Software Requirements Specification for PhysioPlay
(Gaming App Using Pose detection)

Prepared By:

Group 12

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INTRODUCTION

Physioplay is an Android game developed for use in physical rehabilitation and therapy programs to help patients improve their physical function, mobility, and overall health. The game will use various game mechanics and interactive features to engage and motivate patients to perform exercises and movements prescribed by their physiotherapists. The PhysioPlay App is designed for users who require head and face physiotherapy, providing them with games and feedback for the therapy , helping them achieve their health goals.

DOCUMENT PURPOSE

The aim of this document is to specify the software requirements for a gaming app that utilises pose detection of the head and face for gameplay. The app will be built using the Flutter framework and will incorporate features such as user registration, various games utilising pose detection, and score tracking. The purpose of the app is to provide users with an engaging and interactive gaming experience that promotes physical movement and activity.

PRODUCT SCOPE

This app is designed to serve two main purposes. Firstly, it is intended for individuals who require head movement physiotherapy as part of their rehabilitation and recovery process. Secondly, it is suitable for individuals who wish to maintain their overall health and fitness through engaging in physical activity. The app will be user-friendly, responsive, and secure, offering a seamless user experience. It will be optimised to run smoothly on Android devices, providing a high level of accessibility to users.

INTENDED AUDIENCE AND DOCUMENT OVERVIEW

Readers include the panel of professors and the team members consisting of developers and documentation writers.The document consists of a detailed description of all the functional and non-functional requirements and various perspectives of the product. It has all the features that are to be implemented in the product.

STAKEHOLDERS

- PATIENTS
- DOCTORS
- PARENTS OR CAREGIVERS
- EDUCATORS AND THERAPISTS
- ADVOCACY ORGANISATIONS

DOCUMENT CONVENTIONS

Use Times New Roman font for the entire report – Chapter/Section Title – Times New Roman 18, Bold; Heading 2 – Times New Roman16, Bold; Heading 3 – Times New Roman 14, Bold; Body- Times New Roman 13, Normal.

- Line Spacing – Between Heading 2 – 3 lines, between lines in paragraph 1.5 lines.
- Alignments – Chapter/Section Title – Center, Heading 2 & 3 should be Left Aligned. Ensure that all body text is paragraph justified.
- Figures & Tables – Ensure that all Figures and Tables are suitably numbered and given proper names/headings. Write figure title under the figure and table title above the table.

REFERENCES AND ACKNOWLEDGMENTS

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OVERALL DESCRIPTION

PRODUCT OVERVIEW:

Product Perspective: The mobile application will provide a novel approach to physiotherapy for individuals with autism and cerebral palsy by using games controlled by body movements to promote mobility and range of motion. The application will be developed using ML Kit in Flutter, enabling the integration of machine learning algorithms to detect and respond to user movements in real-time.

PRODUCT FEATURES:

→ Games controlled by head movements that promote mobility and range of motion
→ Customizable and adaptive games that cater to the user's needs and abilities
→ Fun and interactive game experiences that engage the user in physiotherapy
→ Machine learning algorithms that detect and respond to user movements in real-time
→ Data collection features to track progress and user engagement

USER CLASSES AND CHARACTERISTICS

The target user group for the application is individuals with autism and cerebral palsy who require physiotherapy. The users are expected to have varying levels of mobility and cognitive function. Another user group is therapists who can add patient information, choose appropriate options and track their progress. Operating Environment: The mobile application will be developed for Android devices. The application will require an internet connection for data collection and storage.

DESIGN AND IMPLEMENTATION:

▪ The application is designed to work on both iOS and Android devices.
▪ The Android API level should be above 21.
▪ The design and implementation of the device should prioritise the inclusion of a high-quality camera, capable of meeting the requirements of its intended purpose and target audience.
▪ The application must comply with the General Data Protection Regulation (GDPR)
▪ The application must be developed using Flutter
▪ The user interface should be simple and easy to understand, with readable text and smooth transitions.
▪ The application should be space-efficient and use a readable and maintainable code.

▪ The variables should be named using camel case, and the class names should start with a capital letter.
▪ The application should follow proper exception handling mechanisms
▪ The front-end should be developed using Dart programming language

ASSUMPTIONS AND DEPENDENCIES :

The assumptions are:-
▪ The system meets all the hardware requirements
▪ The user has internet browsing capability and an internet connection
▪ The system should have more capacity and provide fast access to the database
▪ The games will be developed for both Android and iOS platforms, with similar gameplay and user interface across both platforms
▪ The games will be designed to be accessible and enjoyable for people with different levels of cognitive and physical abilities, without causing frustration or sensory overload

