Research proposal:
Machine Learning for a better forecast

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Abstract

We propose to research and develop an improvement to Joseph Weisenbaum's ELIZA program. The ELIZA program simulates a psychiatrist's questions and responses to a patient. The user of the program is the patient in the simulation. The program was designed to demonstrate some of the superficiality of human conversation. The original program used reflective text-based substitutions. Carefully crafted user inputs easily demonstrate that they were talking to a simulation rather than a person. We are proposing to use regular expressions to further enhance the program, making it somewhat more difficult to demonstrate it is a simulation.

1 Introduction

The introduction generally overlaps with the abstract but expands on the ideas. Here, I would discuss the overall proposal and put a context around it.

You can start a new paragraph by leaving a blank line. This is a new paragraph. The introduction should also give a short overview of the rest of the document – a one or two sentence overview of each part of the document.

2 Literature

It's important to refer to the existing literature in your proposal. In a research proposal I would expect to see at least three or four references directly related to the proposal. The next sentence includes a reference. ELIZA is a program written by Joseph Wiesenbaum. It was proposed in his 1966 paper [1]. Wiesenbaum also wrote a book [2]. He passed away in 2008 [3]. Typically, a research proposal will give a bit of background, listing four or five directly relevant peer-reviewed publications.

3 Research question

All research starts out with an idea. There is no shortage of interesting ideas. An idea needs to be developed into a research question to have a reasonable chance of leading to a successful thesis submission.

A research question has a few essential characteristics. It should be clear and specific. It should be informed by the research work of others, as described in peer reviewed publications, books, and other reliable sources. It should lend itself to an investigation of some sort, that

either provides evidence as to its answer or answers it outright. The investigation needs to be reasonable to complete in the time frame of the proposed research project.

It can be difficult to formulate a research question that meets all those characteristics. Research by its nature is tentative. It may seem impossible to know ahead of time whether a given investigation could be completed in a given time frame.

The purpose of a research proposal, however, is to demonstrate an understanding of the what will be involved in carrying out your research project. You will, in consultation with your supervisors, be able to adapt your research topic, research question, deliverables, and milestones as the project evolves.

Everything is geared towards helping you to succeed in submitting a successful thesis.

4 Timeline

This project will take two years to complete. The Gantt chart in Figure 1 gives an overview of the timeline.

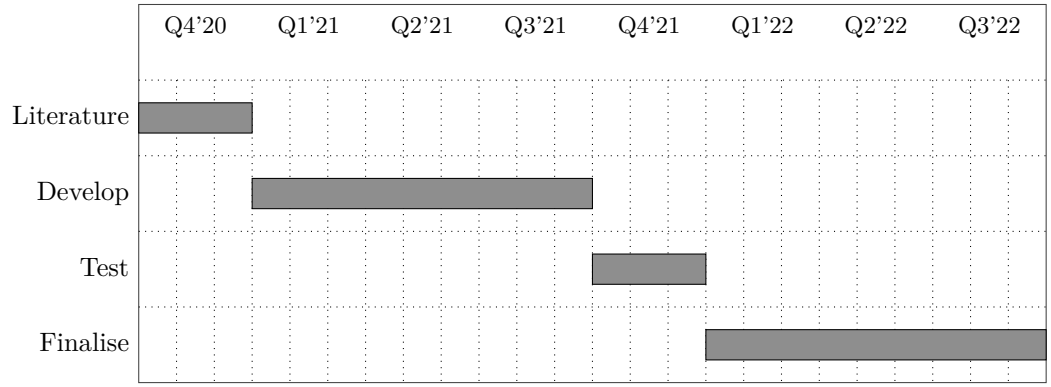

Figure 1: Gantt Chart

4.1 Milestones

The project will be delivered through a series of milestones. The milestones will have the follow deliverables.

Literature review: this will be delivered at the end of month 3.

Chatbot: this will be delivered at the end of month 12.

Tests: the tests will be completed at the end of month 15.

Thesis: the thesis will be delivered at the end of month 24.

