Functional Requirements Specification

for

AI Instructor: Personalized Feedback and Guidance Module

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Revision History

Name	Date	Release Description	Version
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1. Overview

As AI technology continues to grow exponentially in today's world, we are seeing more of it being implemented into our daily lives. Many have concerns over AI replacing careers, but as a society, progress does not come with fear. Progress comes with an open mind as we accept technology that can aid in bettering our quality of life. AI instructors are not here to replace teachers, they are here to ease the stress of managing classrooms and to enrich students in the wonders of education. AI instructors are here to lead students to academic excellence.

There are many different features of AI instructors that we can utilize in the classroom, this document details the features and functionalities of the Personalized Feedback and Guidance module within this AI instructor system. The Feedback and Guidance module is a tool that helps students improve any skill they may need to develop. It also identifies skills they excel at, which is important for helping students discover any interests they may want to pursue in the future. All in all, it is a tool that is not only helpful for a student's academic development, but also encourages personal growth.

This document details the functional requirements and non-functional requirements of the Feedback and Guidance module. The functional requirements go over what the system should be able to do and how users can adjust these requirements to their own needs. The non-functional requirements describe accessibility features, safety/security requirements, and go over potential features for any future releases. Use this document as a starting guide to get familiar with the different features you can use so as to optimize your experience with the AI Instructor's Personalized Feedback and Guidance module. Take it and use it as a stepping stone into a new age of education.

2. Functional Requirements

2.1 FREQ-1

The system should understand user inquiries in natural language.

Description: *The system will utilize large language models to be able to understand user inquiries in natural language. This should allow for ease of use and better accessibility for all users.*

2.1.1 FREQ-1.1: General Inquiries/Help

Users can go to the general inquiries/help UI to submit requests or ask for help and get instant and accurate results. The system should understand the inquiries and help requests submitted by the user in their spoken language.

2.1.2 FREQ-1.2: Feedback System

When starting a task, users must give the feedback system a description of the task they need feedback/guidance on, as well as any supporting documents related to the task at hand. The system should understand user input and provide accurate feedback pertaining to what they need.

2.1.3 FREQ-1.3: Settings/Customization

The settings and customization UI will have predefined settings that users can change to suit their preferences/needs. Settings and customization will also have a prompt where users can input text (in natural language form) to specify what they may be looking for, the system then brings users to the setting they are describing. If a user-described setting does not exist, the system should tell them so, then accept it as a suggestion for later versions.

*Users may input specific subject areas within customization settings. The system treats each specific subject area differently as different subjects may require different forms of feedback/guidance (refer to **2.2 FREQ-2 and 2.3 FREQ-3** for more information). The system may give suggestions on ways to keep organized, the user can customize their organization according to what they prefer or they can use the AIs suggested organization settings.*

2.2 FREQ-2

The system should offer a variety of delivery modes for feedback/guidance based on user preference and user performance. It can also suggest an appropriate delivery mode for the user.

***Description:** Feedback and/or guidance on tasks can be delivered through text, audio, or video. The user can indicate which delivery method they prefer. The AI module will also analyze the user's performance and grades to see which delivery method yields optimal results.*

2.2.1 FREQ-2.1: User Preference/System suggestions

*Before commencing with a task, the system should be able to analyze the task in which it will provide guidance/feedback on. Refer to **2.3.1 FREQ-3.1** for more details. After analyzing the task, the system can suggest a guidance/feedback delivery mode that is best suited for the user. The user is presented with two options: suggested delivery mode, or user preference. They may either choose the suggested mode, or select the delivery mode they prefer. The user can choose more than one delivery mode.*

2.2.2 FREQ-2.2: Delivery Modes

Feedback and guidance can be delivered through text, audio, or video, using generative AI.

- *Text feedback is interactive. The system should provide prompts for users to indicate where they may need guidance. Feedback is presented in text for users to read/reference.*

- *Audio feedback is interactive. The system uses a voice assistant to talk to the user and narrates any pieces of feedback it produces. Users may choose to talk back to the voice assistant, or they may enter text and receive verbal responses.*

- *Video feedback is not interactive. Video feedback is a summary of what the user can be improved on. It provides users instructions on how to implement feedback/guidance into their work. Videos include elements of audio and text feedback by providing subtitles and voiceovers.*

2.2.3 FREQ-2.3: Performance Analysis

Suggested delivery mode is improved through performance analysis. The system looks at the users grades and overall performance before and after receiving feedback before determining which delivery mode is best-suited for the user. Performance analysis is done for each subject area a user may need feedback on. Suggested delivery mode may be different for each subject area.

2.3 FREQ-3

The system should determine the most appropriate form of feedback/guidance to give, based on the task at hand.

Description: *The AI system can choose from the following types of feedback based on what would be most appropriate and helpful for users, depending on the task at hand. Types of feedback include: formal vs. informal feedback, self evaluation, and peer reviews.*

2.3.1 FREQ-3.1: Task Analysis

The user should provide descriptions of the task they need feedback/guidance on, as well as any related supporting documents. The system should be able to read user input and submitted documents of various file formats (PDF, JPG, PNG, DOC, DOCX, TXT, etc.) as well as any web links, videos, or audio files that the user provides. The system should interpret user input and confirm with the user if this interpretation of the task is correct. From there, it will provide feedback and/or guidance on whatever the user needs.

