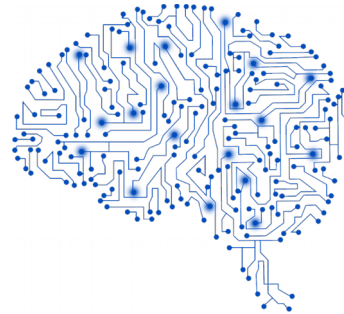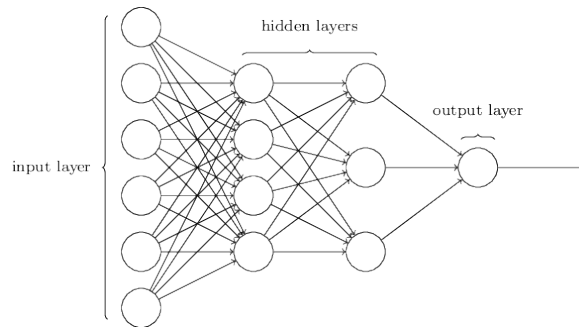# *Deep Learning*

Coursework on de-noising and representation learning for matching [100 points]

Release on 11 Jan 2019, the report due on 22 March 2019 (midnight)

Interim report due on 22 February (midnight)

The coursework requires python programming. Use the environment/toolbox/code, as specified in Q&A http://goo.gl/M5qHBp.

Submission instructions:

Page limit: 4 (four) A4 pages per report. List of references and appendix do not count for this page limit. Use report Latex template from Blackboard.

General principles for writing technical report are expected to be known and adhered to. Similarly for practices in conducting experiments, some are as listed below:

- Select relevant results that support the points you want to make rather than everything that matlab gives.

- The important results should be in the report, not just in the appendix.

- Use clear and tidy presentation style, consistent across the report e.g. figures, tables.

- The experiments should be described such that there is no ambiguity in the settings, protocol and metrics used.

- The main points are made clear, identifying the best and the worst case results or other important observations.

- Do not copy standard formulas from lecture notes, explain algorithms in detail, or copy figures from other sources. References to lecture slides or publications/webpages are enough in such cases, however short explanations of new terms or parameters referred to are needed.

Find and demonstrate the parameters that lead to optimal performance and validate it by presenting supporting results. Give insights, discussions, and reasons behind your answers. **Quality and completeness of discussions within the page limit** will be marked. Include formulas where appropriate, results presented in figures, and their discussions.

Code required for the experiments can be taken from any public library if available, otherwise implemented if necessary.

Submit the report in **pdf** through the Blackboard system. No paper copy is needed. Write your **full names, logins and CID numbers on the first page. Use login in the submitted filename e.g. login.pdf.** The latest submission before the deadline will be assessed.

Download **HPatches** dataset from Blackboard.

> Perform nearest neighbour matching experiments according to standard practices in machine learning. Use the performance metric to evaluate the methods according to HPatches benchmark protocol.

4 page final report should include:

[6 points] 100 word summary

[20 points] Formulation of the Machine Learning problem you address

[20 points] Training and evaluation of the baseline approach.

[20 points] Proposed improved approach, discussing what challenge and how it is specifically addressing.

[20 points] Insightful and comparative evaluation of the proposed approach.

[14 points] A source code that executes the training and testing of the reported methods in a zip package (login.zip). Do not include the data in the zip file. Short user instructions should be included in an appendix of the report. Place the zip on external repository (e.g. Box) and include link in the report.

Both baseline and improved approach should be included. Insignificant improvement upon baseline performance will not be penalised in marking. The quality of the report and proposed idea for improvement is essential.

1 page interim report should include (interim marks can be improved by the final marks) :

[6 points] 70 word summary

[20 points] Formulation of the Machine Learning problem you address

[20 points] Training and evaluation of the baseline approach, planning of the experiments and figures to be included in the final report. Preliminary figures (e.g. relevant figures from tutorial exercises) can be included on an extra page but referred to in page 1.