Are web applications ready for parallelism?

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motivation

- web applications have become pervasive
- JavaScript is the only language supported by all major web browsers
- JavaScript is by design sequential
- recent efforts to bring parallelism to JavaScript: Parallel JavaScript, WebCL

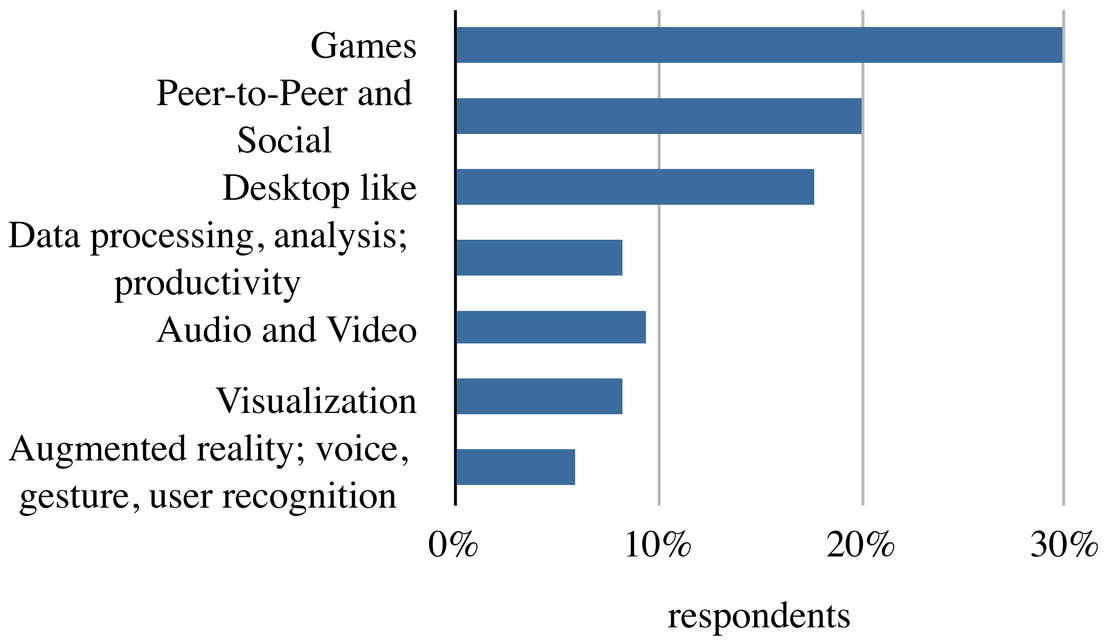
approach

I. Survey
- 20 questions, 174 distinct reposnses

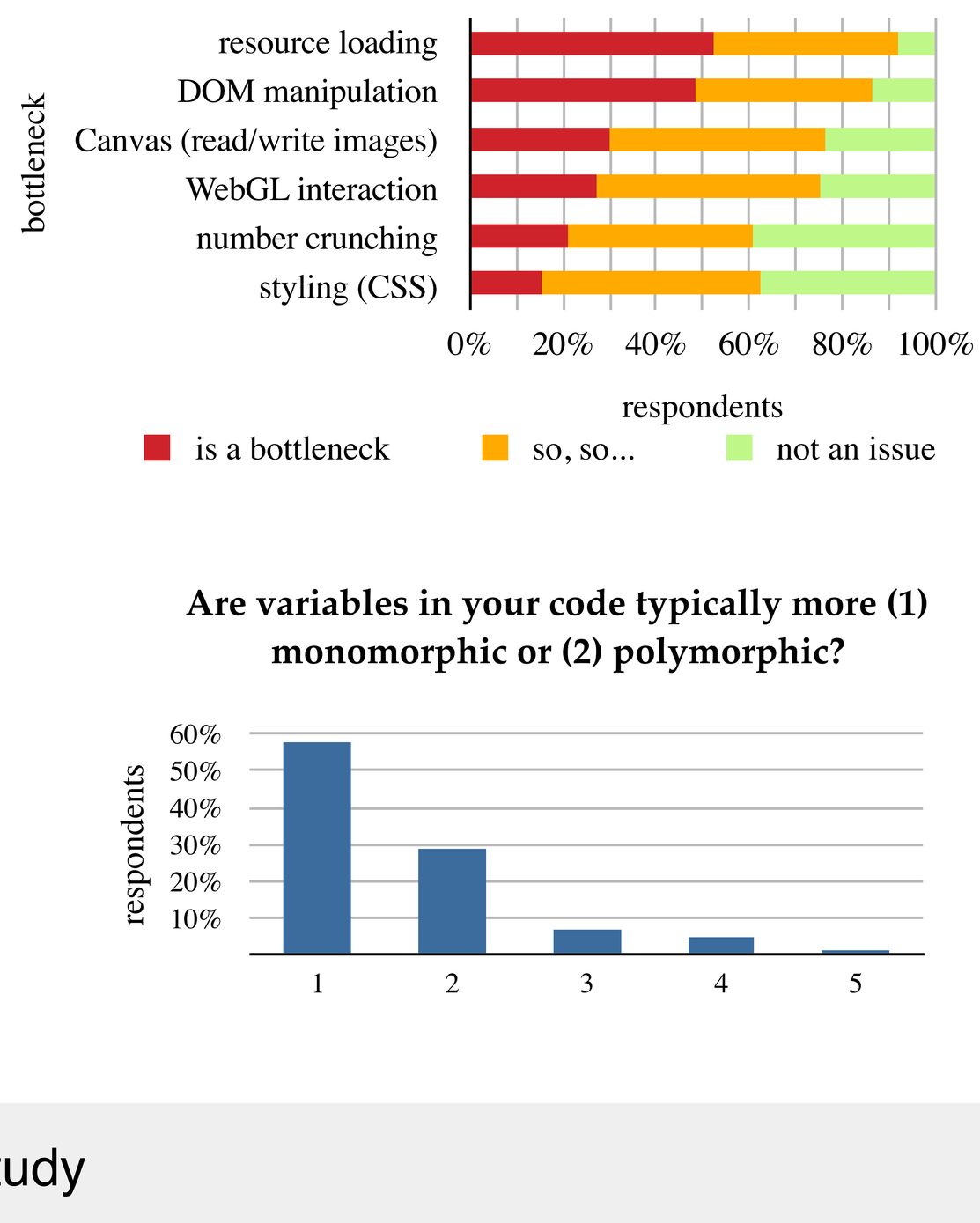
II. Case study
- 12 web applications, 22 loop nests

