Project Proposal

1. Pottery Master

2. Voice Magician

3. Pianista

Hao Jin (hj2354)   Chengxue Qian (cq2159)

Xiaowen Han (xh2204)   Muqing Liu (ml3466)

1. Pottery Master

1. Introduction

In this project, we are going to implement a recreation application using the FPGA board. The application provides an environment of making the pottery for the users. Users can use keyboard to shape the pottery and calcinate and decorate the pottery using colors provided.

2. Hardware components

Display screen; keyboard to control the cursor.

3. Description

As real crafting process of the pottery, the pottery will be placed on a rotating plate that has a 3-dimensional displaying effect. When the users press the key continuously, the shape could be changed. The 4 direction keys control the cursor to move to the place where you want to change the shape. If the direction key and space key are pressed simultaneously, the shape of pottery at the cursor location will be changed. The shape can be thinner, fatter, taller or shorter. Every user can create his unique pottery shape!

After the user finishes the shape of the pottery, it will take a little time to calcinate the pottery. The user could decorate the pottery by choosing the color and decorative pattern provided. The left-key and space-key are used together to choose the decoration location of the pottery. As the pottery is rotating, the whole ring of the pottery will be decorated. The user can choose multiple colors and decorated patterns to decorate the pottery. Once the pottery is finished, the estimate value of the pottery can be displayed. Also, the pottery can be appreciated in 3-dimension. The master can enjoy his own masterpiece by every angle. The application can preserve the top-ten valued pottery as well as its masters!

4. Milestone

Milestone 1(Apr.1): Setup Peripherals and make full preparation for the project.

Including:

1) Setup VGA, implementing some basic movement to get accommodate to VGA display
2) Setup Audio Display
3) Setup keyboard
4) System design
5) Algorithm design: the algorithm are mainly focused on graphic-processing, especially dynamic image modification since in the pottery-making period, the pottery is rotating continuously and the shape will be changed as we use keyboard to modify it. We also need to implement an algorithm to evaluate the "price" of the pottery if we want to "sell" them.(Of course, this evaluation are mainly used for fun)

Milestone 2(Apr.15): Software-level design of the project.

Including:

1) Basic interface design
2) Algorithm implementation in C-code
3) System and scene implementation in C-code

Milestone 3(Apr.29): Hardware-level design of the project.

Including:

1) Hardware implementation of what have been done in milestone 2
2) Enhanced user-interface, as East-Asia is very famous for its pottery-making, thus we want to add more East-Asia ornament in Pottery Master
3) Implementing basic functions, having the first demo

Final Report Wrap-up and adding more features if possible

Voice Magician
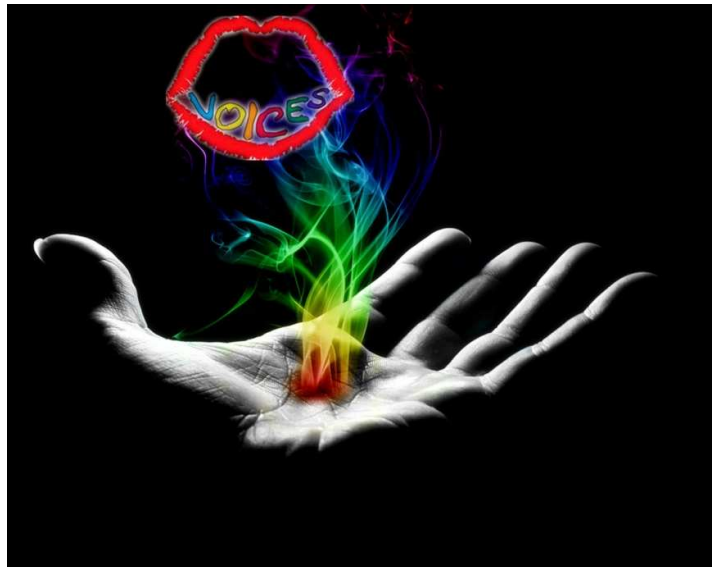
1. Introduction

In this project, our group is going to design a voice-changing game. The game takes a voice input; applies some "magic" and produces a funny output voice according your own choice. Such choices may include an evil wizard; an adorable cherub; or a transformer, etc. Meanwhile, a corresponding vivid figure will appear on the screen. Furthermore, you can interact with the figure by patting; tickling; spraying or feeding it, etc. If possible, you can also make small conversations with it.

