Collaborative eye tracking based code review through real-time shared gaze visualization

Shiwei CHENG , Jialing WANG, Xiaoquan SHEN, Yijian CHEN, Anind DEY

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Problems & Ideas

- Problems: Individual novice programmers face challenges while reviewing code.
  - the lack of experience with algorithm design or software development
  - traditional code review is not inherently a real-time activity
- Ideas: A real-time collaborative eye tracking system
  - design visualizations that support collaborative code review
  - understand the relationship between visual attention and the way participants review code collaborative
  - evaluate whether gaze patterns shar

with collaborators are considered to be helpful or distractive

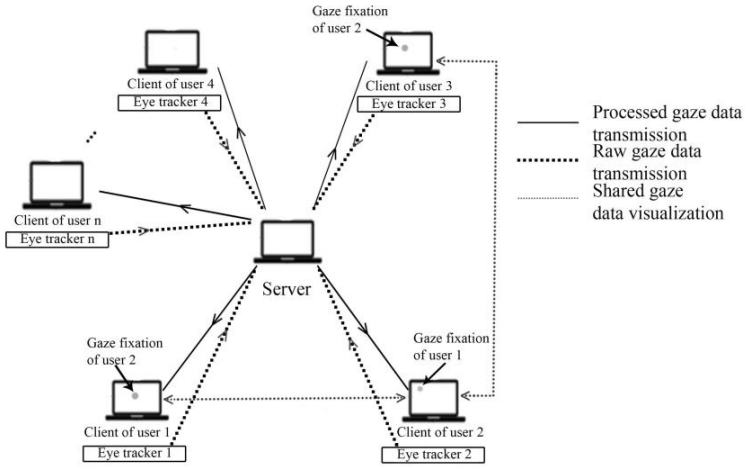


Fig. 1 Architecture of our collaborative eye tracking system

Main Contributions

- Four kinds of visualizations: *gaze cursor*, *border*, *gray shading* and *connected lines*, on two user's monitors are designed to support collaboration between partners in code reviewing.
- For the total time, a paired t-test showed a significant difference for the group without visualizations (M = 940.9 s, SD = 297.0 s) , and the group with visualizations (M = 749.5 s, SD = 188.5 s),t = −3.247, p<0.01.
- The real-time shared gaze visualization could enhance collaborative code review, and help reviewers to coordinate their review policies to improve their efficiency in identifying bugs in the context of remote or co-located collaboration.
- Two kinds of joint gaze patterns are identified: Separated pattern and Followed pattern

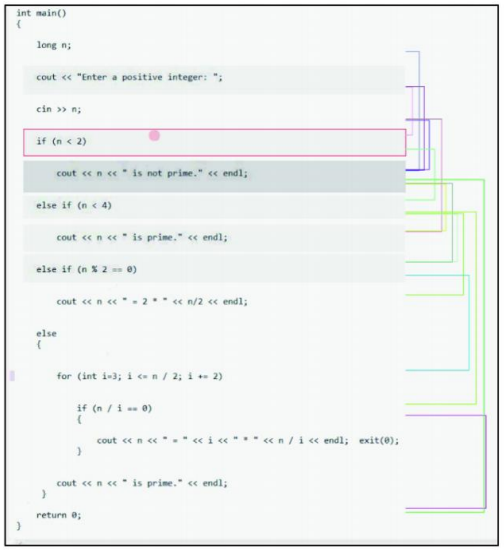
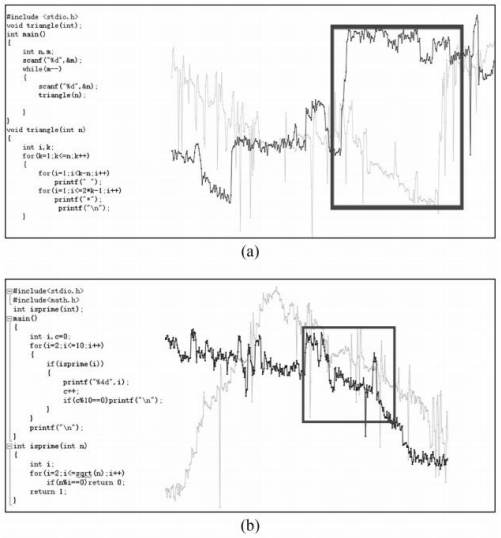


Fig. 3 Screenshot of our visualization (eye tracking data comes from the collaborative reviewers, and the red dot indicates the gaze cursor in real time)



(a)

(b)

Fig. 5 Eye tracking pattern during code paired-review.(a) Example of separated pattern.(b) Example of followed pattern