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A HOME BASED TELEHEALTH SYSTEM FOR ELDERLY WITH ALZHEIMER'S

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Chronic diseases are becoming one of the world's leading causes of death and disability. By 2020, it is predicted to account for almost three quarters of all deaths. According to World Health Organization the elderly population is expected to become 1.2 billion in 2025. This aging problem contributes greatly to chronic diseases like Alzheimer, Elderly suffering from Alzheimer gradually lose their abilities to live normally and might wander aimlessly. The major implications of Alzheimer are patient safety and care. Traditionally, part of the difficulty in achieving equitable access to health care has been the required presence of the patient at the health center. Recent advances in information and communication technologies, in addition to emerging technologies such as the Internet of things (IOT) & RFID have created unprecedented opportunities for overcoming this. The aim of this paper is to develop a Tele-health system, based on IoT technology, for monitoring elderly individuals suffering from Alzheimer's. This paper describes a working prototype that is able to capture the vital signs and deliver the desired data care remotely for elderly patients staying at home, using the wearable ECG wireless sensor. In addition to that, an IR enabled Active wearable RFID wristband, in addition to IR room locators is used to monitor the whereabouts of the elderly at room level or floor level. The active tag has a low power standby mode when it is stationary. This prototype is successfully tested on a number of patients at the King Fahd University of Petroleum and Minerals (KFUPM) Medical Centre in Saudi Arabia.

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EFFECTIVE AND SECURE HEALTH CARE USING ADVERSARIAL LEARNING

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It is crucial for both biological (e.g., immune system) and machine-based systems to recognize patterns and messages as a friend or foe and to respond to them appropriately. We consider here the use of adversarial learning to enhance defenses against adaptive, malicious, and persistent offensive threats, and towards such ends, we propose conformal prediction as the principled and a unified learning framework to design, develop, and deploy a multi-faceted protective and self-managing defensive shield to detect, disrupt, and deny intrusive attacks, hostile and malicious behavior, and subterfuge. Conformal prediction supports a multitude of functional blocks that address the major challenges faced by adversarial learning, including denial and deception, adequate message representation and classification, and platform vulnerabilities, deliberate or not, affecting learning, training, and annotation. The solutions proffered are built around active learning, meta-reasoning, randomness, immunity, semantics and stratification, and most important and above all, around adaptive Oracles that are effective and valid regarding model selection and prediction. The motivation for using conformal prediction and its immediate offspring, those of semi-supervised learning and transduction, comes from them supporting discriminative and non-parametric methods using likelihood ratios; demarcation using cohorts, local estimation, and non-conformity measures; randomness for hypothesis testing and inference using sensitivity analysis; reliability indices on prediction outcomes using credibility and confidence; open set recognition including the reject option and negative selection; and consensus reasoning to upend questionable label annotation, deliberate or not, using aggregation and importance sampling.

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