Honours Project Proposal

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1 Investigator

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2 Project Title

The project is proposed under the title of:
Autonomous Robotic Programming Framework

3 Problem Statement

There does not seem to be any significant research into using the Fischer-Technik robots with artificial intelligence and learning techniques. With artificial intelligence becoming more and more popular within the field of robotics, research into programming artificial intelligence and learning procedures is becoming increasingly important to create a robot that can recover and not make the same mistake twice.

An ideal would be to have a robot that can 'think independently' and solve basic problems without human interaction or intervention. However, independent thinking is still a way off in artificial intelligence research and so it will suffice for now to be able to make a robot as smart as possible and to push the robot's ability to the limits.

4 Research Objectives

The following are the research objectives, based on the above problem statement:

Primary objectives:

- To create a programming framework that allows quick and easy addition of autonomy to a robot.
- To make the programming as easily extensible and adaptable as possible.

Secondary objectives or extensions:

- To adapt the programming framework for different programming languages.

5 Research Approach

To start off a basic understanding of the advantages and disadvantages of the different available programming languages that are compatible with the Fischer-Technik robotics kit is required. It is also required to understand artificial intelligence and be able to create algorithms to allow the robot to learn. To obtain the aforementioned knowledge, a literature survey will be required.

Once the literature survey is complete, the programming language can be selected and a decisive path taken as to exactly what features will be possible to implement, and how to go about implementing them.

After the programming language has been selected, it is necessary to understand how that programming language works; and how to create programs that display the correct behaviour when uploaded to the robot. This will be achieved by creating small programs to test the functionality of the robot.

Once the test programs have been successful, work may begin on the artificial intelligence and learning algorithms. Finally, the testing phase must be completed, whereby the robot will be given a situation and be expected to learn about its surroundings and interpret them correctly.

6 Requirements

- fischertechnik Robotics set [1]
- A robotics programming language
- A computer that runs the above mentioned programming language compiler

7 Design Considerations

Care must be taken when choosing the programming language, as the programming language must:

1) Be compatible with the Fischer-Technik set [1]
2) Be robust enough to support Artificial Intelligence algorithms

8 Project Timeline

Hereunder is the proposed timeline for project completion:

Date	Activity
9 March 2009	Create project website using a content management system
11 March 2009	Start researching the benefits of the different robotics programming languages
17 March 2009	Present project proposal to staff
20 March 2009	Select a robotics programming language
21 March 2009	Start becoming familiar with selected programming language
29 April 2009	Literature review completed
5 June 2009	Working prototype model robot
1 September 2009	Completed model robot
7 September 2009	Short paper on project completed
10 October 2009	Draft thesis completed
10 November 2009	Clean up and finishing of website
12 November 2009	Website complete and Project Hand-in

References

[1] FischerTechnik. Fischertechnik Official Webpage. Online, May 2009. Available from: `http://www.fischertechnik.de/en/`.