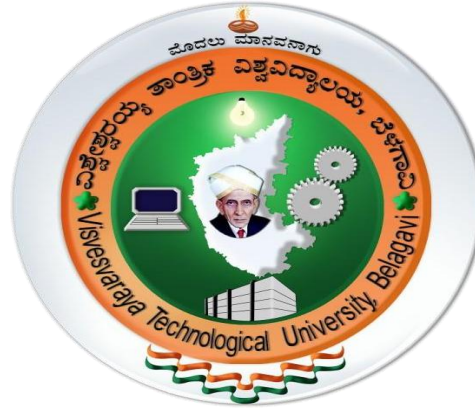


VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI.

KARNATAKA, INDIA



MINI PROJECT REPORT ON

“FACE MAKER”

Submitted in partial fulfillment of sixth semester Computer Graphics Laboratory With Mini Project (18CSL67) in Computer Science and Engineering.

Submitted By

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2021-2022

CERTIFICATE

This is to certify that **MR. MADHU K R USN: 4GH19CS406** and **MR. RAMU H R USN: 4GH19CS413** has satisfactorily implemented the mini project titled “**FACE MAKER**” in sixth semester Computer Graphics Laboratory With Mini Project (18CSL67) as per the requirements of **Visvesvaraya Technological University, Belagavi** for the academic year 2021-2022

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External Viva

Name and Signature of Examiner with Date

1.

2.

DECLARATION

We, **MADHU K R** and **RAMU H R** students of Sixth Semester B.E,GOVERNMENT ENGINEERING COLLEGE, Hassan bearing USN **4GH19CS406** and **4GH19CS413** respectively, hereby declare that the project entitled “**FACE MAKER**” has been carried out by us Under the supervision of our Guide, **Mrs. NIVYASHREE.R**, B.E., M.Tech, Assistant Professor, Dept. of CS&E, GEC Hassan and **Miss. NAVYA A B**,B.E., M.Tech, Assistant Professor, Dept. of CS&E, GEC Hassan, have submitted in partial fulfillment of the requirements for the award of the Degree of B.E in CS&E by the Visvesvaraya Technological University, Belagavi during the academic year 2021-2022. This report has not been submitted to any other Organization/University for the award of degree or certificate.

Date:

Place:

Project Associates:

MADHU K R

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ABSTRACT

This project demonstrates the use of simple geometric shapes. In this project, the user selects an option from the menu which appears on a right click. There exists a default Human face and upon selecting a particular option, the change is reflected on it. To create a face which displays different expressions and styles. This project consists of various options of making a face. It consists of a simple face modelling system that might be used for animation. The face comprises of two identical eyes plus the outline, a nose, and a mouth. The face also comprises of hairs over the head. The main objective of this project is to design various kinds of faces using the options given. This program also provides options such as changing of expressions, skin colour, hair styles, hair colour, size of nose and eyes. The program uses functions such as translation, scaling for the required change. The colour of the face and hairs are also changed using 'colorf' function. A menu is attached to the right click of the mouse. This menu consists of options such as face which has an attribute of changing to square or circle, expressions which possess happy and sad sub-options, skin which possess changing of colour to Caucasian, beige and dark, eyes whose shape and size can be changed accordingly to small, medium and large, nose can also be changed to big and small sizes accordingly, hair consists of three styles namely square type, curly etc., hair colour which can turn black or white and a hat which be placed or can be removed on choice. So, the user can select any of the options, any number of times to design the desired face. These menus are implemented through 'glutCreateMenu' and 'glutAddMenuEntry' in the main function. The program also supports hierarchical menus for more than one entry through 'glutAddSubMenu' in main function.

CHAPTER 1

INTRODUCTION

1.1 Overview of Computer Graphics

The term computer graphics includes almost everything on computers that is not text or sound. Today nearly all computers use some graphics and users expect to control their computer through icons and pictures rather than just by typing. Computer graphics is the field of visual computing, where one utilizes computers both to generate visual images synthetically and to visual and special information sampled from the real world. The term Computers has several meanings:

- The representation manipulation of pictorial data by a computer.
- The various technologies used to create and manipulate such pictorial data.
- The sub-field of Computer Science which studies methods for digitally synthesizing and manipulating visual content.

