Design Methodology

* "Design Study Methodology: Reflections from the Trenches and the Stacks"

Pitfalls

PF-4: No Real Data Available
PF-20: No Real/Important/Recurring Task
PF-21: Premature Design Commitment

Motivation: Task Parallel Programs

Arizona University?

Ease of access to a development environment
High Complexity!

Best of success for a development and support
"Visualization Aid Needed for Debugging & Tuning"

Iterative process

Cost rings: Observed influences on where deployments and conversations with domain experts exposed deeper insights into the various roles that they play in practice.

Data vs. Analysis?

Analysis needed to decide what data to collect, but no data presented by domain experts

Lack of data availability and the domain user’s needs

Whether domain experts will use the visualizations for will persist long enough to complete the study.

Motivation: Task Parallel Programs

Arizona University?

"Communication"

Identification and availability of meaningful preliminary data.

Strong inter-personal relationships.

Overarching goal of the project did not change.

Visualization considered a deliverable by entire project.

Why they choose Task Parallel Programs?

1) Identification and availability of meaningful preliminary data.
2) Strong inter-personal relationships.
3) Overarching goal of the project did not change.
4) Visualization considered a deliverable by entire project.

Execution Mode

TransX * (pred

Execution Mode

Tasks were derived from above: "Goal-Task lattice-1"

U1 Program Comprehension: What happens during program execution "Mental Model"
U2 Performance Analysis: Understanding and improving the performance of a given application
U3 Communication: Create figures to help explain their own research in publications.

Evaluation: Case Study, Task based Evaluation

[Area Case Study] Usage pattern, feedback

Task based evaluation: They take, what difficulties and questions they had

Who is First?

Communication"-

- "Weekly report. The incorporation of visualization is a project-wide outcome undertaken by a continuing approval and feedback from project gatekeepers"

- "Through the process, we created 150 rate files with a mean 2008 characters per file."

"Communication"

Tasks based evaluation: Time taken, what difficulties and questions they had

Evolutionary changes in the code and the need for the visualization tests.

Tasks were derived from above: "Goal-Task lattice-1"

HPX, Phylanx Libraries

Aid Performance … as Phylanx is developing rapidly, the concerns of the team members change over time, affecting their higher-level goals.

The system will optimize execution and data layout from of a user provided expression graph.

Experiences and performance of a given application

Communication: Create figures to help explain their own research in publications.

Phylanx

An Asynchronous Distributed Array Computing Toolkit

My Motivation

Visualizing a Moving Target: A Design Study on Task Parallel Programs in the Presence of Evolving Data and Concerns

Katy Williams et al., Arizona University

CSPC 547 Information Visualization 2019, Michael Kim

Visualizing a Moving Target: A Design Study on Task Parallel Programs in the Presence of Evolving Data and Concerns

Katy Williams et al., Arizona University
Evaluation - Interview

Regarding utility, two participants said they didn’t know whether the features would be helpful or not (R6, R9).

Suggestions for improvement included differentiating primitive types (e.g., variables, functions, control flow) (R6, R7).

Access to timing data (P4, P5, P7), the linked code view (P4, P5, P8), the comparison view (P4, P5, P9), and links between dependencies (P5, P7, P8).

Lessons Learned

1) For “moving target”, seeking to satisfy rather optimize it—PF-10, Premature Design Commitment

“Our rapid deployments often contained UI bugs.”

2) Task analysis and long-term corpus of notes help clamp down on reactivity

3) Rapid changes combined with multiple deployment targets incur a maintenance burden

4) Both the visualization and the design study process aided our collaborators in accomplishing their goals and helped establish a culture of data review

THANK YOU