MONASH University

Information Technology

FIT5186 Intelligent Systems

Unit Overview

Southeast University-Monash University
Joint Graduate School

Suzhou, China
2018

Chief Examiner and Lecturer

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Unit Objectives

- This unit introduces main techniques widely used in intelligent software systems, with focus on neural networks.
- On completion of this unit, students will have a knowledge and understanding of:
  - the applications of intelligent software systems;
  - the principles and theoretical underpinning of intelligent software systems;
  - the models and approaches to building intelligent software systems;
  - the advantages and limitations of intelligent models and approaches for solving a wide range of practical business problems;
  - current research trends in the field.
- Students will gain hands-on experience in solving real business problems in tutorials and assignment, using commercially available neural network software.

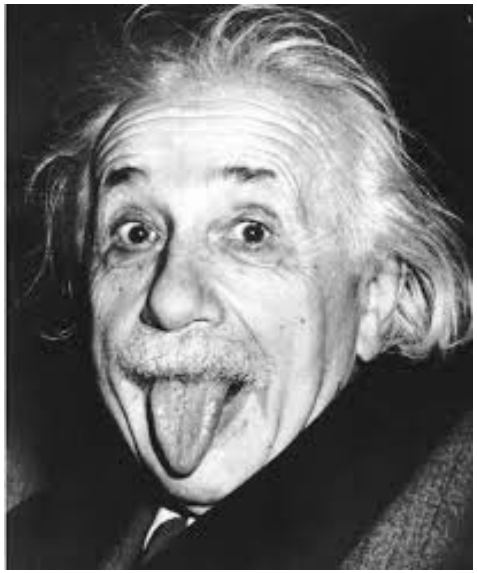
A Practical Approach with Theoretic Foundation

- No theory is good unless one uses it to go beyond.

  - Andre Gide (1869-1951)

- Imagination is more important than knowledge. For knowledge is limited to all we now know, while imagination embraces the entire world, and all there ever will be to know and understand.

  - Albert Einstein (1879 - 1955)



- The formulation of a problem is often more essential than its solution, which may be merely a matter of mathematical or experimental skill.

- Einstein, A. and Infeld, L. (1938). *The Evolution of Physics*. Simon and Schuster, New York

Lecture Topics and Timetable (Weeks 1-6)

Week*	Topic
1	**Unit Overview** **1. Introduction to Intelligent Systems and Neural Networks**
2	**2. Neuron Learning and Perceptrons**
3	**3. Multilayered Networks**
4	**4. Supervised Learning - Backpropagation Learning Rule**
5	**5. Classification and Prediction with Case Studies**
6	**6. Unsupervised Learning - Clustering with Self-Organisation**

* The week number is based on the JGS timetable in Suzhou, while the week number on Moodle is based on the Monash University timetable in Melbourne.

Lecture Topics and Timetable (Weeks 7-13)

Week	Topic
7	7. Unsupervised Learning with Adaptive Resonance Theory
8	8. Data Mining and Knowledge Discovery
9	9. Other Intelligent Techniques
10	Semester break
11	10. Fuzzy Logic
12	11. Business Intelligence Modelling - Decision Analysis under Uncertainty
13	12. Decision Trees, Decision Making using Sample Information Revision and Exam Preparation

Assessment

- **One assignment (40%)**
  - Solving a classification or prediction problem of your choice using a neural network model.
  - The assignment can be an individual work or a team work of 2 or 3 students.
  - **Assignment proposal (10%)** is due on Friday 27 April 2018 (Week 9).
  - **Assignment paper (30%)** is due on Friday 25 May 2018 (Week 13).
- **Final 2-hour written examination (60%)** - Week 15
- **To pass the unit**, students must achieve
  - no less than 50% of the total marks available for the unit
  - no less than 40% of the total marks for the assignment
  - no less than 40% of the total marks for the final exam

Recommended Reading - Books

- Smith, K.A. (1999). *Introduction to Neural Networks and Data Mining for Business Applications*. Eruditions Publishing, Melbourne.
- Samarasinghe, S. (2007). *Neural Networks for Applied Sciences and Engineering: From Fundamentals to Complex Pattern Recognition*. Auerbach Publications, Boca Raton, FL., USA. (e-book from Monash Library)
- Dreyfus, G. (2005). *Neural Networks: Methodology and Applications*. Springer-Verlag, Berlin Heidelberg, Germany. (e-book from Monash Library)
- Engelbrecht, A.P. (2007). *Computational Intelligence – An Introduction,* Second Edition. Wiley, West Sussex, England.
- Negnevitsky, M. (2011). *Artificial Intelligence – A Guide to Intelligent Systems*, Third Edition. Addison Wesley, Harlow, England.

Skills Needed

- Listening – during lectures
- Reading – lecture notes and recommended reading
- Writing – your assignment will be a short report.
- No programming
  - You will be using neural network software (NeuroShell 2) and other software available in the tutorial lab.
- Secondary school mathematics
  - Equation of a straight line, multiplication & addition.

End of Unit Overview

Questions?