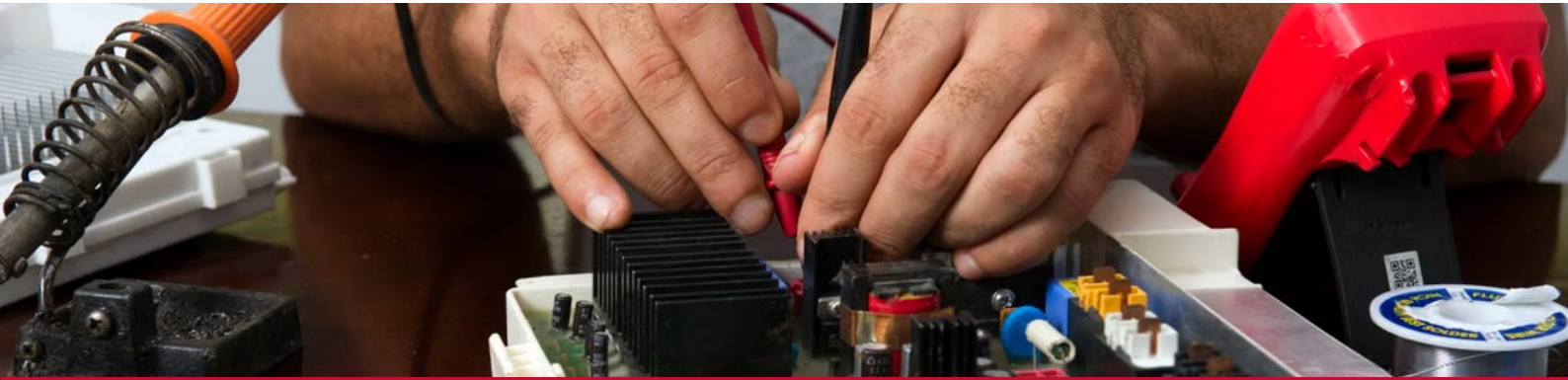




What's Wrong? Exploring Interactive Fault Diagnosis for Everyday Repairs

Background

Everyday objects can fail in many different ways, ranging from damaged mechanical components to loose connections or worn-out parts. Identifying the underlying cause of a malfunction can be challenging, particularly when symptoms have multiple possible explanations or when the relevant components are not directly visible. Incorrect diagnoses can lead to unnecessary disassembly, ineffective repair attempts, or the replacement of functional components. Although personal fabrication technologies enable the production of replacement parts, their potential for repair depends on understanding what is broken and what needs to be addressed. Improving the accessibility of fault diagnosis could therefore help users approach repair tasks more effectively.

Approach

Through an initial analysis of related research and an investigation of common diagnostic challenges, requirements for supporting users in identifying faults are established. These requirements inform the development of a prototype that guides users through the diagnostic process. For example, the prototype could combine interactive troubleshooting, AI-assisted reasoning, visual recognition, or sensor-based measurements to help users identify potential faults and distinguish between possible causes. The prototype is evaluated in a user study using predefined fault scenarios. Evaluation measures may include diagnostic accuracy, time required to identify the fault, unnecessary diagnostic steps, and users' confidence in their conclusions.

The scope of this thesis is adjusted based on Bachelor or Master level.

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Focus in this project

Personal Fabrication
Hardware/Software Prototype
User-Centered Design
User Evaluation