USING GEO STATISTICAL ANALYSIS TO DETECT SIMILARITIES IN EMOTIONAL RESPONSES OF URBAN WALKERS TO URBAN SPACE

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SUMMARY

- Empirical pre-study on measuring emotional arousal in public space
- Study time: 14 - 22 October 2013, Place: Oerlikon, Zurich, Sitzerland
- N= 14 Participants
- Method of measurement: sensor-wristband Smartband
- **Significant similarities of emotional response to same spatial situation among different participants**

Introduction

In the following we investigate the impact of urban form on emotional response. The presented examination is a preliminary-study aimed at developing a method which allows us to measure human emotions in various spatial configurations and to define the spatial statistical methods needed to analyze the collected data.

Data Collection

To directly measure human emotional responses to real world environmental stimuli we use a sensor-wristband (Smartband), developed by Bodymonitor in combination with a GPS-tracker.
The Smartband [Papastefanou 2013] offers a mobile means of measuring skin conductivity (SC) as well as skin temperature. The collected data are analyzed with respect to four activations: Negative arousal, positive arousal, balanced, and retraction.

Statistical Analysis

The aim of the analysis is to answer following questions: What is the probability that the distribution of the emotion values occurs by chance? If the emotion values occur not by chance, where are the areas of clustering? Where is the clustering of high and low values?
Based on Geospatial analysis methods (Getis-Ord General G, and Getis-Ord hot-spot analysis Gi* (Getis 1991, Mitchell 2005) significant clustering of positive and negative arousal values at specific distances was proved and the null rejected

Conclusion

The statistical analysis has proven that different participants had similar emotional response to the same spatial situation regardless factors such as weather or the individual's respective mood or personal background.

The allocation of positive and negative arousal clusters could by characterized by sequence of spaces with high emotional arousal (positive, negative or both) followed be spaces with balanced emotional activation. A possible explanation is that the emotional response is not caused primarily by a certain spatial situation but rather by a changing sequence of spaces. If there are no changes in the environment our emotions are more or less in a kind of balanced or retrieving mode.

