Engineering Course Analysis

Group Six

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Motivation and Objective

- Technology has been evolving ever so rapidly for the past two decades.
- Both students and Departments concerned with technical learning need to keep up with the demanding changes.
- The Course Catalog of a department gives a brief, yet exhaustive description of all subjects covered.
- Analysis on a new dataset created from course catalogs provided an interesting challenge to understand how the universities have changed over time.

Methodology

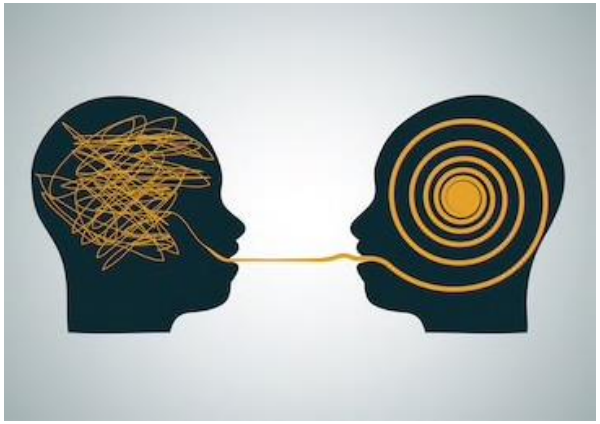
- Catalog descriptions were scrapped to analyze the occurrence of every word and pair of words (2006-present)
- The unigrams, and bigrams along with their occurrence frequency were stored in a database (managed through SQLite)
- Pairs of words (or *Bigrams*) were of relatively higher relevance ("Signal Processing", "Machine Learning", "Fuzzy Logic", "Integrated Circuits")

Catalogs

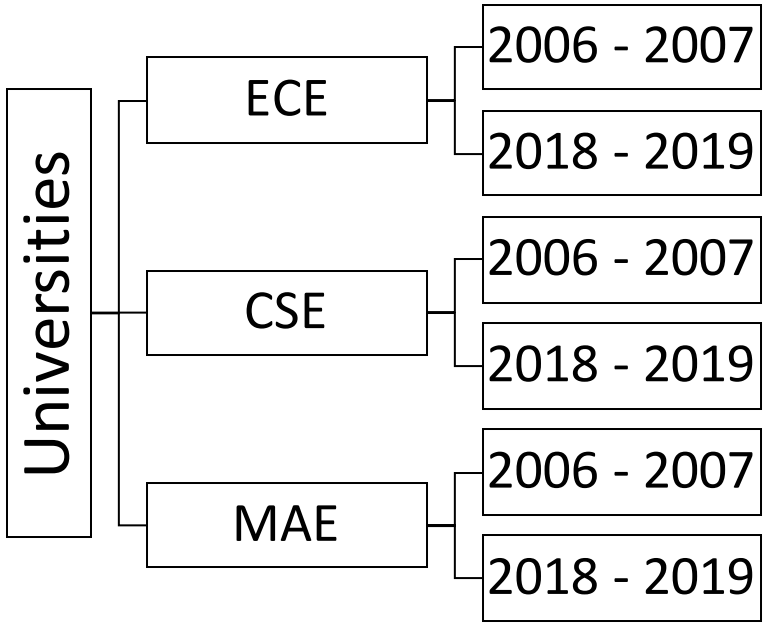
Word Frequency database

Methodology

- To shorten the features of interest and derive more meaning, lemmatization was used (NLTK python library)
- Words with minimal frequency and common words ("credits","pre-requisites", "classes") were discarded, to make the final processed dataset.
- Job descriptions from companies were collected and they underwent the above processing as well.

