Report: Eye-Tracking Experiment on Pakistan Population Density Map

Objective

The purpose of this study was to assess how participants interacted with a population density map of Pakistan using the RealEye eye-tracking tool. The experiment aimed to identify which regions or elements (e.g., legend, map labels) drew the most attention and how participants navigated the map visually.

Methodology

1. **Map Used**
   The experiment utilized the 2017 population density map of Pakistan, showing people per square kilometer across various districts.
   A clear legend was provided to interpret the color codes.
2. **Participants**
   Three participants were included in the study.
3. **Procedure**
   Participants viewed the map while their gaze patterns were tracked using RealEye.
   Fixation points, saccades, and overall visual engagement were recorded.
   The experiment data was visualized as heatmaps and detailed gaze charts.
4. **Data Collected**
   Heatmaps highlighting areas of interest.
   Fixation and saccade charts showing engagement with different map regions.
   CSV file containing fixation data for further analysis.
5. **Survey Questions**
   1. How easy was it to interpret the population density information on the map?
   2. Which part of the map caught your attention first?
   3. Do you think the map provides clear and accurate information about population density?

Key Results

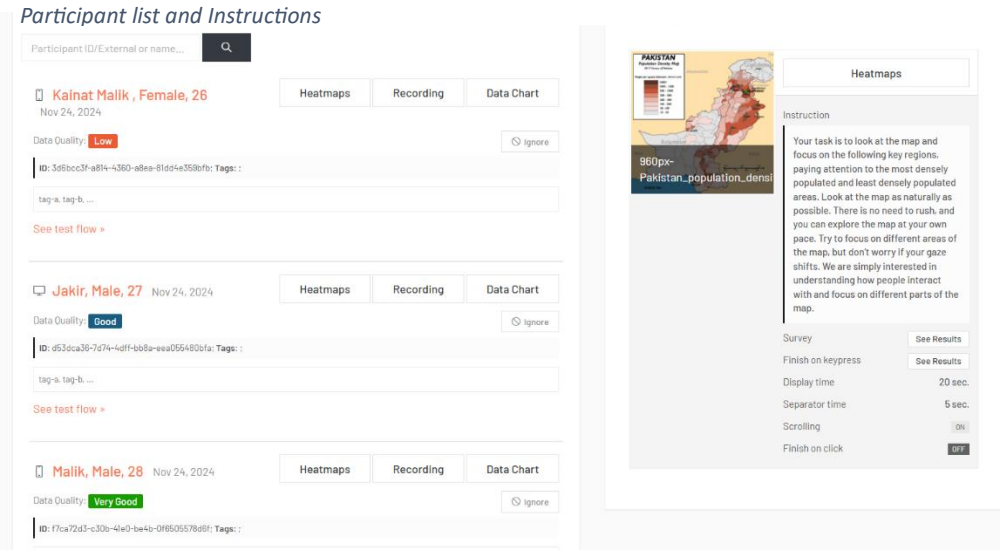
1. **Heatmaps**:
   The heatmaps revealed concentrated visual focus on:
   - The **Punjab region**, particularly near Lahore and Islamabad, likely due to its higher population density.
   - The **legend**, as participants referred to it to interpret map colors.
   - Major cities like Karachi and Quetta.
2. **Fixation and Saccade Analysis**:
   Charts showed frequent fixations on highly populated areas marked in red (1500+ people/km²).
   Saccade patterns indicated participants moved their gaze from the legend to different regions of the map frequently.
3. **Participant-Specific Observations**:
   One participant spent significant time on **Sindh and Karachi**, indicating a potential personal connection or curiosity.
   Another focused extensively on the **northern areas** (Gilgit-Baltistan and Khyber Pakhtunkhwa), despite their lower population density.
4. **Survey Answers**
   All the answers were positive, (YES) maybe due to already having some interactions with the maps/visuals.

Findings

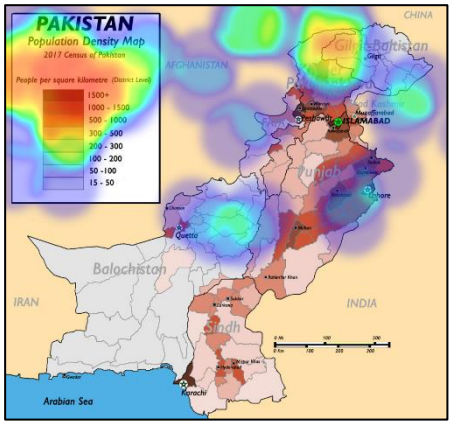
- **Expected Results**:
  Highly populated regions attracted more attention, consistent with the study objective. The legend played a critical role in guiding participants' understanding of the map.
- **Unexpected Results**:
  Some participants fixated on sparsely populated areas (e.g., Balochistan), which were not highlighted as densely populated. One participant's gaze remained focused near Quetta for an extended duration, possibly influenced by personal interest.