2. Main hardware components

Display screen; audio card; keyboard (to choose audio effect and to interact with the 3D figure shown on the screen); and SoCKit board.

3. Description
(Basically screen display and audio effect.)

●A 3D vivid figure will be displayed on the screen according to your chosen favored voice effect.

●The figure on the screen will show a life-like open-and-closing lip as a real talking people. In the meanwhile, there will be a specific audio effect applied to your real-time voice input.

●The figure will react to your interaction with certain facial expression; gestures; and sounds in an amusing way.

●If possible, you can also make small talks with the figure.

4. Milestone

Milestone 1(Apr.1): Setup Peripherals and make full preparation for the project.

Including:

1) Setup audio display, which is the core part of the design, if we are going to using voice-recognition function, we need to pay additional time in setting up voice recognition device
2) Setup VGA, implementing some basic movement to get accommodate to VGA display
3) Setup keyboard
4) Graphic and scene design
5) Algorithm design for various functions such as tone changing, image-processing(as we also need an avatar in the screen to mimic the speaking of a person and even interact with human)

Milestone 2(Apr.15): Software-level design of the project.

Including:

1) Basic interface design
2) Algorithm implementation in C-code
3) Audio-processing implementation in C-code
4) Image-processing implementation in C-code
5) If we have to do the voice recognition and reply to human's word, we have to setup a database for storing the reply word for the avatar

Milestone 3(Apr.29): Hardware-level design of the project.

Including:

1) Hardware implementation of what have been done in milestone 2
2) Enhanced user-interface (focusing on the interact between avatar and human)
3) Implementing basic functions, having the first demo

Final Report Wrap-up and adding more features if possible

3. Pianista

1. **Introduction**

   In this project, we are going to design an interactive piano game that has two modes: first, playing mode in which the player can play the piano themselves and they can choose whether to display the music score or not; second, game mode in which the player should hit the right keyboard that matches the music note falling down and there are three different levels of difficulty to choose from.

2. **Hardware components**

   Display screen, audio card, keyboard which will be modified to be a piano keyboard and the SoCKit board whose buttons will be used to choose different playing mode.

3. **Description**

   Screen display:

   There will be a piano displaying on the screen and the piano keyboard will have 3-D effects. When the player hits the keyboard, it will be pressed down and then bounces back.

   The falling notes in the game mode will have more fantastic visual effects as the player comes to higher levels, for example flaming notes, frozen notes and so on.

   Game rules:

   1) Playing mode: The keyboard will be modified to become a piano keyboard, and if the player can play the piano, they can play whatever music as they like; otherwise for most people who can't, they can choose to display a music score and the corresponding music notes will be highlighted on the keyboard, so our game will help those who cannot play the piano play a song on their own.

   2) Game mode: There will be music notes falling from top of the screen and the player should hit the right keys before they fall down. We are going to set three difficulty levels corresponding to three different songs: easy, medium, and hard, according to the falling speed of the notes and the key combinations which may be one key, two keys or three keys at most. The background music will be the song being played and the player should press the right keys as many as possible. If the player hits the right keys, they will get a point, the more right keys they hit, the higher points they will get.

4. Milestone

Milestone 1(Apr.1): Setup Peripherals and make full preparation for the project.

Including:

1) Setup and reconfigure the keyboard to let it simulate (looks like…) the piano keyboard.
2) Setup VGA, implementing some basic movement to get accommodate to VGA display
3) Setup Audio Display
4) Game rule and game mode design
5) Algorithm design for various functions such as keynote falling, keystroke recognizing and displaying(e.g: judge if the key stroked at a proper time according to the falling of the keynote)

Milestone 2(Apr.15): Software-level design of the project.

Including:

1) Basic interface design
2) Algorithm implementation in C-code
3) Game rule and game mode implementation in C-code

Milestone 3(Apr.29): Hardware-level design of the project.

Including:

1) Hardware implementation of what have been done in milestone 2
2) Enhanced user-interface (game mode selecting, keynote falling, keypad on the screen indicating which key you're stroking)
3) Implementing basic functions, having the first demo

Final Report Wrap-up and adding more features if possible

Dear Professor:

We have considered three potential projects and want to make the final decision after asking your advice.

Thus, the group may also change after the final decision of project.

Thank you!