

Course Content

Course Title (English)	Machine Learning and Having It Deep and Structured
Course Title (Chinese)	機器學習及其深層與結構化
Credit	3
Instructor	Prof. Hung-Yi Lee 李宏毅 教授
Outline	<p>你可能已經修過和計算機程式相關的課程，能夠設計程式讓電腦處理一些簡單的問題，但是你有沒有想過，那些處理非常複雜問題的程式，例如：將語音辨識成為文字的程式，是如何設計出來的呢？事實上，這些程式中的演算法並非由人類直接設計，而是由人類寫出讓機器能夠根據資料學習的演算法後，讓機器自動由大量的資料和過去的經驗找出可以處理這些問題的方法，而如何設計出讓機器自動學習的演算法就是「深度學習」這個領域在探討的問題。</p> <p>本課程旨在介紹深度學習方法，也就是機器如何根據過去的資料或經驗學習去解決人類感興趣的問題，例如：如果我們想讓機器能夠偵測一張相片是否包含人臉，我們可以讓機器「瀏覽」大量的相片，並「告知」機器哪些相片有人臉、哪些相片沒有，機器便可以利用這些資訊自動去建構出鑑別一張相片是否包含人臉的模型，當使用者輸入新的相片時，機器便根據所學的模型去偵測一張相片是否包含人臉。</p> <p>希望透過這門課學生對深度學習的技術可以有系統性的認識，並具備實作這些技術的基本能力，以期在未來能將這些技術活用到各自的專業領域中。</p>

	<p>You may have taken courses related to computer programming and can write programs to handle some simple tasks. But have you ever wondered how to design the programs that can deal with very complex tasks? For example, how does Gmail know if an email is a spam? How does Facebook know if a photo contains a human face? How does Siri understand and answer user questions? Why is Alpha Go made by humans better than professional chess players? Humans do not directly design the algorithms in these programs. Instead, humans write algorithms that allow machines to learn from data.</p> <p>This course aims to introduce deep learning, that is, how the machine learns to solve problems based on past data or experience. For example, if we want a machine to detect whether a photo contains a human face, we can let it "browse" many photos and "tell" it which photos have faces. The machine can use this information to construct a model automatically. When the user enters a new photo, the machine will detect whether a photo contains a human face according to the learned model. Through this course, students can have a systematic understanding of deep learning technologies.</p>
<p>Goal</p>	<p>本課程有四個作業，以組為單位，一到三人一組。四個作業內容如下：</p> <ol style="list-style-type: none"> 1. 深度學習理論驗證 2. 序列對序列模型 3. 機器二次元人物頭像生成 4. 機器打電玩 <p>本學期沒有期末專題。本學期希望只收 40 人。想要修課的同學需要完成作業零，作業零會在第一次上課時公布，作業零會是過去機器學習這門課的某一個作業(也就是變相擋修機器學習，但是只要你對機器學習這個領域非常熟悉仍然有機會修課)。</p>

	<p>There are four assignments in this course as follows:</p> <ol style="list-style-type: none"> 1. Deep learning theory verification 2. Sequence-to-sequence model 3. Anime Face Generator 4. Machine playing video games <p>There are no final topics for this semester. Students who want to take a course need to complete homework zero, which will be announced during the first class. Homework zero will be a certain homework of the machine learning course in the past.</p>
English Teaching	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Teaching Material	<input checked="" type="checkbox"/> English <input type="checkbox"/> Chinese