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Outline

Paper: Guidelines for Human-AI interaction

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Overview

- 18 design guidelines for human-AI interaction is composed from over 150 design recommendations from over 20 years of learning in AI design
- The guidelines are validated through multiple rounds user study
  - The results verify he relavant of them and reveals gaps in our knowledge about HAI

Motivation

- *AI-infused systems* (System that have AI features) have uncertaintes that violates traditional UI design principles
- Over 20 years, numerous guidelines and recommendations has been proposed for HAI in the industries and academia
  - However, there are still mistakes made in various AI interfaces
  - Which shows that designers and developers still struggle with creating effective AI-infuse systems
- A shared guidelines is useful for people to design and evaluate AI-infused systems

Phase 1: Consolidation of guidelines

- Guidines are gathered from three sources:
  - Review of industry AI products
  - Recent public articles about AI desgin
  - Relavent papers about AI design
- 168 design guidelines are obtained, which are consolidated into 20
- The guidelines are organized into four categories based on when during the user's interaction they are applied:
  - Initially
  - During interraction
  - When wrong
  - Over time

Phase 2: Modified Heuristic Evaluation

- 11 team members participated
- The evaluators examine 13 AI-infused products and try to identify both applications and violations of the guidelines
- The findings are reviewd, and the number is further reduced to 18

Phase 3: User study

- A user study with 49 HCI particioners is conducted

Procedure

- A heuristic evaluation: each participant is asign to an AI product and asked to find applications and violations of each guideline

Phase 3: User study

Products

- Products are selected using a maximum-variance sampling strategy:
  - Top ranking apps, software and websites in the U.S. is searched
  - Products are grouped by their use case, resulting in 10 categories, 2 product each
  - Select prominent AI-drivent feature to evaluate per product

Product Category	Feature	Participants
E-commerce (Web)	Recommendations	6
Navigation (Mobile)	Route planning	5
Music Recommenders (Mobile)	Recommendations	5
Activity Trackers (Device)	Walking detection and step count	5
Autocomplete (Mobile)	Autocomplete	5
Social Networks (Mobile)	Feed filtering	5
Email (Web)	Importance filtering	5

Phase 3: User study

Participants

- People at large software company with at least 1 year experience in HCI
- 49 participated
- 2-3 participants is assigned to each product

Adjustment and Misinterpretaion

- The responses are reviewed in the cases of:
  - Duplication (55 instances)
  - The pacipant use "Does not apply" to indicate that they cannot find an example of the guideline (73 instances)
  - The pacipant use "Does not apply" to indicate a violation (20 instances)

+ke clear The participant misinterpretes one guideline to another

Phase 3: User Study (Results)

Clarity and Clarifications

- Some guidelines are rephrased for more clarity
- Examples:
  - G1: “Make capabilities clear” –> “Make clear *what* the system can do”
  - G2: “Set expectations of quality” –> “Make clear *how well* the system can do what it can do”

Phase 3: User Study (Results)

Evolution of guidelines 1 and 2

Phase 1: Consolidating guidelines
Set appropriate expectations.
Set accurate expectations to give people a clear idea of what the experience is and isn't capable of doing.
Phase 2: Internal evaluation
Set appropriate expectations.
Phase 3: User study
G1: Make capabilities clear. Help the user understand what the AI system is capable of doing.
G2: Set expectations of quality. Help the user understand what level of performance the AI system is capable of delivering.
Phase 4: Expert evaluation of revisions
G1: Make clear what the system can do. Help the user understand what the AI system is capable of doing.
G2: Make clear how well the system can do what it can do. Help the user understand how often the AI system may make mistakes.

Table 3: Evolution of Guidelines 1 and 2.

Phase 4: Expert Evaluation

- Experts: peoples who have experience in UX/HCI who are familiar with discount usability methods
- 11 experts are recruited: 6 UX designers, 3 UX researchers, 2 in research and product planning roles
- Experts are asked to asked to review 9 revised guidelines and chose what they prefer

