TODO: Discuss possible drawback and ways how to improve them + results and whether we are satisfied with our predictions.

9. CONCLUSION

We should do as the last part together with abstract.

10. REFERENCES

[1] "Zurich open data," online: https://data.stadt-zuerich.ch/, Accessed: 08.05.2018.

[2] "Geographic information system of the canton of Zurich," online: http://maps.zh.ch/, Accessed: 08.05.2018.

[3] D. Griego, V. Buff, E. Hayoz, I. Moise, and E. Pournaras, "Sensing and mining urban qualities in smart cities," pp. 1004–1011, March 2017.

[4] Xiaojiang Li, Chuanrong Zhanga, Weidong Li, Robert Ricard, Qingyan Meng, and Weixing Zhang, "Assessing street-level urban greenery using google street view and a modified green view index," *Urban Forestry Urban Greening*, vol. 7, no. 3, pp. 201–215, 2015.

11. APPENDIX