CS 5600/6600: F21: Intelligent Systems
Assignment 07
Natural Language Programming of Mobile Robots and Common
Neural Codes for Music and Natural Language

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Learning Objectives

1. Conceptual Dependency Theory

2. Knowledge Engineering

3. Natural Language and Music

Introduction

No programming problems for this assignment. I'd like you to work on your Project 1 submissions. In the last two lectures, we focused exclusively on the theoretical and knowledge representation aspects of Conceptual Dependency Theory (CDT). We will work on the programmatic aspects of CDT next week.

In this assignment, we'll read two applied AI articles on the Holy Grail of symbolic AI – programming robots with natural language (NL). The third article is a brain science article on the possible relationship between natural language and music.

Write a one-page analysis of each paper below and save your analysis in `hw07_papers.pdf`. Make sure that each page mentions the title of the paper you are analysing. Your one-page analysis should include four components:

1. a brief statement of the problem addressed in the paper;

2. what you liked in the paper and why;

3. what you did not like in the paper and why;

4. any inspirations you found in the paper.

Each of the points above should be addressed in a separate paragraph. There's no problem if you go over 1 page when you come across something that inspires you to write more (and some of you do).

Problem 1 (2 points)

Write a one-page review of "A Natural Language Interface to a Robot Assembly System" by Selfridge and Vannoy. This paper describes a concrete system that implemented a simple NL interafce to a robotic assembly system that enables a human operator to have simple NL interaction with the system about vision and manipulation and to teach the system new assembly plans.

Problem 2 (2 points)

Write a one-page review of "Mobile Robot Programming using Natural Language" by Lauria et al. This paper describes the design of a system that uses NL to teach a vision-based robot how to navigate in a miniature town. This is an example of corpus-based research in that there is a corpus of route instructions. An interesting aspect of this article is that when a route is not known to the user, the NL system computes route primitives by interacting with the user. The article presents an instruction-based learning architecture for converting NL to robot-executable procedures.

Problem 3 (1 points)

Write a one-page review of "The Language of Music: Common Neural Codes for Structured Sequences in Music and Natural Language." This article address the question of the relationship between NL and human cognition and provides some direct evidence for the hypothesis that language and music have a shared neural code for producing structured relationships, which these researchers claim to have observed both at the group as well as at the single subject level.

What to Submit

Save your analyses in `hw07_papers.pdf` and submit them in Canvas.

Happy Reading, Thinking, and Writing!