
Topic: Digitalisation of Diagnostic Test Stick-readouts using Smartphones for Self- and Home-Care

The measurement of different parameters such as proteins or nitrite from urine is a commonly used diagnostic method in various medical domains, including prenatal care. Test strips are an affordable option for measurement; however, results are measured by visual comparison of the test strips with a paper-printed visual scale. This process is potentially error-prone if conducted directly by patients or less skilled medical personnel, furthermore, manual data entry is time-consuming.

In order to facilitate self- and home-care, particularly during pregnancy, this work/thesis aims to digitalise the recording of values through commonly present technologies such as smartphone cameras. For example, the user could take a photograph of the urine strip and the system should automatically record the present values. At the same time, different cameras feature different color profiles; furthermore, light settings and scenes may dramatically influence the recorded/photographed colors.

This thesis is part of the SMART Start project and will be conducted together with the Frauenklinik (women's hospital) of Universitätsklinikum (university hospital) Erlangen and other collaborators.

The proposed work consists of the following parts:

- Literature research regarding related work
- Creation of a study protocol
- Study conduction and data aggregation
- Design and implementation of an image processing/machine learning pipeline for automated data extraction
- Feasibility evaluation

The thesis must contain a detailed description of all developed and used algorithms as well as a profound result evaluation and discussion. The implemented code has to be documented and provided. An extended research on literature, existing patents and related work in the corresponding areas has to be performed.

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Start – End: tbd