

C: Accent Transformation Project

I. Design and Originality

This project is a friendly competition to see which team can deliver the best product. Your design **MUST** be original, i.e., built by **your own team** from scratch and tested extensively by yourself. This project is distributed with a **honor pledge**.

II. Team Work

Students in the class should form teams of 2 or 3 to complete this project. Each student **MUST** contribute significantly to the completion of the project and the report and the live demonstration. Each team must complete their own designs. Teams can discuss their ideas but **MAY NOT** exchange programs.

III. Project-C Task

1. **Programming tasks:** Build a voice conversion tool with which a spoken sentence of choice can be transformed into one with a specific accent. The choices of accents will be the Midwest, Southern, or British accent.

2. **Design specifications:** The completed GUI must allow the user to

- (a) Record a sentence by reading from a text. Recognize the phonemes in the sentence.
- (b) Select the accent one wishes to transform the recorded sentence into and map the phonemes in the accented sentence.
- (c) Implement an LPC vocoder and synthesizer (Matlab) to regenerate the voice

3. **Tests and Demonstration:** Each team will be asked to step in front of the class to demonstrate in 5 minutes their **software interactively (best with a GUI)**. The test requirements are:

- (a) Record another student's voice for the program to analyze and convert;
- (b) Play back the result.

IV. Report Requirement

The report should be submitted in a form of a webpage with equations and figures and demonstrations of signal effects in time and frequency domain. You must thoroughly document your findings, including all assumptions, parameters and graphs that are used in your analysis. The report should also contain a description (using your own words) of the problem addressed and

the approaches used. Your webpage should allow users to repeat some of your test examples. Provide the audio files used for testing.

V. Presentation

There shall be a live presentation in class for all teams by using your webpage.

VI. Literature Review to Get Started

<https://link.springer.com/article/10.1007/s10772-015-9328-y>

<http://www.dyslexia-reading-well.com/support-files/the-44-phonemes-of-english.pdf>

<http://accent.gmu.edu/>