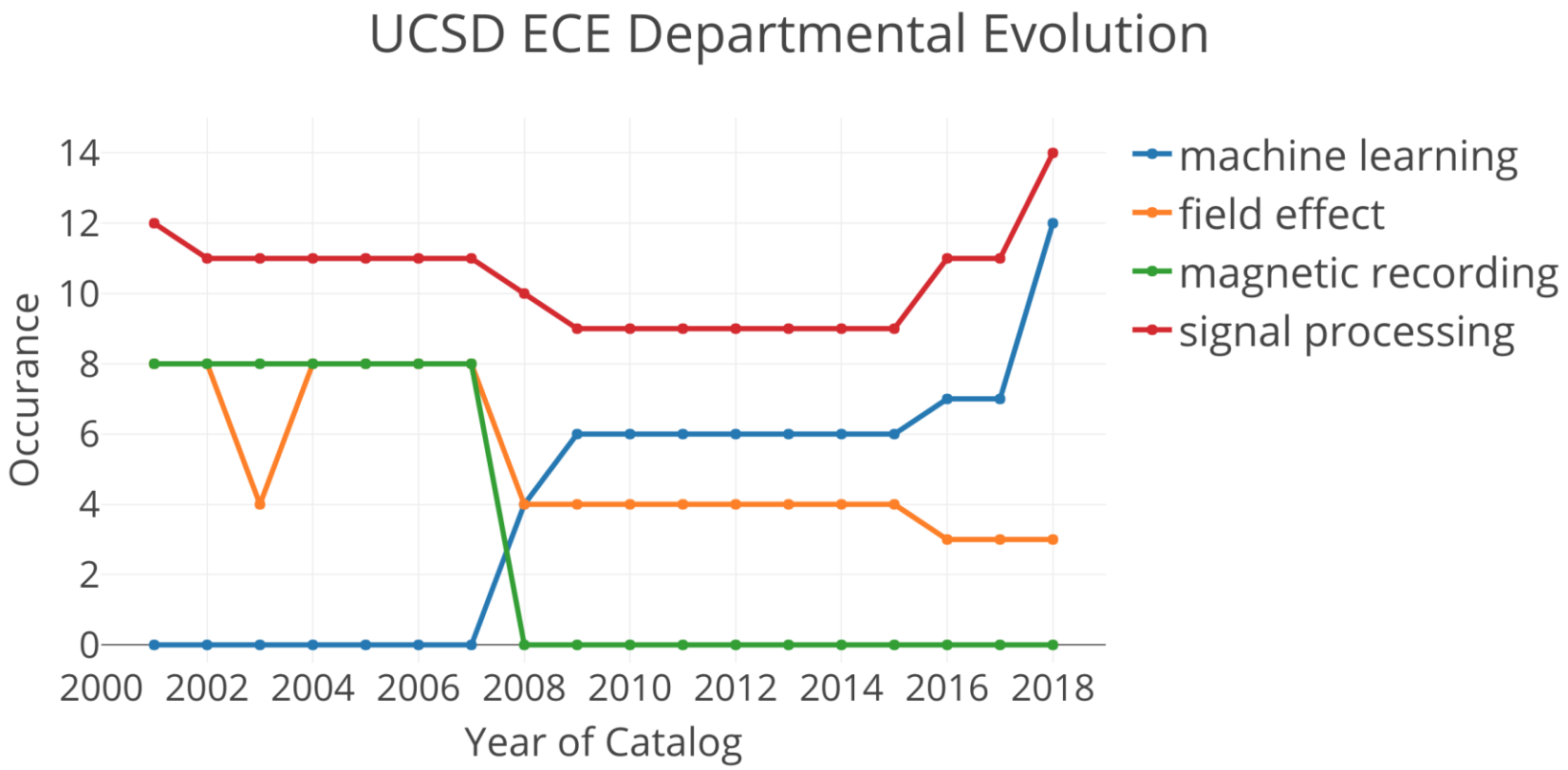


Dataset

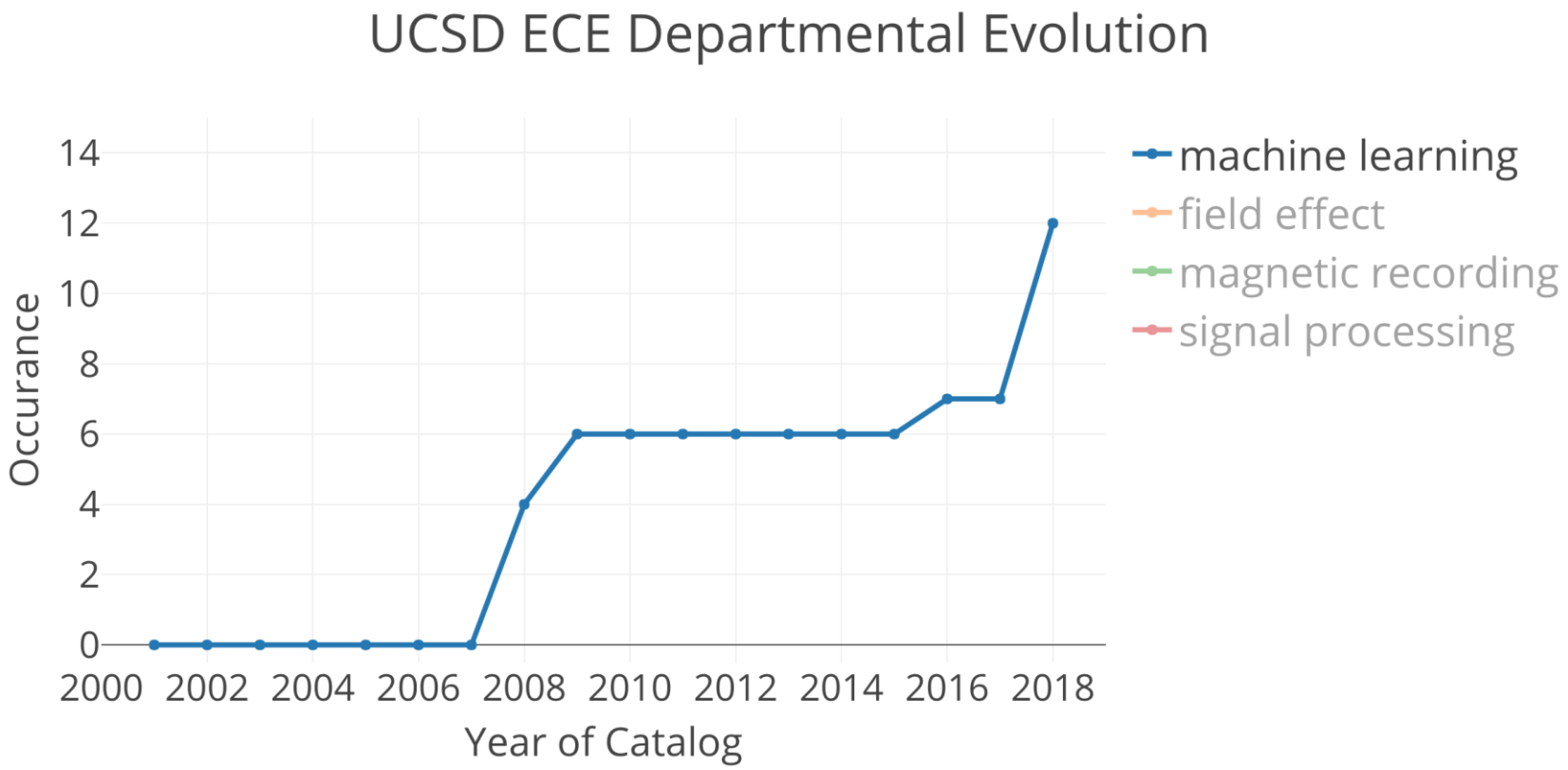


- Universities
  - UCSB, UCLA, UCB, UCSD
- Departments
  - CSE, ECE, MAE
- 4*3*13 – 156 units scrapped
- Text analysis– Bigrams, Stemming and Lemmatization (NLTK library), Occurrence frequency analyzed.
- Database management tool - SQLite

