

## Monitoring of Falls Using Radar and Seismograph Sensors

**Background:** Falls are a leading cause of severe injury in older adults, which oftentimes mark the onset of a major deterioration of health. At the same time, the life expectancy of Switzerland's population increases, resulting in a shift of the age demographic towards the older adults. Consequently, fall detection is a major challenge in the public health care domain and thus reliable surveillance systems are a necessity to mitigate the effects of falls. In recent years, technological advances in sensor systems made it possible to implement new solutions for monitoring various health related conditions; In particular radar and seismograph are promising sensors to monitor movement and detect falls.

**Aim:** Therefore, the aim of this project is to develop and validate a system by using a seismograph and a radar to detect falls. The student has to compile a dataset of common falls by using a provided crash test dummy and implement fall detection algorithms.

### Materials and Methods:

This thesis consists of three parts: First, the student will learn the concepts of radar and seismograph sensor technology and review the literature about common fall patterns. Second, the dataset by using radars and seismographs is created by measuring falls on a crash test dummy, which is mounted with inertial measurement unit (IMU) sensors. Third, algorithms to detect falls will be developed.

### Nature of the Thesis:

Development of algorithms to process the data: 40%

Experiment: 40%

Analysing of the experiment data: 20%

### Requirements:

Basic knowledge in data analysis

Good programming skills

Interest to conduct a small study

### Supervisors:

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**Figure:** Apartment where the experiment will be conducted and the crash dummy.