Gaze-aware mobile map assistant: GAMMA

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Abstract:

Map users might have different strategies when solving a map-related task (e.g., visual search, way finding, etc.) due to individual differences. However, one thing in common is that nobody wants to get lost in the information clutter. Especially when we consider that these solutions are significantly used in smart phones, information clutter on small screens becomes more of an important issue. On the other hand, interaction with the mobile maps is of a series of taps, pans, and zooms which can sometimes be frustrating for the user. There may not be one map that works for everyone but a map application whose design is controlled by users' eye movements could be one solution for maintaining the visual saliency and hierarchy, and smoother interaction with the spatial data. In other words, based on the time and attention spent by the user, map design can be personalized. For instance, certain attributes or map elements can be excluded, simplified, aggregated, highlighted or new representations can be incorporated into the design based on users' attentional activities. By utilizing the front-facing camera of smart phones and machine learning applied to crowd-sourced gaze data of smart phone users, it is possible to mimic the eye trackers (Krafka et al., 2016). Removing the need for an external eye tracker does not only contribute to the interaction and map design, but also makes data collection easier for researchers. However, more cartographic research and information exchange between disciplines are needed in this topic.

References

Krafka, K., Khosla, A., Kellnhofer, P., Kannan, H., Bhandarkar, S., Matusik, W., & Torralba, A. (2016). Eye tracking for everyone. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 2176-2184).