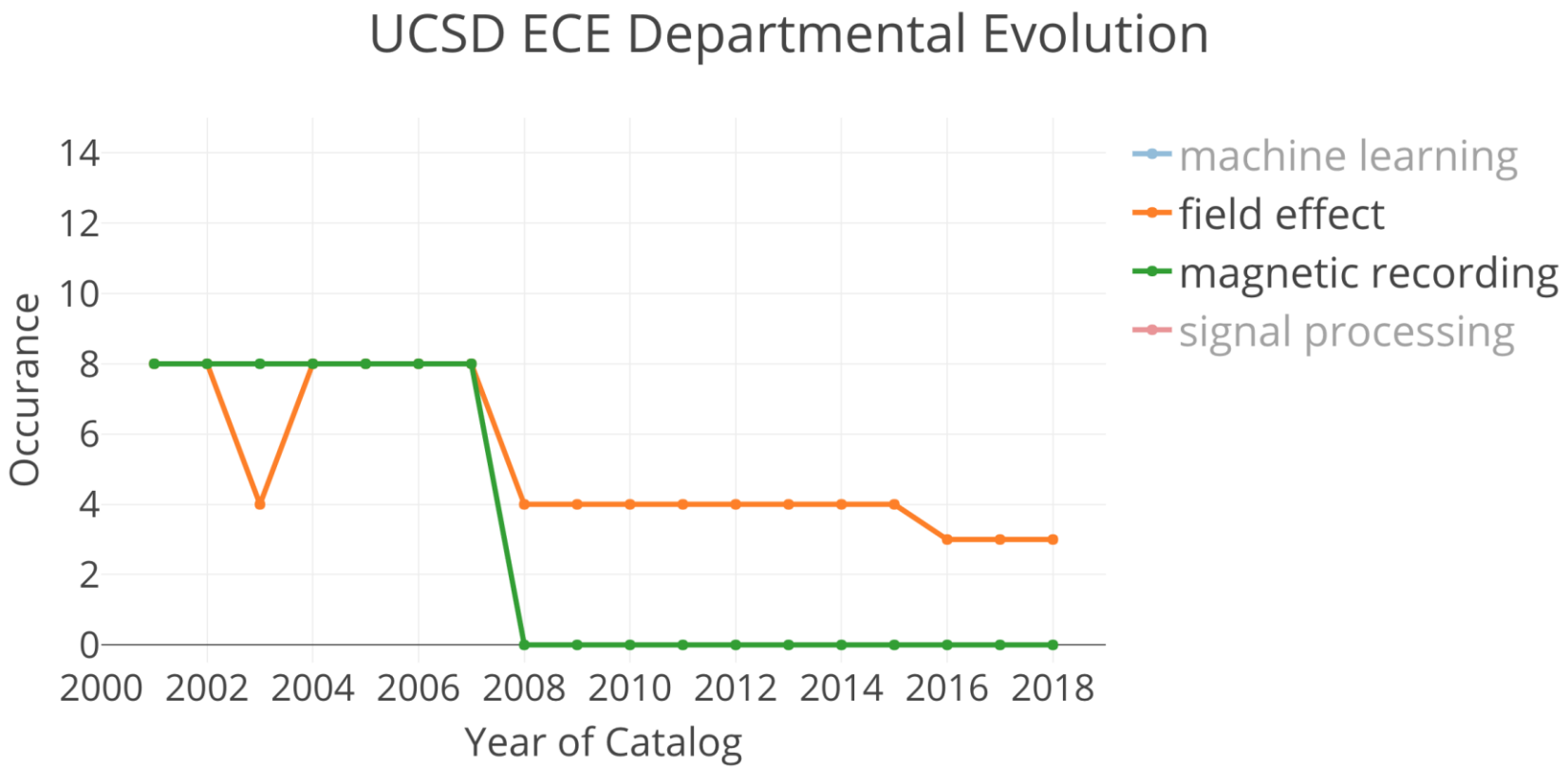
ECE department at UCSD has been dynamic



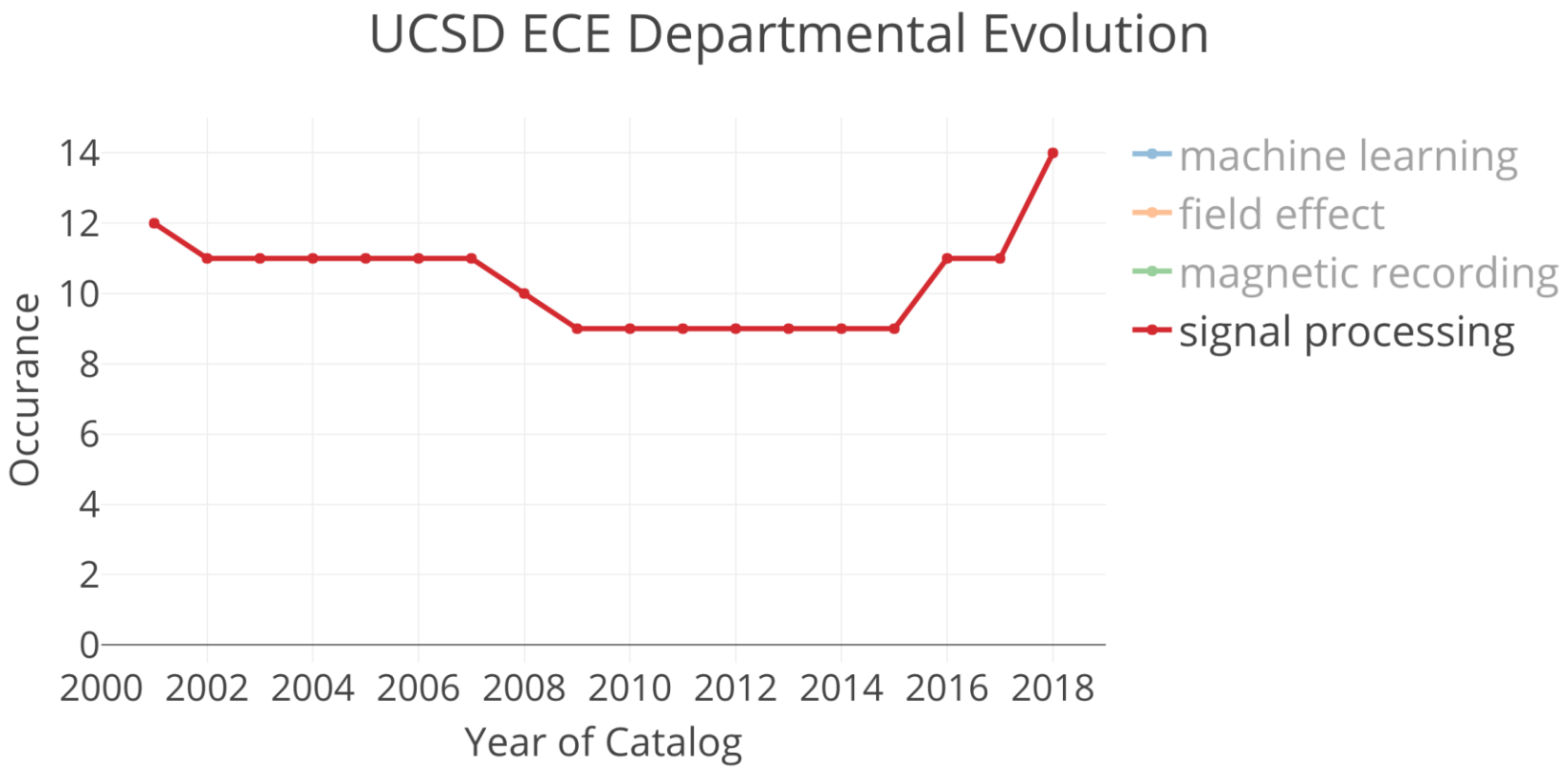
Machine learning has gained increasing attention by industry and public. The department is not left behind.



