**Abstract**

Short description of the project and the main conclusions

**Introduction**

Outline aims and motivations of the project

Problems solved to achieve the objectives

Methods

Results

Achievements and limits

Outline the structure of the rest of the document

**Research Section / Background**

Bio-inspired Computing

Availability of Bio-inspired Algorithms in R

Genetic Programming

CGP in other languages

**Discussion of Implementation**

**Steps taken in designing the software**

CGP in other languages + RGP helped with designing

Maybe add requirements into here?

Previous Project using R to implement Evolutionary Algorithm meant I already had a program structure that worked, and I was familiar with

Trying to represent the structure of the chromosome using an appropriate Data Structure in R. Should have used lists but chose to use Data Frames due to the interface provided in RStudio for working with them.

Diagrams of structure of population will be useful to include here

Using only the required nodes in the decoding process. Have diagram of it in my notepad.

Creation of R package section from last hand in + new knowledge

Choosing other R packages that will aid in development (Already wrote this section)

Implementing Unit Tests confirmed that code needed refactored / restructured (took inspiration from RGP here)

**Issues Faced During Implementation**

Issues faced with choosing correct data structure

Issues faced with using data frames vs lists

Issues faced with R scoping / environments

Issues with checking valid inputs (biased results and NA values caused problems)

Issues with allowing multiple random constants

Issues faced with decoding, i.e. I wasn’t storing the values in the functionNodes in the recursive version I originally created, and this is an important feature of CGP.

Issues changing selectionMethod, similar to mutation and fitnessFunction

Issues with mutation changing things to invalid solutions(this problem creeped up again later)

ISSUES WITH DIVISION AND LOG

**Issues with Releasing software**

Talk about how to release it and what’s expected if I have not done this yet,

Talk about problems that I had here

**Evaluation**

Usability study results

* Aimed for around 8 test users since most usability problems are found by this stage. Helens notes on usability.
* Look at notes I wrote down.

Cover software correctness i.e. Unit Tests

Compare implementations more critical aspects to implementations of CGP in other languages

**Reflection**

Compare what I have achieved to the initial aims

Compare functionality produced to the requirements

How I think my skills in R have developed?

* Compare old tournament selection to newer version
* Compare old validInputs to new getValidInputs

Self-evaluation of my experience using R?

**Conclusions**

Briefly mention achievements compared to aims again

Cover the main limitations of what I have produced

Suggest possible extensions of what I have produced and further work

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