PathFinder: Designing a Map-less Navigation System for Blind People in Unfamiliar Buildings

Published in Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI 2023)

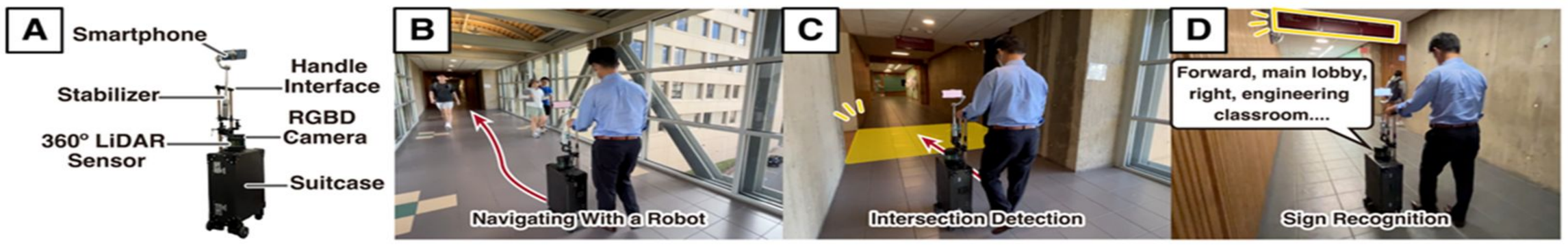
Authors: Masaki Kuribayashi |Tatsuya Ishihara | Daisuke Sato | Jayakorn Vongkulbhisal | Karnik Ram | Seita Kayukawa, Hironobu Takagi | Shigeo Morishima | Chieko Asakawa

Abstract

- Objectives: Develop a map-less navigation system for blind users.
- Contributions: Integrated intersection detection, sign recognition, and participatory design.

Methodology

- Interviews with passersby, blind participants
- Experiment with PathFinder and topline system on two routes
- Data collection via : Video recordings, Likert scale questionnaires



Question	Regular Aid	PathFinder	Topline
Navigation Confidence	4.2	5.7	4.8
Cognitive Load	3.8	2.9	3.5
Ease of Use	5.1	5.4	5.3
Accessibility	4.7	4.9	4.8
Helpfulness of	4.5	5.1	4.7
Feature Richness	3.9	4.2	4.1
Overall Satisfaction	4.8	5.9	5.2
Recommend to Others	4.3	5.2	4.6

Likert Scale Values:
1 - Strongly Disagree, 2 - Disagree, 3 - Neutral
4 - Agree, 5 - Strongly Agree

Findings

- PathFinder had longer navigation times than topline systems
- Increased user confidence
- Reduced cognitive load observed
- Audible signs and intersection cues improved navigation.

Discussion

- Increased user confidence, reduced cognitive load
- Intersection detection, sign recognition useful
- Study limitations: Two routes, single building
- Usability issues with directions, sign types
- Hardware constraints: Short battery life , Uneven terrain challenges

Conclusion

- PathFinder shows promise for map-less navigation
- Intersection detection and sign recognition boost confidence
- Participatory design essential for accessibility
- Hardwar and usability issues need refinement
- Advances inclusive HCI, addresses real navigation needs

UWI
ST. AUGUSTINE CAMPUS
TRINIDAD & TOBAGO, WEST INDIES

(Un)making AI Magic: A Design Taxonomy

Maria Luce Lupetti, Dave Murray-Rust
TU Delft | University of Technology
Presented at the Conference on Human Factors in Computing Systems
Published by the Assosiation for Computing Machinery

ABSTRACT:

Do you know the true capabilities and limitations of AI? Do you think others know? As AI becomes more prevalent in daily life, people's perception of its true capabilities is skewed by its enchanting designs masking the true complexites of AI. The role of enchantment in AI product design, the principles of magic and metaphor all play a part in shaping user experiences. By introducing a taxonomy of design principles (which will be presented) our research provides an ideology for designers to reflect on their AI products. Our study delves into both student and professional design examples to reveal the secret to creating seamless, engaging interactions all while allowing transparency and enabling an understanding of AI systems. We implement a call to action for design practices that encourage designers to think critically about values and assumptions in their work, while maintaining a responsible AI design that balances enchantment with clarity.

GOALS:

- The main objective of this project is to develop a taxonomy for understanding how 'magic' and 'enchantment' contribute to the design of AI systems.
- Additionally, to provide a means for designers to review how their creations affect users that may not have fully understood the capabilities of AI.
- Explain seven design principles that guide the design of AI systems and their effects on enchantments and disenchantment.

HOW DID WE DO IT? (METHODOLOGY)

An experiment was done by analysing both industrial development in AI technology as well as 52 students' design projects (primary data) to unpack the effects of AI in terms of enchantment and disenchantment. The result was a taxonomy composed of seven design principles.

WHAT DID WE FIND? (RESULTS)

We created a taxonomy composed of seven design principals:

1 Applying Stage Magic Principles
2 Applying Magic Metaphors
3 Summoning AI as Supernatural Entity
4 Materializing Beliefs
5 Manifesting Mechanisms
6 Play with AI
7 Presuming AI

DON'T GET IT? LET'S DISCUSS!

Each of the principles in our results addresses ways that AI systems can provide a feeling of 'magic' that enchants users. For example, Amazon's Alexa can 'teleport' by seemingly movingfrom product to product. The results show that while these principles can create engaging experiences, they can also mislead users into misunderstanding the AI's actual capabilities.

BEFORE YOU GO...

