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Portfolio of Game Demo

The Raider - A Fully Playable PVE FPS Demo

Overview

Graph 1. *The Raider - A Fully Playable PVE FPS Demo*

Project name: The Raider - A Fully Playable PVE FPS Demo
Project type: Personal project
My contribution: FPS system design, AI system design, game play design, sound effect design (not sound recording), particle effect design(not creating), part of level building, and all of the blueprint programming implementation
Real-time demo video: Youtube

Introduction:

This project implemented a fully functional PVE FPS game demo, the FPS system design, AI system design, UI design, gameplay design, sound effect design and particle effect design are all independently designed, integrated and implemented by the author into a playable game. The artistic assets were bought from Unreal marketplace or quxel bridge, including character skeleton models, megascan assets, animation segments, original sound cue and particle effects are not created by the author, but are carefully selected and programmingly implemented into the game where they fit. The game environment is build upon an Unreal megascan map and modified to fit the gameplay, but the majority of the environment is not build by the author. All the others are independently implemented by the author, core innovations and highlights of this demo include:

1. **Core FPS system design and implementation**
   (1) **Firing system**:
      ① **Ordinary firing realistic details implemented**:
         1) Muzzle flame
         2) Firing sound
         3) Bullet hitting decal
         4) Diversified hitting effects when hitting different objects:

a. Different bullet hitting decal
b. Different bullet hitting particle effect
c. Different bullet hitting sound with sound attenuation based on distance

5) Real-time UI hitting mark on enemy hit

② **Cannon mode firing realistic details implemented**:

1) Muzzle flame
2) Firing sound
3) Traceable blooming projectile firing from the weapon as cannonball
4) Real time cannonball hitting calculation with particle effect
5) Real time cannonball hitting sound effect with sound attenuation based on distance
6) Enemy repels when cannonball hit
7) Real-time UI hitting mark on enemy hit

③ **Head shot system**:

1) Bullet hitting position calculation for head shot
2) Double damage on head shot
3) Enemy movement and animation speed decreased when shot in the head
4) Different hitting sound when head shot
5) Different hitting UI mark when head shot
6) Different hitting particle effect when head shot

(2) **Moving system:**

① Supports basic movement like walk, run and jump
② Used diversified camera shake to constitute a more realistic walking and running perspective
③ Animation notification to generate accurate footstep sound synced with running animation
④ Supported sound of running breathing after a long running time

(3) **Reloading system**:

① Ammo out empty triggering sound effect
② Ammo out delayed auto reloading

(4) **Melee system**:

① Modified animation to form melee action
② Particle effect including swing trail and hit effect
③ Enemy repels when melee hit

(5) **Skill system**:

① Skills are gradually unlocked with the game progress
② **Dodge**:

1) First skill unlocked to provide player a more swift movement to evade enemy attack
2) Sound, particle and animation implemented as well
3) Short cool down time

③ **Bullet time**:

1) Second skill unlocked, it slows down the time passing speed to allow more accurate head shot and easier evading
2) Long cool down time

④ **Cannon mode firing**:

1) Third skill unlocked, firing powerful cannonball to cause more damage and enemy repel
2) Specified for boss fight as boss moves very quick and melee to repel it is too dangerous

(6) **More realistic player perspective control rotation**: Used camera shake and camera rotation interpolation delay combined to constitute a more realistic gun holding animation and view angle switching feeling.

(7) **Pose and animation modification for better FPS perspective weapon display**: The original character model

and animation from UE market place are made for third person ACT games, modified the animation and character gesture to make them look better under first person perspective.

(8) **Blend space for more fluent inter-animation transforming**: All character animations are implemented with blend space to make the animation transforming more fluent between firing, idling, reloading, melee etc.

(9) **Recoil system**: Used controller rotation offset and camera shake combined to form a realistic recoil system including vertical and horizonal firing recoil.

2. **UI design**
   (1) Star menu, pause menu and end game menu
   (2) Player health number and bar display
   (3) Bullet count number and bar display
   (4) Skill icon and real-time cool down progress bar display
   (5) Mission information display
   (6) Player hint for skill unlock
   (7) Real-time diversified UI enemy hit mark
3. **Gameplay design**
   (1) Objective collection as player mission
   (2) PVE FPS combat as main gameplay
   (3) Dynamic game progress to unlock new skills
   (4) Auto boss spawn from the sky when last objectives collected
   (5) The enemy gets stronger with game progressing, but new unlocked skills provides more option in combat
4. **Enemy and AI design**
   (1) **Diversified enemy design with different model and attacking pattern:**
      ① Boss - Giant and move fastest, up to 5 attack combo, can chase player while attacking
      ② Elite - Bigger than normal and faster movement, up to 3 attack combo, can chase player while attacking
      ③ Normal - Basic enemy, no combo, single attack action and cannot move while attacking

   (2) **AI Behaviour system**: A fully functional AI system is implemented to control the enemy in the game demo, it consists of three sub modules:

      ① **Auto Player Detection**: The AI will periodically scan around to check if player gets into its attack zone, if no player detected, it will start auto patrol.

      ② **Auto Patrol**: The AI will calculate a random reachable position around its current position and move to the target position.

      ③ **Auto Attacking**: Once player detected by the AI, it will start to chase the player and attack her until the player is dead or itself gets killed.

   (3) **AI Attacking system**: The attacking system of the AI includes up to 5 attack combo. Normal attack are randomly triggered and they have different lengths of attack start moves. Some are instant attacks that can hardly be evaded while others has longer animation before actually causing damage. This increases the uncertainty of the enemy attacking pattern so every approach to the enemy will lead to potential unevadable damage, the player need to carefully attack the enemy and evade in time.
5. **Sound design**
   (1) **In combat music:** Auto detect combat status, game plays BGM when player is in combat with enemy and stops after no enemy around.

   (2) **Character Voices**: Used Unreal market place character voices to make the game more rich in content, examples like spawn voice, objective collection voice

   (3) **Feedback sounds:** Tons of feedback sounds was implemented, like when enemy and player get hit, objectives get collected, player casting skills, enemy attacking, etc.