BINFO INFO BOT

Software Requirements Specification

v0.2

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Revision History

Date	Description	Author	Comments
15.03.23	v0.1	Pol, Fardous	Initial Draft
21.03.23	v0.2	Pol, Fardous	Functional Requirements

Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

Signature	Printed Name	Title	Date

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1. Introduction

1.1 Purpose

This document is intended for both students, as developers, and the teacher, as the client, to define the scope and features of the Software Engineering Project and document any changes to these during the sprints.

1.2 Scope

The scope of the project comprises a server-side, AI-driven chatbot written in Python, which will answer questions about the BINFO study program, to promote said program to prospective students. The data on which these answers are based will be solely derived from the uni.lu website, on which the bot is then trained.
Any conversation outside of the topic of BINFO are out of scope.

1.3 Definitions, Acronyms, and Abbreviations

AI   –   Artificial Intelligence
BINFO   –   Bachelor in applied INFOrmation technology
NLP   –   Natural Language Processing

1.4 Overview

Part 2 of the SRS addresses the requirements from a client's point of view, while point 3 will elaborate on, and guide the actual developing process, providing concrete quality criteria by which the end-product should be judged.

2. General Description

2.1 Product Perspective

The deliverable will be a specialized, standalone chatbot, without a dedicated user interface. It is intended to run on a server, receiving and sending in- and output over real or simulated network connections.

2.2 Product Functions

The chatbot will receive text-based input, containing questions about BINFO, to which it will output a comprehensible, factually correct text-based reply.

2.3 User Characteristics

The intended users are prospective students, or any other person interested in facts about BINFO, who does not want to spend a lot of time collecting all the necessary information from the different parts of the uni.lu website.

2.4 General Constraints

The limiting factors of the project are the hard, non-negotiable deadline, as well as the developers' relative inexperience with Python, chatbot design principles, and server-side programming requirements.

2.5 Assumptions and Dependencies

The project assumes the availability of Natural Language Processing libraries, to be used with the AI driven aspect of the chatbot. Failing this, the chatbot will have to revert to a rules-based structure.

3. Specific Requirements

3.1 Functional Requirements

3.1.1 Natural Language Processing in English using machine learning

3.2.1.1 Introduction
Since the chatbot will be designed to interact with humans in a free form conversation expected to be in English, as opposed to a multiple choice, tree form structure. It therefore needs to have systems in place to both interpret natural language input, as well as structure the response output in a grammatically and syntactically meaningful way. This process will use machine learning to gradually improve the quality of the generated answers.

3.1.1.2 Inputs
The input will be in the form of a string of characters entered by the user, that we assume to be in plain English. We will consider this input to be non-malicious and sanitized for security purposes, as this would be handled by the mobile messaging interface, whose development is out of scope for this project.

3.1.1.3 Processing
The input will be processed into word-stem tokens, which will then be passed to a neural network for interpretation using a sequence-to-sequence transformation to generate an output. The neural network will need access to a database of English conversations to be trained on for general conversation, in order for this transformation to be possible.

3.1.1.4 Outputs
After scoring a multitude of possible outputs against a predefined list of quality criteria, the bot will randomly pick from among the outputs tied for highest score and pass this as a response to the user.

3.1.1.5 Error Handling
Error handling will try to catch any formatting issues during the processing of the user input for the neural network.

3.1.2 Access to information on Uni.lu website

3.1.2.1 Introduction

The chatbot will need access to the information presented on the uni.lu website about the BINFO study program and any information relevant to undergrad students in the BINFO program, in order to accurately relay this information to the user upon request.

3.1.2.2 Inputs
The content of the website will need to be collected, so that the bot will be able to access it. This can be done by manually, or possibly automatically scraping the website. If the process can be automated, the information accuracy will remain high across changes to the program or to university regulations over the semesters, as well as the changing academic calendar each year.

3.1.2.3 Processing
The data is then processed, categorized and stored in a file format accessible to the bot, so that the neural net may be trained on this data.

3.1.2.4 Outputs
The output is the database to be loaded by the bot to help it formulate a response to a query by a user.

3.1.2.5 Error Handling
The error handling will try to catch badly formatted datapoints during processing to maintain the integrity and readability of the database.