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Ani-Bot: A Mixed-Reality Ready Modular Robotics System

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ABSTRACT

DIY modular robotics has always had a strong appeal to makers and designers; being able to quickly design, build, and animate their own robots opens the possibility of bringing imaginations to life. However, current interfaces to control and program the DIY robot either lacks connection and consistency between the users and target (Graphical User Interface) or suffers from limited control capabilities due to the lack of versatility and functionality (Tangible User interface). We present Ani-Bot, a modular robotics system that allows users to construct Do-It-Yourself (DIY) robots and use mixed-reality approach to interact with them instantly. Ani-Bot enables novel user experience by embedding Mixed-Reality Interaction (MRI) in the three phases of interacting with a modular construction kit, namely, Creation, Tweaking, and Usage. First, Ani-Bot provides interactive manual and suggestive guidance to help users create their robots. Then, using the virtual tryout feature in the system, the constructive assembly can be further tweaked and improved to meet functional requirements before full construction. Finally, Ani-Bot's mixed-reality UI enables users to control their robots to interact with the surrounding environment through animation and logic-driven events. We developed use cases and a user study, to evaluate and validate that the system is intuitive, effective and expressive. We find that the system has strong potential to deliver a novel user experience in DIY modular robotics.

KEYWORDS

DIY robot kit, Mixed-reality, User interface, Human-robot-interaction, Robot Animation.