Person in Context Assessment

Project Requirements and Specifications

WSU Psychology Clinic



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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

A diagram of a company

Description automatically generated

## Use Cases

**Generate and Send Personalized PDF Report**

|  |  |
| --- | --- |
| Pre-condition | Participants completed a Qualtrics web survey. |
| Post-condition | A PDF report was generated and emailed to participants and clinicians. |
| Basic Path | 1. The system detects that the participant has completed all Qualtrics survey questions.  2. The system automatically generates a personalized PDF report that summarizes the participant's personality assessment results and recommended treatment strategies.  3. The PDF report is sent to the participant and clinician via the system's preconfigured email service. |
| Alternative Path | -In step 2, if an error occurs when generating the PDF, the system will retry the generation. If multiple failures occur, the system will generate an error message and remind the administrator to generate the report manually.  -In step 3, if the email fails to be sent, the system will log the error and continue to try to send in the background queue until it succeeds. |
| Related Requirements | -PDF generation and automation  -Qualtrics integration with Python scripts  -Email sending and notification system |

**Log Emotional Event**

|  |  |
| --- | --- |
| Pre-condition | The user has logged into the mobile self-monitoring app. |
| Post-condition | The sentiment event is successfully recorded and saved to the database along with a timestamp. |
| Basic Path | 1. The user opens the mobile self-monitoring app.  2. The user selects the "Record Emotional Event" button.  3. The app prompts the user to enter the event type (positive or negative), emotional feelings, related behaviors, and thoughts.  4. After the user enters and submits, the system stores the emotional event on the local device or in a cloud database. |
| Alternative Path | -In step 4, users can choose to skip certain fields (such as thoughts or behaviors) and only record emotional feelings.  -If the device is offline, the system will automatically sync the data after the network connection is restored. |
| Related Requirements | -Event logging and local storage  -Database synchronization and backup |

**View Functionally Equivalent Situations**

|  |  |
| --- | --- |
| Pre-condition | The user has recorded an emotional event. |
| Post-condition | Suggestions of functionally equivalent scenarios based on the clustering algorithm are displayed to the user. |
| Basic Path | 1.The user clicks on the option to view functionally equivalent situations.  2.The system analyzes the emotional events recorded by the user based on a clustering algorithm and recommends situations similar to the previous ones.  3.The system displays the suggested "functionally equivalent situations", including possible coping behaviors, related thoughts and strategies. |
| Alternative Path | -If there is not enough data to generate contextual suggestions, the system will prompt the user to record more emotional events to get more precise suggestions.  -The user can choose to manually adjust or filter contextual suggestions to suit their personal needs. |
| Related Requirements | -Clustering algorithm and data analysis  -Situational suggestion generation and display |

**Optimize PDF Report Content**

|  |  |
| --- | --- |
| Pre-condition | The system has generated a personalized PDF report. |
| Post-condition | The system has generated a personalized PDF report.  The charts, explanations, and treatment recommendations in the PDF report have been optimized for easy understanding. |
| Basic Path | 1. The system generates a preliminary PDF report, including the participant's personality assessment results and basic chart presentation.  2. The system adjusts the chart format, color, layout, etc. in the report based on user feedback or specified optimization rules.  3. The system adds explanatory text to the report to help users understand the assessment results and provide personalized treatment recommendations for specific personality components.  4. The system generates and stores the final PDF report. |
| Alternative Path | -In step 2, users or clinicians can manually modify certain report contents (such as chart style or explanation content).  -In step 3, the system automatically generates personalized treatment intervention recommendations based on different evaluation results. |
| Related Requirements | -Report content optimization  -User experience data collection and feedback |

**Import Qualtrics Assessment Results**

|  |  |
| --- | --- |
| Pre-condition | Participants completed a Qualtrics survey. |
| Post-condition | The personality assessment results have been successfully imported into the mobile phone self-monitoring application. |
| Basic Path | 1. The clinician logs into the mobile app and opens the participant's profile.  2. The clinician manually enters or imports the Qualtrics assessment results.  3. The system automatically associates the assessment results with the participant's daily mood record and prompts the impact in future events. |
| Alternative Path | -In step 2, clinicians can choose to manually enter the assessment results instead of automatically importing them.  -If the assessment results are incorrect, the system will prompt and allow the doctor to re-enter or correct the data. |
| Related Requirements | -Manual input and automated import of assessment data  -Association of assessment results with sentiment records |

**Collect User Experience Data**

|  |  |
| --- | --- |
| Pre-condition | The user has interacted with the system (completed a survey or used a self-monitoring app). |
| Post-condition | User experience data has been saved successfully. |
| Basic Path | 1. The system prompts users to fill out the user experience feedback questionnaire regularly or in specific situations (such as after the user completes a certain function).  2. Users provide feedback through the Qualtrics platform or the feedback form in the application, including the degree of understanding of the PDF report, the experience of using the mobile application, etc.  3. The system collects all feedback data and stores it in the cloud database for subsequent analysis and research. |
| Alternative Path | -Users can choose to skip the feedback survey, but the system will prompt them next time.  -If the user's feedback contains specific issues (such as the report is incomprehensible), the system will generate further improvement suggestions. |
| Related Requirements | Collection and storage of user experience data  Relationship between user feedback and system optimization |

## Functional Requirements

### 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

**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. The system should remain stable during peak usage and ensure a smooth user experience.

After a participant completes a Qualtrics survey, the PDF report with personalized assessment feedback should take no longer than 5 seconds to generate, and the email delivery delay should be no longer than 10 seconds.

**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.

**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.

**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.

**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.

**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.

# 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

# References