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Implementation of a Push Button -Based Tangible User Interface for Virtual Object Control in Unity

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ABSTRACT

This study discusses the implementation of a push-button based Tangible User Interface (TUI) as a physical interaction medium to control virtual objects in the Unity environment. The system is designed by integrating physical input devices in the form of push buttons connected to a microcontroller with a Unity application via serial communication. This study uses a system design and implementation method that includes the stages of requirements analysis, system architecture design, hardware and software implementation, and functional testing. User input is processed by the system to produce a visual response in the form of movement of virtual objects to the left or right with a toggle mechanism. The test results show that the system is able to respond to physical input in real-time with stable and consistent object movement according to user commands. This TUI implementation provides a more concrete interaction experience compared to conventional mouse-or keyboard-based interfaces, and has the potential to be developed as a basis for interactive media, control simulations, and multimedia applications based on physical-digital interaction.

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