Speech Recognition Systems

Modality: On Demand

Duration: 24 Hours

About this course:

Understanding and Developing the system of Automatic Speech Recognition (ASR) is an inter-disciplinary action, taking aptitude in mathematics, computer science, linguistics, and electrical engineering.

At the point when a human expresses a word, they cause their voice to create a pattern of sounds that varies over time. These sounds are floods of weight that proliferate through the air. These are caught by a sensor, for example, a microphone, and transformed into an arrangement of numbers showing the weight change after some time. The programmed speech recognition system changes over this signal of time-pressure into the energy of the time-frequency signal. These acoustic names are joined with a model of pronunciation for the word and a model of word arrangements, to make a literary portrayal of information disclosed.

Rather than examine one piece of this procedure profoundly, this course is intended to give a review of the parts of a recent ASR framework. In each training, we depict a segment's motivation and general structure. In every lab, the understudy makes a working block of the framework. Toward the finish of the course, we will have built a speech recognition system on the whole out of Python code.

Course Objective:

- Basics of Speech Recognition
- Fundamentals Signal Processing for Speech Recognition
- Acoustic Labeling and Modeling.
- Common Language Modeling Algorithms.
- Features of Decoding Acoustic into Speech

Audience:

- Voice recognition system specialist
- Speech processing analyst
- Linguistic theorist

Prerequisite:

1. Basic principles of Machine Learning
2. Some python experience
3. Knowledge of statistics and probability.

Course Outline:

Background and Fundamental Theory

- Fundamental Theory
- Phonetics
- Performance Metrics
- Other Considerations
- Module 1 Review
- Module 1 Lab

Speech Signal Processing

- Introduction
- Feature Extraction
- Mel Filtering
- Log Compression
- Feature Normalization
- Module 2 Review
- Module 2 Lab

Acoustic Modeling

- Introduction
- Markov Chains
- Problems with Markov Models
- Hidden Markov Models
- Deep Neural Network Acoustic Models
- Training Feedforward Deep Neural Networks
- Using a Sequence based Objective Function
- Module 3 Review
- Module 3 Lab

Language Modeling

- Introduction
- N gram Models
- Language Model Evaluation
- Operations on Language Models
- Advanced LM Topics
- Module 4 Review
- Module 4 Lab

Speech Decoding

- Overview
- Weighted Finite State Transducers
- WFSTs and Acceptors

- Graph Composition
- Module 5 Review
- Module 5 Lab

Advanced Acoustic Modeling Techniques

- Improved Objective Functions
- Sequential Objective Function
- Connectionist Temporal Classification
- Sequence Discriminative Objective Functions
- Module 6 Review?