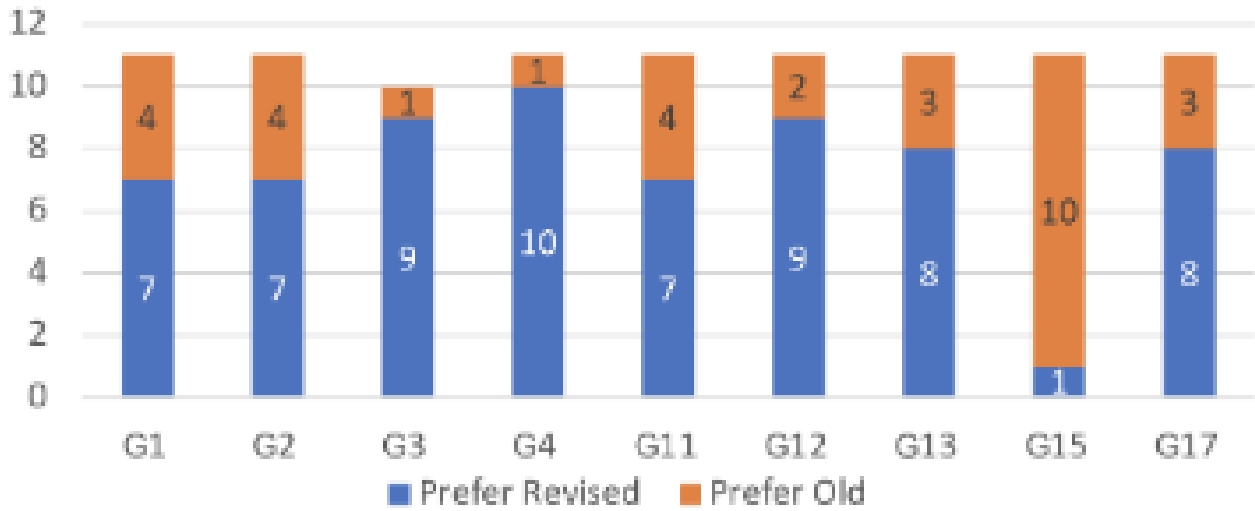


Figure 3: Number of experts out of 11 who preferred the revised or the old version. One participant suggested their own alternative for Guideline 3.

Discussion

There is are tradeof between generality and specialization

- The guidelines might not be able to address all types of AI-infused system
  - For example, voice-based AI, activity trackers
- Design guidelines that can be easily evaluated from the interface are focused on.
  - Ex: Broarder principles such as “build trust” is excluded

Some guidelines

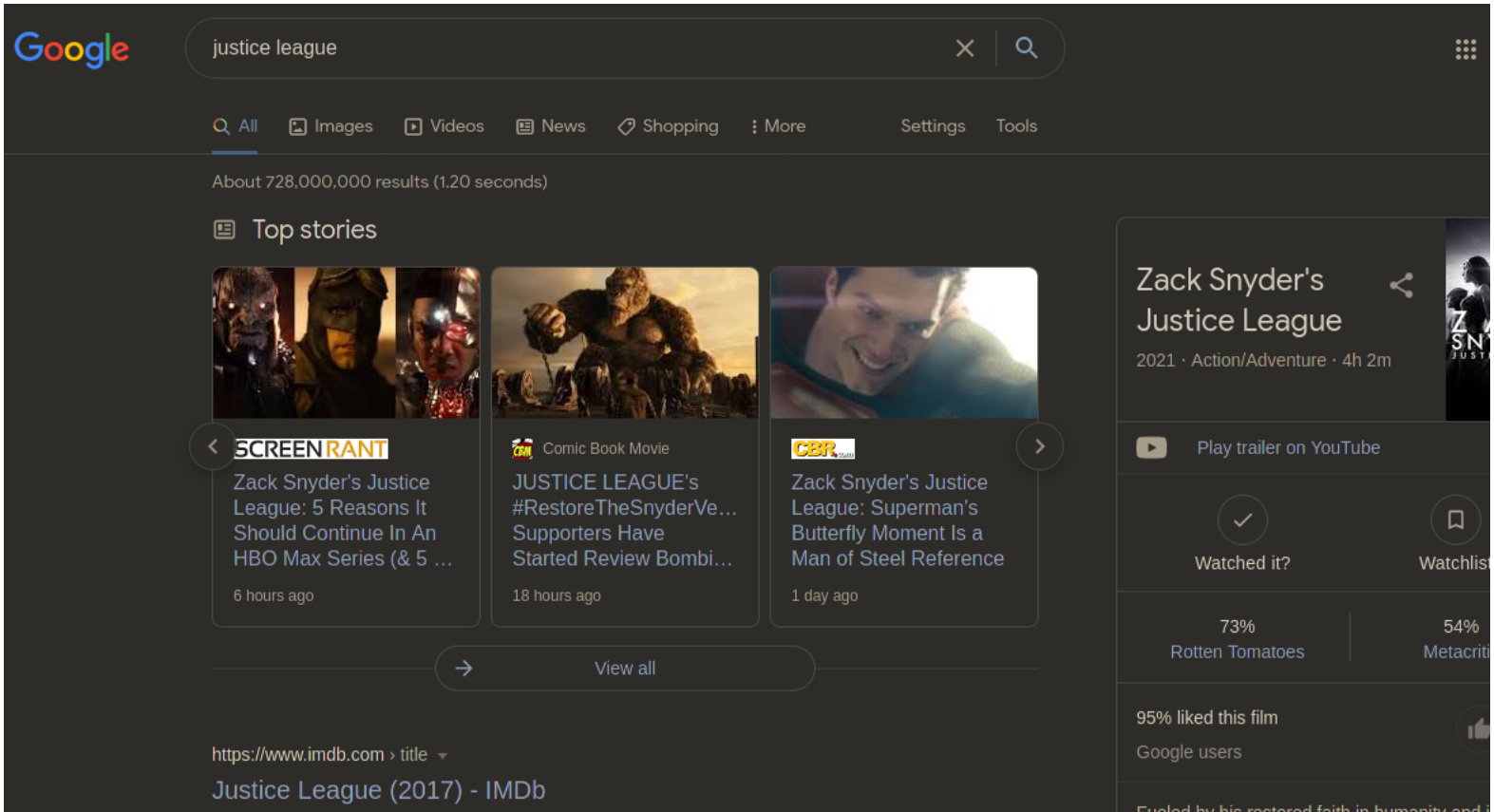
G1: Make clear what the system can do

- Help the user understand what the AI system is capable of doing
- Category: Initially
- Example: Activity Trackers
  - All metrics that it tracts is displayed and explained how

