

Project/Internship/Bachelor's Thesis/Master's Thesis

## Ubiquitous Investigation of Overall State of Health Using a Smart Toothbrush in Palliative Care

### Background:

A major problem in modern palliative medicine is the lack of objective and continuous assessment of the health status of patients. This status can be classified by measurement tools such as the Karnofsky index or ECOG (Eastern Cooperative Oncology Group) score. The score of a patient within these scales is largely determined by the ability to perform so-called activities of daily living (ADL). At the moment, physicians largely rely on questionnaires to assess performance of those ADL. However, this bears the risk that the examination is not representative, as it is collected at a single moment and the patient's statement may be influenced by the presence of the doctor, and only reflects one point in time. In order to be able to get a more accurate and detailed overview of the current state of health, a passive and continuous assessment of these conditions would be beneficial.

We previously developed a smart toothbrush using IMU sensors, and ran two different studies with 10 and 28 participants, respectively.

### Task:

We are now looking forward to include additional healthy participants, as well as extend our study to the palliative care station at Erlangen University Hospital, including patients. Your thesis/internship thus aims to answer whether it is possible to detect decreasing overall state of health from IMU toothbrushing data.

### Tasks:

- Literature research
- Develop study design together with Erlangen University Hospital
- Build additional prototypes (if demand exists)
- Conduct the study (at the palliative care ward)
- Evaluate recorded data and write thesis/research report

### Requirements:

- Very good (i.e. near-native, very fluent) German language skills (you will be conducting a study in the hospital ward, which involves talking to patients and caregivers)
- Hardware skills/IoT knowledge (e.g. soldering, 3D printing) are beneficial
- Basic Python knowledge
- Thesis cannot be written remotely

Please send your CV, your transcript of records and 2-3 sentences about your motivation to:

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