The dependencies are:-
▪ The specific hardware and software due to which the product will run
▪ The end users should have proper understanding of the product
▪ On the basis of listing requirements and specifications the project will develop and run
▪ The information of all users must be stored in a database that is accessible by the system
▪ The face-tracking technology may require customization or calibration to work effectively with the target users, which may require additional testing and development time

SPECIFIC REQUIREMENTS

EXTERNAL INTERFACE REQUIREMENTS:

User Interfaces

A. Sign in page
B. Login page
C. Profile page
D. Games page
E. Difficulty choosing page

Hardware Interfaces

A. Operating system: android
B. Disk Storage: 4 GB RAM : 128 GB SSD
C. Processor : Qualcomm Snapdragon 845 and above

Software Interfaces

A. Firebase
B. Figma
C. App Store
D. GitHub

FUNCTIONAL REQUIREMENTS:

Use Case	Description
Register	The user can register by typing their credentials
Login	The user can login into their account using correct credentials
Play Game	The user can select and play any of the available game and the games will be played using head movements
Face Point Detection	Real Time detection of user’s face point with accuracy to control the game
Track Score	The user score will be captured and displayed then it will be stored in the database.The user can view their scores for each game and compare them over time to monitor their progress.
Adjust Sensitivity	The sensitivity level for each game can be adjusted based on the user's preference. The sensitivity levels will be Low, Medium, and High, and the higher the sensitivity, the faster the avatar will move.
Set Timer	The Fruit Collection game will have a timer of 60 seconds, after which the game will end. The user will be notified when the time is about to run out, and the final score will be recorded.
Notification	The user can receive notifications from the application, reminding them to play games or perform other exercises.

USE CASE MODEL:

1)Use Case Name: Login

Summary: The login feature allows the actor of the software to use the application as a registered user.

Preconditions: Create an account.

Triggers: Actor selects the sign in button.

Basic course of events (Scenario):

Internal Precondition: The sign in page is displayed.

Actor	**System**	**Screen**
1. The actor selects to sign in		
	2. Email and password	
3. Actor completes fields and select sign in		
	4. The Application validates actor as registered user	

Internal Post Condition:

1. Actor confirmed by the system as a registered user.
2. Customers can proceed to use the website.

ALTERNATIVE PATHS :

Actors sign in as guest users.

Internal precondition: None

Actor	System	Screen
1. Actors sign in as guest users		

Internal Post Conditions:

1. Customers can proceed to select the difficulty level.

2)Use Case Name: Difficulty Level

Summary: The feature allows the actor of the software to choose the difficulty level of the game.

Preconditions: Sign in page is displayed

Triggers: Actor selects the difficulty level button.

Basic course of events (Scenario):

Internal Precondition: The actor signed in using registered username and password.

Actor	System	Screen
	1. Displays the difficulty level page	
2. Actor chooses from easy, medium, hard levels		
	3. The Application validates the level of the game	

Internal Post Conditions:

1. Customers can proceed to select the game.

3)Use Case Name: Selecting Game

Summary: The feature allows the actor of the software to choose the required game to play.

Preconditions: Difficulty level interface is displayed.

Triggers: Actor selects game button.

Basic course of events (Scenario):

Internal Precondition: None.

Actor	System	Screen
	1. Displays the selection page	
2.Actor chooses the required game to play		
	3.The application validates the game	

Internal Post Condition:

1. Users can start the game now.

NON-FUNCTIONAL REQUIREMENTS:

▪ **Performance:** The app is fast, responsive, and reliable, with minimal loading times and smooth transitions between screens.

▪ **Usability:** The app is user-friendly, with an intuitive interface that is easy to navigate, understand, and use. It is accessible to users with disabilities.

▪ **Security:** Security is ensured with strong data encryption and authentication protocols to protect user data and prevent unauthorised access.

▪ **Compatibility:** Compatible with different mobile platforms, devices, and screen sizes, and works seamlessly with different versions of operating systems.

▪ **Reliability:** The application is reliable and free from errors or crashes.

▪ **Maintainability:** It is made easy to maintain and update the app, with clear documentation, modular design, and efficient code.

SYSTEM DESIGN ARCHITECTURE :

The application will be developed using a client-server architecture. The client will be the mobile application, while the server will store user data and game content. Data Flow Diagrams: The data flow diagram will show the flow of data within the system, from the user's interaction with the games to the storage of data on the server.

SOFTWARE QUALITY ATTRIBUTES :

▪ Capacity: The storage requirements of the app can be minimal
since no information about the user is stored.
▪ Compatibility: Compatible with any version of the android which supports voice assistants.
▪ Response Time: Each page loads within 10-15 seconds and the output is expected to have the same response time.
▪ Reliability: Chances of failure or system crash is low compared to other heavy applications that require huge storage.
▪ Availability: The app will be always available to the user except times of maintenance. It will be made available in the Play Store for installation.
▪ Efficiency: The app is very efficient as the user can reach their goal within minimal time.