Person in Context Assessment

Project Requirements and Specifications

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# Introduction

Mental health issues are a prevalent problem in our society today. Those with depression, anxiety, and other mood disorders may struggle day to day with their lives, jobs, and relationships. With the rise in awareness of people’s mental health struggles, there has also been an increase in the amount of research that has been done to investigate treating the mentally ill which has also led to many different types of treatment. Many people with mental health treatment may try to seek psychological help through a doctor or therapist but may struggle to figure out what the best type of treatment would be for them.

One type of psychological research investigates how a person’s personality (also called their temperament) affects their thoughts, emotions, and behaviors. There has been some research to show how a person’s temperament may show how well they are responding to their treatment though there has been little evidence-based research about it.

The goal of our project is to build upon that investigation of how a person’s temperament reflects their treatment and use surveys to show that correlation. Our main survey is the Person in Context Assessment (PICA) which gets a general idea of what a person’s current temperament is and then sends a PDF with the results of their assessment. The other survey is a daily application where the person enters the different events/contexts they were in as well as any thoughts, feelings, or behaviors that they did when in the context. Our goal is to optimize these surveys to collect real user’s data and be able to allow a doctor to better understand and tailor a patient’s treatment based upon how their temperament and daily behaviors.

# System Requirements Specification

## Use Cases

A diagram of a person's work flow

Description automatically generated

*Figure 1: Use Case Diagram*

The use cases describe common scenarios of user interactions with the system, explaining how various functional requirements are applied in specific situations.

**Use Case 1: Complete Survey**

|  |  |
| --- | --- |
| **Use Case** | Complete Survey |
| **Actors** | Participant |
| **Pre-condition** | Participant logged in and started the Qualtrics survey |
| **Post-condition** | The participant completed all survey questions and the system received the complete survey results. |
| **Main Flow** | - Participant opens the Qualtrics survey.  - Participant answers all questions and submits the survey.  - The system confirms the survey is complete and ready to generate feedback. |
| **Alternative Flow** | -If a participant drops out of the survey midway, the system saves the current progress and allows the participant to continue later. |
| **Related Requirements** | FR1:Results PDF  FR2:Automatic PDF Sending  FR3:Data Collection |

**Use Case 2: Generate Personalized Feedback**

|  |  |
| --- | --- |
| **Use Case** | Generate Personalized Feedback |
| **Actors** | System |
| **Pre-condition** | The survey was completed, and the system received the participant's survey results. |
| **Post-condition** | Personalized assessment feedback was generated, including preliminary feedback and detailed feedback. |
| **Main Flow** | -The system receives and analyzes survey data from participants.  -The system generates preliminary feedback, including personality assessment results.  -The system generates detailed feedback, providing specific treatment strategies.  . |
| **Alternative Flow** | -If the data is incomplete, the system will generate feedback containing only basic information. |
| **Related Requirements** | FR1:Results PDF  FR5:PICA Based Questions  FR6:Clustering Algorithm  FR7:Data Collection |

**Use Case 3: Generate and Send PDF Report**

|  |  |
| --- | --- |
| **Use Case** | Generate and Send PDF Report |
| **Actors** | System |
| **Pre-condition** | Personalized feedback generated. |
| **Post-condition** | PDF reports were generated and emailed to participants and clinicians. |
| **Main Flow** | -The system generates a personalized PDF report based on the feedback, including charts and treatment recommendations.  -The system automatically sends the PDF report to the email address provided by the participant.  -The system confirms that the report was successfully sent.  . |
| **Alternative Flow** | -If the email fails to be sent, the system will record the failure information and try again. |
| **Related Requirements** | FR1:Results PDF  FR4:PICA Assessment Results  FR7:Data Collection |

**Use Case 4: Log Emotional Event**

|  |  |
| --- | --- |
| **Use Case** | Log Emotional Event |
| **Actors** | Participant |
| **Pre-condition** | Participants were logged into a mobile phone self-monitoring application. |
| **Post-condition** | Emotional events and related information have been saved to the database |
| **Main Flow** | -The participant opens the mobile app and chooses to record an emotional event.  -The participant enters the type of emotion, thoughts, feelings, and behavior information.  -The system saves the record and confirms that it was saved successfully.  . |
| **Alternative Flow** | -If the device is offline, the system will automatically sync the data when the connection is restored. |
| **Related Requirements** | FR5:PICA Based Questions  FR6:Clustering Algorithm FR7:Data Collection |

