

CSCI 3813/780 – Spoken Language Processing  
Prof. Rosenberg

Homework 2  
Due October 17, 2011 @ 3:00pm

Part 1 Individual Work (35 points)

Question 1a) [5 pts] Give an example where the Gricean Maxim of **Quality** is necessary for interpretation. Describe how conversational implicature is necessary for correct interpretation.

Question 1b) [5 pts] Give an example where the Gricean Maxim of **Quantity** is necessary for interpretation. Describe how conversational implicature is necessary for correct interpretation.

Question 1c) [5 pts] Give an example where the Gricean Maxim of **Relevance** is necessary for interpretation. Describe how conversational implicature is necessary for correct interpretation.

Question 1d) [5 pts] Give an example where the Gricean Maxim of **Manner** is necessary for interpretation. Describe how conversational implicature is necessary for correct interpretation.

Question 2) [15 pts] Quantization error is the absolute value of the difference between a true analog signal and a digital (quantized) signal.

Question 2a) Plot a sine wave,  $\sin(x)$ , both continuously and a digitized version. The digitized version should sample the signal at  $\pi/7$ , and quantize the data into 8 equally sized bins.

Masters students only -- Question 2b) calculate the quantization error of this conversion between 0 and  $2\pi$ .

Part II Group Work (65 points)

In the group project you are asked to build a spoken dialog system. The system can access an existing resource (email, library website, twitter, chat, text messaging, airline status services, sports scores, etc.) The system will take user input in speech using open source ASR libraries, and deliver output in speech using open source TTS libraries.

Part 1. Choose a domain.

Decide what task your system will be addressing. Finding a book in a library. Providing a voice interface to a google calendar, etc. You can think about this in terms of a voice

application for a mobile device, or on a standard computer. Motivate your choice in terms of usefulness, interestingness, or difficulty.

Describe the functionality that your system will have. What kinds of queries will you accept? What information will you deliver? The domain must have at **least 5 degrees of freedom**. That is, you should receive at least 5 types of information, like 1) a calendar command – add, move, delete, show 2) an event name, 3) event date, 4) event time 5) participants. These items are **domain concepts**, the things you can ask about and recognize in order to respond appropriately.

## Part 2. Input and output design

Define as clearly as possible what the input and output of the system will look like. The more you can describe your plans, the better feedback I can give you about scope and feasibility. Describe the type of input you will accept from the user, the domain concepts and output that you will provide in as much detail as possible. Also describe where your system will get data to deliver to users. For example, say your system provides flight information, and you allow users to specify flights by date, flight number, departure time or arrival city. You need to decide to prompt for one piece of information at a time or if users can input information in any order. The system might provide the arrival time and any delays. If the user does not specify enough information, you will need to prompt for additional information.

Provide a concept table for your system, showing the domain concepts and a sample of the values they can take. For example:

Date  
Flight Number  
Time  
Arrival City

Sample values might be

Date {January, February, ..., December} {1-31}  
Flight Number {0-9|0-9|0-9|0-9}  
Time {Morning, Afternoon, Evening}  
Arrival City {Austin, Boston, Cleveland, Dallas}

Sample query: “When does flight 0012 arrive in Dallas?”

This should create the following frame

Date	
Flight Number	0012
Time	

Arrival City	Dallas
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If the system needs a date to make a query, you might need to confirm the assumption that the user is talking about “today”, or explicitly prompt for this information: “And what date are you interested in?”

Think about what difficulties the domain and functionality might arise based on your choices of domain and functionality. For example, if your systems allows a user to ask for concepts with many values it might be hard to recognize all of them accurately. For example, any city in the world, or US would be too big, but if you limit the queries to one airline, or one airport, it should be acceptable. You will need to experiment to see how many vocabulary items your system can handle, and how it might limit your functionality if the vocabulary needs to be limited.