

1. 3D model

I designed a 3D model using VRoid Studio because of its ease of use in creating attractive models and automatic rigging which means the facial expressions are already generated.



2. User Interface

A simple UI to let users know what controls are available and an info display showing what the current expression is showing. Additionally, the controls on the top left can also be clicked with a mouse.



3. Coding

To achieve variable expressions intensity, I used a script to control the blendshape weights.

In the start function I set default values for the variables used in the script. The targetWeights list is used to first contain all the default blendshape values, which will then be modified to target values that current blendshapes can move towards.

```
Unity Message | 0 references
private void Start() {
    //set default values
    currentExpression = "neutral";
    currentBlendshape = "Fcl_BRW_Angry";
    for (int i = 0; i < face.sharedMesh.blendShapeCount; i++) {
        targetWeights.Add(face.GetBlendShapeWeight(i));
    }
}
```

In the update function, three things are done: continuously change the current blendshape weight towards the target weight value, update the expression status, and process input. Holding shift while pressing keys 1-5 will increase an expression's intensity by 10%. Pressing keys 1-5 will set an expression's intensity to 100%.

```
Unity Message | 0 references
void Update() {
    //move towards target weight
    for (int i = 0; i < targetWeights.Count; i++) {
        face.SetBlendShapeWeight(i, Mathf.MoveTowards(face.GetBlendShapeWeight(i), targetWeights[i], Time.deltaTime * speed));
    }

    //update current expression status
    ExpressionStatus(currentExpression, currentBlendshape);

    //process inputs
    if (Input.GetKey(KeyCode.LeftShift)) {
        if (Input.GetKeyDown(KeyCode.Alpha1)) {
            //increase joy
            ChangeBlendshapeWeight("Fcl_ALL_Joy", 10);
        }
    }
}
```

To show the current expression status, I use a function that shows the current expression's weight as a percentage. For the neutral expression, because the values are all at 0, I subtract 100 by the current value of the last expression's blendshape weight.

```
//shows current expression status
1 reference
void ExpressionStatus(string expression, string blendshape) {
    if (expression == "neutral") {
        status.text = "Current expression: " + expression + " " + (100 - GetBlendshapeWeight(blendshape)) + "%";
    }
    else {
        status.text = "Current expression: " + expression + " " + GetBlendshapeWeight(blendshape) + "%";
    }
}
```

4. Demo Video

The demonstration video can be viewed [here](#).