TJHSST Senior Research Project Proposal: Optimization of Iterative Prisoner's Dilemma by Evolutionary Algorithm 2006-2007

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Abstract

My interests within Computer Science are machine learning, computer graphics, and computer music. My project ideas involve programming and research centering on these areas:

- Project area 1: brief description
- Project area 2: brief description
- Project area 3" brief description
- etc

Keywords: genetic algorithms, algorithmic composition

1 Introduction: program versions

1.1 1st Quarter

1.1.1 Program area 1

First version of my program area 1 will consist of... (detailed description here outlining the characteristics of the program you could write for 1st quarter. Try to be as specific as possible with inputs, outputs, types of processing and algorithms you will use.)

This text is inserted to demonstrate how to start a new paragraph.

1.1.2 Program area 2

First version of my program area 2 will consist of... (detailed description here outlining the characteristics of the program you could write for 1st quarter. Try to be as specific as possible with inputs, outputs, types of processing and algorithms you will use.)

This text is inserted to demonstrate how to start a new paragraph.

1.2 2nd Quarter

1.2.1 Program area 1

2nd version of my program area 1 will consist of... (detailed description here outlining the characteristics of the program you could write for 1st quarter. Try to be as specific as possible with inputs, outputs, types of processing and algorithms you will use.)

This text is inserted to demonstrate how to start a new paragraph.

1.2.2 Program area 2

Second version of my program area 2 will consist of... (detailed description here outlining the characteristics of the program you could write for 1st quarter. Try to be as specific as possible with inputs, outputs, types of processing and algorithms you will use.)

This text is inserted to demonstrate how to start a new paragraph.

1.3 3rd Quarter

1.3.1 Program area 1

Third version of my program area 1 will consist of... (detailed description here outlining the characteristics of the program you could write for 1st quarter. Try to be as specific as possible with inputs, outputs, types of processing and algorithms you will use.)

This text is inserted to demonstrate how to start a new paragraph.

1.3.2 Program area 2

Third version of my program area 2 will consist of... (detailed description here outlining the characteristics of the program you could write for 1st quarter.

Try to be as specific as possible with inputs, outputs, types of processing and algorithms you will use.)

This text is inserted to demonstrate how to start a new paragraph.

2   Background

Types of research include:

1. Applied Research

   - Research which studies the relationship and/or applicability of theories or principles to the solution of a problem for the purpose of producing results that may be applied to real world situations.
   - Research used to answer a specific question, determine why something failed or succeeded, and solve a specific, pragmatic problem.

2. Operations Research and Modeling

   - Application of mathematical models to study or plan a process designed to determine the most efficient way to do something. Often used to analyze complex real-world situations.

3. Primary (or original) research and Modeling:

   - Original research in which new data is actually collected from the natural world (via experiments, naturalistic observation, case studies, etc.) conducted to answer a research problem. Secondary research draws information from books, publications, or expert opinion.
   - Primary research requires: 1. knowing what has already been discovered on a subject (background) and 2. formulating a method to find out what you want to know.

4. Qualitative research

   - Concerned with understanding the processes which underlie various behavioural patterns through loosely structured, mainly verbal data rather than measurements. Analysis is interpretive, subjective, impressionistic and diagnostic.

- An exploratory study, to explore an unknown sector, identify the main dimensions of a problem, draw assumptions, understand motivations. Or an operational study based on in-depth analysis of interviewee responses.

5. Quantitative research

   - Examines phenomenon through the numerical, projectable representations of observations and uses statistics to analyze results in an attempt to establish general laws and principles.

   - The numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect. Used in a wide variety of natural and social sciences, including physics.

6. Research and development

   - Aimed at discovering new knowledge in hopes that such activity will be useful in developing or creating research findings into new and improved prototypes, processes or services.

7. Secondary research

   - Finding out what others have discovered through original research and trying to reconcile conflicting vewpoints or conclusions, find new relationships between normally non-related research, and arrive at your own conclusion based on others' work.

8. Opensource development; Open Learning and research labs MIT

3   Machine Learning

The Biological Language Modeling project is based on the assumption that protein sequences from different organisms may be viewed as texts written in different languages.[**?**]

This is interesting to me because ... (or I find interesting ...) I have read about...

A possible project may be to try to...

4   Computer Music

McBlare is a robot bagpipe player.

This is interesting to me because...

A possible project may be to...

5   Procedures

You should show that you clearly understand your task, have a logical time plan, say, by the research, design, programming, sub-testing and testing phases of your project.

Show that you have identified the resources that you will need.

5.1   Software

Computer language(s) I'll use

1. C

2. Fortran

3. Python

5.2   Algorithms

I'll be using the following algorithms

1. process used to sort

2. process used to search

3. process used to test and analyze

6   Expected Results

What results do you expect to obtain from your project? How will the final results and analyses be presented (including visuals such as graphs and charts)?

What contributions can these results give to future researchers (next year's seniors who would like to do a similar project, for example)?

What time frame do you think you will need to accomplish the identified tasks and subtasks?

References

[1] K. Bryant, "Genetic Algorithms and the Traveling Salesman Problem", www.math.hmc.edu/seniorthesis/archives/2001/kbryant/kbryant-2001-thesis.pdf, 2000.

[2] "Project 2 - Prisoner's Dilemma." Massachusetts Institute of Technology Department of Electrical Engineering and Computer Science. 21 Feb. 2005. 11 Sept. 2007 ¡http://ocw.mit.edu/NR/rdonlyres/Electrical-Engineering-and-Computer-Science/6-001Spring-2005/7E08B148-CCE1-47A3-AECD-FDE943EEB2F6/0/project2.pdf¿.