Appendices

A Math, images, code, and tables

LaTeX contains many features for incorporating various visual elements.

A.1 Math

For instance, LaTeX is great at rendering math.

$$f : \mathbb{R} \to \mathbb{R} : x \to e^{x+1}$$

A.2 Plots

You can create plots programmatically from within LaTeX like in Figure 2.

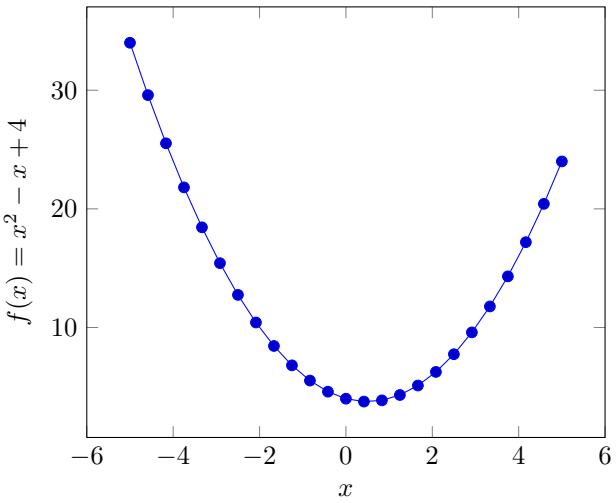

Figure 2: Great at plots.

A.3 Images

Latex can incorporate raster images like PNG's and JPG's, as in Figure 3.

Figure 3: The GMIT logo.

A.4 Mind maps

The TikZ package is the main plotting library for LaTeX. It can create mind maps like in Figure 4.

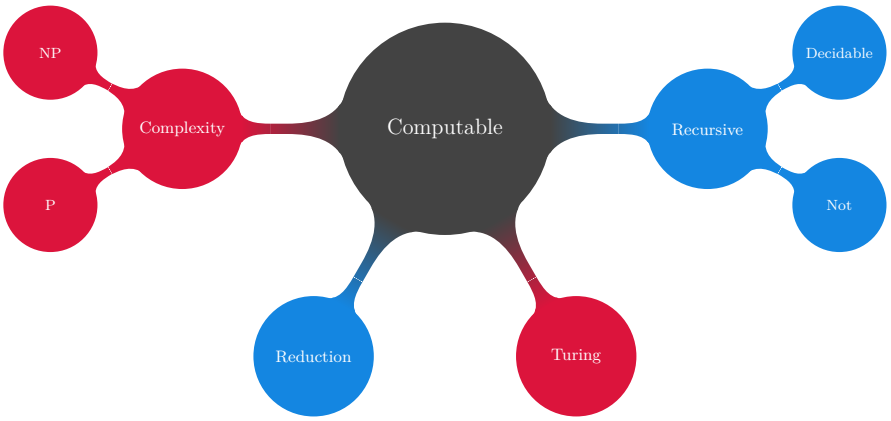

Figure 4: A mind map.

A.5 Automata

It can also create automata like in Figure 5.

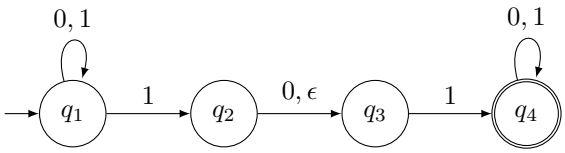

Figure 5: An automaton.

A.6 Code

The `minted` package will syntax highlight code.

```
import numpy as np
def f(x):
  # Minted has support for lots of languages.
  y = x * xc
  return y

f(-4)
```

References

[1] J. Weizenbaum, "Eliza—a computer program for the study of natural language communication between man and machine," *Commun. ACM*, vol. 9, p. 36–45, Jan. 1966.

[2] J. Weizenbaum, *Computer Power and Human Reason: From Judgment to Calculation*. USA: Freeman, 1976.

[3] J. Markoff, "Joseph weizenbaum, famed programmer, is dead at 85," 2008.