

Leveraging graphical user interfaces to facilitate selection of elements in web-pages

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BACKGROUND

- User interaction logging is an important activity for **understanding user behaviour on web-pages**. One tool for logging user interactions is the LogUI framework (Maxwell & Hauff, 2021)
- Integrating LogUI into an application can be challenging to a novice user
 - Understanding the JavaScript **configuration object**
 - Trackers require **selectors** to identify elements for logging
- Graphical user interfaces (GUI) can simplify this process for non-expert users.

```
configurationObject = {
  logUIConfiguration: {
    endpoint: 'ws://logui/endpoint/',
    authorisationToken: '',
    verbose: true,
    browserEvents: {
      ...
    }
  },
  trackingConfiguration: {
    'searchfocus': {
      selector: '#search-box',
      event: 'focus',
      name: 'SEARCH_FOCUS',
    },
    ...
  }
}
```

Example minimal LogUI configuration object

RESEARCH QUESTIONS

RQ1: Can a GUI-based tool be used to facilitate the construction of configuration objects?

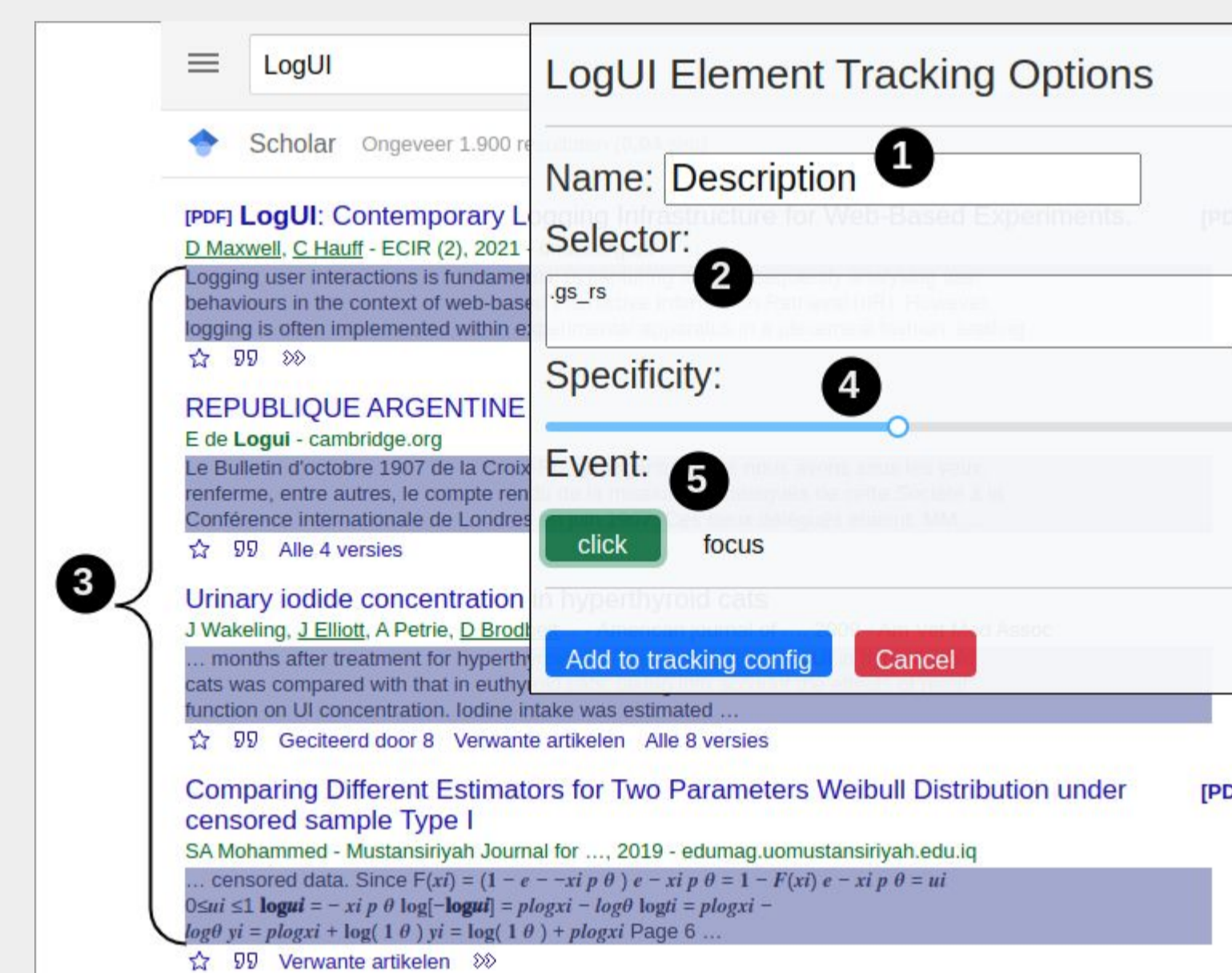
RQ2: Can users of the GUI-based tool create an accurate configuration object?

