Understanding Why People Struggle to Integrate Robots Into Daily Life

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Introduction

Robots are becoming increasingly common in homes, workplaces, and public environments [1–2]. Their applications range from cleaning and caregiving to education, logistics, and personal assistance [3–4]. Despite these advancements, many people continue to struggle with integrating robots into their daily routines. Prior research highlights issues such as usability challenges, lack of trust, unclear robot intentions, and difficulty adapting to new technologies [5–6]. Although existing studies have attempted to address these challenges through improved interfaces, safety guarantees, and social cues, user adoption remains uneven.

This study proposes an investigation into the psychological, social, and technical factors that hinder smooth human–robot integration, followed by the development of a user-centered framework designed to enhance comfort, trust, and usability.

Method

This study will employ a mixed-methods approach to identify user barriers and propose solutions for improved robot integration.

- **User Research:** Distribute short surveys to identify common barriers such as trust issues, fear, and usability problems.
- **Behavioral Experiments:** Observe participants as they interact with basic robots to capture points of confusion, hesitation, and emotional responses.
- **Modeling:** Develop a simple conceptual model linking user barriers to specific robot behaviors and design choices.
- **Design Intervention:** Suggest design improvements, provide more precise feedback, foster more transparent communication, and simplify interaction patterns to mitigate the identified barriers.

Experiment and Evaluation

Experiments will compare user interactions before and after the design improvements are implemented. Evaluation will include ease of use, task success rate, completion time, trust levels, and user satisfaction. Qualitative notes on emotional responses and perceived safety will also be collected. Statistical and behavioral comparisons will determine whether the new design improves everyday robot integration.

Discussion and Conclusion

This research aims to provide insight into the human factors that limit the adoption of robots in non-industrial environments. By identifying these barriers and testing user-centered design strategies, the study will propose practical methods for achieving smoother human–robot

coexistence. The findings may support improvements in service robots, assistive technologies, educational robots, and household automation, highlighting how thoughtful design can bridge the gap between robotic capability and human acceptance.

References

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