Syntax Dictionary for C#

Project proposal & Statement of Work

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# Project Proposal (Proposal]

Software applications are an integral part of our lives now days, we use them on our mobile phones and laptops most commonly in our day-to-day life. For past more than 30 years software engineers have been writing software applications for automation of processes those have been performed manually. An effort has always been made to automate the very process of writing the software itself.

The purpose of automation in process of software writing are to work on problems related to speed of development, standardization of code, high readability, agility to maintain, lower cost and improve the utilization of human resource.

This is a proposal to automate the creation of a syntax (and expression) dictionary for Microsoft C# coding language. This dictionary will be used by algorithms in Code Generator (out of scope of this project) to write source code in C#. The code generator will eventually contribute to resolve aforesaid problems.

# Statement of Work (SOW)

This project will be developed using Microsoft C#. The final product of this project will be a C# class library (a MS dot net DLL file). The library will be designed, that can be referenced and called by an MS dot net desktop executable (MS dot net EXE file) file.

Some of the major features of this library will be:

1. Read a source code file written in C#.
2. Identify the syntax as
   1. Known element (already existing in the dictionary)
   2. New elements (not existing in the dictionary)
3. Add the new elements in the dictionary
4. Create / update a flat file as the dictionary

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| V 0.5 | Draft – 1  Attached: Capstone\_gantt-chart\_V\_0.2.xlxsx | | 1. Project Plan | 10/07/2024 | Ajay |
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# Executive Summary

Automation of software writing process is a need of the time as requirement of new software applications is growing day by day. Having a dictionary, of syntax and expressions those can be used along with variables having values and syntax string to create a customer made source code based on the given parameters is an important component of code generation. This dictionary can be a running flat that shall be update as and when desired to accommodate new complex expression in the source code. This shall enable the software developers to keep their focus on business of the customer, with code generation applications available to aid them in the changing business requirement of the customer.

Syntax Dictionary is a key component of a code generation process, as it brings the agility to update and store the most used syntax and the most complex expressions to be written in a source code file that is custom made for a particular project.

It contributes to the structured process of code writing and minimize the randomness in code structures that is an inherit part of manual code writing.

The dictionary is part of a design for an “All Code” Code generator, unlike a “Low Code” or “No Code” platform. This enables the developer to access the source code just like any other manually written code to perform all required operations like manual code review, dry runs and debugging.

With a flat file format, the dictionary can be accessed manually for review, and it contributes to speed of reading, writing and organizing the data in the dictionary. The format is kept simple so that it can be replicated for any other language going forward.

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| --- | --- |
| **Team Member** | **Feature responsibility** |
| Ajay | Reading C# file |
| Miki | Identify Known or New element |
| Miki | Construct expression to store in output dictionary |
| Ajay | Writing output dictionary file |

Table Preliminary Subsystem Responsibilities

# User/Market research

The dictionary creating application is a component of a Code Generator application. Being part of a “All Code” Code Generator there is no direct competition, but at a higher level it is competition for “Low Code” platforms. The parent application (“Code Generator”) of this component will be used by hardcore software developers.

Overall market of Generative AI in coding and low code development platforms is growing and is expected to be roughly 1 trillion US dollars, by the end of this decade. Code Generation application, with a well-defined structure of generated code, that contributes to the tiered architecture and can replicate the structure in more than one language is the differentiator of the parent application.

# Product Features

#### Feature 1: Read a source code file written in C#

Existing dictionary for C# will be loaded in the memory and input source code file will be read one line at a time.

#### Feature 2: Identify Known and New Elements

Each line will be broken into individual words and each word will be searched in the existing list of items in the dictionary. Words and expressions not found in the dictionary will be marked for addition in the Dictionary.

#### Feature 3: Add new elements in the dictionary

Elements marked for addition in Dictionary will be evaluated for existence of C# key words and based on certain rule the element will be added in Dictionary (in memory) fully or partly.

#### Feature 4: Create / Update a flat file as the dictionary

Final feature of this application will be to write the dictionary in flat file.

