Developing a Memory Module for the Bowdoin RoboCup Robotics Platform

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My research project this summer was to design and develop a memory module using Google Protocol Buffers for man, the robotics platform developed by Northern Bites, the Bowdoin RoboCup team. Man is a platform developed internally at Bowdoin that uses Naos, robots built by a French company named Aldebaran, to compete in RoboCup, a global tournament that pits teams of robots against each other in soccer in order to foster research in the domain of robotics. RoboCup’s goal is to be able to have a team of robots defeat the world champion team in soccer by the year 2050.

The most important new feature that the memory module brings to man is the way in which it centralizes all of the crucial information that the robot has available, such as visual observations, sensory information, localization information and so forth. This will allow the robots to easily keep track of past observations in making current decisions, much like our memory as humans allows us to pull information that happened in the past and use it in the present. This is a potentially huge improvement over the classical frame-by-frame system that man has in place at present time. The choice to use Google Protocol Buffers (the message passing technology used by Google) in the design of the memory module is due to their highly efficient nature and ease of handling.

Continuing on my Spring independent study, I focused my efforts on refining the man memory module and supplementing it with a module that allows logging and reading the data stored in memory in a highly efficient manner, along with developing a new software platform using the open source QT framework that allows us to display the logs in a human readable form. Such a tool has been proven to be crucial in the debugging process and has been designed to be easily extended with other debugging tools that we will need to build along the way.

This summer of research has been essential in paving the way to the advanced independent study I am going to pursue next year, in which I hope to design and build a simulator based on the real-life attributes of the robots that will allow us to use machine learning to quickly optimize parameters in our robot behaviors.

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