Development of an Automated Mechanical Receptionist

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Abstract

The main objective of this project is to continue development of a robotic receptionist for NRL (Naval Research Laboratory). This will involve adjusting the robot's AI code to be more fitting to NRL and adding features involving a card reader. The AI code was originally programmed for Carnegie Mellon University and needs to be adapted in its algorithms for providing directions and responses to users. The card reader program also needs to be modified so that the robot will be able to identify users through an id card. Users will also be able to start up and shutdown demonstrations automatically by swiping certain cards for a set number of times.

Background and Procedure

The adaptation of the AI code will mainly involve C++ and IPC. IPC (inter-process communications) will allow the process that interprets user input to communicate with other programs running on the robot. Ensuring that the robot interprets requests for general information, directions, and people correctly is a critical part of the project. The requests must then be transferred to the appropriate algorithm, which will provide the response. The card reader program will also use MD5 sums to identify different id cards. MD5 sums, which are different codes assigned to cards, are used to differentiate cards that are authorized and known from unknown cards. The program identifies users based on the MD5 sums stored in a database and uses IPC to let the robot's AI know who the user is. A process management application, Microraptor, will also be used by the card reader to facilitate the automatic startup and shutdown of demonstrations. When a user swipes a certain card for a set number of times, the Microraptor central server will startup programs required to run a certain demonstration. The process management application is necessary to make sure the dependencies of the programs are running and to monitor the status of all of the running processes.

Results

The issues with the AI misinterpreting requests and incorrectly parsing directions and information were resolved. Though the cause of another issue (greeting users incorrectly and doing extraneous monologues) was discovered, the issue was not resolved. The additional features to the card reader and the automatic startup and shutdown methods were implemented and are functional. Minor issues occurred that were caused by flaws in some of the processes composing the demonstration and an old version of microraptor.