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Expanding LogUI: Adding Screen Capturing and a Statistical Analysis Dashboard for Web-Based Experiments

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1. Background

IIR

- Interactive information retrieval.
  - Study and evaluation of user interactions with information retrieval systems [1].

logUI

- Logs user interactions on any web application [3].
- Still misses two vital features:
  - Screen capture functionality.
  - Dashboard for statistical analysis and visualization of logs.

2. Research Questions

RQ1. What metrics and visualizations are required for a dashboard with LogUI user logs for IIR researchers, and what features aid in their usability?

RQ2. How can screen capture be efficiently integrated into the LogUI logging process for use in IIR research?

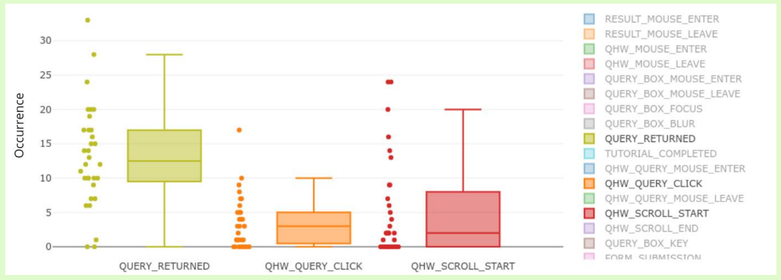
3. Dashboard

Survey ➡Initial designs ➡Interview about designs ➡Dashboard creation ➡Dashboard evaluation

Visuals
- Box plots
- Time series plots
- Event timeline

Metrics
- ☑ Dwell time
- ☑ Session duration
- ☑ Time between queries
- ☑ Event occurrences

Features
- ☑ Group selection
- ☑ Aggregated statistics
- ☑ Visuals
- ☑ Filters
- ☑ Statistics table
- ☑ Session dashboard



4. Dashboard Evaluation

- Evaluated with 5 IIR researcher.
- Most **tasks** completed with **little difficulty** on average.
- Coherency issues.
- **5/5 participants said they would use the dashboard in their research.**

Example task
Create two box plots for the QUERY_RETURNED event and the FORM_SUBMISSION event side by side and download this plot.

5. Screen Capture

- Bandwidth-efficient:
  - Single tab recording.
  - H.264 video format.
  - Low bitrate.
    - Negative impact on video quality.
- User logs relatable to occurrence in screen recording.

6. Future Work

- Make predictions in the dashboard (e.g. result evaluation strategy, human performance)
- Reduce loading times.

- Evaluation of screen capture robustness.
- Screen capturing for mobile devices.
- Machine learning on screen recordings.
- Recording webcam for eye-tracking [2,4].

References

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[3] David Maxwell and Claudia Hauff. 2021. LogUI: Contemporary Logging Infrastructure for Web-Based Experiments. In Advances in Information Retrieval (Proc. ECIR). 525–530. (Mar. 2021) https://doi.org/10.1007/978-3-030-72240-1_59

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