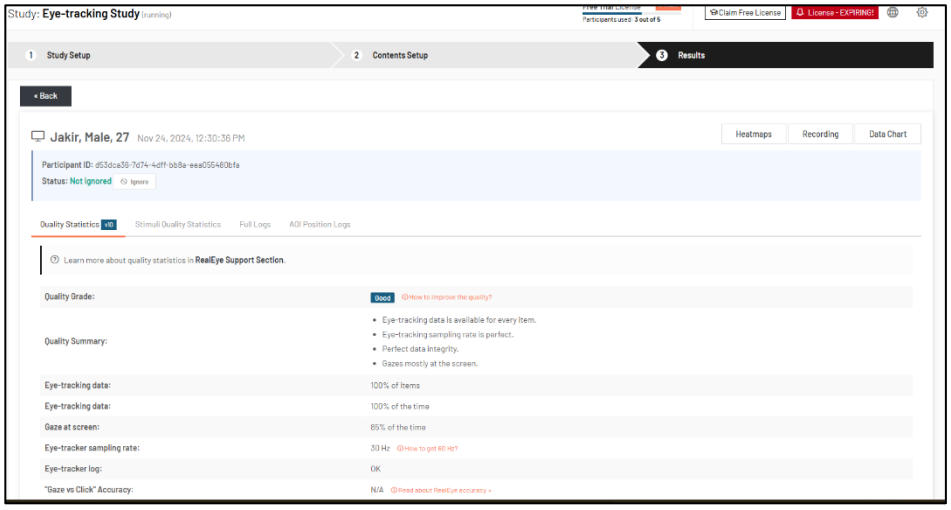
Conclusion

This eye-tracking study successfully identified patterns of visual engagement with the population density map. Key regions such as Punjab, Sindh, and Karachi received significant attention. The results can be used to refine map designs for readability and to prioritize regions that naturally draw attention.

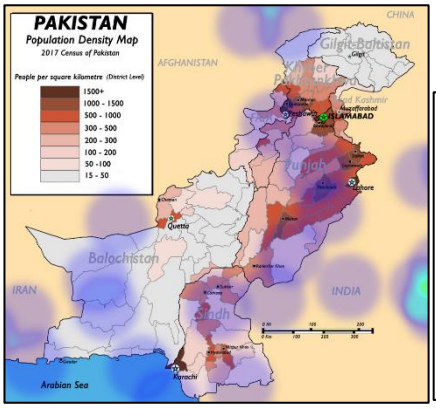


Participant NO. 1





Syeda Noor ul Saba Bukhari (s1109450)



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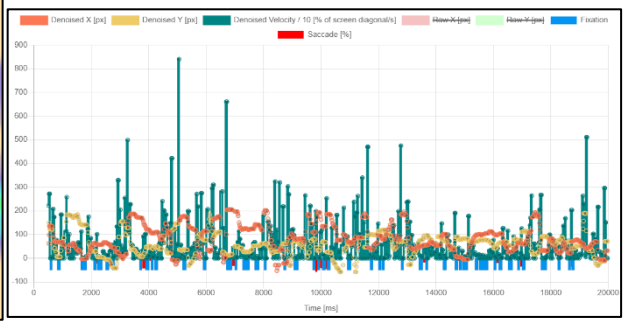

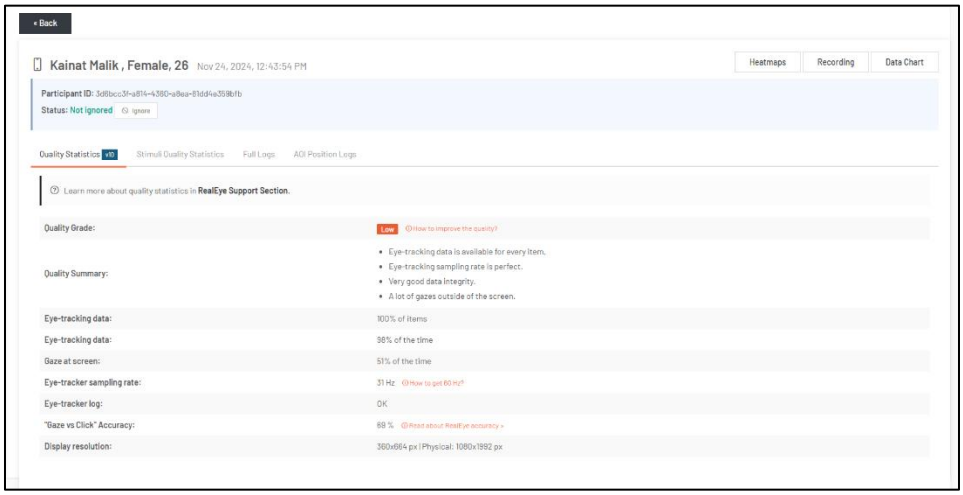

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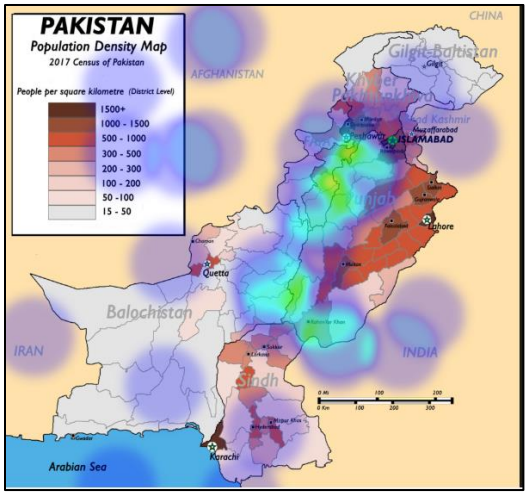

Participant NO. 3