survey

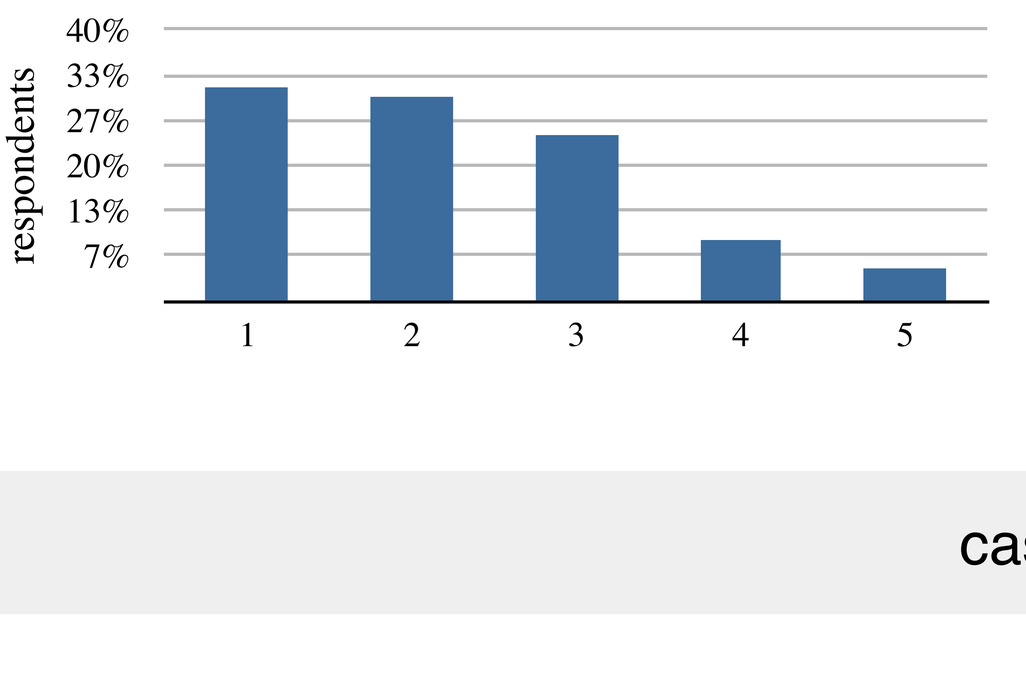
What new kinds of applications will trend on the web over the next 5 years?



Which of the following are performance bottlenecks for JavaScript?



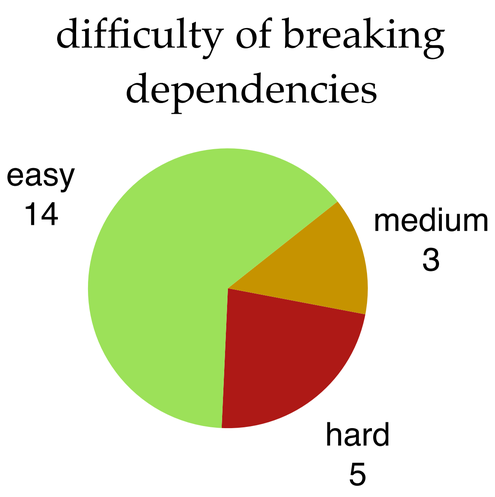
Do you prefer code written in a more (1) functional style or (5) imperative style?



Are variables in your code typically more (1) monomorphic or (2) polymorphic?

case study

How much latent data parallelism is available?



issues impeding parallelization

Control-flow divergence
- branching statements, loops with data-dependent trip count
- hampers parallelization on SIMD architectures
- serious issue in 8/22 cases, appears in another 7

DOM accesses
- there is no concurrent DOM implementation
- an issue in 10/22 cases

Polymorphic variables
- no polymorphic variables in inspected loops