**Use Case 5: View Functionally Equivalent Situations**

|  |  |
| --- | --- |
| **Use Case** | View Functionally Equivalent Situations |
| **Actors** | Participant, System |
| **Pre-condition** | View Functionally Equivalent Situations |
| **Post-condition** | The system provides participants with functionally equivalent situational suggestions based on the recorded data. |
| **Main Flow** | -The system analyzes the emotional events recorded by the participants.  -The system generates functionally equivalent situational suggestions based on a clustering algorithm.  -The system displays the suggestions to the participants.  . |
| **Alternative Flow** | -If the system fails to identify similar situations, participants will be prompted to record more events to obtain more precise suggestions. |
| **Related Requirements** | FR5:PICA Based Questions  FR6:Clustering Algorithm FR7:Data Collection |

**Use Case 6: Import Personality Assessment Results**

|  |  |
| --- | --- |
| **Use Case** | Import Personality Assessment Results |
| **Actors** | Clinician |
| **Pre-condition** | A PDF report of the personality assessment results has been generated and sent. |
| **Post-condition** | The clinician has entered the assessment results into the mobile app. |
| **Main Flow** | -Clinician logs into mobile app.  -Clinician manually enters or uploads personality assessment results.  -System confirms data was saved successfully.  . |
| **Alternative Flow** | -If the data is incorrect, the system will prompt the doctor to re-enter or modify the data. |
| **Related Requirements** | FR4:PICA Assessment Results FR6:Clustering Algorithm FR7:Data Collection |

**Use Case 7: Collect User Feedback**

|  |  |
| --- | --- |
| **Use Case** | Collect User Feedback |
| **Actors** | Researcher |
| **Pre-condition** | Participants and clinicians completed the corresponding functional operations. |
| **Post-condition** | User experience data is stored in the database for subsequent analysis. |
| **Main Flow** | -Researchers regularly push experience surveys to users.  -Users complete the experience surveys and submit data.  -Researchers review the data for subsequent analysis and improvement.  . |
| **Alternative Flow** | -If the user skips the survey, they will be prompted to fill it out again the next time they use the system. |
| **Related Requirements** | FR6:Clustering Algorithm FR7:Data Collection |

## Functional Requirements

Functional Requirements are the necessary capabilities of our program to meet the basic needs of our clients. We have split the two lists of functional requirements between the PICA survey and the phone application.

### PICA Assessment

**Results PDF:**

|  |  |
| --- | --- |
| Description | The PICA Qualtrics survey needs to be able to create a PDF of the resulting charts and graphs that is easy to understand for the user as well as adding more in-depth details and a radar chart. |
| Source | Required from Client. Adding on to already implemented functionality. |
| Priority | Priority Level 0: Essential and required functionality |

**Automatic PDF Sending:**

|  |  |
| --- | --- |
| Description | The PICA Qualtrics survey results will be automatically sent to the email that the user provided in the survey and will be sent after the survey is completed. |
| Source | Required from Client. Client needs to be able to send results to patient. |
| Priority | Priority Level 0: Essential and required functionality |

**Data Collection:**

|  |  |
| --- | --- |
| Description | The PICA survey data from all surveys taken must be sent to the MongoDB database to be stored. |
| Source | Internal requirement from team. Building upon functionality added by previous team. |
| Priority | Priority Level 0: Essential and required functionality |

* + 1. **Phone Application**

**PICA Assessment Results Integration:**

|  |  |
| --- | --- |
| Description | The PICA data for the patient must be able to be inputted into the phone app which allows the user to see their results in the phone app. |
| Source | Requirement from Client. Client needs to be able to integrate the PICA data with the phone app. |
| Priority | Priority Level 0: Essential and required functionality. |

**PICA Based Questions:**

|  |  |
| --- | --- |
| Description | The phone app will ask specific questions based upon the patient’s temperament that was entered into the survey. |
| Source | Requirement from Client. Client needs to be able to ask questions based upon the entered temperament. |
| Priority | Priority Level 0: Essential and required functionality. |

**Clustering Algorithm:**

|  |  |
| --- | --- |
| Description | The algorithm that is used to group events that are “functionally equivalent” based on shared thoughts, feelings, or behaviors will be grouped together either through a mathematically complex algorithm or AI and will be then approved to be clustered by the user or the doctor. |
| Source | Internal requirement from team. Building upon already implemented functionality. |
| Priority | Priority Level 2: Extra features or stretch goals |

