Problem Statement and Goals
Software Engineering

Team 11, technically functional
Matthew Huynh
Cieran Diebolt
Vaisnavi Shanthamoorthy
Maham Siddiqui
Eman Ashraf

Table 1: Revision History

Date	Developer(s)	Change
September 17th, 2025	Matthew	Added 1.1, 1.2 and References
September 17th, 2025	Vaisnavi	Added onto 1.2 and Reflection
...	...	...

1 Problem Statement

1.1 Problem

From the Global Burden of Diseases, Injuries and Risk Factors study performed in 2019, individuals that would benefit from physical rehabilitation at least once in their lifetime is upwards of 2.41 billion globally [**?**]. Furthermore, a study indicating the perception of access to physiotherapy based on socio-demographic factors yielded that approximately 1 in 4 participants felt they had limited access to physiotherapy as a results of cost, wait-times or location [**?**]. Those with access to a physiotherapist experienced a disconnect with performing a movement with proper time-under-tension (TUT) and correct form [**?**]. While a physiotherapist can advise these individuals during assessment and proceeding follow-up appointments, the efficacy of rehabilitation depends heavily on the individual. In turn, this creates a need for a tool that helps users adjust exercise form unsupervised. This project aims to develop a tool that can provides feedback and correction during physical rehabilitation exercise.

1.2 Inputs and Outputs

Inputs: A recording of the user performing their physical rehabilitation exercise, captured through a smartphone, webcam, or any other device.
Outputs: Feedback or corrections of the demonstrated movement, along with highlighting targeted adjustments to the form as needed.

1.3 Stakeholders

1.4 Environment

[Hardware and Software Environment —SS]

2 Goals

3 Stretch Goals

4 Extras

[For CAS 741: State whether the project is a research project. This designation, with the approval (or request) of the instructor, can be modified over the course of the term. —SS]

[For SE Capstone: List your extras. Potential extras include usability testing, code walkthroughs, user documentation, formal proof, GenderMag personas, Design Thinking, etc. (The full list is on the course outline and in Lecture 02.) Normally the number of extras will be two. Approval of the extras will be part of the discussion with the instructor for approving the project. The extras, with the approval (or request) of the instructor, can be modified over the course of the term. —SS]

Appendix — Reflection

[Not required for CAS 741 —SS]

The purpose of reflection questions is to give you a chance to assess your own learning and that of your group as a whole, and to find ways to improve in the future. Reflection is an important part of the learning process. Reflection is also an essential component of a successful software development process.

Reflections are most interesting and useful when they're honest, even if the stories they tell are imperfect. You will be marked based on your depth of thought and analysis, and not based on the content of the reflections themselves. Thus, for full marks we encourage you to answer openly and honestly and to avoid simply writing "what you think the evaluator wants to hear."

Please answer the following questions. Some questions can be answered on the team level, but where appropriate, each team member should write their own response:

1. What went well while writing this deliverable?

   In terms of what went well throughout writing this deliverable, we were able to define the problem clearly by looking at research on access to physiotherapy. Having two members who were more knowledgeable about the topic helped guide our discussions while also peaking our interests as well. At the same time, the rest of the team put in a fair amount of research, which allowed us to fully understand the problem and align on realistic goals. Moreover, splitting up each of the deliverable sections also made it easier to combine different perspectives.

2. What pain points did you experience during this deliverable, and how did you resolve them?

   One of the major pain points was that our orignal scope was too broad, as we were trying to cover the entire body. To make the project more manageable, we decided to narrow our focus to a specific area of the body and concentrate on measurable aspects such as time-under-tension and form correction.

3. How did you and your team adjust the scope of your goals to ensure they are suitable for a Capstone project (not overly ambitious but also of appropriate complexity for a senior design project)?

   To ensure our scope of goals remained realistic within the bounds of our timeline, we decided to focus on a specific area of the body rather than the entire thing. We also decided to stick to a small set of exercises to ensure that the project can be completed within our timeline.