VietAI Class Syllabus

Week 1:

Course introduction.
Mathematics review (Linear Algebra, Probability, & Calculus).
Introduction to Python and NumPy libraries.
Exercise:

- Use Python to solve simple problems.
- Use Numpy to execute simple computations.

Lab: Install and use TensorFlow with GPU on Google Cloud Platform.

Week 2:

Introduction to Machine Learning and its real-world applications.
Introduction to Tensorflow.
Linear Regression to predict real-valued outputs.
Exercise:

- Use Tensorflow to execute simple computations.
- Use Linear Regression to predict house prices.

Week 3:

Logistic Regression to solve binary classification problem.
Gradient Descent to learn parameters in models.
Softmax Regression to solve multi-class classification problem.
Assignment 1 (20%):

- Using Logistic Regression to recognize Vietnamese motorbikes.
- Using Softmax Regression to solve handwriting recognition problem.

Week 4:

Introduction to Neural Networks.
Backpropagtion algorithm, stochastic gradient descent, and dropout.
Assignment 2 (20%):

- Using Feedforward Neural Networks to improve handwriting recognition accuracy.

Week 5:

Introduction to Convolutional Neural Networks (CNNs) and commonly used architectures (AlexNet, VGGNet, InceptionNet, ResNet).
*Lab***:** Using CNNs to improve handwriting recognition accuracy.

Week 6:

Midterm Quiz (10%).
Introduction to deep learning for natural language processing.
Introduction to word embeddings.
Introduction to Recurrent Neural Networks (RNNs) and language modeling.
Assignment 3 (20%):
Using RNNs to do sentiment analysis.
Course project: introduction.

Week 7:

Revise RNNs and introduction to Long Short-Term Memory (LSTM).
Introduction to sequence-to-sequence (seq2seq) models & their applications.
Lab: Neural machine translation tutorial using seq2seq.
Course project: discussion.

Week 8:

Introduction to Attention Mechanism for seq2seq.
Advances of seq2seq models.
Course project: discussion.

Week 9:

Guest Lectures.
Course project: discussion.

Week 10:

Guest Lectures. Course Review.
Course project (30%): presentation + report.