Masters/Bachelors thesis or Project
AI-Powered Image Analysis for Next-Generation Biosensing

Project Summary:

Surface Plasmon Resonance (SPR) imaging is an optical, label-free technique that generates real-time images of biomolecular interactions. This joint thesis project between the Institute of Materials in Electrical Engineering 1 (IWE1) and the Institute of Imaging and Computer Vision focuses on processing and analyzing the extensive data produced by SPR imaging systems. The candidate will utilize state-of-the-art image analysis and machine learning techniques to improve system performance, develop efficient data storage and manipulation solutions, and potentially integrate these into user-friendly software. You'll collaborate closely with another student conducting the experimental work, ensuring a seamless flow from data generation to computational analysis. Supervision will be provided by experts in both image processing and biosensing, offering a unique opportunity to work at the forefront of biosensor technology.

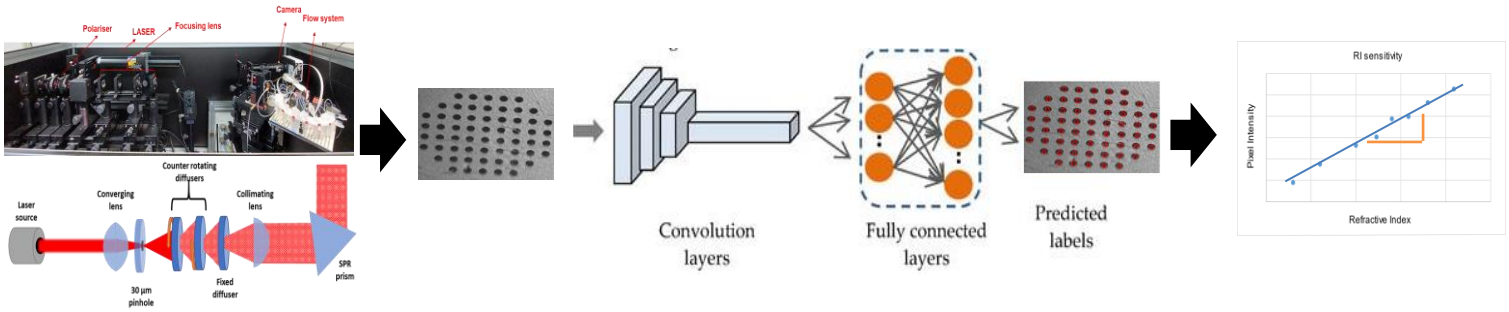

Figure: Laboratory-based SPR optical setup (left), images collected and pipeline, including data acquisition, image processing, and machine learning-based analysis for predictive output.

Key Tasks:

1. Implement ML/DL models for SPR image segmentation (ie., detection of regions of interest) and analysis
2. Develop noise correction and image enhancement algorithms
3. Design calibration methods for varying experimental conditions
4. Create efficient data storage and management solutions
5. Develop a user-friendly software/GUI and integrate all components into a streamlined pipeline.

Your (ideal) Profile:

- Experience in image processing and machine learning
- Proficient in programming (preferably in Python for data analysis and image processing)
- Familiarity with data storage and management techniques (e.g., databases, file systems)
- Basic understanding and/or experience of software integration principles
- Passion for biosensing and collaborative research

Contact:

Please send an email with your CV and possible start dates to: Mr. Ahmed Ben Romdhane a.romdhane@iwe1.rwth-aachen.de and Dr. Divagar Murugan: d.murugan@iwe1.rwth-aachen.de.

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