1.2 History

The phrase “Computer Graphics” was coined in 1960 by William Fetter, a graphic designer for Boeing. The field of computer graphics developed with the emergence of graphics hardware.

The first major advance in computer graphics was the development of the Sketchpad by Ivan Sutherland. Further advances in computing led to greater advancement in interactive computer graphics. In 1959, the TX-2 computer was developed at MIT’s Lincoln Laboratory.

1.3 Application of Computer Graphics

- Computational biology
- Computational physics
- Computer-aided design

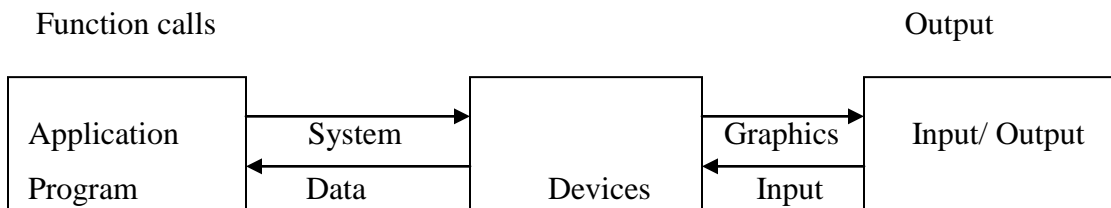
- Computer simulation
- Digital art
- Education
- Graphic design
- Video games

1.4. About OpenGL

- The Computer Graphics is one of the most effective and commonly used methods to communicate the processed information to the user. It displays the information in the form of graphics objects such as pictures, charts, graphs and diagram instead of simple text.



- **OpenGL** is a low-level graphics library specification. It makes available to the Programmer a small set of geometric primitive – points, lines, polygons, images, and bitmaps. OpenGL provides a set of commands that allow the specification of geometric objects in two or three dimensions, using the provided primitives, together with commands that control how these objects are rendered.
- Since OpenGL drawing commands are limited to those that generate simple geometric primitive (points, lines and polygons), the OpenGL utility(GLUT)has been created to aid in the development of more complicated three-dimensional objects such as a sphere, a torus, and even a teapot. GLUT may not be satisfactory for full-featured OpenGL application, but it is a useful starting points for learning OpenGL.
- **OpenGL** API-based application can run on systems ranging from consumer electronics to PCs, workstations and supercomputer, As a Result, application can scale to any class of machine that are minimum.



1.5 About the project

To create a face which displays different expressions and styles. This project consists of various options of making a face. It consists of a simple face modelling system that might be used for animation. The face comprises of two identical eyes plus the outline, a nose, and a mouth. The face also comprises of hairs over the head. The main objective of this project is to design various kinds of faces using the options given. This program also provides options such as changing of expressions, skin colour, hair styles, hair colour, size of nose and eyes. The program uses functions such as translation, scaling for the required change. The colour of the face and hairs are also changed using ‘colorf ‘ function. A menu is attached to the right click of the mouse. This menu consists of options such as face which has an attribute of changing to square or circle, expressions which possess happy and sad sub-options, skin which possess changing of colour to Caucasian, beige and dark, eyes whose shape and size can be changed accordingly to small, medium and large, nose can also be changed to big and small sizes accordingly, hair consists of three styles namely square type, curly etc., hair colour which can turn black or white and a hat which be placed or can be removed on choice. So, the user can select any of the options, any number of times to design the desired face. These menus are implemented through ‘glutCreateMenu’ and ‘glutAddMenuEntry’ in the main function. The program also supports hierarchical menus for more than one entry through ‘glutAddSubMenu’ in main function.

