Sprint 1 Design Report - Team [88]

1. Architecture Design

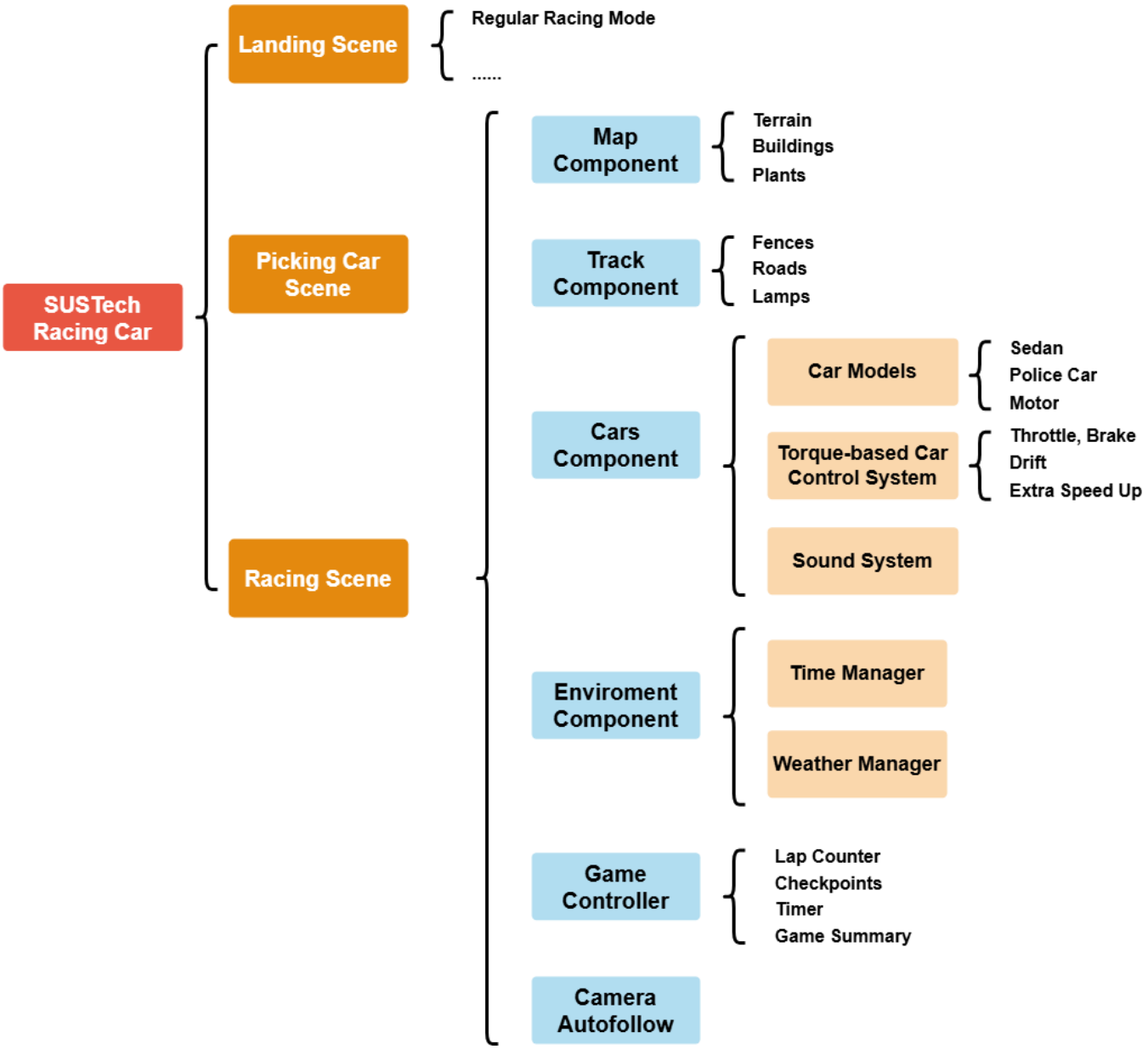

Diagram Description:

As illustrated in the above figure, the project currently consists of three scenes: `Landing Scene`, `Picking Car Scene`, `Racing Scene`.

1.1 Landing Scene

The initial interface presented to users when the game starts. It allows players to choose different game modes. At current stage, only `Regular Racing Mode` is available.

1.2 Picking Car Scene

Enables users to browse and select their preferred vehicle before entering the race. It reuses the car models in `Racing Scene`.

1.3 Racing Scene

The main interactive environment where the race takes place. All modes share the same racing scene. It consists of several critical components:

- **Map Component**: Defines the spatial structure of the game environment, including terrain, buildings and plants. **Note**: This component is built on the basis of Real World Terrain.
- **Track Component**: Sub-module responsible for the track-related design, including fences, roads and lamps. **Note**: This component is built on the basis of EasyRoads 3D.
- **Cars Component**: Handles the configuration, spawning, and control logic for all in-game vehicles. **Note**: This component is built on the basis of Arcade car physics.
- **Environment Component**: Manages the environmental context of the race such as lighting, weather, and dynamic changes.
- **Game Controller**: Acts as the central hub for managing game states, checkpoint recovering, and coordination among subsystems.
- **Camera Autofollow**: Provides dynamic camera tracking by following the player's car with smooth and intuitive movement.

1.4 Additional Notes

The current architecture focuses on single-player gameplay and does not yet consider multiplayer online functionality. If multiplayer support is needed in the future, network synchronization components can be introduced. Additionally, the weather and day/night effects in the environment system are only implemented with basic functionality in Sprint 1, with further optimizations planned for future iterations.

2. User Interface (UI) Design

We used Figma to create basic UI design, please visit the follwoing link to access:

> https://www.figma.com/design/S9mFf9fV5JlrUs7myfzZ13/SUSTech-Racing-Car-Wireframing?node-id=1059171-91&m=dev&t=z6tRH05L9atGP2rv-1

3. Project Progress

1. **SUSTech Campus Racing Map** (6/10) Race through a detailed and immersive map inspired by SUSTech's campus.
2. **Advanced Track Design** (1/2) User-friendly tracks for beginners and hidden shortcuts for strategic gameplay.
3. **Multiple Game Modes** (4/25)
    - **Regular Racing Mode**: Classic racing for speed enthusiasts.

    - **Item Race**: Use power-ups and items to outsmart opponents.
    - **Exploration Mode**: Freely explore the campus map and discover hidden secrets.
    - **Online Competition Mode**: Compete with your friends in real-time.
    - **Electric Vehicles vs Security Guard (PvE Mode)**: A unique player-vs-environment challenge.

4. **Dynamic Weather & Time System** (4/6) Experience realistic changes in weather (rain, fog, etc.) and time (day/night cycles) that affect gameplay.

5. **Themed Vehicles** (3/4) Select from a variety of department- or college-themed cars, each featuring unique power-ups, to enrich your driving experience and gain strategic advantages in races.

6. **Realistic Driving Experience** (4/4)
   Provides torque-based control systems, realistic driving sounds, speed-up mechanisms, and drift mechanisms.

7. **Multi-View Switching & Recording** (0/2) Switch between different camera angles (e.g., first-person, third-person) and record your best moments.