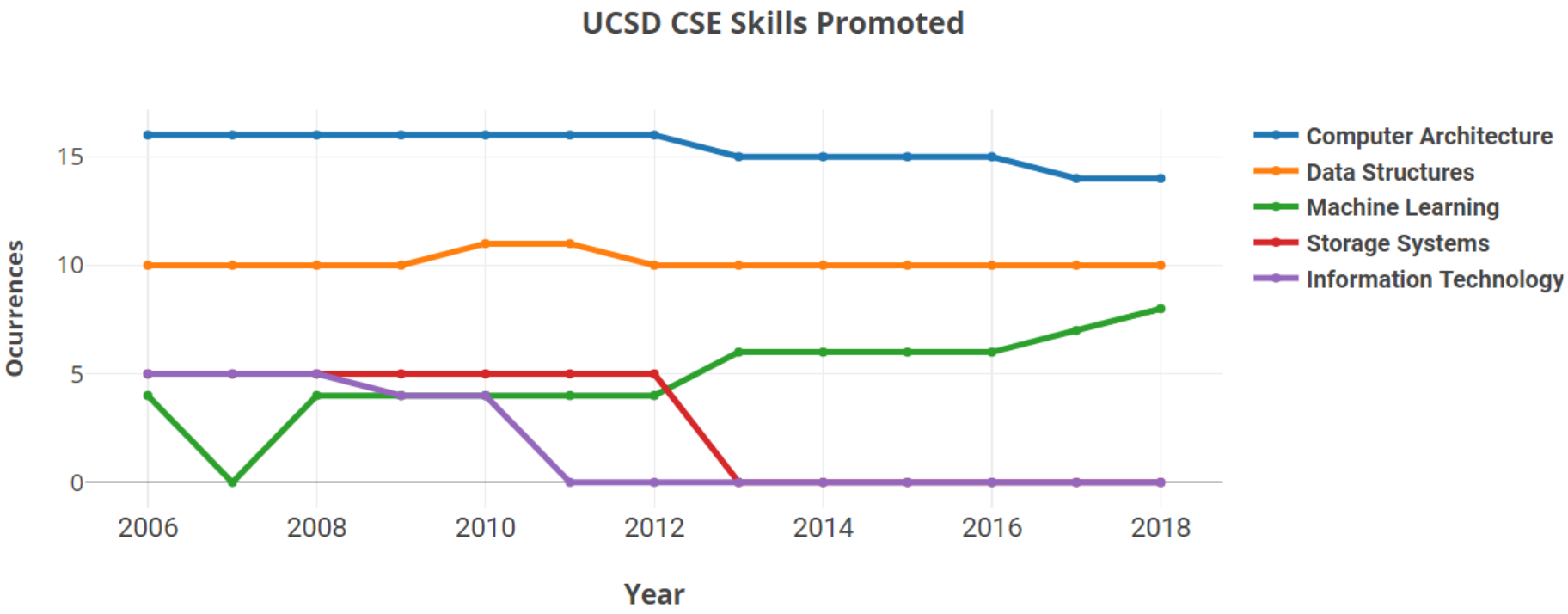
Interest in **magnetic recording** and **field effect** has also dropped as expected.



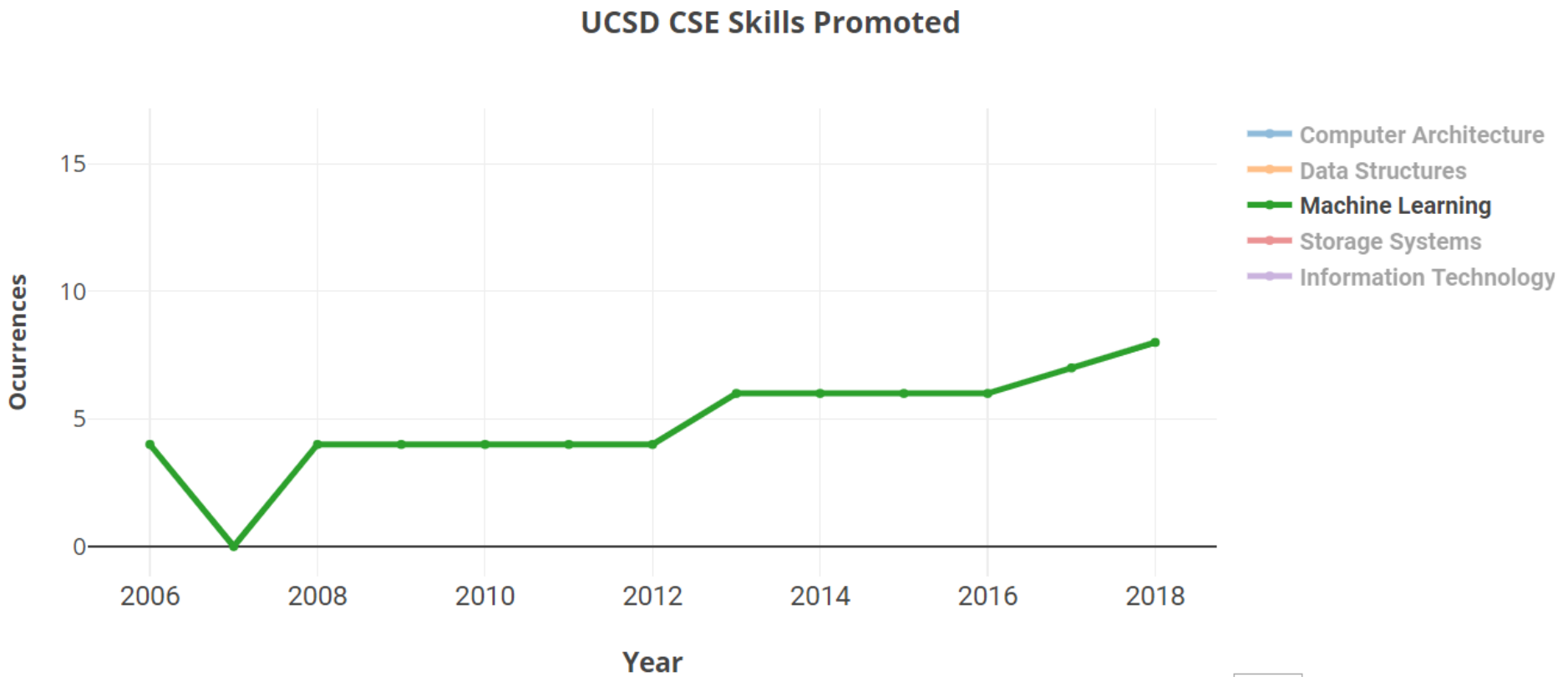
Those ECE core knowledges remain as important parts of the department and new applications of these knowledges are essential for the future.



