RadiantIQ

UNIVERSITÀ
DI TRENTO
Department of
Information Engineering and Computer Science

| | |
|---|---|
| *Project's acronym:* | RADIANTIQ |
| *Project's title:* | RadiantIQ |
| *Start date:* | 08/03/2024 |
| *Finish date:* | DD/MM/YYYY |

# D1 - RadiantIQ Software Specification

| | |
|---|---|
| **WP1:** | Software Specification |
| **Task 1.1:** | Define Software Specification |
| **Submission date:** | 09/04/2024 |
| **Responsible:** | RadiantIQ |
| **Version:** | 1.0 |
| **Status:** | Completed |
| **Author(s):** | Lorenzo Cattai, Gabriele Pernici, Anh Tu Duong, Lorenzo Negut |
| **Deliverable type:** | DOCUMENT |

## Version list:

| Version | Authors | Date | Description |
|---------|---------|------|-------------|
| 0.1 | Anh Tu Duong | 09/04/2024 | Define the scheme of the document |
| 1.0 | Anh Tu Duong | 11/04/2024 | Complete domain analysis and objectives |

# Contents

## Acronyms

| Acronym | Description |
| --- | --- |
| FRS | Functional Requirement Specification |
| FSD | Functional Specification Document |
| LLMs | Large Language Models |

# 1 Introduction

The project consists in a platform providing a better learning experience for scientific subjects. The idea is to include standard formal explanations of topics (with associated exercises) accompanied by a small number of interactive minigames. To better involve the students, each exercise will be put in an AI generated context (e.i. a phisics problem related to speeds and distances could be told using the story of Achilles and the turtoise). Moreover, the formal explanations can be genrated by an AI, uploaded by a professor or by a combination of the two. Lastly, AI is used to suggest which topics should be revised for the students using the platform.

# 2 Domain Analysis

## 2.1 Domain: Interactive Education

We want to create an application in the education domain and try to make it extremely interactive.

## 2.2 SWOT analysis

- **Strengths:**

    - (1) Use of AI to generate basic information in the articles, with the supervision of admins.
    - (1) Use of AI to generate more advanced information from user's customized necessities and weaknesses
    - (2) Use a more fun and interactive approach in the education process
    - (2) Learn by trying with minigames with immediate feedback or in a more standard way with articles
    - (3) Possibility for experts to contribute with their own articles
    - FLOSS Education Platform

- **Weaknesses:**

    - Developing effective mini-games' experiences might be time consuming from a developer perspective
    - Making fun and yet instructive experiences is hard
    - Careful management of the AI generated information is needed
    - Quality check on article uploaded must be implemented
    - Costs of using LLMs

- **Opportunities:**

    - (1) Using AI in education is an emerging idea that has not yet spread widely and can make this system unique
    - (2) Various studies show the positive effect of interaction and hands-on experiences in the learning process
    - Large demand of easy and complete ways to learn science
    - (3) Lack of effective and proficient communication/cooperation/interaction between students and teachers which creates an ample improvement margin to be enhanced

- **Threats:**

    - Possible limitations of AI technologies from government entities
    - Minigames must be entertaining to be successful
    - Brilliant is a direct competitor (tho it does not currently use AI nor personalize its exercises and lectures)
    - Hard to find funding

# 3   Project Objectives

## 3.1   Use of minigames in interactive learning

Create some minigames to make learning more interactive and more intriguing for students.

## 3.2   Use AI to help develop a more compelling learning experience

Use AI to generate compelling descriptions of the topics, to make learning funnier.

## 3.3   Make learning science more approachable and enjoyable

Make the platform an accessible starting point in the learning of science, to allow everyone to learn science using intuition and reason.

## 3.4   Provide single-topic focused content

Providing single topic courses means the possibility to create a learning path specific for the interests of the user.

## 3.5   Provide private classes as instances of a course

Create classes, from the general courses, to allow teachers/professors to integrate the platform in their standard lectures.

## 3.6   Allow better student-professor interaction

Using the classes the professors can understand which topics are clearer and then provide feedback. Moreover students can easily determine the level of comprehension of each topic before a test.

## 3.7   Provide quality guarantees on the material published

Have personnel checking the validity of the published material, while not interfering with the private resources.

## 3.8   Collect data and provide a progress history

For the learning user, having feedback on the level of comprehension is fundamental and will help them focus more on the less understood topics.

