Speech recognition has had a huge resurgence in the past few years, both commercially and in the underlying technology. We can talk to Google, Siri, and Alexa to get information and carry out routine tasks. However, the technology is far from perfect when compared to human performance. There are still errors in recognizing the words, understanding the speakers intentions or providing an adequate response.

This course will touch on all of the components in a spoken dialog system, including speech recognition, natural language understanding, dialog state tracking, and response generation. For each topic area in the course, there will be two important parts:

- Understanding the paradigms, formalism and algorithms in current approaches in each components of the system,
- Getting hands on experience in using the top research and industry tools to build models and system components.

The main topics and examples of what we’ll cover are shown below:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Approaches</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech recognition</td>
<td>Architecture, phonetics, feature extraction, hidden markov models, weighted finite state transducers, Gaussian mixture models</td>
<td>Kaldi, OpenFST, SRILM, NIST SCLite</td>
</tr>
<tr>
<td>NLP and frame-based dialog systems</td>
<td>Intents &amp; Entities, dialog context</td>
<td>Dialogflow, Watson Conversation, Alexa</td>
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</table>
Schedule

Topics and assignments for each class are posted on the schedule page. Please check this regularly, as it may change throughout the year.

Details on the assignments are posted on the assignments page. Again, please check this regularly, I’ll update it as the assignments get closer.

Grading

There will be the following types of gradable elements in class. Due dates will be posted on the schedule page and announced in class. No extensions will be considered after the due date of the assignment for any reason and extensions will only be considered for well articulated reasons. If that reason is because you didn’t understand the problem or weren’t able to access data, etc, then it needs to be well in advance of the actual due date. Bottom line: Start early and communicate.

Policy on working together: Unless it is specifically stated in the assignment, all assignments must be done independently. However, when working with 3rd party toolsets, you may collaborate on getting the tools installed and running. In order to make this collaboration fair for everyone, you must post questions and answers on the class blog (tools TBD), even if it’s just a summary of a hallway conversation. If it was helpful, share it.

Assignment Types:

- Show competency in the approaches presented in class and in reading through take home quizzes (10%)
- Show competency in the tools by completing tutorials and directed assignments (20%)
- Show ability to go beyond the course material in research through small group research and presentation projects (20%)
- Show ability to go beyond the course material in system development by a small group application project in one of the three topic areas. (40%)
- Participation (10%)

If you are a student with a documented disability on record at Brandeis University and which to have reasonable accommodations made for you in this class, please see me immediately.

Success in this 4 credit hour course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (readings, papers, discussion sections, preparation for exams, etc.).