

Assignment 6: Gesture Recognition (15P)

Goals

You know different methods for recognizing unistroke gestures and can implement them. You are familiar with LSTM neural networks. You can include robust gesture detection into simple applications.

1 Implementing the \$1 Gesture Recognizer 5P

Implement Wobbrock's \$1 gesture recognizer. You can find a description on Wobbrock's website¹. Train the recognizer with at least five gestures. You might already have done that in the course. Build a little user interface where users can enter gestures to test the gesture recognizer.

- (2P) \$1 gesture recognizer works.
- (1P) Efficient implementation.
- (1P) Five gestures can be distinguished.
- (1P) Gesture entry user interface.

2 Comparing Gesture Recognizers 5P

Create a test dataset for unistroke gestures based on Wobbrock et al.'s unistroke gesture logs. Your dataset should contain ten gestures from each class. Train an LSTM classifier with the remaining data. Then, try to systematically reduce the LSTM's parameter count. Create at least three different versions.

Then, compare accuracy and prediction times of the LSTM with different parameter counts, as well as the \$1 gesture recognizer. Report method results in a Jupyter Notebook called *unistroke-gestures.ipynb*. Which one would you choose for a practical application, and why?

- (1P) LSTM gesture classifier works.
- (2P) Systematically compared different parameter counts.
- (2P) Report

¹<https://depts.washington.edu/acelab/proj/dollar/index.html>

3 Gesture Detection Game

5P

Create a Python program called *gesture-application.py*. The program should be a very simple 2D application, such as a game, a media controller, an application quick start menu – you name it. The program can be controlled with gestures (e.g. triangle, square, circle, zig-zag, ...) drawn by a user.

The application should support at least three distinct gestures. Ideas for a game would be something like rock-paper-scissors, or the annoying minigame to learn new spells from old *Harry Potter* PC games², where players had to follow a specified shape.

Score

- (1P) Gesture input works.
- (2P) Functionality and aesthetics of the application.
- (2P) Three gestures are distinguished robustly.

²<https://gamefabrique.com/storage/screenshots/pc/harry-potter-and-the-philosophers-stone-11.png>