

AI-Based Spectral Analysis for Bacterial Detection in Wound Diagnostics

About Odinwell

Odinwell is a start-up based in Mölnlycke driven by a small multi-disciplinary team. They focus on developing innovative solutions for wound care, using optical sensors.

Background

Odinwell is developing advanced optical sensing technologies for wound care. One promising approach involves analyzing spectral fluorescence data to detect bacterial presence. However, spectral signals are highly sensitive to environmental factors such as wound depth, exudate levels, and sensor positioning. These variations make it difficult to extract reliable diagnostic information using traditional methods.

This thesis explores how AI and machine learning can be used to extract robust, meaningful features from noisy spectral data. The goal is to classify the presence and concentration of bacteria, and potentially distinguish between bacterial types based on subtle spectral differences. This work has direct applications in real-time, non-invasive wound diagnostics.

Scope

The thesis will combine literature study, data modeling, classification, feature extraction, and validation.

- Address variability in excitation intensity and environmental conditions
- Explore normalization, augmentation, and domain adaptation techniques
- Develop AI models to classify spectral data
- Compare predictive value of two spectrometers (low vs. high resolution)

Do you fit the profile?

- A background in Computer Engineering, AI, Machine Learning, Biomedical Engineering, Biomedical Data Science, or Applied Physics.
- Experience with Python, or similar tools for signal processing and data visualization.
- Analytical mindset, willingness to work hands-on with data
- Strong interest in AI, data analysis, and medical technology

You will work closely with Odinwell's R&D team, gaining insight into real-world medical device development and contributing to next-generation wound care diagnostics.

Location: Odinwell AB, or remote with regular onsite meetings.

Start: January 2026

Duration: 20 weeks

This thesis is intended for 2 students working in pairs.

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