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# Course Information

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## Administrative Details

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<b>Instructor:</b>	<b>Mehul Motani</b>
Email:	<a href="mailto:motani@nus.edu.sg">motani@nus.edu.sg</a> <a href="mailto:mehul.motani@gmail.com">mehul.motani@gmail.com</a>
Hours:	By appointment

Assessment:	40% Quiz 20% Assignment 40% Project
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# Syllabus / Topics

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- Applications of AI/ML to IoT based systems
- Supervised Machine Learning Algorithms
  - Linear Regression
  - Decision Trees & Random Forest
  - Support Vector Machines
  - Neural Networks
- Performance Evaluation
  - Confusion matrix
  - Bias vs. Variance

## Learning outcomes

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After you complete the module, you should be able to:

1. Understand network architectures and protocols for Internet-of-Things networks.
2. Identify and differentiate supervised and unsupervised machine learning algorithms.
3. Deploy machine learning algorithms on complex real-world IoT data sets.
4. Analyze and visualize complex real-world IoT data sets.

# What are we going to do in class?

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- 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
- 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 References

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- 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/>
- The Elements of Statistical Learning: Data Mining, Inference, and Prediction (Springer Series in Statistics) (2009), by T. Hastie, R. Tibshirani, J. H. Friedman.  
<http://web.stanford.edu/~hastie/ElemStatLearn/>
- Understanding Machine Learning: From Theory to Algorithms, by Shai Shalev-Shwartz and Shai Ben-David, Cambridge University Press, 2014.
- Internet-of-Things (IoT) Systems: Architectures, Algorithms, Methodologies, by Dimitrios Serpanos and Marilyn Wolf, Springer, 2017.
- 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.
- Other links to references will be provided throughout the semester and updated on the course webpage.

# Getting to know each other

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- Why are you taking this class?
  - Do some self-reflection and let me know your goals for this class.
- How will we run the class?
  - Video lectures and Interactive sessions
  - Critical Thinking and Independent learning
- What do I expect?
  - Watch the lecture before the interactive sessions
  - Do the assignments and homeworks
  - Ask questions – Feel free to email me if you have questions.
  - Read the assigned materials and also read/learn things on your own.
- What will you get out of it?
  - Understand Concepts of Data Science/ML
  - Learn how to think about problems and solutions
  - Learn how to learn

## Learning How to Learn

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- Cultivate your curiosity - You should read extensively outside of class. Read blogs and technical papers.
- Talk to Other Professors and Students
  - Find out what other researchers are working on to get a broad idea of the research space
- Good source of references include:
  - Blogs, Textbooks, Magazines and Journal articles
  - NUS: Physical Library & Digital Library
  - IEEEExplore database, ACM Digital Library
  - Machine Learning Research: PMLR / JMLR
  - Arxiv.org, Baidu, Google
- Great Web Site for Advice on Research:  
<http://www.cs.cmu.edu/~mleone/how-to.html>

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