

Adapting CAPTCHAs for Smartphone Usage

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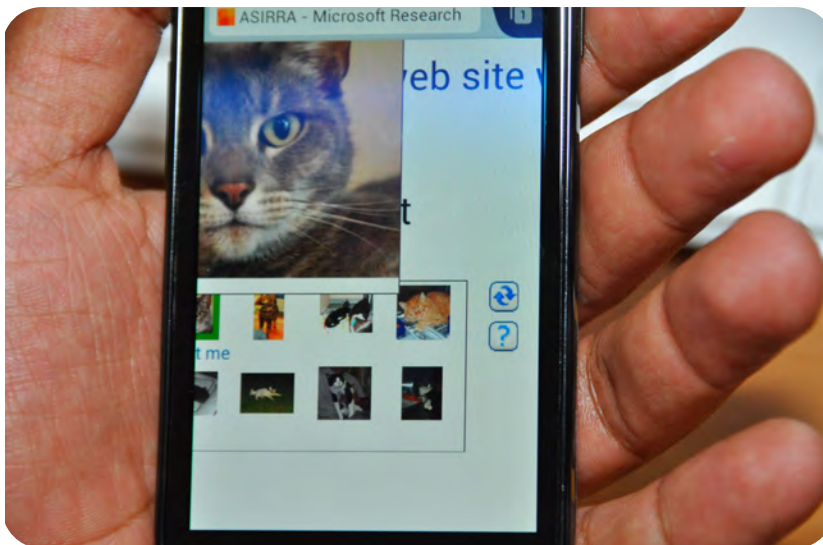
CAPTCHAs are challenge-response tests typically used on websites to verify that a human generates the input as opposed to a bot. Our prior research evaluating the usability of CAPTCHAs on smartphones, has shown that the user interaction required by various types of CAPTCHAs, adds barriers to correctly solve challenges on small

screen devices. We are currently working on a framework to adapt various classes of CAPTCHAs for better mobile use.

Our first prototype addresses issues in Image Recognition CAPTCHAs, and we are modifying Asirra's dog and cat categorization as an example. The original Asirra implementation had several usability problems, exacerbated by small controls and the overall layout of the challenge (see Asirra's zoomed cat image), and the expected user

inputs. Our new prototype addresses these issues by displaying one image at a time, enabling swipe gestures for browsing and double-tap to select. Our solution aims to simplify user interaction by decreasing zooming and panning to solve challenges, while maintaining the fundamental security offered by the scheme. Typically, CAPTCHAs are embedded in HTML code, thus our prototypes will work on mobile web browsers. Our next prototype will address mobile usability problems in Character Recognition CAPTCHAs. Each of our prototypes will undergo usability testing.

The ultimate goal for this project is to develop a framework with design principles to adapt CAPTCHAs for smartphone use.



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Direct Manipulation of Time-Varying Charts

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Many types of data, such as census statistics and sales revenues, change over time. Familiar chart types, such as bar charts and scatter plots can be used to display time varying data. Changes in data values over time are most often shown through animation or through interaction with a time slider widget. These techniques require divided attention – manipulating the time slider while watching how items of interest change. Researchers at the University of Ontario Institute of Technology, supported by SurfNet, have developed a new direct manipulation technique, DimpVis, for interacting with visual items in information visualizations to enable exploration of the time dimension.

Using DimpVis, navigation through time is controlled by directly manipulating any data item, for example, dragging a scatterplot point to a new position. The interaction is guided by visual hint paths which indicate how a selected data item changes through the time dimension of a visualization.



Changes in attributes of data items over time can often result in complex trajectories, which can be difficult to follow with a mouse. In contrast, surface input such as touch offers the freedom to easily follow complex paths and tightens the association between an analyst and the object of interest.

The DimpVis technique enables intuitive investigation of queries. For example, to answer “Was this bar ever at height 500?” in a time-varying bar chart, one simply has to drag the bar of interest to that height. If a year exists

when the bar was at that value, the time slider will update to that year, and all other bars in the chart will change according to the new time.

This interaction technique has been implemented for bar charts, scatter plots, heat maps and pie charts. A lab-based controlled study showed the DimpVis technique was subjectively preferred and quantitatively competitive with the traditional time slider and faster than small multiples for a variety of tasks.

SurfNet News

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- Come join us in Calgary at the Canada 3.0 conference from May 26 - 28th and see SurfNet demo at the *Innovation Showcase*. For more information please visit: <http://canada30.ca>. As a Strategic Partner, SurfNet can offer our partnering SMEs a discounted registration. Please contact **Robin Arseneault**: raarsene@ucalgary.ca, SurfNet Network Manager, if you are interested in this opportunity.
- Is your company looking for opportunities to work with SurfNet researchers? Contact our Business Development Manager, **Jeff LaFrenz**: jeff.lafrenz@ucalgary.ca, and he can help connect you to the right person.
- **MARK YOUR CALENDARS:** SurfNet Annual Workshop will be held at the University of Calgary from October 8-10, 2014, along with our Open House.

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