As you know, nothing is perfect and our study no exception. There were some limitations that we encountered. Such as:

- the study relies heavily on seculation as well as individual findings
- there is little to no definitive data to support the results
- the students' designs project may not have upheld to professional practices
- our proposed taxonomy has not been tested frequently in the real world where human interactions with computers are much more complicated

CONCLUSION:

We believe that this paper is very prominent as it provides a deeper understanding of AI development as well as design practices. We encourage AI developers to consider the user's experience to create 'magical' products. We hope that out taxonomy of design practices can not only engage users but also provide transparency helping the users to understand the limitations of AI. Additionally, the research conducted from the study remains open-ended. The proposed taxonomy is not definitive. The authors call for future empirical investigations to explore how other factors such as designers' experience, the context of a project, and user interactions affect the dynamics of enchantment and disenchantment. We encourage designers to ask the all-important question of "Why?", to encourage the consideration of ethics and user experience. This is an important as Ai is becoming increasingly significant in everyday life and can shape society's behaviour and their perception of AI.

UWI
ST. AUGUSTINE CAMPUS
TRINIDAD & TOBAGO, WEST INDIES

CAN'T GET ENOUGH?

SCAN THE FOLLOWING QR CODE TO CHECK OUT THE ENTIRE STUDY!

GENERATING AUTOMATIC FEEDBACK ON UI MOCKUPS WITH LARGE LANGUAGE MODELS

Authors: Peitong Duan | Jeremy Warner | Bejorn Hartmann | Yang Li

OVERVIEW

The main objective of this paper was to develop a tool that can provide constructive feedback on UI designs based on a set of design guidelines and also assess the strengths and limitations and performance of LLMs in this task, and how they can fit into design practices today.

CONTRIBUTIONS

STEP 1:

- A Figma plugin that uses GPT-4 to automate heuristic evaluation

STEP 2:

- Investigate GPT-4's capability to automate these evaluations using 3 human participants to rate its accuracy and appropriateness.

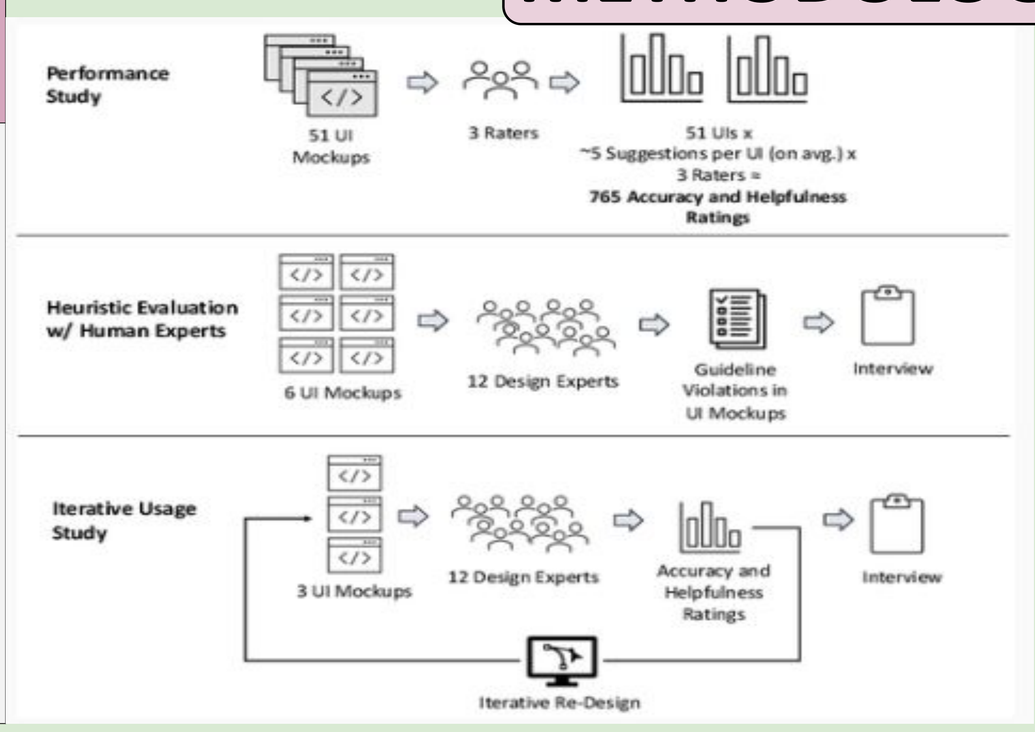
STEP 3:

- Compare the feedback found by the tool with those identified by the human experts.

STEP 4:

- Explore how this tool can fit into existing design paractices by allowing 12 design experts to use it to refine different UIs.

METHODOLOGY



MAIN FINDINGS

GPT-4's Strengths:
>> Useful in finding subtle errors
>> Improving text to be more user-friendly.
>> Can also understand the underlying meaning, providing feedback contextually relevant.

GPT-4's Weakness:
>> Its performance decreases as the design improves.
>> The accuracy of its feedback can vary depending on the specific guildlines.
>> The LLM may provide too vague suggestions.

DISCUSSION

1. Saves the designers' time by reducing the need for manual evaluation.
2. It detects the issues early on in the process and avoid costly rework later on.
3. It also improves design Quality and can serve as a learning tool for novice designers.

Nevertheless,

1. It is crucial to address implications for improvement
2. Ethical consideration is essential as it is still essential for human to oversee the quality and appropriateness.
3. Designers have stated that they would integrate it into their workflows but further research and development are required in order to fully rely on this tool in design practice

The paper demonstrates the potential of large language models (LLMs) to automate heuristic evaluation of user interface (UI) mockups. While LLMs have shown promising results in this task, there are still limitations to be addressed, human oversight is necessary and further research is needed for the best possible outcomes.

LIMITATIONS

- They have not considered interactive elements
- The evaluation of the feedback by human experts was subjective which could have influenced the results
- The study involved a small sample size which can limit the generalizability of the results.

The paper was published in 11th May 2024 by ACM

I have a suggestion to improve this design!