Observing the Impact of Interface Design on User Choices

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Abstract

This poster explores human-computer interaction with an emphasis on how an interface affects the human user's behavior. It describes a history of academic and popular research about the topic, which borrows from psychology but occupies a growing body of research in computer science. It then articulates the motivations and design of software application currently under development that will allow a web developer to easily test these principles with their own websites in a straightforward, rigorous way without the need for a large-scale usability test. It concludes with a look to the future and a few thoughts on the impact of this knowledge for both social and computational sciences.

Background

In the last decade, psychologists and social scientists (most popularly, Cast Sunstein and Richard Thaler) have developed the notion of a "nudge" as a component of a system. A nudge is any change to the design or layout of a system or its environment that changes the behavior of an individual but does not reduce the number of options they have.

The field of human-computer interaction (HCI) has conducted research along similar lines. Oinas-Kukkonen is among the researchers in computer science who has produced a theoretical framework about how interfaces on a variety of platforms change behavior, with an explicit emphasis on the human's side of the interaction. The research draws on a series of specific changes an interface may want to produce in a user:

• change in compliance

• change in behavior

• change in attitude

A system designed to produce such changes is a "behavioral change support system (BCCS)," "[an] information system designed to form, alter, or reinforce attitudes or behaviors or both without using coercion or deception." He argues that a given interface may change one of three qualities in the user, emphasizes cross-platform applicability, and develops more specific mechanisms.

Example: iOS Design Guidelines

The hardware-software giant Apple Computer has published guidelines for the design of application interfaces. The guidelines contain tips about the proven approaches to making an application functional, easy to learn, and pleasant to use.

The guidelines emphasize that decision-making within a software application belong to the user. From this principle they derive such notions as letting a user cancel a decision, designing with consistency so users know what each of the options presented to them mean (another section is titled "WYSIWYG [What You See Is What You Get]"). If guiding user behavior, they prefer suggestions over requirements.

Software

Major firms have application programming interfaces (API's), internal guidelines, the credibility to organize usability tests, and other advantages that those not employed by them do not enjoy. Such extensive setup work is beyond the capacity of an independent or academic developer, which can slow the progress of research. Furthermore, many academics outside computer science will find the maze of resources impenetrable without dedicating substantial extra time to them.

Design
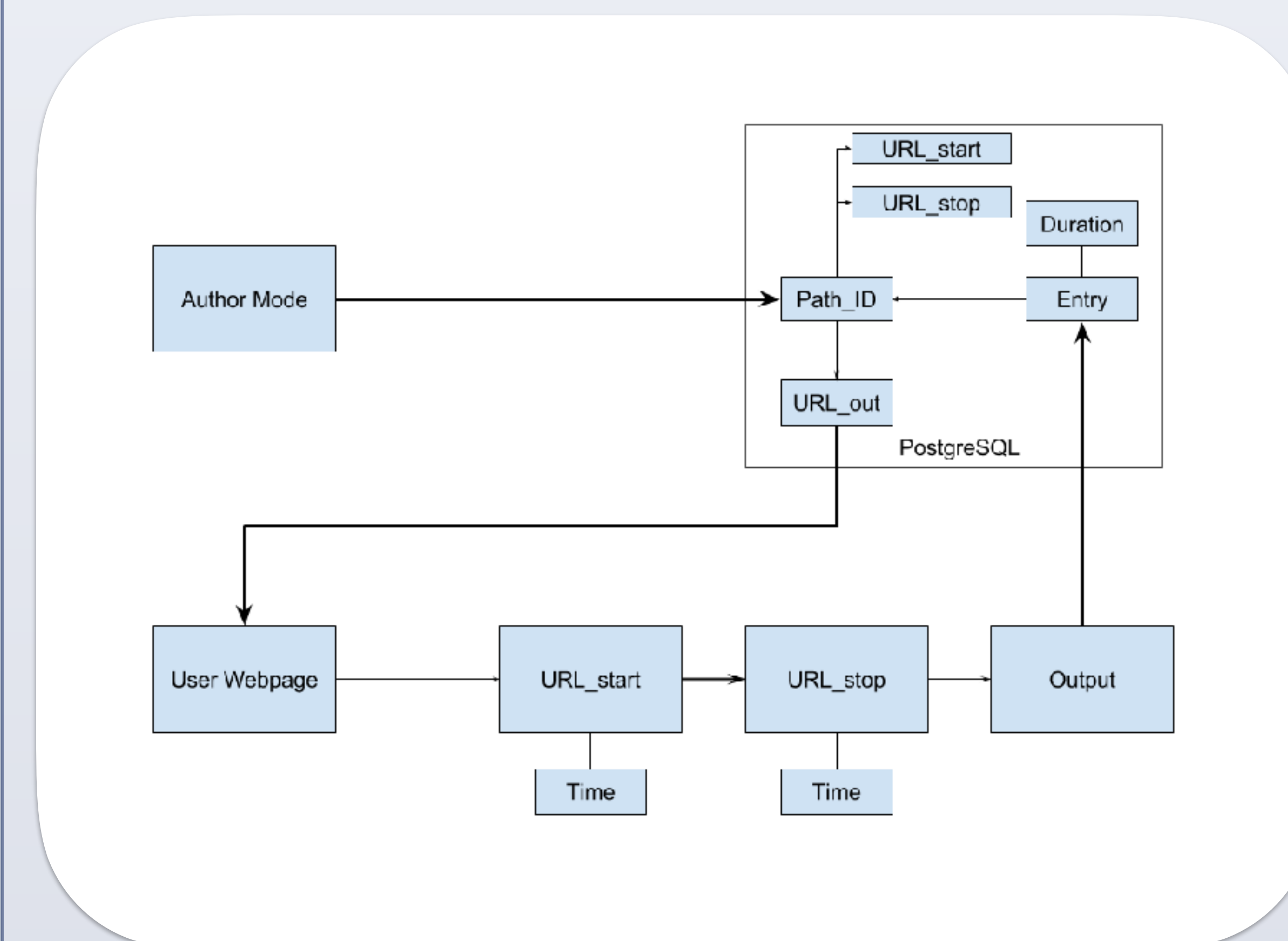
The solution under development is a Chrome extension. It will enable A/B testing on a small scale using open-source tools, common programming languages, and an accessible platform.

