Project: AR Applications for Business and Consumer Engagement

Assignment 1: Design Document (30%)

- Team-based Report (single PDF document). Online **submission** **by 5pm Friday Wk6**

Assignment 2: High Fidelity Prototype / Demonstration (40%)

- Team-based Code (a single .**zip** file and a single **.mp4** file).
- Online **submission** **by 5pm Friday Wk12**
- Week 12 Team-based **Demonstration**. In class (NA/GC) or Online (OL). **Wk12**

Assignment 3: Reflective Performance Analysis (30%)

- **Individual.** One PDF document. Online **submission** **by 5pm Friday Wk13**

In this project, students will design and develop an **Augmented Reality (AR) application** that enhances business and consumer engagement. The application can be tailored for various industries, such as retail, tourism, education, or real estate, providing interactive and immersive experiences.

Project Scope:

- Implement AR features such as **product visualisation, interactive advertisements, virtual guides,** or **promotional experiences**.
- Utilise **marker-based** or **markerless tracking** to display AR content in real-world environments.
- Ensure the application is user-friendly and provides **valuable engagement** for customers or businesses**.**
- Optimise performance and conduct an in-depth analysis of **rendering efficiency, tracking stability,** and **system resource usage**.

For this group project, you will work in teams of three (3) to design, develop, and deliver an AR application. The project consists of three assessment components:

1. **Design Document (Group Submission)**
   - Develop and submit a design document using the provided template.
2. **High-Fidelity Prototype (Group Submission)**
   - Create a functional prototype and present a demonstration video showcasing the application.
   - Deliver an in-class presentation explaining the features and development process.
   - Submit a supporting document.
3. **Reflective Performance Analysis Report (Max 5 pages, Individual Submission)**
   - Reflect on your final project.
   - Analyse **performance metrics** obtained from Unity's Profiler,
   - Conduct a comparative analysis of the application's performance between **two mobile devices**, or between **a mobile device** and **a computer**.

Detailed marking criteria and submission guidelines are available on the course website.

Assignment 1: Design Document (40%)

- Team-based Report (single PDF document). Online **submission by 5pm Friday Wk6**

Each group must submit a **Design Document** outlining the development of their AR application, which serves as the primary deliverable for this project.

Design Document Requirements

The **Design Document** will capture the project's requirements and design specifications. A structured template is provided to ensure consistency and clarity. The design may incorporate a mix of:

- **Low-fidelity prototypes**, such as storyboards to illustrate interactions.
- **Throwaway prototypes**, demonstrating specific features or interactions.

Submission Guidelines

- The document must follow the **marking criteria**, available on the course website.
- Any **modifications to the template structure**, such as altering section numbering, will result in **significant mark deductions**.
- Additional materials can be included in the appendix if necessary.
- Time spent on this assignment must be **documented in the project journal** (see **Assignment 3**).

This is a **team-based assignment**, and only **one report per team** is required.

Assignment 2: High Fidelity Prototype + Demonstration (40%)

- Team-based Code (a single .**zip** file and a single **.mp4** file).
- Online **submission** **by 5pm Friday Wk12**
- Week 12 Team-based **Demonstration**. In class (NA/GC) or Online (OL). **Wk12**

High-Fidelity Prototype Submission

The **high-fidelity prototype** is the primary deliverable of the project. Assessment will be based on:

- A **3-minute pre-recorded demonstration video** showcasing the prototype.
- A **10-minute in-class presentation**, including discussion.
- Submission of **supporting documents**, such as source code and an asset register.

Presentation Details

In **Week 12**, your team will present the project to the class. This will include:

1. A **pre-recorded demonstration video** (maximum 3 minutes) highlighting the prototype's key features and functionality.
2. A **10-minute in-class presentation**, where you will discuss the design and technical aspects of your project.
3. A **Q&A session** with course staff and peers.

The use of PowerPoint (or similar presentation tools) to structure your discussion is encouraged.

Additional Information

- The schedule for presentations will be provided later in the course.
- The **time spent on this assignment** must be documented in the project journal (see Assignment 3).

Assignment 3: Reflective Performance Analysis Report (30%)

- **Individual.** One (max 5pages) PDF document. Online **submission** **by 5pm Friday Wk13**

Each student must reflect on their final AR application and analyse its performance metrics using Unity's Profiler. This assignment is designed to help students critically evaluate the impact of AR features on performance and develop optimisation skills. Your report should include the following key components:

1. Reflection on the Final Product

- Discuss the overall performance of your AR application.
- Reflect on the development process, (challenges faced and design decisions that impacted performance.)
- Identify areas where performance could be improved and discuss the trade-offs made between functionality, visual quality, and efficiency.

2. Performance Metrics Analysis

Evaluate the following performance aspects, which may (or may not) include:

- **Rendering & Graphics**: Frames per second (FPS), draw calls, shader complexity.
- **Tracking Stability & Latency**: Accuracy and response time of tracking.
- **Memory Usage**: Asset sizes, garbage collection frequency.
- **Physics & Collision Performance**: Efficiency of physics interactions.
- **Networking & Data Handling (if applicable)**: Latency, data transfer rates.
- **Battery & Thermal Performance**: Power consumption, device temperature over time.

3. Comparative Analysis

Conduct a comparative study based on one of the following approaches:

- **Comparison Between Two Mobile Devices**: Evaluate performance differences between two different mobile devices, using the metrics listed above.
- **Comparison Between a Mobile Device and a Computer**: Focus on FPS, CPU/GPU usage, memory consumption, and input latency to assess performance differences across platforms.

4. Performance Optimisation Discussion

Based on your findings:

- Identify performance bottlenecks and their potential causes.
- Suggest optimisations or improvements to enhance efficiency.
- Discuss trade-offs between quality, responsiveness, and resource consumption.

Report Structure

1. **Introduction**
   - Brief overview of the analysis.
   - Purpose of the performance evaluation and reflection.
2. **Reflection on Final Product**
   - Discussion of development challenges and design decisions.
   - Insights on how performance considerations shaped the final product.
3. **Methodology**
   - Explanation of the test setup, devices used, and Unity tools utilised.
4. **Performance Metrics Evaluation**
   - Detailed analysis with graphs, screenshots, and data tables (if applicable).
5. **Comparative Analysis**
   - Side-by-side comparison of key performance indicators.
6. **Discussion & Recommendations**
   - Interpretation of findings and suggested optimisations.
7. **Conclusion**
   - Summary of key takeaways and reflections.
8. **References** (if any)