

Announcements 11/4

- Today
 - Quantitative / qualitative evaluation
 - What reviewers look for
(How to make a research contribution)
- Monday
 - Guest lecture by Steve Checkoway
 - Reading: Experimental Security Analysis of a Modern Automobile

Feedback: Proposals

- Great job on presentations!
- Will return written proposals ASAP
- Going forward...
 - Document process (design, evaluation)
 - Document problems encountered, how solved

Qualitative / quantitative data

- Quantitative
 - Numeric (quantity)
 - E.g. task completion time
- Qualitative
 - Non-numeric (quality)
 - E.g. participant's experience of task
- Use multiple data sources, types
 - Validate data
 - Explain data
- Use multiple analysis methods

Analyzing quantitative data

- Descriptive statistics (summarize)
 - Count, mean, intervals, etc.
 - Indicate distribution (error bars, std dev)
- Inferential statistics (draw conclusions)
 - Statistical significance (Result unlikely to have occurred by chance)
 - Assert null hypothesis
 - No relationship between phenomena
 - Test null hypothesis
 - $p\text{-value} < \text{threshold} ? \text{false} : \text{true}$
 - If null hypothesis rejected, results statistically significant
 - Relationship exists between phenomena
 - Examples: t-test, Anova, Mann-Whitney U

Analyzing qualitative data

- Top down v. bottom up
- Affinity diagramming (bottom up)
 - Group data by similarity
 - Themes/categories emerge from data
- Coding (top down)
 - Code data by category



What do reviewers look for?

- Novelty
- Significance
 - Problem
 - Solution
 - Results (findings, implications)
- Validity
 - Method (clearly defined, sufficient for purpose)
 - Correct execution (researcher did what was claimed, accurate)
 - Correct conclusions drawn from results
- Presentation (content, style)
 - Clarity (description, language, figures, layout)
 - Organization
 - Focus

Primary criterion: Contribution to field

- Contribution types
 - Interface artifacts or techniques
 - Systems, tools, architectures and infrastructure
 - Understanding users
 - Methodology (design, evaluation)
 - Theory (principles, concepts, models)
 - Innovation, creativity, and vision (thought pieces, PoC)
 - Argument (provocative essays)

Contribution:

Interface artifacts or techniques

Dev. of new artifacts/techniques or refinement of knowledge about existing approaches

- Provide context (what is known, not known)
- Motivate real problem worth solving
- Describe in sufficient detail to replicate
- Rigorous, convincing validation showing gains of practical significance

Contribution: Systems, Tools, Architectures and Infrastructure

Underlying software and technology

(Associated w/ app, UI design, UI feature, dev tool)

- Idea is original, of interest, broadly valuable
- Idea placed in context
(situation, tasks, users)
- Can system work in practice?
- Clear about what was implemented or not
- Describe in sufficient detail to replicate
- Idea is validated by evidence
(argument, experiences, empirical eval, user studies)

Contribution: Understanding users

Analysis of people, behaviors, situations, capabilities, interactions

- Clearly describe methodology (study, analysis)
- Clearly describe new understanding
- Show how new understanding is relevant
 - Understanding of human behavior, social org.
 - Insight into to other contexts
 - Implications for design (inspiration, requirements)