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Helptic: Haptic-Enhanced AR CPR Training with AI-Based Evaluation and Feedback

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I. Abstract

Out of hospital cardiac arrest, otherwise known as OHCA, is one of the top causes of death worldwide [1]. In Korea, according to the Korean Cardiac Arrest Research Consortium (KoCARC) registry, from 2015 to 2018, there were 7,577 incidents of OHCA [2]. It is reported that for every 5 minutes of delay to the return of spontaneous circulation (ROSC), it results in a 38% increased risk of mortality [3]. Hence, immediate cardiopulmonary resuscitation (CPR) is vital in such situations. However, traditional CPR training sessions have some drawbacks, such as the rapid decline of CPR skills, within six to nine months, if practice is not done regularly [4]. CPR manikins are also known to be bulky and expensive, ranging from a few hundred dollars to a few thousand dollars in some cases. Also, it is reported that there is a lack of accessibility to trainers to conduct CPR training [5]. Therefore, the main gaps identified in traditional CPR training methods are the lack of engagement of CPR training, resulting in the decline of skill retention, and expensive and inaccessible training materials. With that in mind, our team aimed to build an augmented reality (AR)-based CPR training system which simulates chest compressions using a spring-based physical interface, utilizes computer vision to track hand posture, compression rate and depth, while giving real-time performance feedback through an LLM-powered assistant, while using haptic feedback to enhance the realism to the user. The main goal of our system is to improve CPR skill acquisition and retention, offer an engaging, selfguided training, as well to make CPR training more accessible by reducing the cost and space requirements.

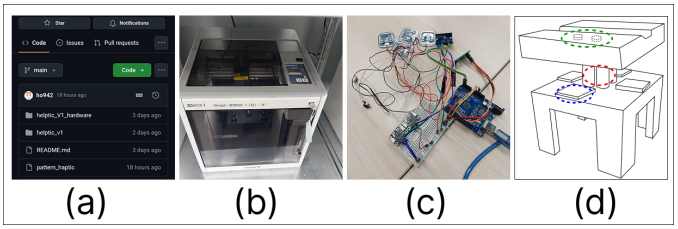

Fig. 1. Workflow of Helptic hardware

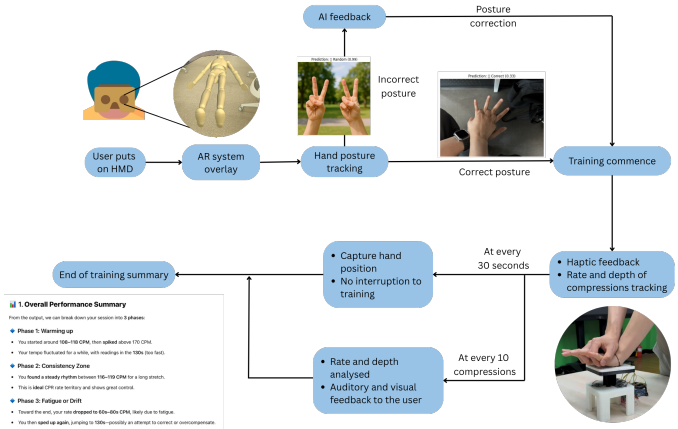

Fig. 2. Proposed Solution Outline

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