

EE4211 Data Science for the Internet of Things

Instructors	Teaching Assistants
Mehul Motani, Biplab Sikdar	Liu Shiyu, John Tan Chong Min, Shelvia Wongso
Email: {Motani, bsikdar}@nus.edu.sg	Email: {shiyu_liu, e0441892, e0385059}@u.nus.edu

Course Description

This module covers data analytics for the Internet of Things. It starts with an introduction to the Internet of Things (IoT) systems, including the enabling technologies, IoT network architectures and protocols. IoT systems have applications such as semiconductor manufacturing, smart power grids, and healthcare. The module then covers data science fundamentals such as Bayesian statistics, classification, supervised learning, unsupervised learning, and deep learning. The module also covers basic machine learning algorithms such as decision trees, logistic regression, support vector machines, and neural networks. Students will visualize and analyze real-world data sets via practical IoT case studies.

Syllabus / Topics Covered (Mehul Motani)

1. Introduction to the Course
2. Statistical Thinking Review
3. Introduction to Machine Learning
4. Decision Trees
5. Support Vector Machines
6. Model Performance
7. Neural Networks

Course Mechanics

- Online videos to learn and understand the basics of machine learning
- Interactive sessions to clarify details and answer student questions
- Online quizzes to test your basic knowledge of the material
- Problem solving assignments / homework to reinforce the concepts studied in the lectures
- Programming assignments in Python to allow you to practice implementing machine learning algorithms
- More complex project to combine your machine learning skills with creative problem solving
- Course material will be available on LumiNUS: <https://luminus.nus.edu.sg>
- We will also be using Piazza (piazza.com) for Q-and-A and announcements.

Selected References

1. An Introduction to Statistical Learning: (2013) (Springer Series in Statistics), by G. James, D. Witten, T. Hastie and R. Tibshirani. <http://www-bcf.usc.edu/~gareth/ISL/>
2. The Elements of Statistical Learning (Springer Series in Statistics) (2001 & 2009), by T. Hastie, R. Tibshirani, J. H. Friedman. <http://web.stanford.edu/~hastie/ElemStatLearn/>
3. Python machine learning, 2nd edition, by Sebastian Raschka and Vahid Mirjalili, Packt Publishing Ltd, 2017.
4. Understanding Machine Learning: From Theory to Algorithms, by Shai Shalev-Shwartz and Shai Ben-David, Cambridge University Press, 2014.
5. Internet-of-Things (IoT) Systems: Architectures, Algorithms, Methodologies, by Dimitrios Serpanos and Marilyn Wolf, Springer, 2017.
6. Computer Networking: A Top-Down Approach Featuring the Internet, by J. Kurose & K. Ross, Pearson/Addison-Wesley, 3rd edition, May 2004. 4th edition, July 2007