PiSonal Trainer: Weight Lifting Performance Tracker
System Architecture

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Revision History

Date	Version	Primary Author	Comment
4/1/2017	1.00	Birunthaa Umamahesan	Proofread document for revision 1
4/1/2017	1.00	Micaela Estabillo	Adjust technical specifications based on changes
1/11/2017	0.00	Birunthaa Umamahesan	Proofread document for revision 0
1/11/2017	0.00	Micaela Estabillo	Finalize document draft
1/9/2017	0.00	Micaela Estabillo	Create document outline

Table 1: Revision history

1 Introduction and Overview

This document provides a description of how PiSonal Trainer will be built. The following are covered in this document:

- Diagram and individual descriptions of the overall component decomposition of the system
- Anticipated and unlikely design changes
- The Requirements and Design Traceability Matrix relating the system's components to the project requirements established in the Software Requirements Specifications (SRS) document

2 Decomposition into Components

The system is decomposed based on its different elements in order to allow each component to be implemented and developed independently. Nevertheless, each component interacts with at least one other.

1. **User Interface (UI)**: The UI encompasses the frontend and backend of the mobile app used to track workouts and display performance history. The app communicates with the database containing a collection of authorized users to authenticate. It also sends exercise performance statistics to the database. A mobile platform is ideal for PiSonal Trainer so that users can easily bring their device to their gyms, and record or view their performance.
2. **Camera and Counting Algorithm**: Since the camera in use is connected to the device itself, the movement counting algorithm is implemented there as well using OpenCV. This is done to reduce resource overhead that would be generated by sending image information for processing to a remote server. The algorithm is discussed in detail in the Detailed Design document.
3. **Database**: The database keeps unauthorized users from using the app and stores counts pertaining to a user's exercises. User performance graphs are dynamically generated by querying the database and sending data back to the user's phone. All the counts are stored in the database in order to avoid taking up too much space in the phone's disk.

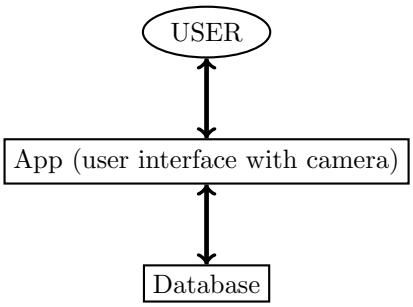

Figure 1: Interaction of PiSonal Trainer Components

3 Requirements and Design Traceability Matrix

The following table contains the functional requirements identified in PiSonal Trainer's Software Requirement Specification document, their descriptions and their corresponding design component/s.

Requirement	**Description**	**Design Reference**
R1	Only registered users may be able to use the app	UI, Database
R2	The app shall provide meaningful error messages	UI
R3	The app shall display the user's progress statistics through visual graphs	UI, Database
R4	A camera shall track the motion of the gym equipment	Camera
R5	The user's exercise performance data shall be stored for future retrieval	Database
R6	The user's performance shall be calculated using data from the camera and the equipment's weight	UI, Database, Camera

Table 2: Requirements and Design Traceability