



Project Proposal - Smiley Budding

Team: TYTS

Abstract

We will develop a virtual companion Smiley Budding that encourages users to smile more. Smiley Budding uses the facial expression recognition technology to detect when a user is smiling when he/she is working on the computer. Budding will gain energy from users' smile and appear accordingly. We will use PyQt to build a GUI application and OpenCV and deep learning models to support the face recognition task.

The Team

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Background & Motivation

Smile is not only a responsive facial expression due to happiness, but happiness can be attributed to more smile. Research has found a strong link between regular smile and health and mood¹. To encourage people to smile, we build the e-companion Smiley Budding that is 'fed' by users' smile. Budding is a popular emoji character among young people in China because of its lovely appearance. Budding has been downloaded

Software Requirement

Software Overview

The user can register for a companion (Budding). Once the software is run, Budding will appear on the screen and start to detect users' smile using a camera. The user will have a smile score representing his/her smiling history. Budding has an energy bar that is charged by users' smile. The appearance of Budding will change according to its energy level.

Each time the camera detects users' smile, the score of the user will increase and Budding will gain energy. Budding will appear to be happier if he is in high-energy level. If the user does not smile for a fixed period, Budding's energy will gradually decrease and start to be less happy.

¹ <https://sunwarrior.com/healthhub/15-health-benefits-of-smiling>

User Story

We have one user type: the user who is smiling to Budding

- (1) As a user, I want to create a new account of my own so that I can access to the system and check my private data.
- (2) As a user, I want to see Budding act happier when I am smiling so that I will feel happier and gaining energy from it.
- (3) As a user, I want to access my smile data by plots so that I can know the total scores and compare with others

Technical Summary

Language and Platform

Python3, Mac

Backend

PyQT5 - GUI backend

SQLite - Data storage

Matplotlib - Data visualization

OpenCV, Pre-trained Keras/Pytorch model - facial expression recognition

Frontend

PyQT5 - GUI frontend

QT Designer - GUI frontend designing

Other Tools

Pylint - Code static analysis

Github - Version control

Budding Pop emoji - Graphics

Project Risk & Contingency Plan

Why this project is doable?

The Project utilizes various open-source tools: we use Qt designer to develop the user interface, PyQt5 to react to user's interaction events (e.g., clicking), OpenCV to recognize people's smile, SQLite to store users' accounts information, and Github to realize version control. Pre-trained facial expression machine vision model is also available from various online sources. Therefore, this project is technically manageable.

The idea, requirement and management of this project is neither too difficult nor trivial so the project is highly doable and meaningful.

Potential Risk & Contingency Plan

Risk 1:

The open source pretrained detection algorithm may have an unaccepted recognition accuracy and the software cannot detect smiles of user.

We also don't have enough dataset and time if we want to build our own machine learning model.

Contingency Plan 1:

In our demo-version, we replace the smile detection module with a clickable button, the user gets scores and Budding gains energy when the user clicks the button, or we only use face detection rather than smile detection for demo purpose. Face detection is much more tractable than smile detection.