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### An RFID based Activity of Daily Living for Elderly with Alzheimer's

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#### Abstract

**Background:** The rise in aging population implies more people suffering of dementia. Dementia is a disease which causes loss in memory that leads to the issue of wandering elderly who are fragile and vulnerable to falls [Padakandla, 2013].

**Objective:** Elderly suffering from dementia often show psychotic behavior, which creates the need for physical assistance and thus requiring a smart system for localization of elderly in a smart home scenario. This paper purposes a solution to monitor elderly and send alarms when needed. Using passive wearable tags, antennas, an RFID reader and some python socket programming to capture the readings directly to python and process all the data in real time.

**Method:** The proximity adopted approach relies on dense deployment of antennae. When the target enters in the radio range of a single antenna, its location is assumed to be the same that this receiver. When more than one antenna detects the target, the target is assumed to be collocated with the one that receives the strongest signal. With passive battery-less tags used, the proximity technique is privileged compared to other localization techniques [SinGH, 2016].

**Results:** The anklet wearable localization approach minimizes the effect of body shadowing because no matter how the anklet is rotated around the ankle, there is at least one tag facing outwards on each foot such that it can be read by the RFID reader. The positioning of the RFID tag in the Necklace and Bracelet (Wrist) were almost comparable and gave the highest detection accuracy.

**Conclusion:** In this paper, a low-cost batteryless RFID solution for localizing up to three elderly people living in a smart home setting has been developed. The results of the experimental study related to real-time monitoring of wandering behaviours of elderly people with dementia were presented.

**Keywords:** RFID, IOT, Dementia, Body shadowing, RSSI

#### Biography

I have 30+ teaching and research experience in King Fahd University of Petroleum & Minerals, Saudi Arabia. I Obtained my Phd from University Bradford UK 2005 in embedded systems & signal processing. In 2010, I established the first Smart Card & RFID university lab in the region to support student projects as well as conducting short courses for the industry in RFID/NFC. In the last two years I was involved in two funded projects: implementing RFID in MIT joined project for renewable energy & hajj project for tracking pilgrimage. Recently coordinated & taught a short course on introduction to IOT & industry 4.0 to Saudi Aramco.