

Learning

Subtitle

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Learning

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Abstract

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Preface

Part I

Introduction

Chapter 1

Introduction

1.1 Background and Motivation

Cancer Cancer is, today, the second leading cause of death in the world, only behind cardiovascular diseases.

The most common types of cancer in males are lung cancer, prostate cancer, colorectal cancer and stomach cancer. Stewart and Wild 2014

Statistics The western (or modern) world has been in a battle against cancer, and despite a lot of new cures/innovations it is still one of the deadliest killers in the world.

colorectal cancer You can get cancer in every major organ, but some types of cancer are more common than others. For instance cancer in the gastrointestinal tract (GI) is one of the more common places to get cancer. This is just behind x, and it has a mortality rate of x in the first y years. We often call this 5 year survival rate for z. This is the standard way to measure the life expectancy of a patient diagnosed with cancer.

polyps The colorectal cancer often starts in polyps. Polyps are, polyps do.

preventative matters and early detection A good way to fight cancer is to detect and remove it early, or some times remove areas with a high chance of getting cancer. We classify cancer in to x stages, and the stage the patient are in often determines the chance you have for survival. In general, the earlier you find the cancer, the more likely it is that the patient will survive. And as mentioned above, the colorectal cancer often starts in these polyps. A crucial stage to prevent cancer lies in the early removal of there polyps. Reports shows x about this

*4 stages maybe? *early detection *survival rate

Because of this the ability to find, and remove colorectal polyps is great for preventing cancer in the GI tract.

colonoscopy/On-tonoscopy In the most common way to look for polyps in the GI tract is to use a medical team, and perform a colonoscopy or On-tonoscopy colonoscopy is preformed with a camera.....

Onoskopy is the same procedure, only the camera is inserted orally.

Advantages * Accurate * **Disadvantages** *expensive

MRI

pillcam

In the last 3-4 years there have been testing and development on the pillcam project EIR. Machine learning has, through many of the earlier projects, got the detection rate for the polyps up to x%

Simulas contribution Simulas EIR

* CAD ACD (computer aided diagnosis, Automated computer diagnosis)

1.2 Goal / Problem

* Now that we got a lot of tests, why not unsupervised As mentioned, simula research centre has done a lot of testing on the pillcam project.

* We know that we can get some results using a neural network * Can this be done unsupervised? * Can it be done in a fashion that is better than S-ML

1.3 Scope and Limitations

* Something about earlier research already got far, so the scope is mainly unsupervised deep learning. * (and how to generalise it?)

1.4 Outline

The rest of the thesis is structured as follows:

Chapter 2 - Background

talk about cancer *talk about machine learning. *how to use ML on the pillcam video? **Chapter 3 - Me doing stuff**

Chapter 4 - Me got and presented result

Chapter 5 - Me saying result was good A+

Chapter 2

Background

2.1 Cancer

2.1.1 regular colonoscopy/ Gastroscopy

2.1.2 Pillcam

2.2 Machine Learning

Machine learning is a very broad term, but can in short be summarised by:

A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P , if its performance at tasks in T , as measured by P , improves with the experience E . Mitchell 1997 Here we have a

couple of parameters:

E text about p

T text about p

P text about p

From this we see that the goal of machine learning is to improve some performance P with experience. **might here talk about different tasks ML can do?**

2.2.1 Supervised & Unsupervised machine learning

We often divide machine learning into two (diffuse) categories: supervised and unsupervised.

Supervised learning: is the act of training with data that has an answer. The learning algorithm can't get supervision while training on the task.

Unsupervised learning: is the act of training without any supervision, on the sense that we do not give the algorithm the answer to the training data set.

In the description of supervised vs unsupervised we looked at a specific branch of machine learning: Classification. Classification is, as the name implies, the task of getting data sorted in to groups of similarity.

2.2.2 Tasks (other better word goes here)

- Classification
- regression
- transcription/translation
- de-noising / finding missing inputs

2.2.3 The rate of success

What is a good result, how to measure?

FP,TN,FN,TP

2.3 supervised vs unsupervised

What it means to be S/US.

Something about the kind of experience allowed during the learning process.

2.4 Unsupervised

noe med å dele i grupper? Experience the dataset containing many features, and finds useful properties of the structures. ***Unsupervised learning algorithms** experience a dataset containing many features, then learn useful properties of the structure of this dataset. In the context of deep learning, we usually want to learn the entire probability distribution that generated a dataset, whether explicitly, as in density estimation, or implicitly, for tasks like synthesis or denoising. Some other unsupervised learning algorithms perform other roles, like clustering, which consists of dividing the dataset into clusters of similar examples. Goodfellow, Bengio, and Courville 2016*

2.4.1 Approaches to unsupervised learning

look at the subsection 2.2.2 to see what applies to the unsupervised.

2.4.2 Deep Unsupervised learning

2.4.3 more

2.5 Related work

Part II

The project

Chapter 3

Planning the project

Part III

Conclusion

Chapter 4

Results

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