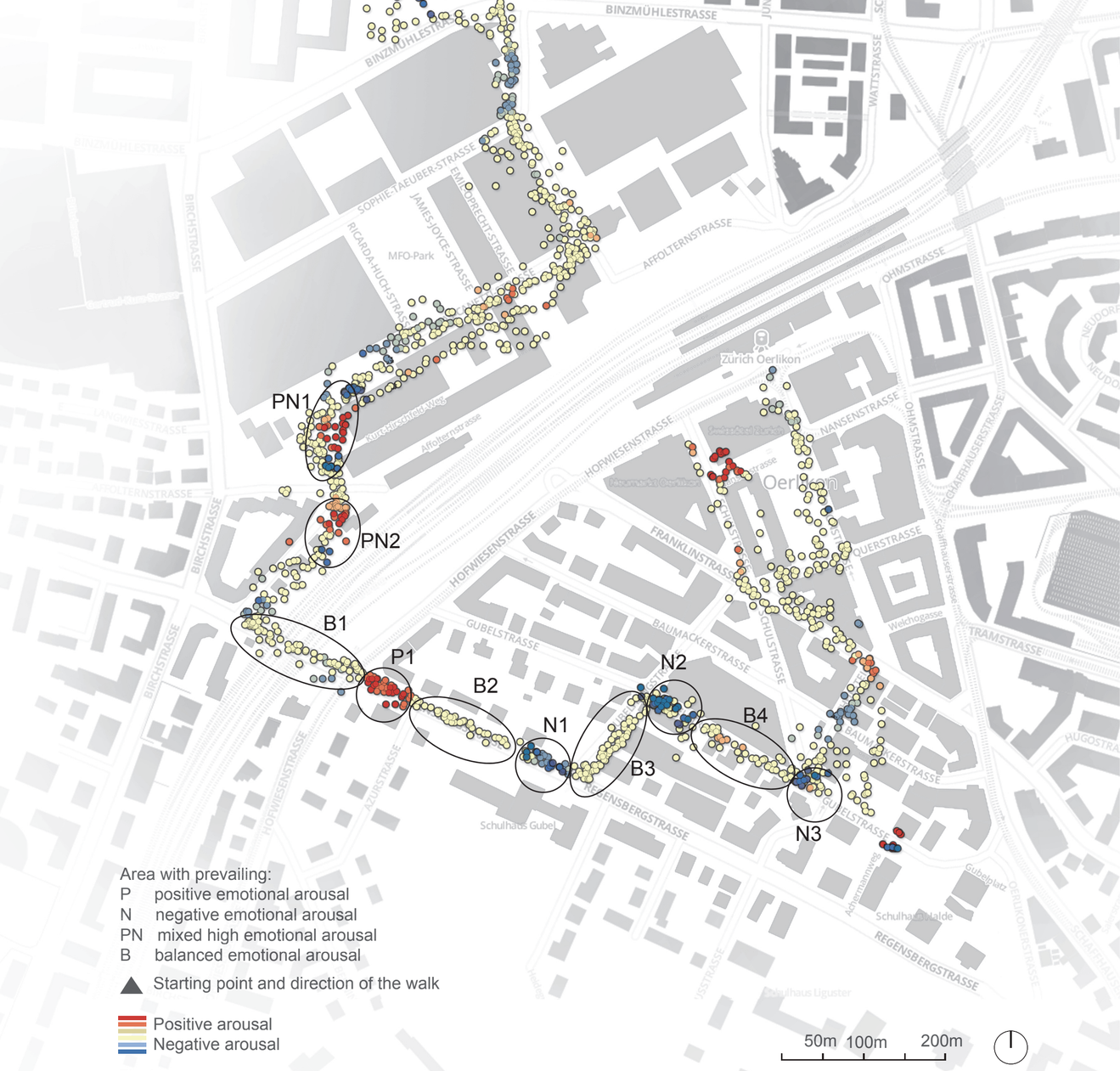

Fig 1
Locations of emotional arousal are colour-coded by Z-scores. Locations surrounded by locations with similarly positive or negative values are shown in red or blue.

Fig 2
(left) 3d model of study environment + walk path and analysis point (every 5 meter), (middle) 2d Isovist set on analysis points looking in walk directioin at restricted angle 60°, (right) 3d isovist

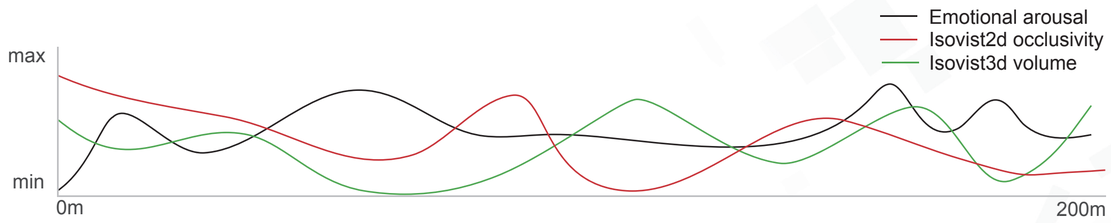

Fig 3
shows a sequence of changes of measures for simple 2D, 3D-Isovists and emotional arousal

Outlook

Assuming that further studies validate our findings, we will then search for correlations between emotional response and spatial measures derived from computational spatial analysis like isovists (2D and 3D Fig 2), visibility graphs (Hillier 1996), daylight and street-network analysis as well as combinations of these.
As the results of this pre-study suggest, changes in a sequence of spaces along a path may be a reason for positive or negative arousal (Fig 3). Consequently, it would be valuable not only to test static values for certain points of view but to investigate how the measured responses change along the path.

References

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