CSEE 4840 Embedded System Design
Spring 2014
Project Proposal

Design Topic: Mudd Adventure – A 3D RPG Game with Voice Attach Control

Project members:
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Overview

The goal of this project is to develop a 3D video game with voice- control, turn-based 2D fighting system. The player explores the 3D map of MUDD building and the mission of the game is to destroy all the enemies in the map and defeat the final boss on the last floor. Different degrees of levels will be designed and users can make a choice from them.

Broad Description

In this project, we will use the ray casting technique to create a 3D perspective in a 2D map. The game will accept keyboard input controlling moving in the map and voice input controlling fighting and display a real world scene of MUDD building on a VGA output. In each floor, there will be enemies randomly distributed at different locations on the map. The player is not able to move towards the next floor unless the current floor is clear. Fighting scene module will be triggered when the user meets the enemy. The fighting system is turn-based. When it comes to the player's turn, the player speaks different keyword to activate the specified weapon. A game logic module will interface will the keyboard and voice sensor, and communicate with the algorithm block and VGA controller. When the user moves on the map or confronts the enemy, some parameters will be updated, like the position on the map and the state of the user.

Basic Realization and Control

Inputs: PS2 Keyboard, microphone (voice sensor),
Outputs: VGA output for the game interface, Speakers

- **Keyboard:**
  When the game is in the 3D view, we can use the keyboard to realize the character's movement such as forward, back, left or right. Also, we can make the user feel free to reset, pause or quit the game anytime by pressing the specific keys.

- **Microphone:**
  When the game enters fighting scene, we use the microphone to collect voice commands from user and then the character can activate the corresponding attack actions. We will set several different attack modes such as throwing blackboard eraser or chalk. Different attack modes have different attack damages and they can be generated by different voice signals.

- **VGA and Speaker**
  The gaming is showing on the monitor screen by utilizing the VGA display port. The speakers will output music and sound effects of the game.

HW/SW Split

The main algorithm and game features will be implemented mostly by software design. The keyboard, microphone and speakers performances will be handled by hardware to realize the interactions between software and hardware.

- Software
  3D realization+ hardware acceleration (optimal)

  Map design (Columbia map, maze and bosses)

  Character's movements and fighting scene (logic module)

- Interface:
  Audio Recognition, Keyboard Input, VGA output

Milestone:

April 1:
Map design, Fight scene, Audio Recognition

April 15:
3D realization on FPGA (+hardware acceleration)

April 29:
Character's movements
Integrate 3D module, fighting module, movement module and interface.