CHAPTER 2

REQUIREMENTS SPECIFICATION

System requirements are expressed in software requirement document. It is the official statement of what is required of the system developers. Requirements document includes the requirement definitions and the requirement specification. The software requirement document is not a designed document. It should set out what the system should do without specifying how it should be done.

System Requirements specification in our project are:

2.1 User requirements

- The package provides good user interface.
- The system design should be based on functions.
- The package should be flexible.

2.2 Functional requirements

- User should provide main containing all functions.
- Interface is required.
- Presentation of the function should have a clear cut approach.
- There should exist interaction between user and system.

2.3 Hardware Specification Details

- Processor: Intel 386 onwards Compatible Hardware.
- RAM:4GB RAM.
- Keyboard : Normal keyboard (QWERTY).

- Backup Media : Hard disk.

2.4 Software Specification Details

- Operating System : Ubuntu.
- Language Tool : OpenGL
- Compiler : C++ Compiler.
- Libraries : GL/gl.h, GL/glut.h, GL/glu.h, GL/glew.h
- Documentation Tools : geditor

CHAPTER 3

DESIGN

The Graphics Package is designed using the in-built graphics library. The objects, which are drawn, are stored as functions that can be used according to the requirements.

3.1 Basic Design

The 2-D transformation project has been developed in C++ that also provides an in-built graphics library through "GL/glut.h".

3.2 Modules and their descriptions

3.2.1 Header files

- **“stdio.h”**: This is the header file that includes the functions like printf(), scanf() for read and write operations. It also includes the file handling like open(), close(), etc.
- **“stdlib.h”**: This is used to get some standard libraries.
- **“GL/glut.h”**: This is to include the graphics built in OpenGL function and utilities to build and implement our customized graphics packages.
- **“string.h”**: This is the header file that include the strings like bitmap character() to read strings.
- **“math.h”** : The math.h header defines various mathematical functions and one macro. All the functions available in this library take double as an argument and return double as the result.

3.2.2 Inbuilt functions

- **glClearColor():**
 - **glClearColor(GLfloat red, GLfloat green, GLfloat blue, GLfloat alpha);**
 - Description: This function sets the color value that is used when clearing the color buffer. The background color for the display window is chosen in RGB mode with the open GL routine.

- **glClear():**
 - **glClear();**
 - Description: This function clears the particular buffer.

- **glColor3f():**
 - **glColor3f(TYPE R , TYPE G, TYPE B);**
 - Description: This function sets the present RGB (or RGBA) colors.

- **glVertex2i() :**
 - **glVertex2i();**
 - Description: This function defines a line segment.

- **glutBitmapCharacter() :**
 - **glutBitmapCharacter(void* font, int char);**
 - Description: This function renders the character with ASCII code char at the current raster position using the raster font given by font.

- **glutPostRedisplay() :**

- **glutPostRedisplay();**
- Description: This function requests that the display callback be executed after the current callback returns.

- **glutInit() :**

- **glutInit(int *argc, char **argv);**
- Description: This function initializes GLUT.

- **glutInitDisplayMode() :**

- **glutInitDisplayMode(unsigned int mode);**
- Description: This function requests a display with the properties in mode.

- **glutInitWindowPosition() :**

- **glutInitWindowPosition(int x, int y);**
- Description: This function specifies the initial position of the top-left corner of the window in pixels.

- **glutCreateWindow() :**

- **glutCreateWindow(char *title);**
- Description: This function creates a window on the display.

- **glutDisplayFunc() :**

- **glutDisplayFunc(void (*func)(void));**
- Description: This function registers the display function that is executed when the window needs to be redrawn.

- **glOrtho() :**

- **glOrtho(GLdouble left, GLdouble right, GLdouble bottom, GLdouble top, GLdouble near, GLdouble far);**
- Description: This function defines the orthographic viewing volume with all parameters measured from the center of the projection plane.

- **glutKeyboardFunc() :**

- **glutKeyboardFunc(unsignedchar key, int x, int y);**
- Description: It controls the movement of the ship.