RQ3: How do users perceive the GUI-based tool?

METHOD



Element picker



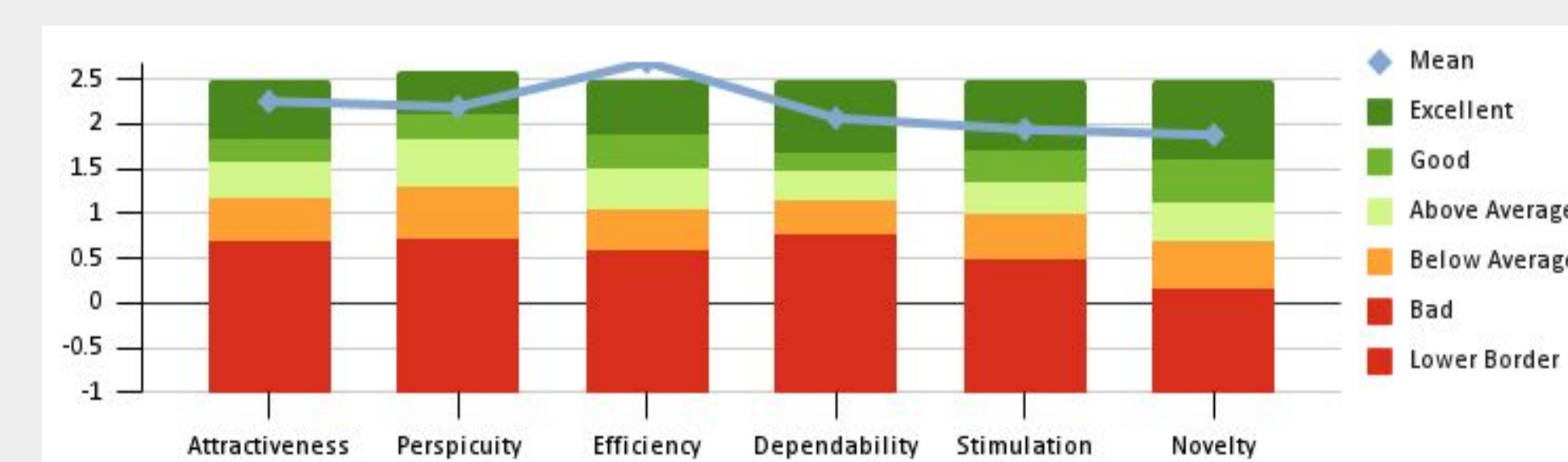
Tracker editor

- **RQ1 approach:** Experimental Chrome/Chromium Extension
 - Development of experimental tool for creating selectors using “point and click” interactions. Automatic GUI generation can produce a GUI based on a web-page’s Document Object Model (DOM)
- **RQ2 approach:** Small scale user study with 5 participants.
 - Task: create a configuration object with 6 different trackers
 - Selectors are compared against a calibrated gold standard
- **RQ3 approach:** User experience benchmark
 - Based on the *user experience questionnaire (UEQ)*

RESULTS

Tracker	# Selection	# Specificity	Accuracy
thirdresult	5	5	1.0
searchbox	4	4	0.8
searchresult	3	5	0.6
firstad	4	5	0.8
adfocus	1	4	0.2
searchfocus	4	4	0.8

Accuracy of user-generated selectors. 5 participants.
Average accuracy = 70%



User experience benchmark

- **Selection accuracy:** User-generated selector and gold standard yield the same selection
- **Specificity accuracy:** User-generated selector has the same or higher specificity than the gold standard

Based on 4 UEQ responses

CONCLUSION

Chrome extension tool can be used to aid user in constructing configuration objects

Users can generate accurate selectors using the tool

The tool performs well in user experience benchmark and is regarded as efficient

LIMITATIONS

Extension prototype for Chrome/Chromium only

Modified DOM can invalidate a selector

Prototype GUI for creating bare minimum configuration objects

Natural language tasks can cause ambiguity in semantics of selectors using a GUI

Small amount of participants

REFERENCES

Maxwell, D., & Hauff, C. (2021). LogUI: Contemporary Logging Infrastructure for Web-Based Experiments. In D. Hiemstra, M.-F. Moens, J. Mothe, R. Perego, M. Potthast, & F. Sebastiani (Eds.), *Advances in Information Retrieval* (Vol. 12657, pp. 525–530). Springer International Publishing. https://doi.org/10.1007/978-3-030-72240-1_59