Some guidelines

G4: Show contextually relevant information.

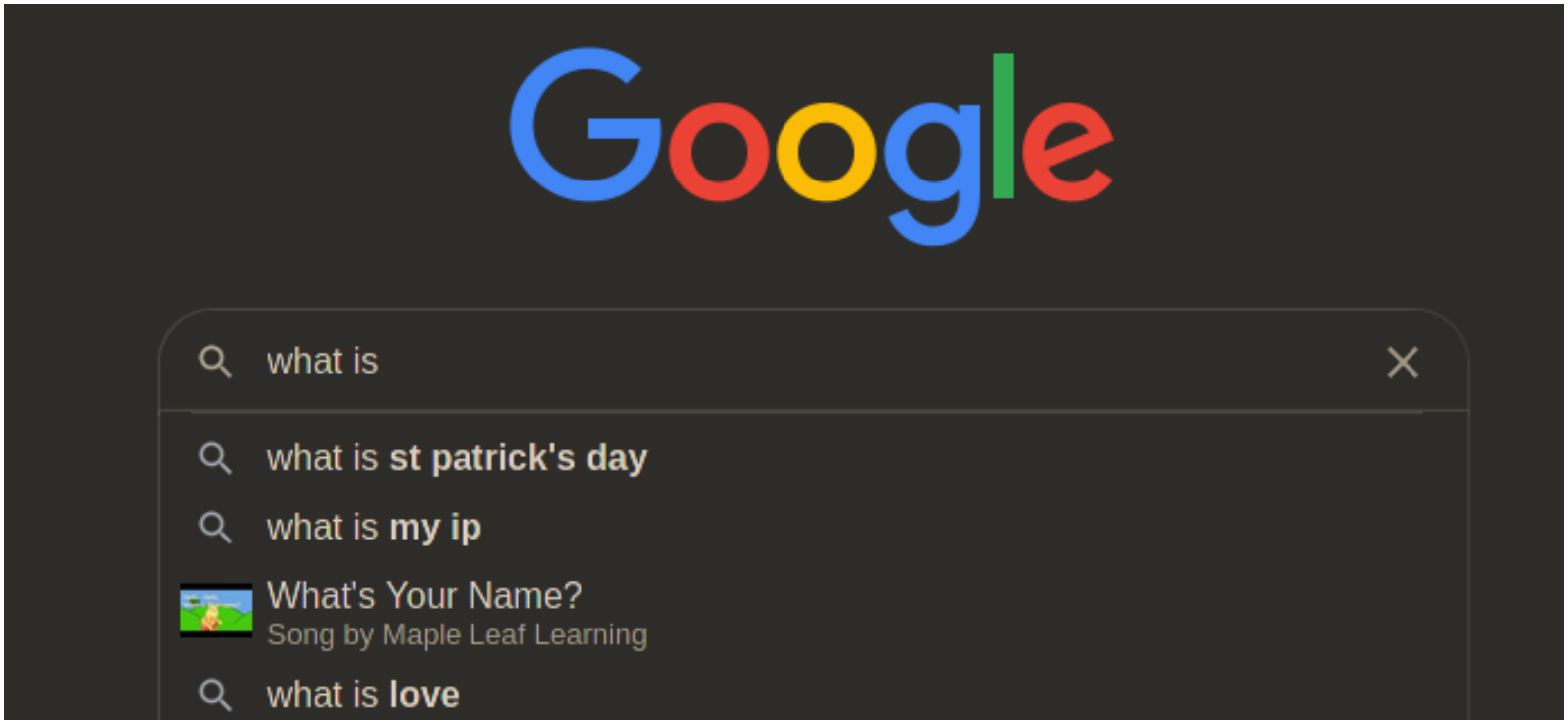
- Display information relavent to the user's current task and environment
- Category: Durring interaction
- Example: Web Search



Some guidelines

G10: Scope when in doubt.

- Engage in disambiguation or gracefully degrade the AI system's services when uncertain about a user's goal
- Category: When wrong
- Example: Autocomplete
  - Usually 3-4 suggestion is provided instead of directly completing



Some guidelines

G13: Learn from the user behaviour.

- Personalize the user's experience by learning from their actions over time.
- Category: Overtime
- Example: Music Recommenders, Video Recommenders