



Automated tremor detection based on brain signals in patients with Parkinson's disease – Jan Hirschmann

Parkinson's Disease

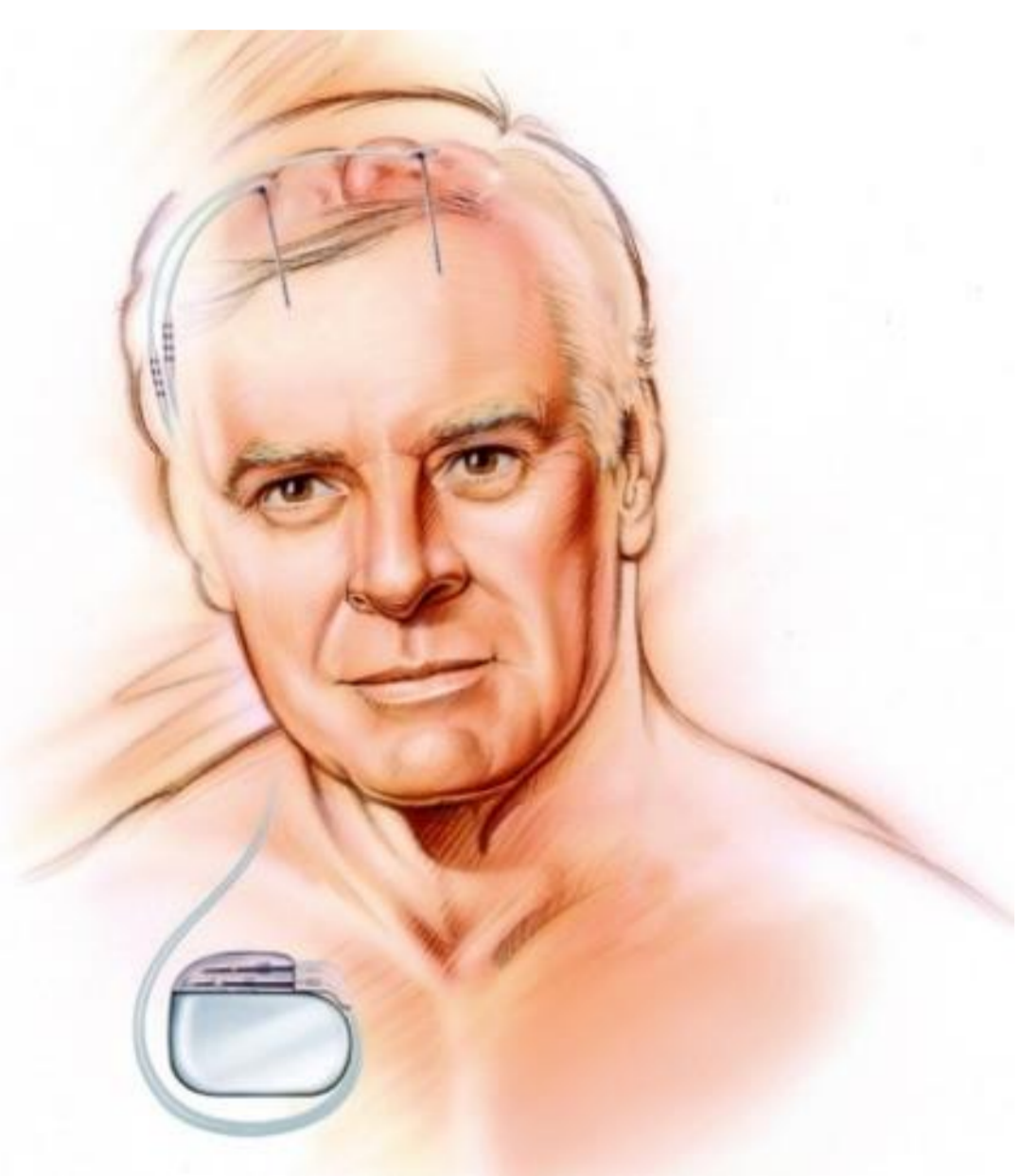
Parkinson's disease is a progressive, neurodegenerative disorder. Due to its high prevalence in the elderly it has considerable and growing impact on society. The main symptoms are:

- akinesia (poverty of movement)
- rigidity (muscle stiffness)
- rest tremor



Treatment

Parkinson's disease is primarily treated pharmacologically. However, medication induces side effects, which become more severe over time. Thus, neurologists often decide to administer deep brain stimulation in advanced stages.