## Non-Functional Requirements

Non-functional requirements outline the operational qualities of the system, such as performance, system availability, maintainability, and security, and require accuracy and security of data stored in the MongoDB database. In addition, the system needs to ensure user experience to ensure that it meets quality standards beyond core functionality. Details of non-functional requirements are as follows.

|  |  |  |
| --- | --- | --- |
| **Non-Functional Requirements** |  | **Description** |
| [NFR-1]System Performance |  | The system should be able to scale as the number of users grows, especially when a large number of clinical graduate students or psychological clinics use the system at the same time. |
| [NFR-2]Data Storage and Management |  | All emotional events, evaluation data, and user feedback should be accurately stored in a MongoDB database, and the integrity of the data should be ensured. The database should support automatic backup and recovery mechanisms to ensure that no data is lost in the event of a system failure. |
| [NFR-3]Security |  | The system should have role-based permission management capabilities to ensure that only authorized users (such as clinicians and researchers) can access specific assessment results and user emotional events. |
| [NFR-4]System Availability |  | If the system fails, it should have automatic recovery and error handling mechanisms to ensure that the user experience is not affected. For example, when PDF generation fails, the system should automatically retry or send a notification to the administrator. |
| [NFR-5]User Experience |  | The application should have an intuitive user interface so that users can start using the system without having to read a lot of documentation. The emotional event recording and feedback functions in the mobile self-monitoring application should be simple and easy to understand, and participants can complete them quickly. |
| [NFR-6]Maintainability |  | The system should be designed with an extensible and maintainable architecture to support the addition or modification of future functions. The development team should be able to quickly locate and fix potential problems in the system and update it without affecting users. |

## User Stories

These are scenarios related to our use cases to show possible things that can happen with our use cases. Our first four user stories are listed here. Please see Appendix-1 for the rest.

**User Story US1**: Complete Survey

As a user, I want to be able to complete the survey so I can have my temperament logged.

Feature: Survey Completion

Scenario: User takes the survey

Given the user is logged in

When they fully answer the survey questions and click submit

Then the system logs the survey answers

**User Story US2**: Generate Personalized Feedback

As an Admin, I want to be able to have the system generate personalized feedback based upon the user’s survey so that the user can see their survey’s results.

Feature: Generated Personalized Feedback

Scenario: The user has finished their survey

Given the user has completed their survey

When they submit the survey

Then a personalized report will be generated based upon the user’s answers.

**User Story US3**: Generate and Send Personalized PDF Report

As a User, I want my PICA results PDF to be automatically sent to my email so I can have a personal copy of my results.

Feature: Automatic PDF generation and sending

Scenario: User gets report

Given that the user has finished the PICA fully

When they click the submit survey button

Then the PDF of the results should be automatically sent to the email they inputted into the survey

**User Story US4**: Log Emotional Event

As a User, I want to be able to log an emotional event in the phone app so I can keep track of emotionally similar events.

Feature: Log Emotional Events

Scenario: User logs an event

Given the user is in the phone app

When they fill out the form to log a new emotional event

Then the daily results will be logged in the MongoDB database with the timestamp of the submission

## Traceability Matrix

The table below aligns functional requirements with their corresponding use cases and user stories. This ensures that all requirements are accounted for and directly connected to specific user scenarios.

|  |  |  |  |
| --- | --- | --- | --- |
| Functional Requirements | Use Case | User Story | Priority |
| FR-1: PICA Assessment Results PDF | UC-3: Generate and Send PDF Report | US1: As a user, I want my PICA results PDF to be automatically sent to my email | Level 0 |
| FR-2: Automatic PDF Sending | UC-3: Generate and Send PDF Report | US1: As a user, I want my PICA results PDF to be automatically sent to my email | Level 0 |
| FR-3: Data Collection | UC-7: Collect User Feedback | US6: As an admin, I want to be able to keep user’s data in a database | Level 0 |
| FR-4: PICA Assessments Results in Phone App | UC-6: Import Personality Assessment Results | US5: As an admin, I want to be able to import a User’s PICA results into the phone app | Level 0 |
| FR-5: PICA-Based Questions | UC-4: Log Emotional Event | US4: As an admin, I want the PDF results of the PICA to be optimized | Level 0 |
| FR-6: Clustering Algorithm | UC-5: View Functionally Equivalent Situations | As a user, I want to see functionally equivalent situations | Level 2 |
| FR-7: Data Collection | UC-4: Log Emotional Event | US6: As an admin, I want to be able to keep user’s data in a database | Level 0 |

# System Evolution

As our project progresses, it is important to keep in mind the fundamental assumptions that drives our development. We must also consider the potential changes that may come up due to evolving technology, changing user expectations, and unforeseen challenges. We will be able to make wise design choices that ensures the system’s longevity, scalability, and adaptability by understanding and anticipating these changes.