2.3.2 FREQ-3.2: Formal and Informal Feedback

- *Formal feedback refers to any written reports, graded feedback, and/or summaries of what the user needs to work on. The system will provide formal feedback to the user after they finish/submit their work.*
- *Informal feedback refers to real-time feedback and guidance. The system will interact with the user to help guide them through their work.*

The system will use task analysis to decide whether formal feedback, informal feedback, or both, are necessary for the user. The system aims to optimize user understanding based on the form of feedback it decides to use.

2.3.3 FREQ-3.3: Peer and Self Evaluation

Peer evaluation and self evaluation can be provided in both formal and informal feedback. The system uses task analysis to decide whether peer or self evaluation will be helpful. If so, it will let the user know that peer or self evaluation will take place. It will then give the user the option to opt out.

- *In peer evaluation, the system will generate work from the same task, as though it was done by a different student. It will prompt the user to evaluate the generated work. Afterwards, it will indicate any other pieces of feedback the user might have missed while evaluating.*

- *In self evaluation, the system will provide the user with prompts and questions that encourage the user to self-reflect on their work. Questions may require short paragraph answers (by imposing a minimum word count) or multiple choice questionnaires about how the user felt about a task. Self evaluation question types depend on what the user requires feedback on; the system uses task analysis to provide the user with appropriate self evaluation questions.*

2.4 FREQ-4

The system should be able to identify users' strengths and weaknesses.

Description: *The system utilizes its nature as an educational software to analyze user statistics. User statistics refer to performance within different subject areas as well as proficiency in different skills. The system should be able to identify its users' strengths and weaknesses and give suggestions on ways to improve in both.*

2.4.1 FREQ-4.1: Analyzing User Statistics

The system will periodically gather its users' work and feedback it provided in order to analyze user performance. It will keep track of its users' growth in different subject areas as well as areas where the user may need further improvement. If a user wants any specific skills of theirs to be measured, they may input that into the system. The system will automatically identify different skills needed in order to work, and track user progress over time. Users can access their performance analysis at any point in time.

2.4.2 FREQ-4.2: Performance Suggestions

The system will suggest ways for the user to improve in any subject area they may need more guidance on. It will give suggestions for the user to try on their own time, and it will generate optional extra work that helps the user get more practice.

2.4.3 FREQ-4.3: Extracurricular Suggestions

The system can suggest extracurricular activities that the user may like based on its user statistics analysis. Users may opt out of this feature.

2.5 FREQ-5

The system should generate daily, weekly, and monthly reports on what the user improved on, and what the user should continue to work on.

Description: *Daily, weekly, and monthly reports vary in detail and format. Users may choose to opt out of reports. This feature uses the system's User Statistics Analysis data (see* ***2.4.1 FREQ-4.1*** *for more information) to generate reports. All reports are made per subject area (i.e. each subject has its own report).*

2.5.1 FREQ-5.1: Daily Reports

Daily reports are short summaries of any feedback/guidance given to the user that day. The system gives a recap on things the user improved on, things they may need to work on further, and a summary of what they learned that day. Users can access previous daily reports up to 6 months from when the latest was released.

2.5.2 FREQ-5.2: Weekly Reports

Weekly reports are more detailed than daily reports. They contain more detailed information about where the user can improve and where they excelled that week. Weekly reports also contain a summary of what was learned that week. They also give out suggestions on learning materials the user may want to check out. Users can access previous weekly reports up to one year from when the latest was released.

2.5.3 FREQ-5.3: Monthly Reports

Monthly reports have the most detail. They contain everything the daily and weekly reports have. They also have details about the different feedback delivery modes and feedback types that were used throughout the month and how the user responded to each one.

3. Nonfunctional Requirements

3.1 NFREQ-1: Security

The system should not collect the user's personal information.

Description: *A personalized feedback/guidance system does not need to collect personal information such as address, contact information, and any official records belonging to the user. It operates on data given to it by the user. It may collect such data (data given to the system by the user) for the purpose of system improvement. Users must make an account to access personal feedback, only a user's name, their school's account, and email is necessary. Any extra user information can be stored for the purpose of account backup, but must not be shared. Data is stored in a cloud server.*

3.2 NFREQ-2: Feedback Adaptation

The system cannot adapt the feedback/guidance it provides based on the user's feelings unless specifically stated by the user.

Description: *At the moment, the system is unable to use facial recognition or natural language tone in text or voice input to judge how the user perceives any feedback and change its delivery method to suit the user better. Such a feature may be implemented in later versions.*

3.3 NFREQ-3: Hardware Requirements

The system should be easily accessible for all users.

Description: *The system can run on Windows, Mac, and Linux/Unix OS. The system also has a web version which can run on Chrome, Microsoft Edge, Safari, and Firefox. The web version may not have as many features as the regular version.*