User Interface Software & Technology (UIST) Discussion

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Agenda

- EarHover: Mid-Air Gesture Recognition for Hearables Using Sound Leakage Signals
  - Overview and Demonstration
  - Discussion
- DirectGPT: A Direct Manipulation Interface to Interact with Large Language Models
  - Overview
  - Discussion

EarHover: Mid-Air Gesture Recognition for Hearables Using Sound Leakage Signals

- Best Paper UIST 2024 (One of Four)
- EarHover - System that enables mid-air gesture input for hearables
- Identified 7 suitable gestures from 27 gesture types
  - Signal discrimination
  - User acceptability

Worthy of Study?

- Eliminate the need to touch your device when listening to music on your phone
- Initially limited by camera use or infrared sensors
- Utilize sound leakage
  - External microphone
  - Speaker

Areas of Focus

- Input and output
  - Hand-input methods
  - Hands-free input
- Acoustic based recognition
- Machine Learning
  - Gesture detection
  - Gesture classification
- Wearable devices

HCI Research Contribution

- Artifact contribution
- Empirical Evaluation
  - User study!
  - 11 participants with mean age of 27.9 years
- Standard contribution for UIST conference
- Artifact builds on previous research gap
  - Innovation and exploration

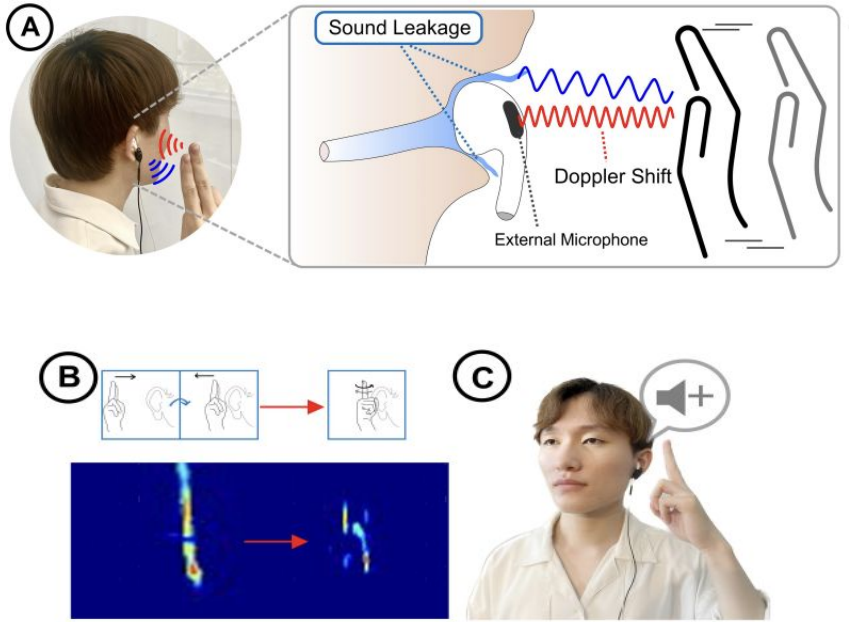
Figure 4: A: prototype devices, B: device configurations (blue line: playback signal path, red line: recording signal path).

Discussion

- Would you use the Ear Hover device?
- Are there other applications where this device would be useful? If so, what are they?

HCI Takeaways

- New Gesture Inputs for Hearables
  - Sound leakage for touchless control.
  - Provides hands-free interaction.
- Improved Sustainability
  - Uses existing hearable components.



DirectGPT: A Direct Manipulation Interface to Interact with Large Language Models

- Honorable Mention at CHI 2024
- Improves LLM Usability
  - Achieves interactive editing of text, code, and images by using Direction Manipulation principles
  - Tasks are completed faster and with fewer and shorter prompts

Worthy of Study?

- Current LLM Interaction is Inefficient
  - Many LLM interfaces rely on trial-and-error prompting
  - Interactions are slow.
- Direct Manipulation Improves Control
  - Traditional software benefits from direct manipulation, but yet many LLM interfaces lack this

Areas of Focus

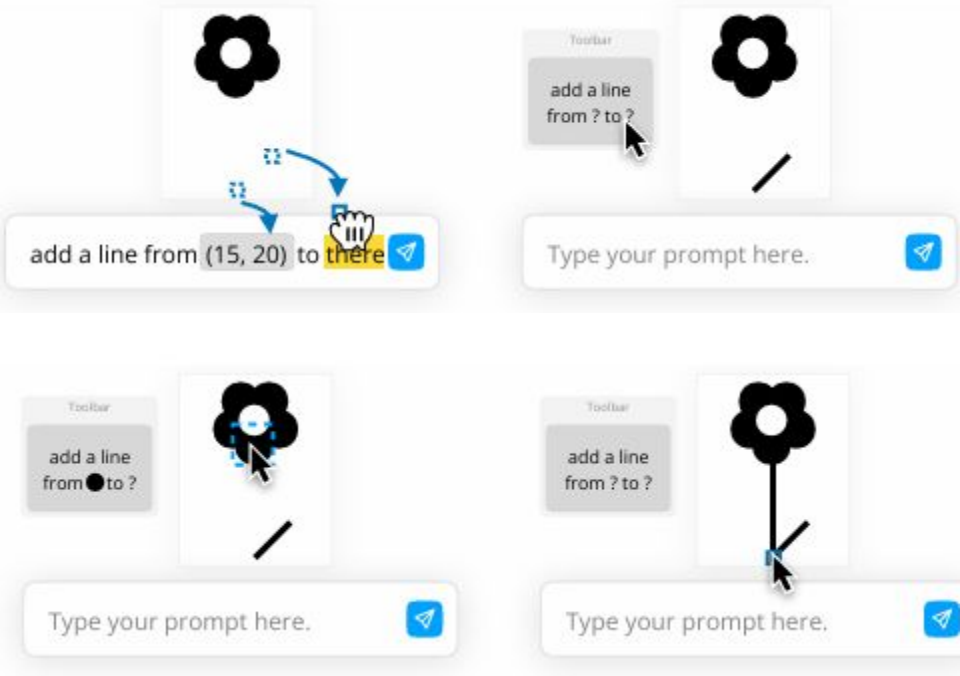
- User Interfaces
  - Uses direct manipulation principles
- Human-AI Interaction
- Cognitive Science
  - Less mental demand with fewer and shorter prompts

