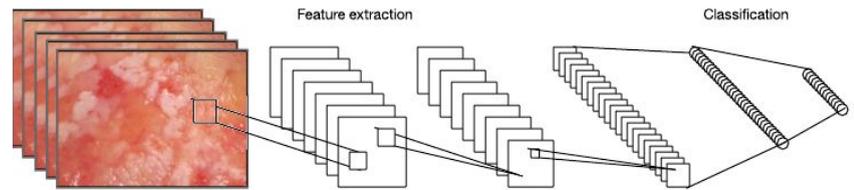


# Master Thesis Project

## Artificial intelligence as an aid for diagnosis of oral lesions from clinical photos

### Background:

**Deep learning** and Deep Convolutional Neural Networks have revolutionized the field of Computer Vision, with applications ranging from face recognition to self driving cars. This revolution is now propagating into the fields of medical image analysis where it shows great promise and is currently becoming one of the hottest research topics on the planet.



**Oral cancer** incidence is rapidly increasing worldwide, with over 450,000 new cases found each year. The most effective way of decreasing cancer mortality is early detection, which makes routine screening of patient risk groups highly desired.

### Project description:

The intention with this project is to develop a system for diagnostic aid and surveillance, to single out oral lesions for tissue sampling that are potentially malignant. We have access to annotated clinical photos of oral lesions for training as well as evaluation. We wish to evaluate machine learning as an alternative to invasive methods and explore its clinical usefulness and applicability in clinical routine.

This project will evaluate the use of Deep Convolutional Neural Networks (DCNNs) as a basis for a diagnostic support system for fast, robust and cost effective diagnosis of oral mucosal lesions. We aim to detect potentially malignant changes at a very early stage, when still possible to remove with minor surgery in order to prevent development into an invasive cancer. This requires detection of subtle texture variations which are not easily captured by visual inspection, and where big data and machine learning provides new solutions.

This project complements and extends ongoing collaboration between the Centre for Image Analysis UU, Folk tandvården AB, Stockholm, and Karolinska University Hospital.

### Conditions:

The master thesis project will be carried out at Uppsala University. Some programming experience is a requirement. Knowledge of machine learning, computer graphics, image analysis and/or computer vision is a plus. The extent of the Master Thesis project is 20 weeks.

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