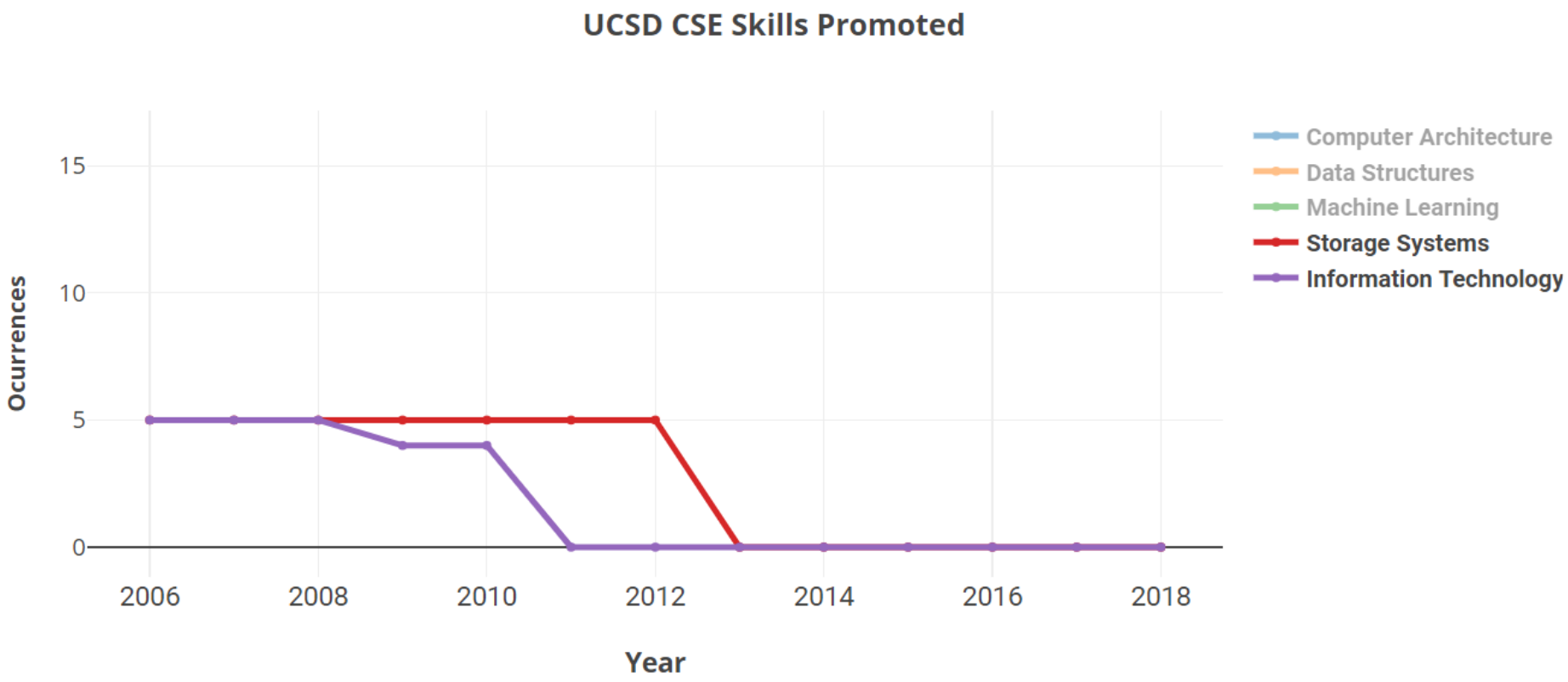
What's hot at UCSD CSE?



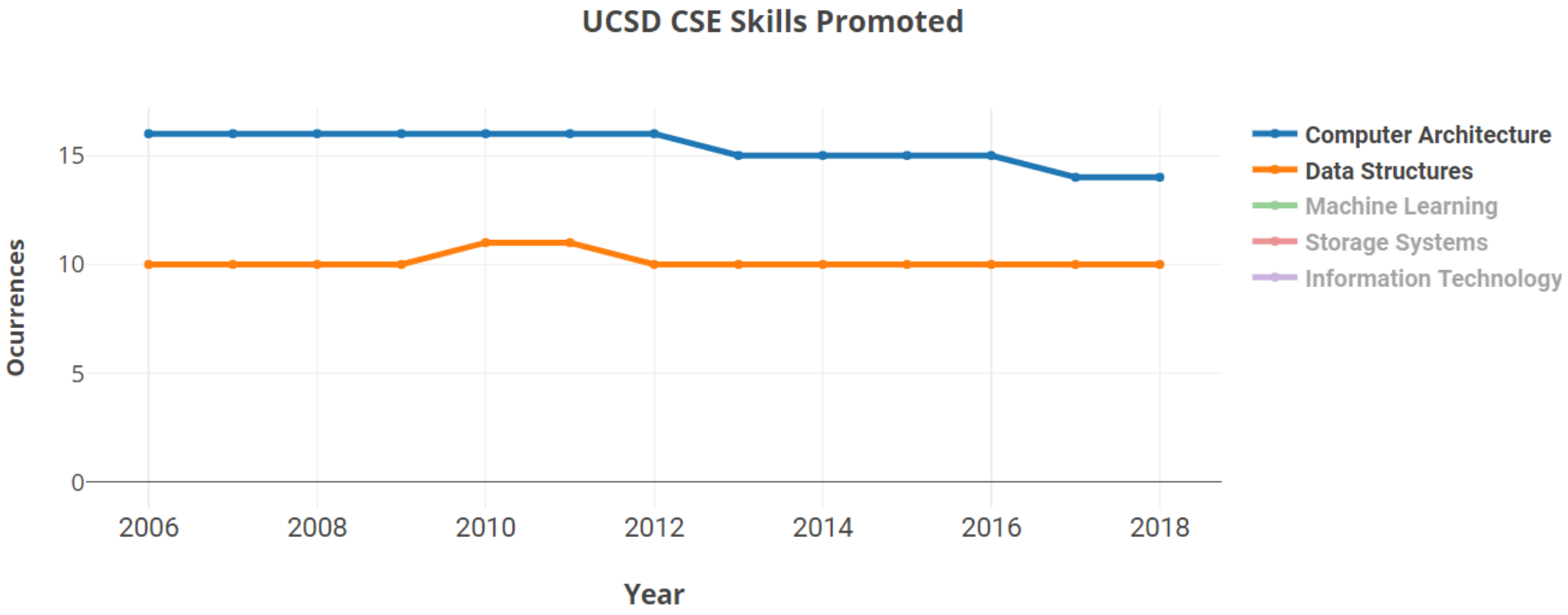
Machine Learning is **RISING**



Information Technology & Storage Systems are **GONERS**

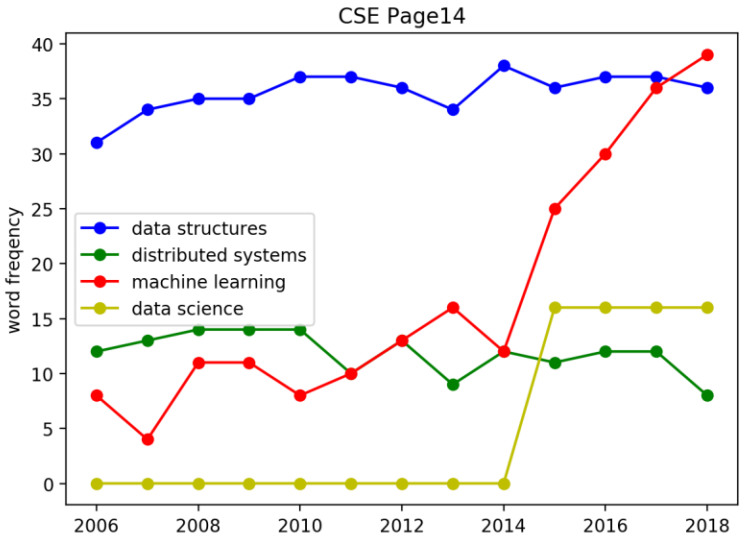


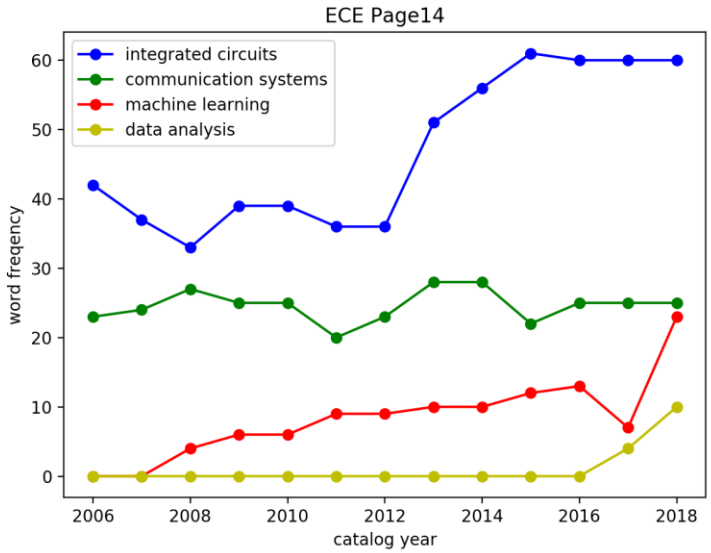
Computer Architecture & Data Structures **STAY STRONG**