Discussion

Beyond text, code, and images, what other applications/items could benefit from direct manipulation with LLMs?

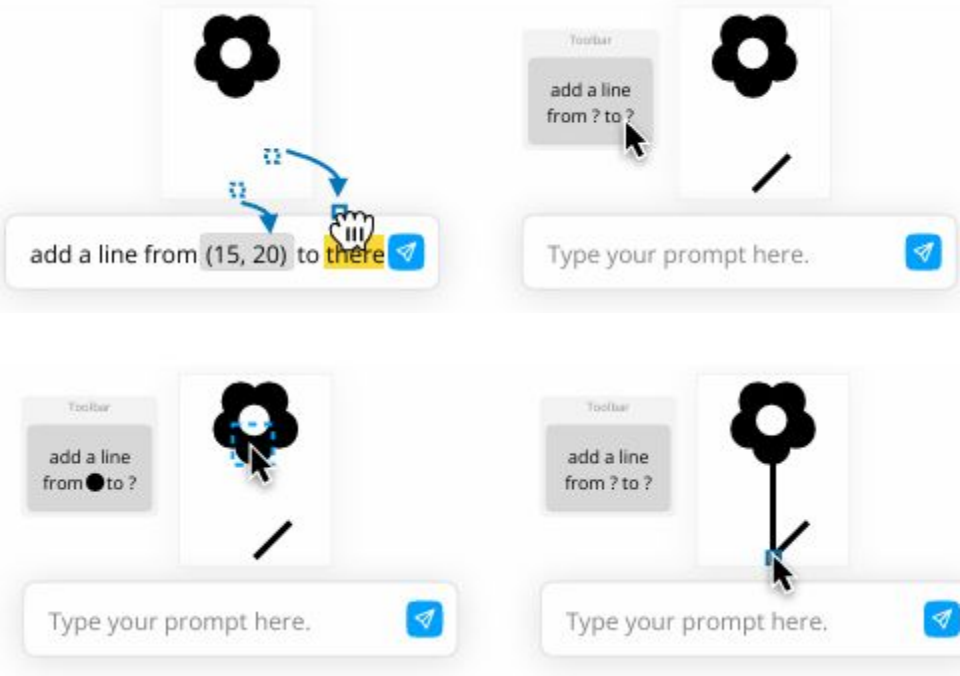
HCI Research Contribution

- Artifact Contribution
  - contributes a novel User Interface that applies direct manipulation principles to LLMs
- Empirical contribution
  - Performed a user study on 12 participants (20 to 34 age range,M=26.8, 6 self-identified as female and 6 as male).
- This is standard for UIST papers
  - Novel interactive system with user studies to validate UI techniques
  - (Even though this is a CHI paper)



HCI Takeaways

- Continuous representation of generated objects.
- Physical interactions (e.g., selecting and dragging objects).
- Reusable commands (e.g., toolbar of previous prompts).
- Undo and redo mechanisms for easy reversibility.
- Immediate feedback to help user confidence



Takeaways for other research communities

- AI and NLP research
  - Image and graph reading and generation
  - Making generated compositions and code directly interactable
  - How to process this visual information, how to turn prompts into interactable items
- Software Development AI Assisting tools
  - Interactive AI assisted programming
- UI/UX design
  - lacks usability features
  - undo/redo
  - unclear partial responses with a lack of transparency
  - blackbox answers

Discussion

How do you think direct manipulation will change the way users use AI?

Some aspects of direct manipulation in AI art

Real Time AI Drawing

https://youtu.be/dOJEjl0li6g?si=jLxblwNKWoZnxvKr&t=117

- Continuous representation
- Physical actions

What might be some unintended consequences of implementing direct manipulation features?

How might the testing group have skewed the evaluation results?

“All our participants had experience with LLMs. This was clear from their use of effective prompt engineering strategies, as mentioned previously. Additionally, our participants also had experience in coding and could generally be considered expert computer users.”

How can redesigning the chatbot's visual interface influence the accessibility and usability for diverse user groups?

AI chatbot UI/UX seems to be behind. What effects might this have?