POPULAR SCIENTIFIC ABSTRACT

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Situational Awareness and Acceptability of Robots in Shared Environments

In recent years, robots have evolved from facilitating rigid automation in factories to being present in our daily lives, appearing in places like hospitals, homes, and shops. As we move closer to a future where robots could be as common as smartphones, questions about how they will fit in our world arise. How do we enable their navigating in shared spaces without causing discomfort or danger, and how do we ensure their acceptance?

This thesis explores these questions by focusing on two key aspects: Situational Awareness and Acceptability. For robots to function safely and be accepted in environments where they interact closely with people, they must not only avoid obstacles but also recignise social cues, respect personal space, and behave in ways that humans find predictable and comfortable.

It includes new methods that allow robots to model context in social environments: recognising people's actions or gestures, detecting groups, and navigating without interrupting interactions. These methods enhance the robot's situational awareness and socially acceptable navigation.

This work considers the ethical aspects of using robots in sensitive environmnents like care homes. As robots enter the lives of vulnerable populations, it is important to consider the emotional and ethical effects of their presence.

Moreover, it delves into the challenges encountered as the density of robots increases. Planning methods and adaptations, which take into consideration the uncertainties of the real world, are suggested, which, when adapted, will enable robust and dependable navigation in real applications.

Ultimately, this thesis brings us closer to a future where robots move beyond structured and confined spaces to become a part of our everyday lives, as commonplace as any other modern technology.