# 4 Actors

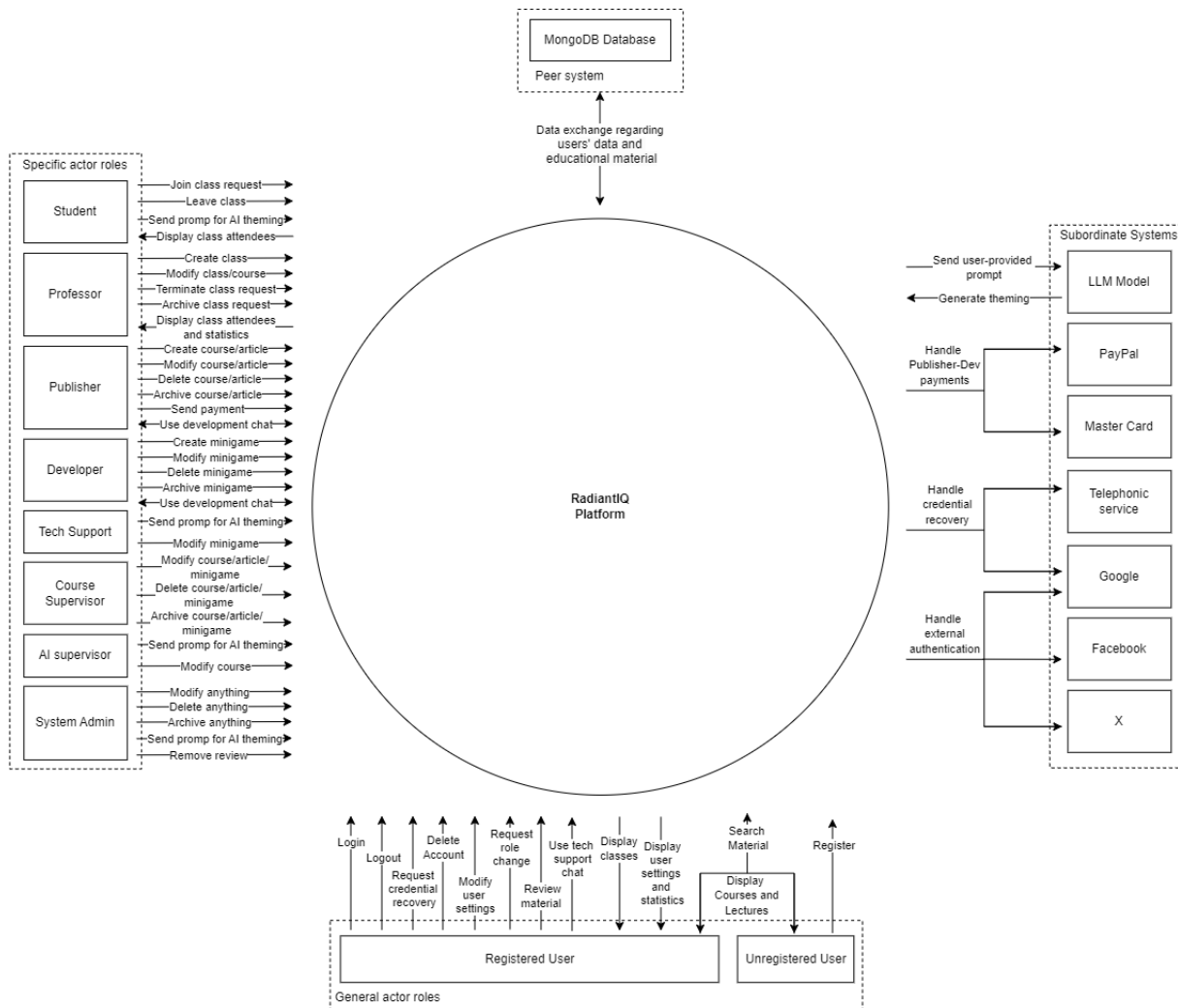# 5  Functional Requirements

# 6 Non-functional Requirements

# 7  Usecases

# 8  Context Diagram

We created a context diagram separating the general roles (registered and unregistered users), the specific roles (all the others), the subsystems (payment, authentication, credential recovery, LLM) and the peer system (database).

# 9 Component Diagram

# 10  Class Diagram

# 11 Conclusion