# Project Timeline & Gannt Chart (Schedule)

|  |  |
| --- | --- |
| Milestone | Delivery Date |
|  |  |
| First Draft Proposal | Mon 9/09/24 |
| Draft Finalization | Mon 9/16/24 |
| Signed proposal | Fri 9/20/24 |
| Project Planning | Tue 9/24/24 |
| Requirements Gathering | Sat 9/28/24 |
| Design | Tue 10/08/24 |
| Development | Thu 11/07/24 |
| Unit Testing | Tue 11/12/24 |
| Integration with Dummy Interface | Fri 11/15/24 |
| Testing | Thu 11/21/24 |
| Documentation | Thu 11/28/24 |
| Poster Demo Prep | Sat 11/30/24 |
| Poster Demo | Sun 12/01/24 |
| iShowcase | Sat 12/07/24 |

Table 3: Milestone Schedule

A screenshot of a computer

Description automatically generated Gantt Chart



# Ethics

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Question** | **Generally** | **Data Breach** |
| 1 | Could a user sell drugs or other illegal items on your platform? | Y/N/M | Y/N/M |
| 2 | Could a user of your platform engage in sex trafficking? | Y/N/M | Y/N/M |
| 3 | Could a user sell class notes or cheat on their homework on your platform? | Y/N/M | Y/N/M |
| 4 | Could a stalker use your project to find someone? | Y/N/M | Y/N/M |
| 5 | Could your app be used to spy on or track individuals? | Y/N/M | Y/N/M |
| 6 | Could your app/software access the camera or microphone and record things without users being aware? | Y/N/M | Y/N/M |
| 7 | If someone uses your platform, could they be re-traumatized or have their mental health impacted in some way? | Y/N/M | Y/N/M |
| 8 | Could your algorithm promote material that would traumatize or upset individuals? | Y/N/M | Y/N/M |
| 9 | Would your users be upset if the data you collect was given to someone else? | Y/N/M | Y/N/M |
| 10 | Could a data leak potentially lead to identity theft? | Y/N/M | Y/N/M |
| 11 | If your site was hacked, would users of that product potentially lose their job, spouse, or family? | Y/N/M | Y/N/M |
| 12 | Should there be an age limitation on your product? | Y/N/M | Y/N/M |
| 13 | Could someone use your product to find, contact, and potentially commit elder abuse? | Y/N/M | Y/N/M |
| 14 | If the data on your platform was breached, could it be used to blackmail the users? | Y/N/M | Y/N/M |
| 15 | Does the existence of your project imply that a particular racial group, gender, religion or other protected category is inherently bad, gross, or unwanted? | Y/N/M | Y/N/M |
| 16 | Could your product be used to commit hate crimes against a specific group? | Y/N/M | Y/N/M |
| 17 | Does the primary content of your game or algorithm focus on something considered deeply unethical? | Y/N/M | Y/N/M |
| 18 | Does your game or software contain race, gender, or other stereotypes? | Y/N/M | Y/N/M |
| 19 | Could users of your app scam other individuals? | Y/N/M | Y/N/M |
| 20 | Is your particular algorithm biased towards predicting correctly only for one race, gender, or other group? | Y/N/M | Y/N/M |
| 21 | Are the users of your project, players of your game, or those being surveyed for your data aware of how their data will be used? | Y/N/M | Y/N/M |
| 22 | What are the possible misinterpretations of your results? For example - would a white supremacist or misogynist be stoked about your results if they misinterpreted it? | Y/N/M | Y/N/M |
| 23 | Does the use or purchase of your data potentially contribute to a dangerous group or regime? | Y/N/M | Y/N/M |
| 24 | Could your virtual reality environment cause injury to the user? | Y/N/M | Y/N/M |
| 25 | Are your study participants or game players aware that their data will be collected and used? | Y/N/M | Y/N/M |
| 26 | Does your game or app contain addictive design elements without benefit to the user? | Y/N/M | Y/N/M |
| 27 | Does your survey contain an aspect of compulsion or unusually large incentive, that would command users to take it even if it was to their detriment? | Y/N/M | Y/N/M |
| 28 | Could your research outcomes harm an individual or entity? | Y/N/M | Y/N/M |

# Approvals

The signatures of the people below indicate an understanding of the purpose and content of this document by those signing it. By signing this document, you indicate that you approve of the proposed project outlined in this Statement of Work, the division of work, the Ground Rules and that the next steps may be taken to create a Product Specification and proceed with the project.

