



## Assessed Coursework

Course Name	Computational Social Intelligence		
Coursework Number	1 (second part)		
Deadline	Time:	17.00	Date: Nov. 26 <sup>th</sup> , 2018
% Contribution to final course mark	20%		
Solo or Group ✓	Solo	X	Group
Anticipated Hours	10 hours (this includes both first and second part)		
Submission Instructions	The coursework must be submitted via the Moodle page.		
Please Note: This Coursework cannot be Re-Assessed			

### Code of Assessment Rules for Coursework Submission

Deadlines for the submission of coursework which is to be formally assessed will be published in course documentation, and work which is submitted later than the deadline will be subject to penalty as set out below.

The primary grade and secondary band awarded for coursework which is submitted after the published deadline will be calculated as follows:

- (i) in respect of work submitted not more than five working days after the deadline
  - a. the work will be assessed in the usual way;
  - b. the primary grade and secondary band so determined will then be reduced by two secondary bands for each working day (or part of a working day) the work was submitted late.
- (ii) work submitted more than five working days after the deadline will be awarded Grade H.

Penalties for late submission of coursework will not be imposed if good cause is established for the late submission. You should submit documents supporting good cause via MyCampus.

**Penalty for non-adherence to Submission Instructions is 2 bands**

You must complete an "Own Work" form via <https://studentltc.dcs.gla.ac.uk/> for all coursework

## 1.Introduction

The second part of the assessed exercise revolves around Lecture 15 (“Facial Expressions”):

- Ekman and Friesen, “Measuring Facial Movements”, Environmental Psychology and Nonverbal Behavior, 1(1):56-75, 1976.
- Baltrušaitis, Robinson, and Morency, “Openface: an open source facial behavior analysis toolkit”, IEEE Winter Conference on Applications of Computer Vision, 2016.

This is the second part of the Assessed Exercise, the first part was handed out on October 18<sup>th</sup>, 2018. The marking will be done over both parts.

The deadline for submission is November 26<sup>th</sup>, 2018.

## 2.The Data

The data (file “data-part-2.csv”) includes 52 feature vectors extracted from 52 face images. Half of the vectors (26) have been extracted from smiling faces, while the other half (26) have been extracted from faces of people displaying frown.

Every record of the csv file includes one feature vector and its respective class:

- The feature vectors include 17 components that account for the activation level of 17 Action Units (AU01, AU02, AU04, AU05, AU06, AU07, AU09, AU10, AU12, AU14, AU15, AU17, AU20, AU23, AU25, AU26, AU45);
- The class is either “smile” or “frown”.

The minimum value of the features is zero (meaning that the muscles underlying an Action Unit are not active) and larger values correspond to higher activation.

## 3.The Assessed Exercise

The goal of the second part of the exercise is to develop a classifier capable to automatically map every vector into its class:

- The classification approach must be based on Gaussian Discriminant Functions (see Lecture 13 and associated texts);
- The approach should make the assumption that the features are statistically independent given the class (see Lecture 13 and associated texts);
- The training must be performed according to the k-fold approach, with k=4 (see Lecture 14 and associated tests);
- The results have to be reported in terms of error rate, the percentage of times your approach maps a vector into the wrong class (see Lecture 14 and associated texts).

You are free to use the programming language you prefer, but you must implement the Gaussian Discriminant Functions (the code must be attached to the report). The use of packages implementing the Gaussian Discriminant functions is not allowed.

## 4.The report

The report must include the following elements:

- An introduction to the problem of facial expression analysis;
- A description of the theory underlying the Gaussian Discriminant Functions;
- A description of the experimental approach (k-fold, etc.);
- A description of the results;
- The software you have written (the code must be added in appendix);

The report should not include more than one page per each of the points above.

### **5. Marking Scheme**

The Assessed Exercise (including both first and second part) accounts for 20% of the final mark. The weight across the different components is as follows:

- Classification Experiments: 60%;
- Editorial quality: 20%;
- Quality of the code: 20%.

The two parts of the Assessed Exercise have the same weight (each accounts for 10% of the final mark).