ROBOTS, COMPUTERS, AND CONVENIENCE: A LITERATURE REVIEW OF HUMAN-ROBOT INTERACTION AND ITS PRACTICAL APPLICATION

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INTRODUCTION

With the rise of technology reaching a breaking point into robotics and AI being commonplace, certain challenges are becoming more and more apparent. The first steps in battling them are recognition, study, and categorization. While many of these issues are currently related to the practicality of robotic assistants, it is vital for the future of technology development as well as personal privacy that they are acknowledged.

Abstract

Every day, technological advancements are being made that have the potential to help humans in their everyday lives. The capabilities of AI are limitless, but this poster will be exploring the practical aspects of development and application. The AI discussed in this poster are a combination robot and AI personal shopping assistant, KeJia, which will demonstrate machine learning and the growth of human-AI interaction; STRANDS, a project dedicated to long-running autonomous robots aimed to increase the scope of robotic security and surveillance as well as care and customer service; and a project regarding a group of AI and robotic systems, BWIBots, that can assist and become an integrated part of a building complex, which documents many experiments, most notably ones related to machine learning and verbal instruction.

Figure 2. Two BWIBots on standby.

Figure 1. The STRANDS robot.

Robot	Goal	Strong Points	Weak Points	Notable Data Points	References
STRANDS Robot	Long-term autonomy, adaptability in navigation	Long runtime, ability to fix navigation failure	Increasing failure rate with time, got stuck fairly easily	Traveled for 104 days over 116 kilo-meters	[1]
BWIBots	To learn bits of language and navigate smoothly within a building	Easily upgradeable, learns quickly, advanced mapping system	Short battery life, easily stuck on carpet and less skilled with recovering	Learned over 70 words through I Spy and other games with humans	[2]
KeJia	Inform patrons and guide mall-goers through changing environments	Affordable, has potential shown in poll results	Short battery life, discomfort-ing, weak navigation	150 com-bined hours running, able to work 4 hours/ day	[3]

CONCLUSIONS & FUTURE WORK

It seems that a majority of the robots are able to be active for impressive lengths of time, but only collectively. As individual units, they work briefly and often encounter navigation failures. Their maps tend to lead them well, but the constant updating of a human-filled path is difficult to manage. It is likely that future development will focus on reliable navigation through crowded areas in order to allow for robots in more densely populated establishments, like the mall KeJia was stationed, as human obstruction was hugely responsible for failure. Hardware failure was also common, but this was often described vaguely and will be an issue fixed with time and innovation as the technology is improved. Navigation's fix may lie, then, in the ability to determine possible future failures with humans by measuring position and velocity by sight.

Figure 3. KeJia, the robot featured in a Chinese mall.

References

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[3] Yingfeng Chen et al. (2017). Robots serve humans in public places—KeJia robot as a shopping assistant. *International Journal of Advanced Robotic Systems*, *14*(3), 635-659. doi:10.1177/1729881417703569

Acknowledgments

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