This document is based upon and supersedes the *<PRD title> Version X.X.* Deviations, (versus clarifications), from the PDR have been clearly noted. For any requirements not listed in this SOW, the PRD requirements shall remain in effect.

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| --- | --- | --- | --- |
| Approver Name | Title | Signature | Date |
| Miki Katyal | Team Project Manager |  |  |
| Ajay Kumar | Team Member |  |  |
|  | Team Member |  |  |
|  | Team Member |  |  |
| Prf. Sazzadur Rahaman | Faculty Advisor |  |  |
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| Section | Author | Word Count |
| 1. Proposal | Miki | 151 |
| 2. SOW | Miki | 109 |
| 3. Executive Summary | Miki | 280 |
| 4. Market Research | Ajay | 115 |
| 5. Product Feature | Miki | 114 |
| 6. Schedule | Ajay |  |

# Appendix

## Advisor Engagement

## Project Team Responsibilities

* The Project Manager will set up and facilitate a weekly call/meeting with the Faculty Advisor. The Project Team will provide weekly status updates to the Faculty Advisor including upcoming deliverables, critical issues, and any adjustments to the Project Plan.
* Documents will be provided to the Faculty Advisor with adequate time for review and signature. The time necessary for review will be agreed with the Advisor. The minimum review time will be 3 days prior to the document due date.
* Design files will be provided to the Faculty Advisor as requested in a format agreed to with the Advisor.
* Support requirements will be clearly requested from the Faculty Advisor with the dates required and an adequate time for fulfilling the request.
* Modifications requests to the Project Plan by Faculty Advisor will be reviewed and agreed to within 1 week of the request.

## Faculty Advisor Responsibilities

* The Faculty Advisor will provide knowledge and expertise to help the group stretch their skills.
* The Faculty Advisor will participate in a weekly or bi-weekly call/meeting with the Project Team to review the project status, upcoming deliverables, priorities, issues, and progress to the agreed Project Plan.
* The Faculty Advisor will provide document review, feedback and approval, rejection, approval with contingencies with adequate time for the Project Team to meet the course due dates.
* The Faculty Advisor will provide feedback to requested support requirements from the Project Team. This includes feedback and guidance on design implementations decisions, design files, test plans, test procedures and test results.
* The Faculty Advisor shall provide technical advice and guidance to the Project Team answering inquiries approximately 1 hour per week.
* Modifications to the Project Plan by the Project Team will be resolved and documented within 1 week of the request.
* Grade the finalized project using a skill-based rubric
* Attend iShowcase in May.

## Ground Rules

As a team and as individual team members, we agree to:

1. **Stay focused on our objectives and goals.**

Each time the team meets, we will clearly define our objectives and desired outcomes at the beginning of the meeting. We will politely remind team members if we are getting off track.

1. **“Sidebar” any issues that are relevant but not consistent with the immediate objectives.**

Occasionally, important matters are raised that are not relevant to the immediate goals of the meeting. To keep the group on track, but avoid losing the issue, create a “sidebar” where these topics can be listed and discussed later.

1. **Listen when others are speaking.**

We will listen and consider others’ input before adding our own comments.

1. **All viewpoints will have an opportunity to be heard.**

We understand that some team members may be quieter than others. We will make an effort to get each team member’s viewpoint and that no one dominates the discussion.

1. **Differences of opinion will be discussed respectfully**

We will identify areas of agreement before assessing areas of disagreement. We will encourage each other to look beyond our own point of view. We will discuss different ideas respectfully. As a team, we will weigh the merits of different opinions and agree on a process for choosing a direction. All team members will respect and follow the decision or direction.

1. **Look for the good points in new ideas.**

We will endeavor to explore the value in each idea as we assess and select our path forward.

1. **Focus on the future, not the past.**

We will use our past experience to inform our decisions, but focus the discussion on the future

objectives. Blame for past performance is counterproductive, we will focus on finding solutions.

1. **Agree upon specific action items and next steps.**

At the end of each meeting and discussion, we will summarize and agree on specific next steps, action items and assignments.

1. **Accountability**

As team members, we will each be responsible for our individual assignments and contribution to achieving the team objectives and goals. We will honor our responsibilities and not let our team members down.