Masterproef industriële ingenieurswetenschappen

EEG signal analysis

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Introduction

Background

Extended supervision of sleep patients is key to diagnosing more accurately.
The solution resides within the use of personal sleep-EEG systems.
However, existing ones only provide rough means of EEG-signals while diagnosing abnormal brain functioning cluster groups need to be precise.
In addition, the experience of a patient during certain brain activity could contain crucial information and should be registered systematically.
Furthermore, there is no universal standard of the frequency ranges of the brain waves.

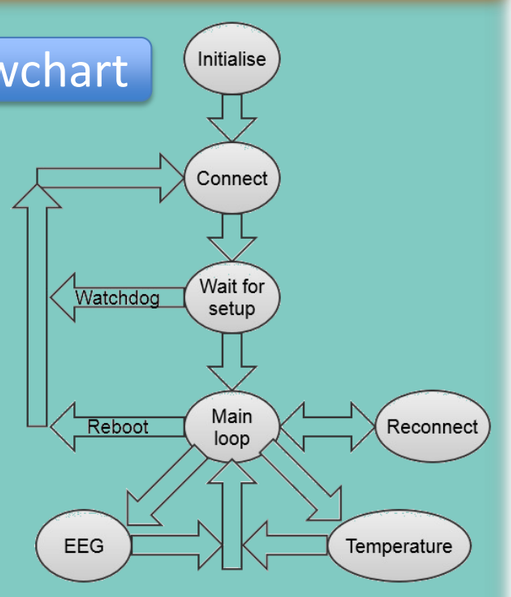
Objectives

To develop a diagnostic EEG-sleep data logger system with:

- a high time resolution,
- programmed awakenings,
- registrations of a patient's experience,
- flexible frequency ranges,
- and real-time output.

Methods

Sensor Flowchart

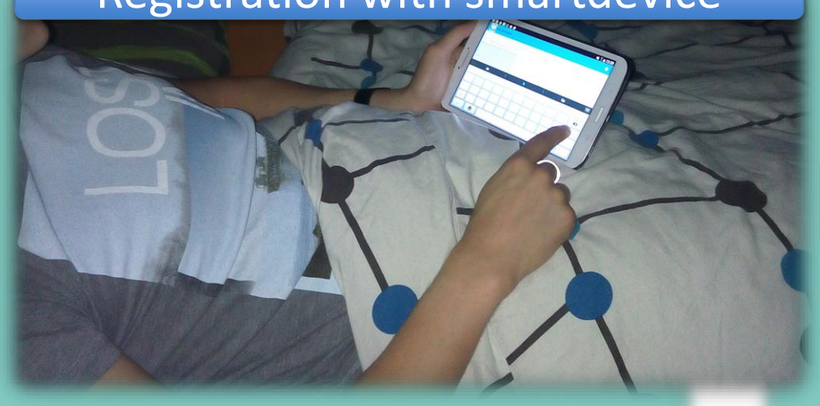


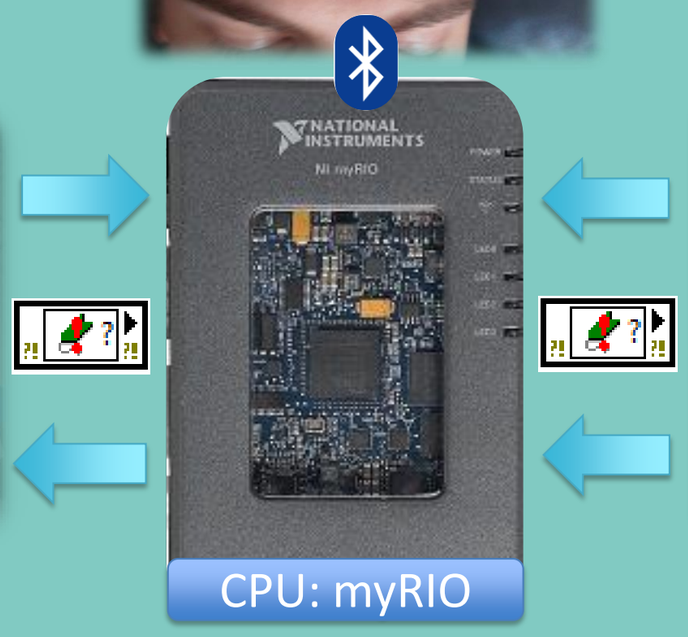
Network communication

LabView Shared Variables

The EEG-sensor

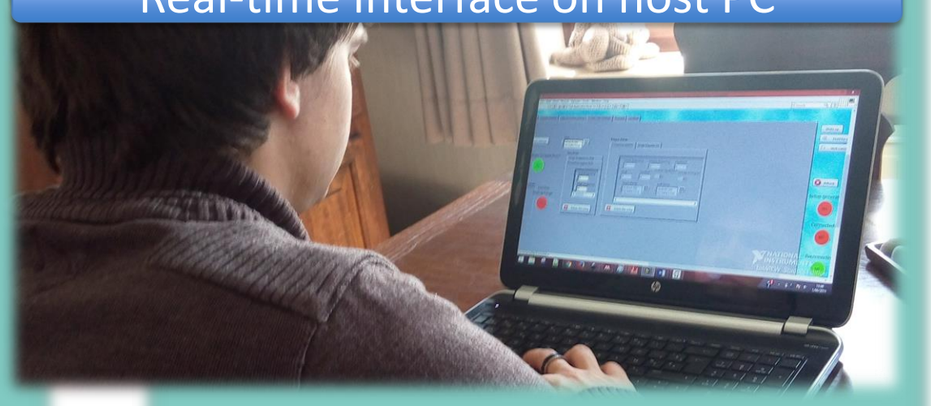
Registration with smartdevice



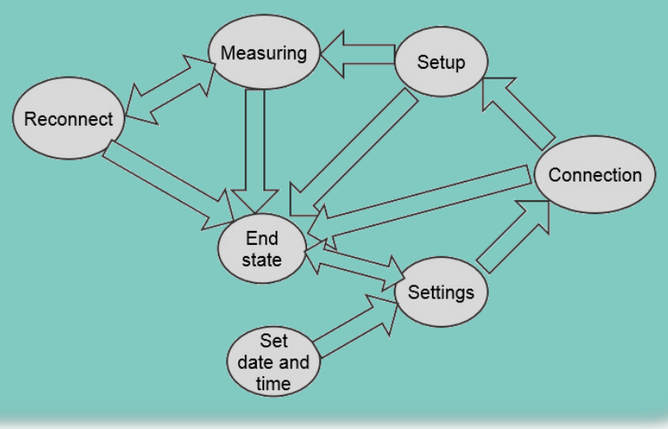


CPU: myRIO

Real-time interface on host PC



MyRIO finite state machine



Results

Real-time interface

Generated files

- Measurements (.csv type)
- Ratings from intentional awakenings (.txt type)
- Spontaneous ratings (.txt type) (person was not woken up)
- Settings (.txt type)

Conclusion

The system acts as a stand-alone data logger, but can simultaneously also be used as a real-time interface.
There are numerous settings that can be applied for programmed awakenings and various frequency ranges that can be requested.

Promotoren / Copromotoren: Dr. Ir. Jos Klaps
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