- **glutMainLoop() :**

- **glutMainLoop();**
- Description: This function causes the program to enter an event processing loop.

- **glBegin() :**
 - **glBegin(GLenum mode);**
 - Description: This function is used to starts the collection of vertices.

- **glPointSize() :**
 - **glPointSize(GLfloat size);**
 - Description: This function is used to set the point size attributes.

3.2.3 User Defined functions

- **myinit():**
 - **myinit();**
 - Description: This function sets the viewing positions, and point size.

- **display():**
 - **display(void);**
 - Description: This function will display the output.

- **createMenu():**
 - **createMenu (void);**
 - Description: This function is used for the menu creation which is used in display.

- **keyboard():**
 - **keyboard(unsigned char key,int x,int y);**
 - Description: This function is said to call back for events when key is pressed. The glut function glut keyboardFunc is the call back for event generate by depressing the key, whereas the glutKeyboardUpFunc is the Call back for event generate by release of a key.

CHAPTER 4

IMPLEMENTATION

4.1:User interactions: There are 5 major Menu added to this project via mouse click.

You can get the menu via right clicking!

START - Simply right click to see the face shape rectangular, circular and another shapes.

SECOND OPTION :Face expressions with Normal , Happy And sad face.

THIRD OPTION: Face with big eyes and small eyes.

FOURTH OPTION: FACE with different hair color ,hairstyles and With hat and without hat options.

EXIT – QUIT from the server

4.2:Architecture:

Figure 3.2 shows the flow of the program. The program allows the user to choose a feature. Based on the choice the appropriate object is drawn. The main function in the program first calls the init function. This function draws the default features of the Face. There are various functions used like Face, Skin, Expression etc which are used to change the features accordingly.

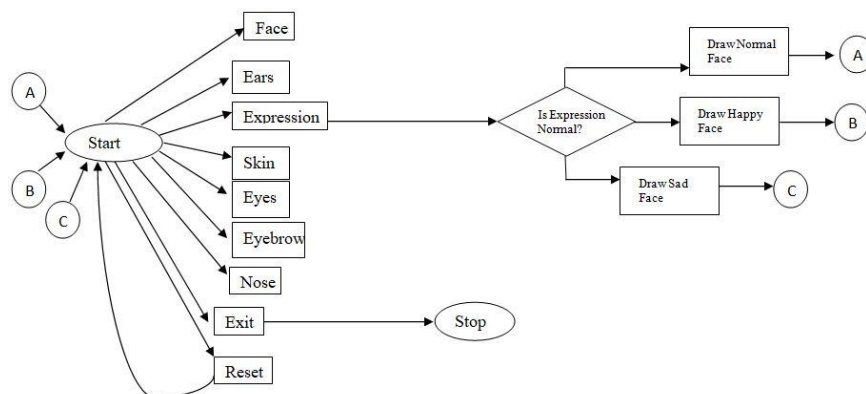


Figure 4.2 Flow Chart

4.3 Modules

4.3.1 Face :-

- You can change the Face shape.
- Shapes are: Square, Circle, Another Shape .
- Square is default face

4.3.2 Expression :-

- You can change the Expression
- Expressions are: Normal, Happy, Sad.
- Normal is default Expression

4.3.3 Skin :-

- You can change the skin color
- Skin Colors are: light pink, , orange.
- Light pink is default Expression

4.3.4 Eyes

- You can change the eye size
- Eye sizes are: Small, Medium, Big.
- Small Eye is default

4.3.5 Nose

- Also you can change the Nose size
- Node sizes are: Small, Big
- Big Nose is default