Deep brain stimulation devices stimulate non-stop until the battery is used up. However, many symptoms, like tremor, occur sporadically. Thus, it would make sense to stimulate only when symptoms are present (closed-loop stimulation). This approach will lead to

- Less side effects
- Possibly, improved symptom suppression
- Less energy consumption

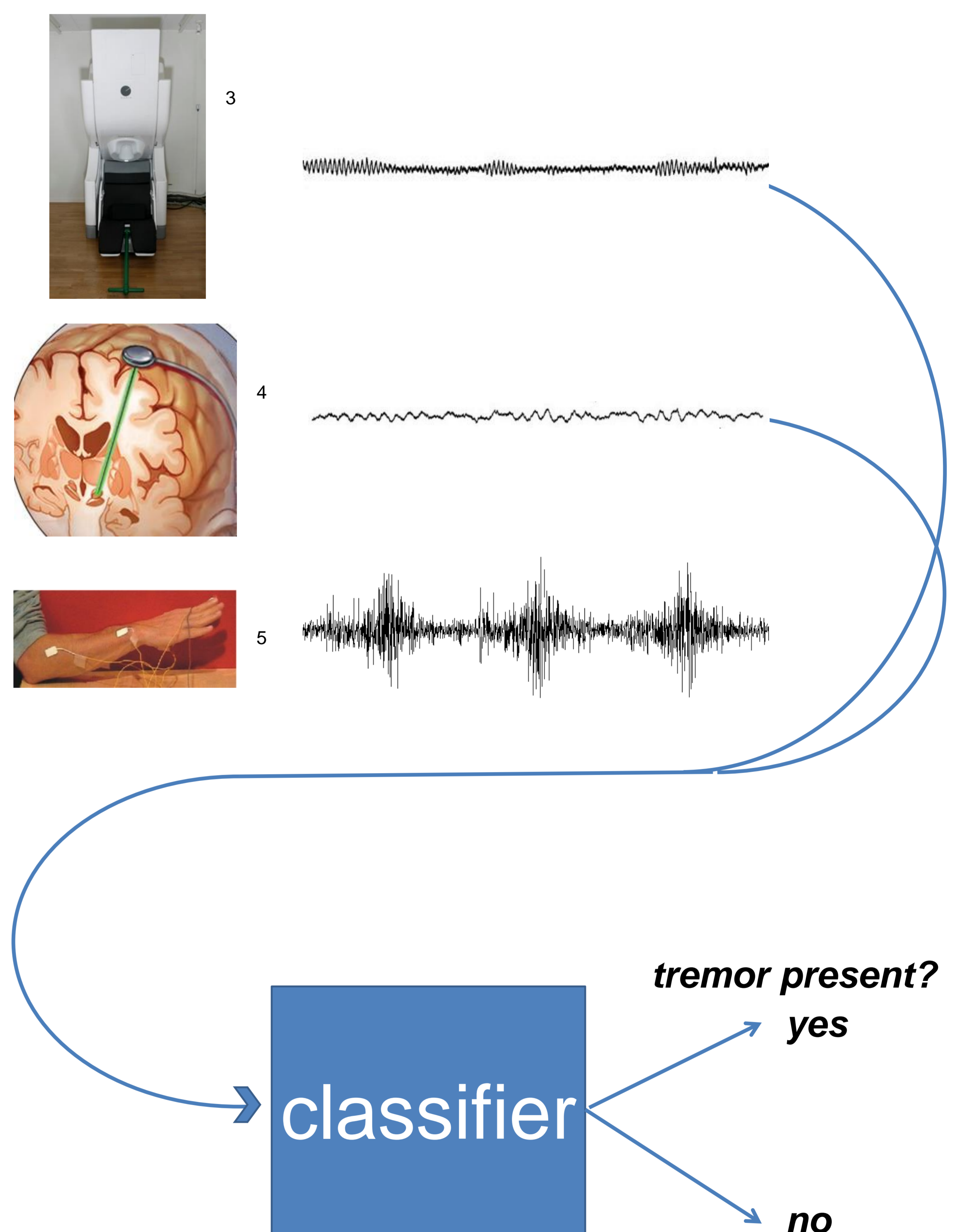
As a prerequisite for closed-loop stimulation, *the device must be able to detect symptoms automatically.*

Research Question

Can a machine infer the presence of tremor from brain signals?

Research Plan

Re-analysis of existing data with state-of-the-art machine learning techniques:



Milestones

- Proof of principle: Tremor detection is possible with our approach
- Identification of most informative data features: Which signals/brain areas are critical for tremor detection?
- Implementation of algorithm for online stimulation control

Perspective

- Practical tests for safety and effectiveness in animal models and patients

Collaborators