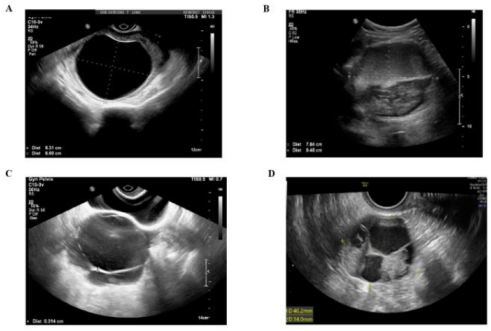
Leids Universitair Medisch Centrum

Master Thesis project
In Biomedical Machine Learning

Deep learning-based approach for malignancy assessment in ovarian cancer

Project overview
Ovarian and endometrial carcinoma are the most widespread gynecological malignancies in the Western world. Ovarian cancer is often diagnosed after it has already metastasized extensively. Therefore, women with this disease generally have a poor prognosis. This is mainly because it does not cause symptoms until late and women therefore often seek medical help late. On the other hand, benign ovarian abnormalities are also common. An ultrasound examination and blood test are normally used to distinguish between benign and malignant abnormalities of the ovary. Unfortunately, these tests are not sufficiently accurate. This may result in patients with an ovarian abnormality not being adequately treated. Endometrial carcinoma, on the other hand, gives early symptoms in the form of postmenopausal blood loss. In general, this disease can also be treated well. However, postmenopausal bleeding is also common in women who do not have a malignancy. To check this, an ultrasound is first made. If the endometrium on the ultrasound is too thick, an invasive and painful examination must be performed in order to be able to perform tissue examination.



The aim of this project is to use Artificial Intelligence (deep learning networks) and pre- and post-processing of the ultrasound images to develop a deep learning model that can distinguish between a benign and a malignant abnormality of the ovary or endometrium just as well experts but can be used by non-expert ultrasound users as well. Annotated data, computer hardware and software, and validated baseline (CNN) networks are readily available.

Where and when?
The project will take place at the Division of Image Processing, Department of Radiology, LUMC, https://lkeb.lumc.nl/ and the department of Gynaecology, LUMC. You will be supervised by dr. Bart Groen and dr.ir. Jouke Dijkstra. Start date of the project is flexible, duration is 6 – 12 months.

Who?
Students with a major in computer science, mathematics, biomedical engineering, artificial intelligence, physics, or a related area in the final stage of master level studies are invited to apply. Basic knowledge of Python programming is required, as well as interest and experience with machine learning and deep learning.

Interested?
Contact: dr. Bart Groen (b.groen@lumc.nl) or dr.ir. Jouke Dijkstra (j.dijkstra@lumc.nl)