Implementation

On activating the extension:

• user is navigated to one of the suggested pages and begins regular web interaction with the goal of reaching the stop URL

• extension begins a timer on a click, ends it when the user reaches the stop site, and saves the URL's and duration for that transaction

The author can then compare across multiple users' results to determine which of the two start URL's tends to produce faster completion.
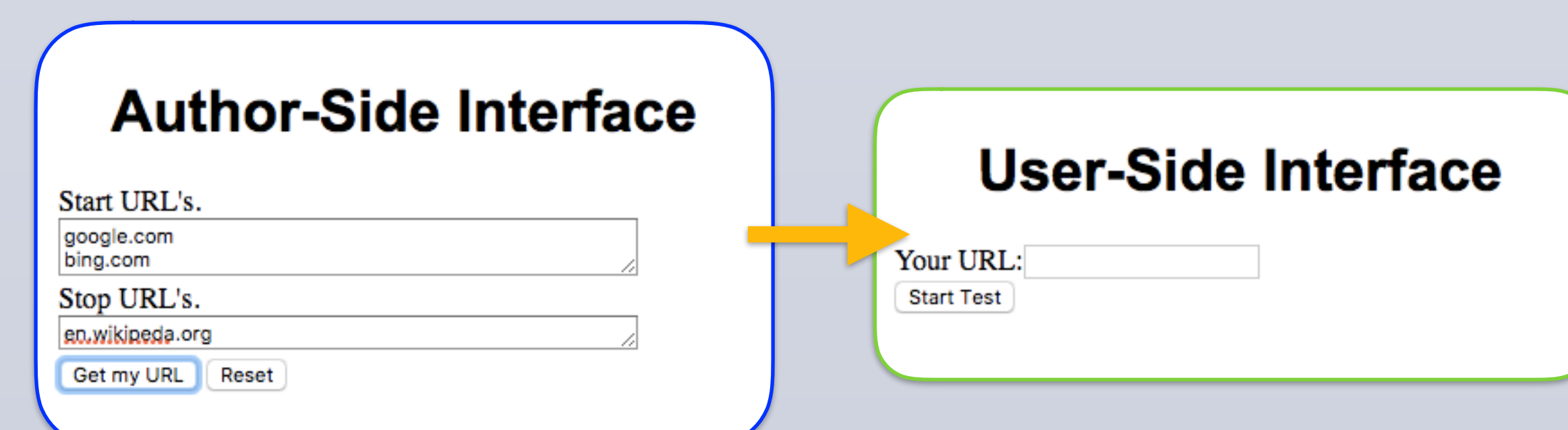
Discussion

Computer scientists must be mindful that the decisions they make affect the decisions users make and the attitudes they develop. Those changes may be positive, negative, or value-neutral, but they must be considered as part of the design and testing processes. (Indeed, if they did not make a difference there would be no need to hire people to build them.) Software such as that proposed here, coupled with the research purpose described above, provide ample opportunity for such discoveries.

This research was inspired by existing research by psychologists and behavioral economics about the large effects of small changes. Computer scientists should recognize that their work has spillover effects in these disciplines and in most aspects of modern life.

Future Work

Future research about this topic must be interdisciplinary and collaborative, with a focus on choices. Psychologists in particular can offer insights to computer scientists that they may not otherwise realize.

Future development of the extension come in two parts. First, the current version should be completed by adding a few key features:

• database integration: for storage and retrieval of data

• complete toolchain: author and user pages should be part of the extension

• start/stop functionality: on clicking the icon, start timer for the chosen test

• style and visual improvements

The second phase of development is to enable much greater flexibility for testing, so that it measures not only completion rates and times but also rates of user choices e.g. given a set of starting points and a set of stopping points, which stopping point does a user tend to land on? Ideally the start/stop points will be different versions of a developer's web tool. Future versions might also consider mobile apps as well as websites.

Acknowledgements

References

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