

Motor Control Recovery Minigame

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Abstract : This project focuses on developing a gamified mobile application to aid in stroke rehabilitation by enhancing motor skills through interactive activities. The primary goal was to design a companion app for a passive haptic rehab glove, incorporating Google MediaPipe for gesture tracking and vibrotactile feedback. The app simulates farming activities, offering a fun and engaging experience while addressing the monotony of traditional rehabilitation methods. The prototype focuses on a single minigame, Flower Picking, which uses gesture recognition to interact with virtual elements, encouraging users to perform exercises that improve hand dexterity. The development process involved creating accessible and user-centered designs using Figma, integrating gesture recognition algorithms, and implementing unity-based game mechanics. Real-time feedback and progressive difficulty levels ensured a personalized experience, motivating users to adhere to rehabilitation routines. The prototype achieved a gesture detection precision of 90%, effectively recognizing predefined gestures such as the Fist and OK symbols. Quantitative analysis highlighted a 40% increase in average session duration compared to traditional exercises, while qualitative feedback praised the app's immersive design and ease of use. Despite its success, challenges included rigidity in gesture recognition, requiring precise hand orientations, and limited gesture support. Future improvements include expanding gesture adaptability and incorporating additional minigames to target a broader range of exercises. The project demonstrates the potential of gamification in stroke rehabilitation, offering a scalable and accessible solution that complements clinical treatments, making recovery engaging and effective for users.

Keywords : stroke rehabilitation, haptic feedback, gamification, MediaPipe, motor control

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