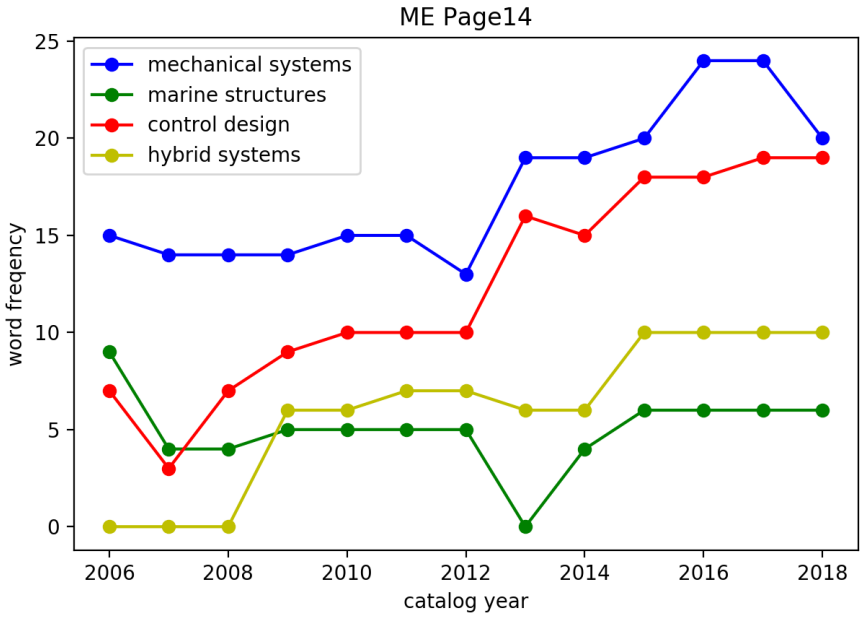


ECE & CSE Departments Change Frequently

MAE lacks booming subjects during the time period







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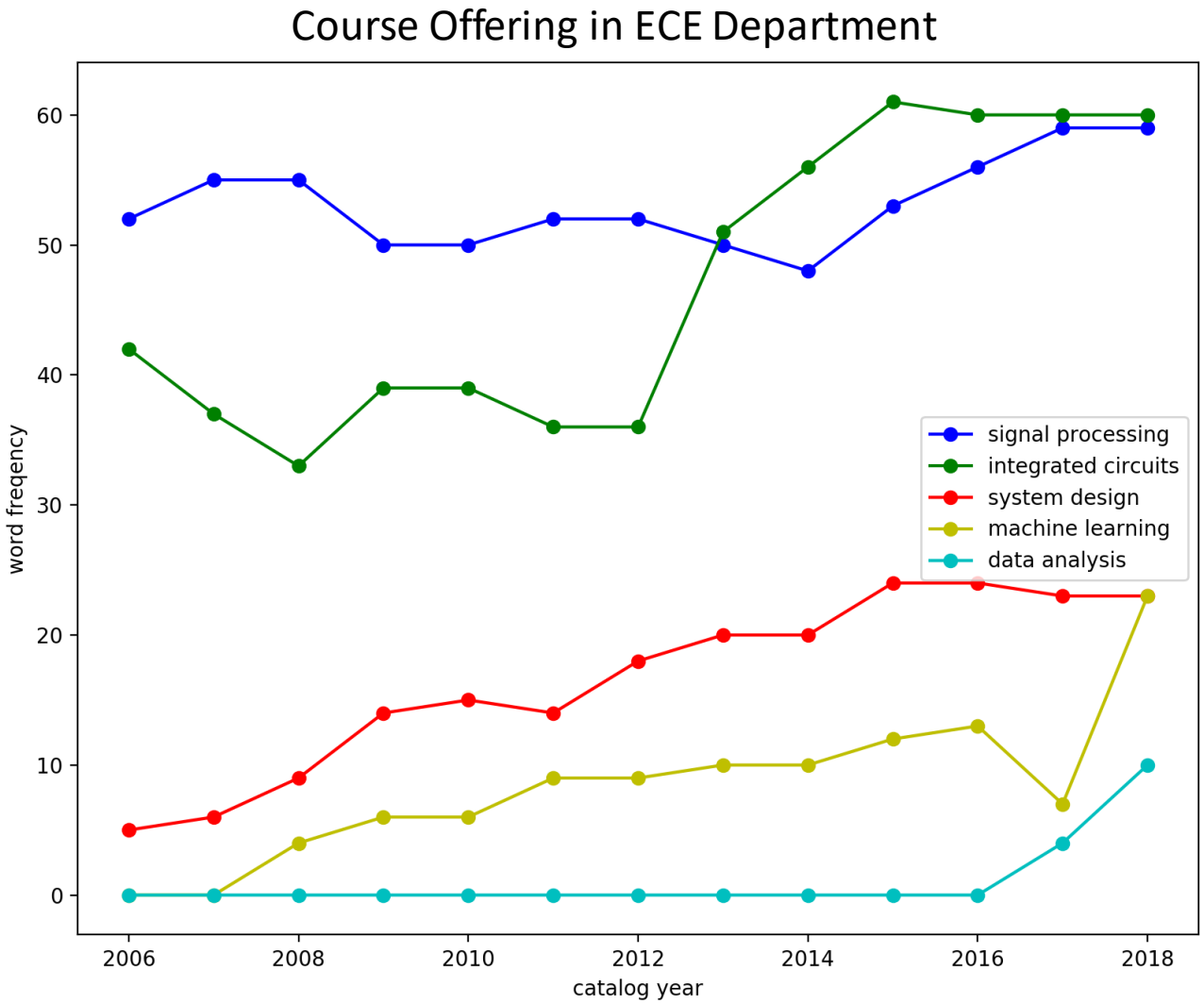

