Stress3d: Mapping Cyclists' Physiological Responses to Inform Urban Planning

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Motivation

Stress3d uses measurements of skin conductance responses, which occur when external or internal stimuli are physiologically arousing, collected from 12 cyclists wearing GPS trackers in The Netherlands to see how stress can be affected by our environment. Designed as a research tool, Stress3d's overall development is motivated by its ability to assist researchers in urban planning, environmental health and epidemiology to better direct their research efforts when exploring how human behavior varies as a function of location, space and time.
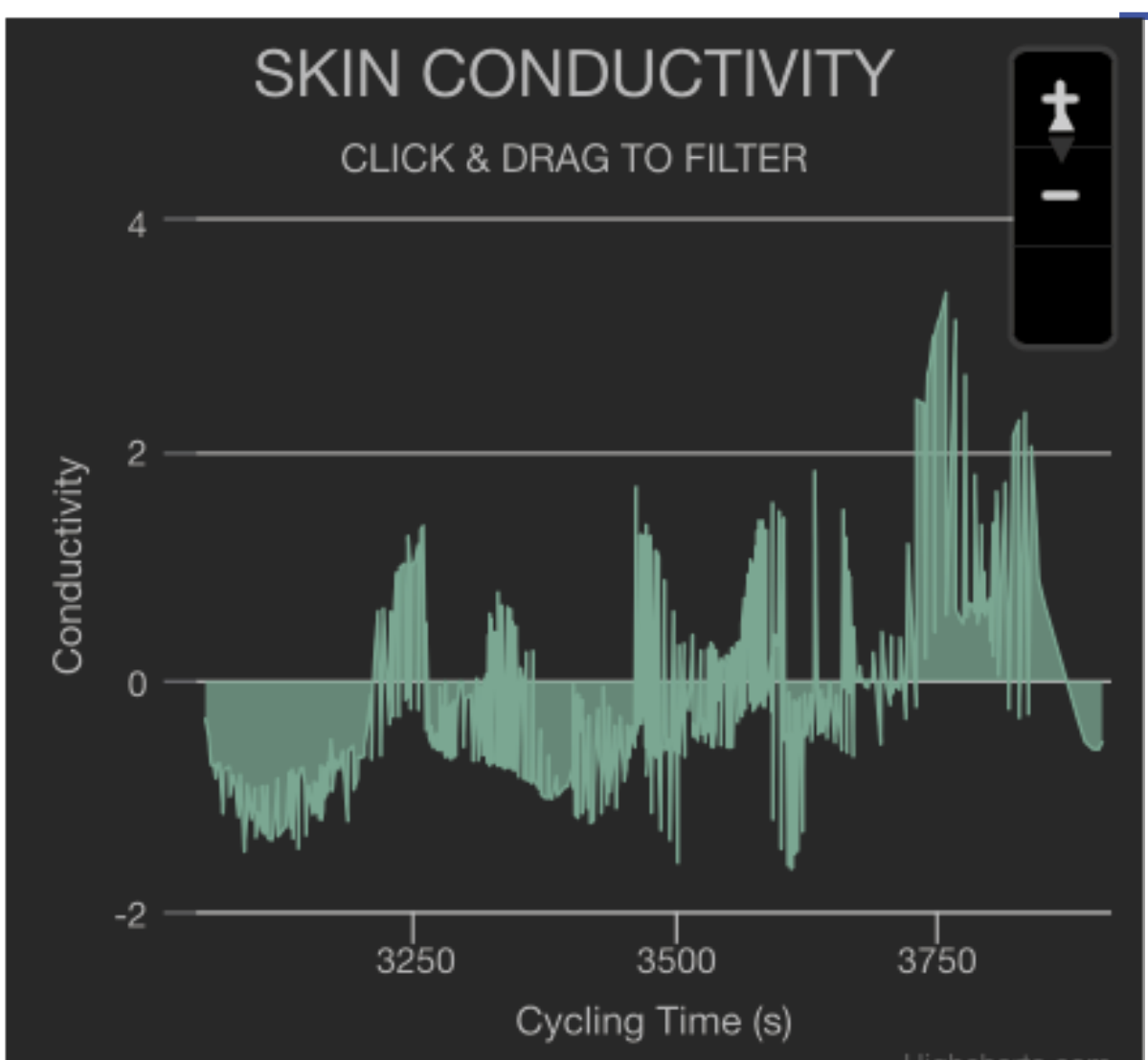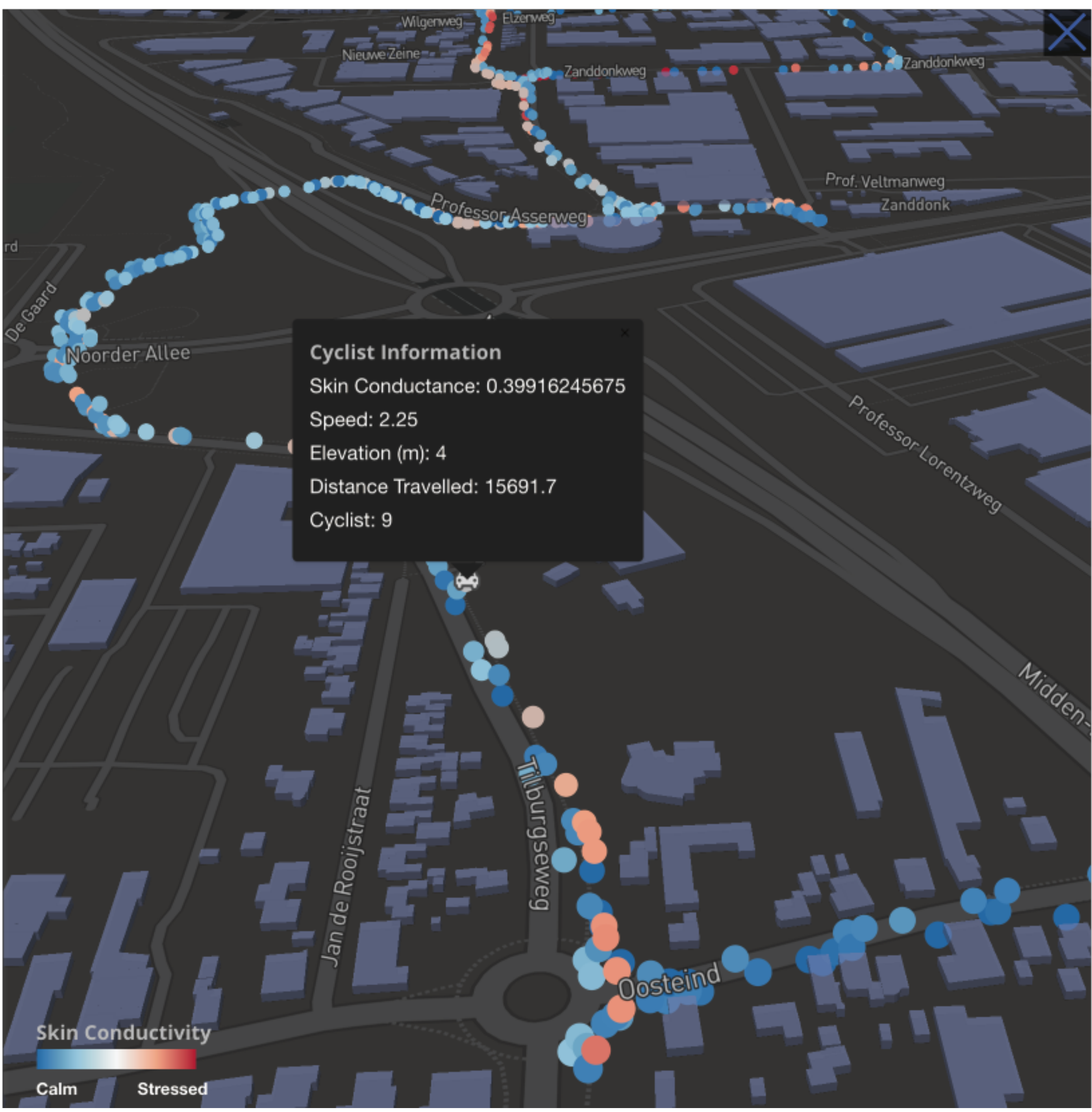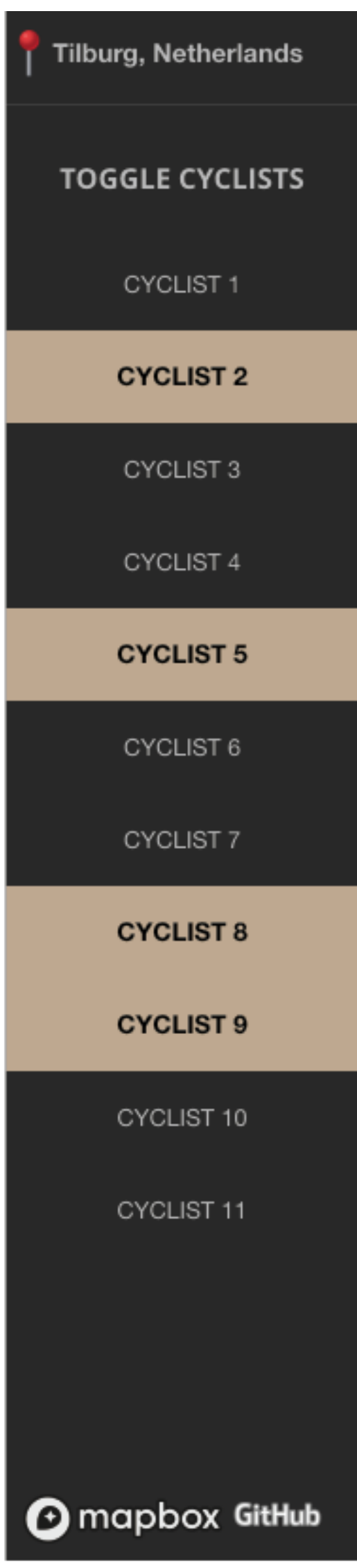
Spatial-Behavioral Data