4.3.6 Exit

Click the exit button you exit the console

4.3.7 Reset

Its name itself Reset the all expression.

```
//Code for Expression
if(expr==EXPR1)//Normal Expression Code
for(float thet=240;thet<300;thet=thet+0.2){
float tR=3.14*thet/180;
glBegin(GL_POINTS);
glVertex2f(300+75*cos(tR),250+75*sin(tR));
glEnd();
for(float thet=60;thet<120;thet=thet+0.2){
float tR=3.14*thet/180;
glBegin(GL_POINTS);
glVertex2f(300+75*cos(tR),120+75*sin(tR));
glEnd();
}}
else
if(expr==EXPR2)// Happy Expression Code
for(float thet=240;thet<300;thet=thet+0.2){
float tR=3.14*thet/180;
glBegin(GL_POINTS);
glVertex2f(300+75*cos(tR),250+75*sin(tR));
glEnd();
}
else
if(expr==EXPR3)//Sad Expression Code
for(float thet=60;thet<120;thet=thet+0.2){
float tR=3.14*thet/180;
glBegin(GL_POINTS);
glVertex2f(300+75*cos(tR),120+75*sin(tR));
glEnd();
}}
```

CHAPTER 5

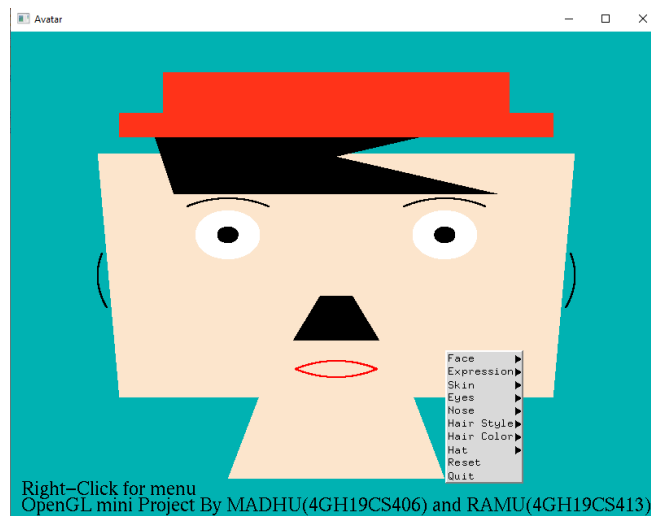
SNAPSHOTS

5.1 Default: This page Default page.



Snapshot 5.1: Default

5.2 Menu: When click the mouse right button it shows the menu



Snapshot 5.2: Menu

5.3 Face: This page shows the different faces (Square, Circle, Other)



Snapshot 5.3: Types of Faces

5.4 Expression: This page is shows the different expression (normal, happy, sad)



Snapshot 5.4: Types of Expressions

5.5 Skin: This page is shows the different Skin color



Snapshot 5.5: Types of Skin Color

5.6 Eyes: This page is shows eyes (small, medium, big)



Snapshot 5.6: Various sizes of Eyes

5.7 Nose: This page is shows Nose (small, big)



Snapshot 5.7: Types of Nose

5.8 Hair Color: This page is shows different hair color (black, white, yellow)



Snapshot 5.8: Various Hair colors

5.9 Hair Styles: This page is shows different hair styles



Snapshot 5.9: Various Hairstyles

5.10 Hat: This page is shows hat. You can add and remove the hat



Snapshot 5.10 : Cap/No Cap

CONCLUSION

It gives us great pleasure in announcing the completion of the project. This project attempts to display functions of graphics using OpenGL in a lucid and easy to understand manner. The design of this project has helped us to improve our knowledge about Computer Graphics. We started with a modest aim, with no prior experience in any programming projects such as this, but ended up in learning many things, fine tuning my programming skills and getting into the real world of software development with an exposure to corporate environment. During the development of any software of significant utility, we are faced with the trade-off between speed of execution and amount of memory consumed. This is a simple interactive application. It is extremely user friendly and has the features, which makes simple graphics project. It has an open source code and no security features has been included. The user is free to alter the code for future enhancement. Checking and verification of all of all possible types of the functions are taken care. Care was taken to avoid bugs. Bugs may be reported to creator as the need may be. So, I conclude on the note that I am looking forward to develop such projects with an appetite to learn more in the field of computer science.

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