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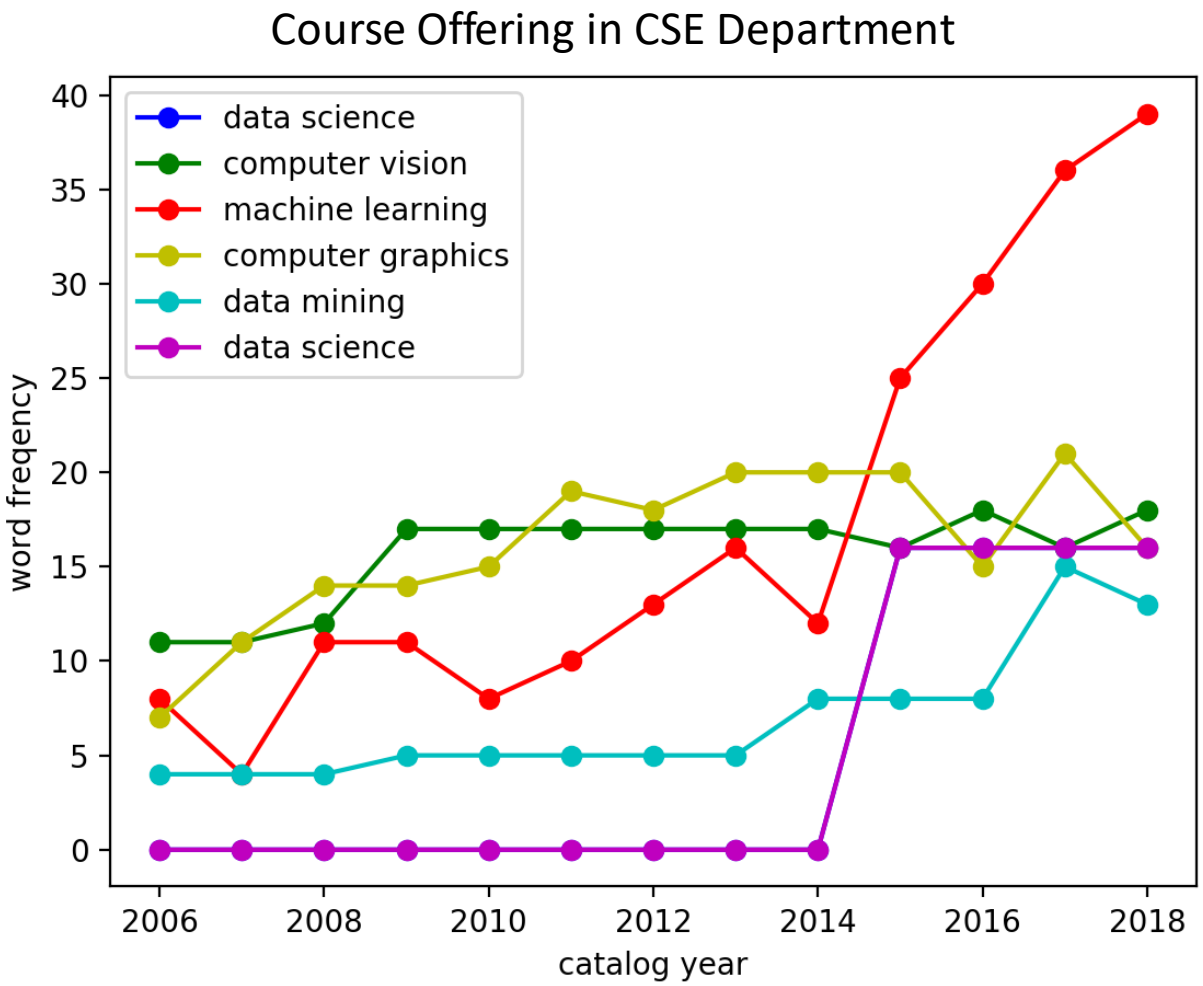

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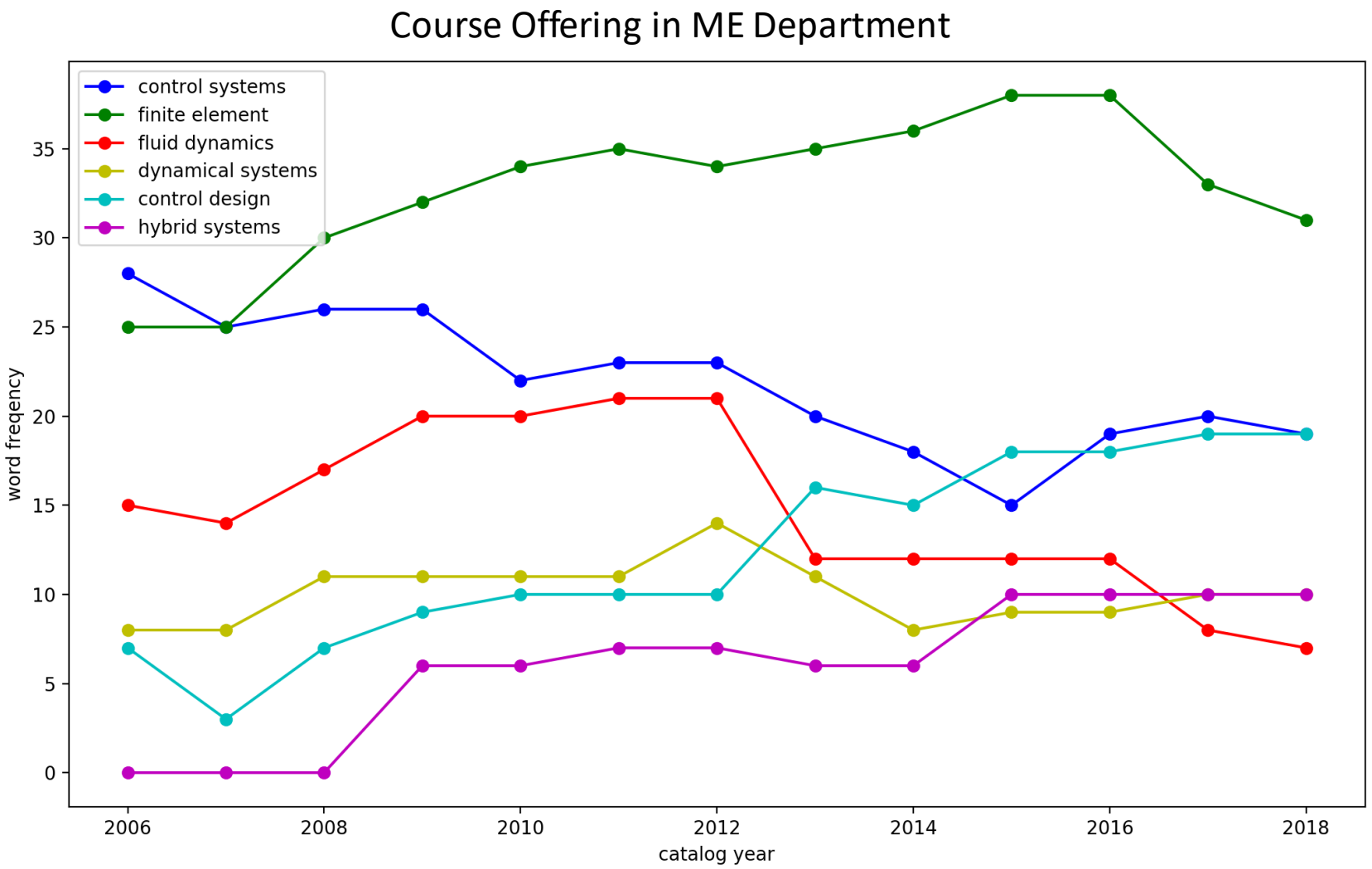
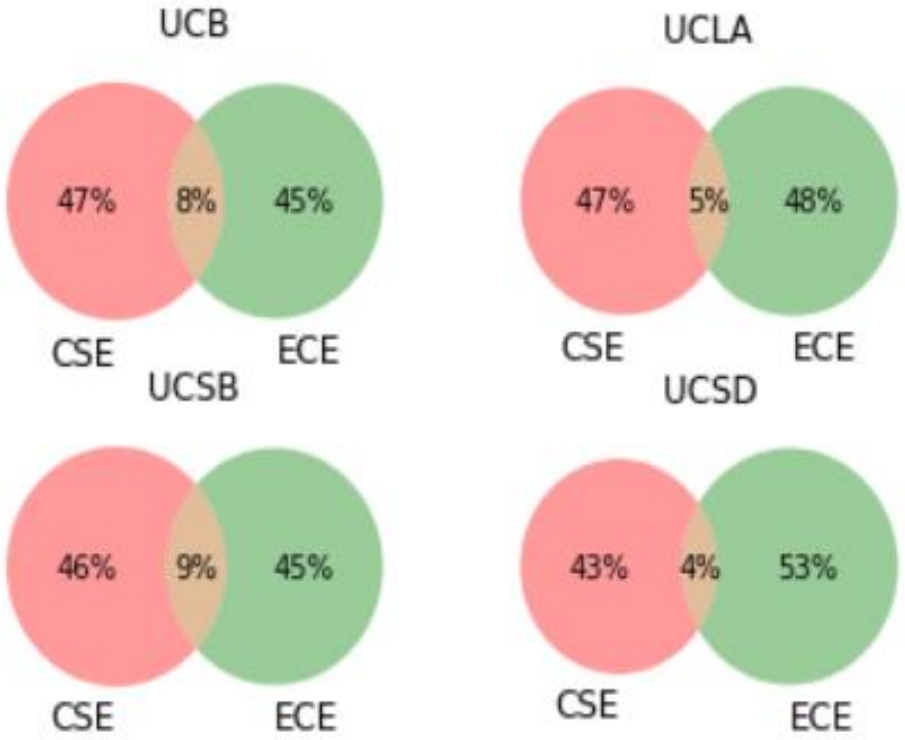
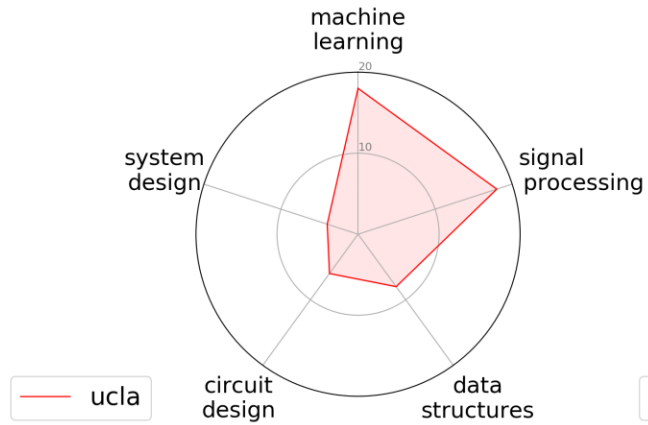


