Research Journal

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Contents

Thursday, 1st June 2017 **1**

1 Summary 1
2 Placement objectives 1
3 Reading a paper critically 1
4 Structuring your time 2
5 Figuring out what to write about 2
6 Structuring your work 3
7 How to use this book 3

Thursday, 1st June 2017

1 Summary

- Set up this labbook.
- Wrote down what I'd like to achieve during my placement.
- Listed a bunch of classic computer vision papers.

2 Placement objectives

During my 8-week placement I would like to:

- Apply and understand the most useful computer vision algorithms.
- Write either a statistics, machine learning, or computer vision research paper worthy of publication.
- Develop a systematic workflow to problems involving data, and demonstrate this workflow in publicly available scripts or notebooks.

3 Reading a paper critically

- Motivations for the problem posed
- The choices made in finding a solution
- The assumptions behind the solution
- The validity of those assumptions
- Whether assumptions can be removed without invalidating the approach
- What was accomplished
- Future research directions

4 Structuring your time

I think it's realistic to aim for 12 hours of productive work each day. This includes reading, studying, and running my own experiments. To begin with, I think I should spend at least three-quarters of this time learning. Maybe by week four I will shift the ratio.

I will see how it goes, but I suspect I will prefer to work from the University rather than DNV-GL's offices.

To make this placement a success, I will need to be disciplined about how I use my time. I know that if I get up early and immediately go to work, I can easily crack out four hours without breaking a sweat. After this time I can take at least a couple of hours - go to the gym, read, walk, or - of course - eat. After that I'll get back on that horse for another four or five hours, before taking another short break, then do a few more hours.

Having lots of sleep is important for my mental health and emotional wellbeing, so I should aim to get at least eight hours. If I get up at six, this means that I should go to bed at half-nine. I can work from my flat, University buildings, or the DNV-GL offices. It would be a good idea to mix the places I study up - I know this has helped me keep focused in the past. I need to be careful to provide some time for myself too, so that I can recuperate: I think two hours at the end of the day, eight until ten, will be enough.

5 Figuring out what to write about

1. Narrow down your field of study

2. Define what to investigate

3. Establish a thesis or an argument

I am studying computer vision and statistics. This is because I want to build robust algorithms to understand visual information, which in turns makes it easier to automate difficult or tedious tasks, such as watching CCTV cameras or spotting damage to structures in video footage. I am doing this so that we will know more about how patterns in visual information can be found, and so that we can exploit these patterns to automate economically and socially beneficial tasks. I am also interested in how we can represent visual information to make it easier to work with and to understand.

6 Structuring your work

1. Find data that poses an unsolved problem, or find a problem that needs data to be solved.
2. Find the data, or pose the problem.
3. Review the relevant literature.
4. Propose a solution, then run experiments and conduct analysis to test that solution.
5. Write up the results.

7 How to use this book

I should use this book to record what I'm doing, ideas and conversations I have, experiments I run, papers and books to read, things I understand and don't understand - everything related to my research. It only takes a few minutes to put a screenshot in this document - remember this!

As a habit, at the beginning of each day I will write down what I plan to do. At the end of the day I'll review what I've done. I should also review the book each week, to get an idea what I've been up to and where I'm headed.

Thursday, 1st June 2017

Papers

Title	Authors	Year	Topic	Read
Theory of Edge Detection	D. Marr, E. Hildreth	1980	Computer vision	No
A Computational Approach to Edge Detection	J. Canny	1986	Computer vision	No
Determining optical flow	B.K.P. Horn, B. Schunk	1981	Computer vision	No
An iterative image registration technique with an application to stereo vision	B. Lucas, T. Kanade	1981	Computer vision	No
Snakes: Active contour models	M. Kass, A. Witkin, D. Terzpoulos	1988	Computer vision	No
Eigenfaces for recognition	M. Turk, A. Pentland	1991	Computer vision	No
Shape and motion from image streams under orthography: a factorization method	C. Tomasi, T. Kanade	1992	Computer vision	No
Texture features for browsing and retrieval of image data	B. Manjunath, W. Ma	1996	Computer vision	No
Conditional density propagation for visual tracking	M. Isard, A. Blake	1998	Computer vision	No
Normalized cuts	J. Shi, J. Malik	2000	Computer vision	No
Non-parametric model for background subtraction	A. Elgammal, D. Harwood, L. Davis	2000	Computer vision	No
Distinctive image features from scale-invariant keypoints	D. Lowe	2004	Computer vision	No