Cyclists' Physiological & GPS Data over Time
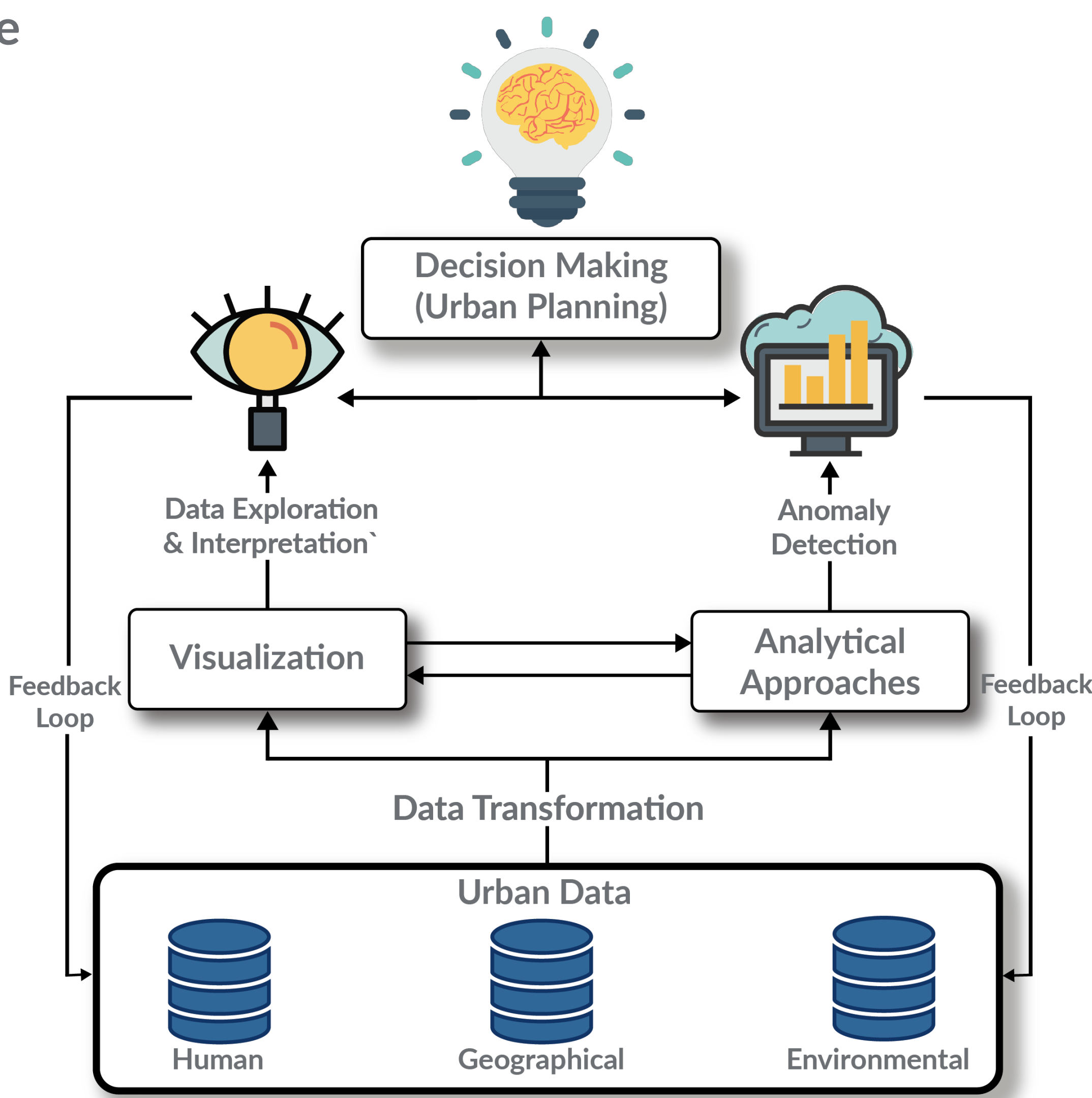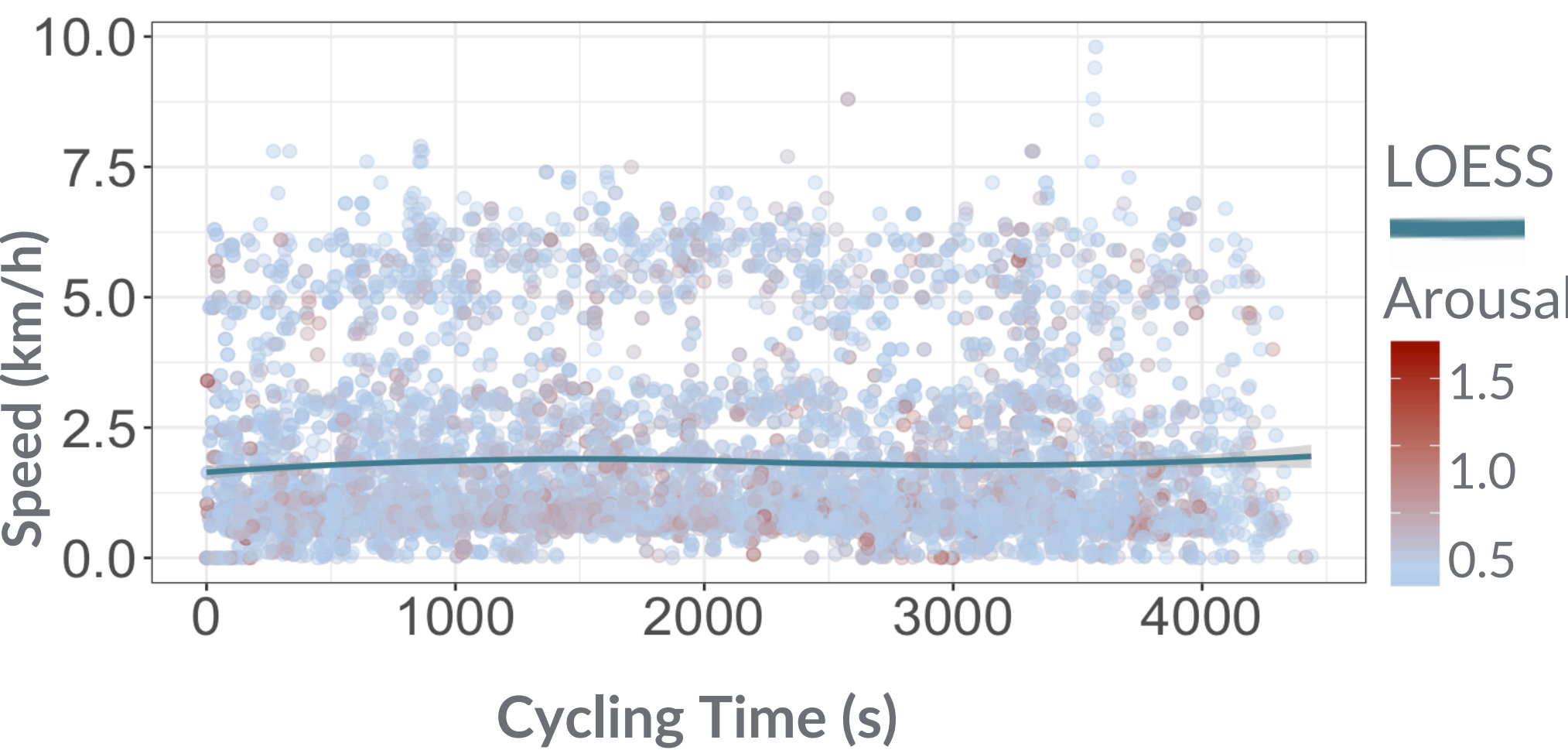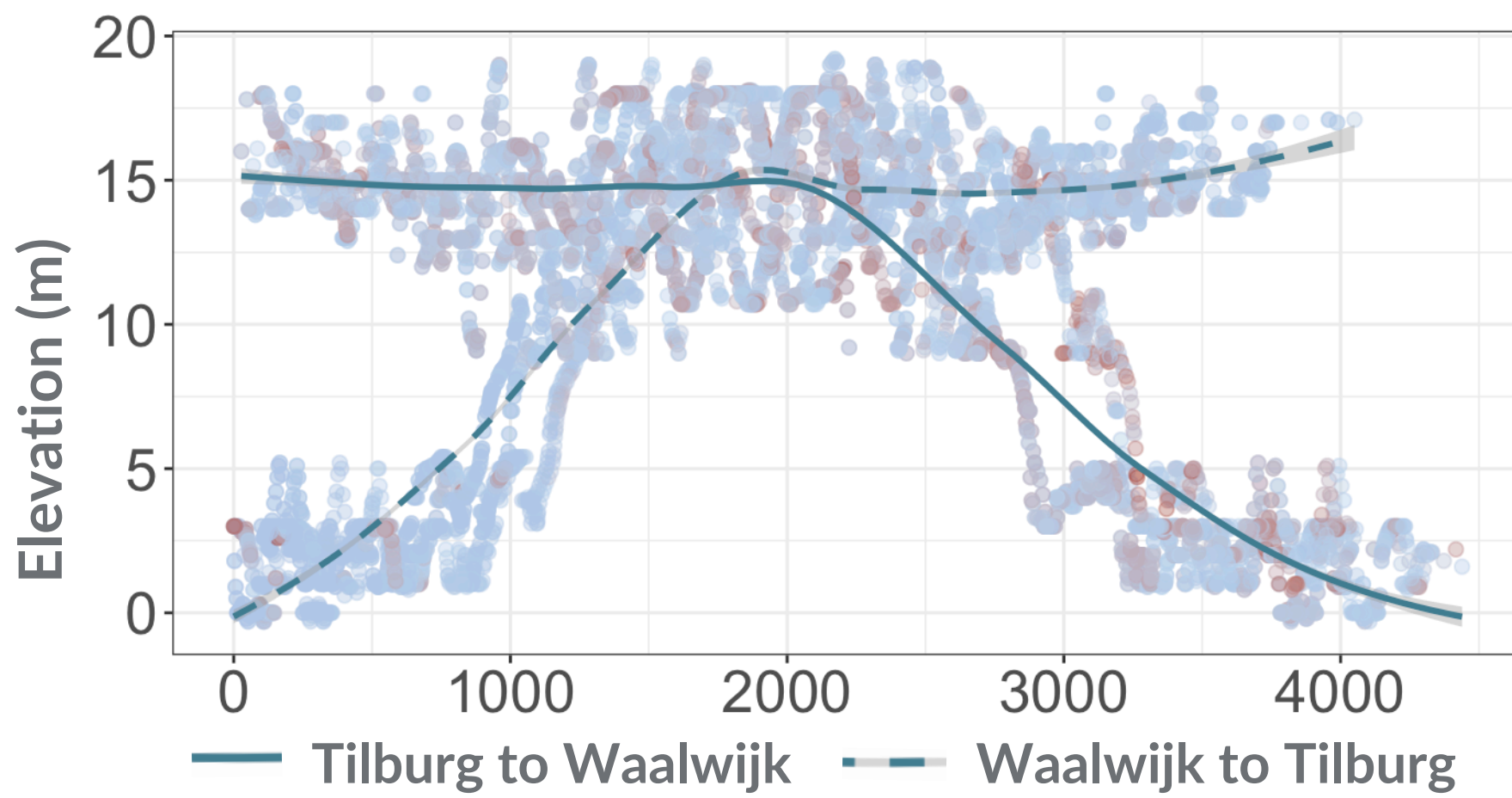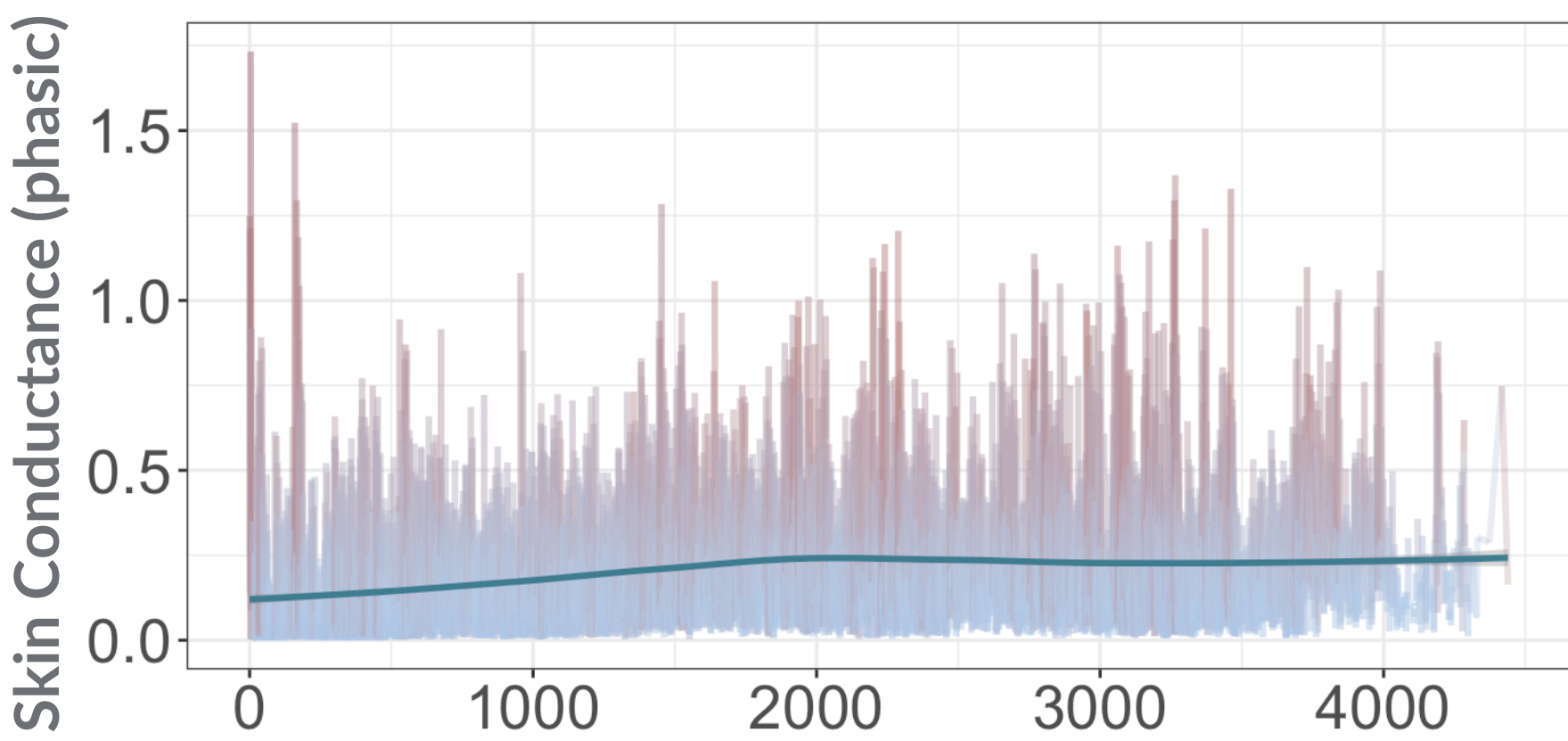
System Framework

Stress3d's system framework is capable of handling most formats of spatiotemporal data, specifically physiological data, making this platform valuable for many examinations of how geographic contextual factors impact human behavior.

Application Features

Toggable Data

Users can toggle between different cyclists. This is important due to the variability of skin conductance across people.

3D Map

The 3D mapping platform allows users to interactively explore how features in the environment impact human behavior. The view can be rotated, tilted and zoomed in/out. Clicking points gives information such as the cyclists' speed, elevation and more. The 3D buildings also give users a better sense of the density of urban areas the cyclists travelled through and their corresponding line of sight.

Dynamic Chart

From only reading the data loaded in the map frame, the skin conductance chart dynamically displays the average of all selected cyclists' physiological arousal over time.

Automatic Street View

Clicking on a point will automatically display a street view. This helps users understand what environment a cyclist was in during high (or low) levels of stress.

Conclusions

This application was developed and tested using the cyclist data shown on the left of this poster. The link to the online application is: **https://gcmillar.github.io/stress3d**

Acknowledgements

This work would not be possible without the significant contributions of Wilco Boode, Lisette Hoeke and Joost de Kruijff, all at NHTV Breda University of Applied Sciences.

References

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