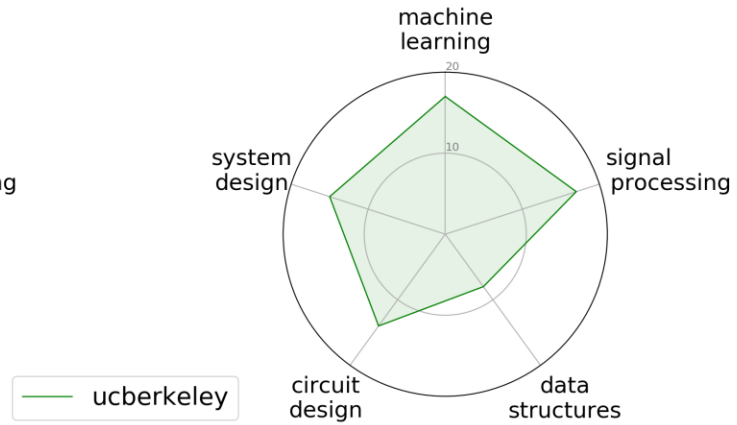
Extent of overlap between CSE & ECE

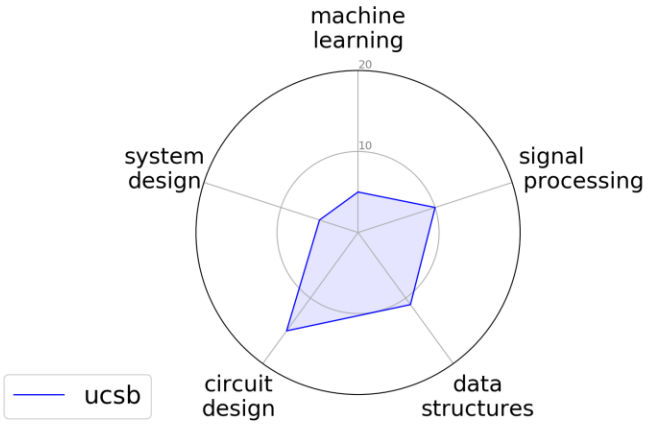


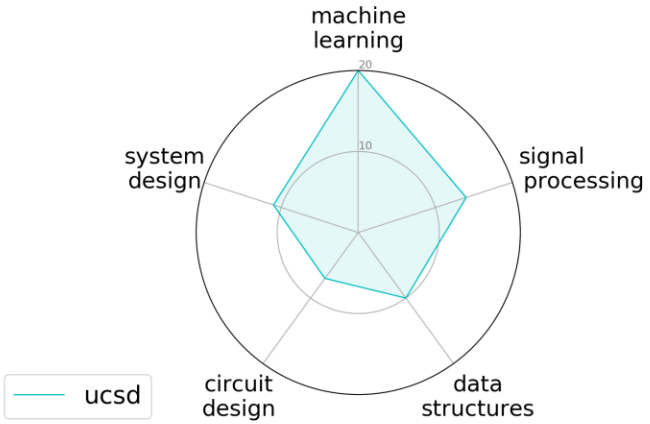
- ECE and CSE department overlap is not very high in general
- Overlap is mainly over **Artificial Intelligence**: Machine Learning, Data Science, Computer Vision
- Other common fields: Computer Graphics, Embedded systems, Digital design, Computer Aided Design and System Design

Most universities are concerned with popular topics in industry









Five frequently mentioned topics has been chosen from ten different companies' job descriptions

Company List:

AMD Bloomberg Google Qualcomm SAMSUNG amazon NVIDIA intel

THANK YOU