

## Master Thesis Proposal

# Embedded Development for Monitoring of Activities of Daily Living (ADL)



**Background:** The higher prevalence of age-associated disorders such as stroke, Alzheimer's Disease (AD), and other forms of dementia, is in line with a steady increase of the average life expectancy in Switzerland. With the progression of neurodegenerative disorders, the need for institutional care intensifies, which contrasts with the desire of most patients to live independently (World Health Organization 2012). In that respect, the type, diversity and regularity of ADL are important indicators of the capacity for independent living. Thus, in order to provide adequate care to patients and in order to support independent ageing, caregivers need to assess how well patients perform ADL, particularly when they live alone. Subsequently, several research groups have proposed monitoring systems to quantify ADL without the disadvantages of self-reporting: they include the use of Passive Infrared (PIR) sensors and wearable sensor systems. Our hope is that these sensor systems may not only provide a more objective means to assess the ADL status of a person, but further to help better judge the point at which patients need professional care.

**Aims:** Your task would be to complete development of a system that can track signals from a Bluetooth LE /Smart Beacon (ex. using the Apple iBeacon protocol) with accurate timing information (time must be synchronised over multiple devices) over a long time period by using as little power as possible. A valid system design and a working prototype exist.

**Workload:** Hardware 50%, and software development 50%.

**Requirements:** Willingness to learn embedded hard- and software development (prior experience would be ideal), C++ programming skills.

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