Our system’s development relies on several key assumptions about the hardware, software, and user requirements. To start, our current technology stack, which consists of primary Python as well as MongoDB, and Qualtrics, will continue to be maintained and developed in a manner that keeps it compatible with our project. Python Anywhere is a reliable platform for hosting applications and we expect this reliability to continue. Additionally, we anticipate that the end user’s devices will be able to meet the web-based application’s requirements in terms of processing speed and picture quality. The system is designed prioritizing ease of use, as we believe users will need intuitive and easy access to their personality assessment data and daily emotional tracking.

We anticipate several technological and user-driven changes over time that may have an impact on the system. One of which is that as technology evolves, so will cyber threats. Since our system handles sensitive personality assessment data that will be used for research, it must adhere and abide by strict data protection standards. As for the user side, we anticipate that user demands will change as more people use digital tools to manage their mental health. The use of artificial intelligence (AI) may make users demand more personalized and immediate feedback.

We must also consider several risk points that may come up throughout the development of our project. The integration of Qualtrics and the web-based app may not scale well as the number of users increases dramatically. The system now, uses relatively simple algorithms that process and display personalized data. As more users interact with the app, performance issues with data handling and processing could arise.

The app’s current clustering feature that uses a simple rule-based algorithm to determine “functionally equivalent” emotional events is another potential risk. As we explore the use of ChatGPT and other models that could be pre-trained and fine-tuned to fit this project, there is a chance that these approaches will not work as planned. They could also introduce complications and complexity that are difficult to handle in the current system. If there are changes in availability or cost, it will require us to adapt quickly or look for other options.

To address these risks, we are implementing several precautionary measures to mitigate these risks. First, we need to enhance and manage the system with scalability in mind. This is to ensure the system can handle increased user traffic without significant performance issues. As for integrating AI, we will monitor AI technologies and remain flexible in our approach. If ChatGPT or some other model becomes too costly or unavailable, we will investigate other alternative clustering methods. This may include refining the current clustering algorithm or implementing open-source AI tools. Finally, we will create modular system components that will allow us to upgrade or swap out certain features. Doing so will not require a complete redesign of the system.

Our proactive approach to anticipating and adjusting to these changes will be vital as our project progresses. By keeping a close eye of the assumptions underlying our system’s design, and continuously evaluating potential risks and opportunities for improvement, we ensure that we are well prepared to deliver a robust and secure application. This approach allows us to remain flexible and responsive which sets up the project for long-term success and stability.

# Glossary

**ChatGPT:** Stands for Chat Generative Pre-Trained Transformer. It is a large language model-based chatbot that allows users to refine and steer a conversation towards desired length, format, style, etc.

**Qualtrics:** Qualtrics is a cloud-based platform that allows users to create, distribute, and analyze surveys. It is the platform used to host the two surveys of the project.

# References

# Appendix-1

**Additional User Stories**

**User Story US5**: View Functionally Equivalent Situations

As a User, I want to be able to see functionally equivalent situations so I can know what events have been grouped together and were emotionally similar.

Feature: View Functionally Equivalent Situations

Scenario: User views their situations

Given the user is in the phone app

When they select to view their emotional situations

Then a list of their situations is shown and are grouped based upon the clustering algorithm.

**User Story US6**: Import Qualtrics Assessment Results

As an Admin, I want to be able to import a User’s PICA results into the phone app so that the User’s temperament can be factored into the phone app’s questions.

Feature: PICA Phone App Integration

Scenario: Admin enters PICA results

Given I am an Admin, and a user has taken the PICA

When I enter the User’s results into the phone app

Then the questions in the daily survey will be more tailored to the person based upon their temperament.

**User Story US7**: Collect User Experience Data

As an Admin, I want to be able to keep user’s data in a database so that I have a record of the user’s PICA and phone app responses.

Feature: User Data Collection

Scenario: User completes PICA

Given I am an Admin and at least one person has completed the PICA

When I access the MongoDB database

Then I can see the user’s results to the assessment and can query the database.