**1. INTRODUCTION**

The data-science bootcamp we went through over the last 15 weeks has been a fantastic experience and we enjoyed many memorable moments. We smiled and laughed a lot, in large part thanks to our amazing instructor.

But not long into the bootcamp we realised that not every day was the same. On some days we felt good and smiled a lot, and on other days we felt the pressure and smiled less.

That’s how we came up with the idea of developing a system that detects if a person is smiling or not, with the objective of allowing our instructor to monitor if a participant is smiling less, same, or more than usual, in order to identify if he or she is doing okay or not.

**2. HOW**

The project, which was essentially divided into 2 phases, falls under the field of deep learning and computer vision, and the framework used was Tensorflow.

**Phase 1:**

During phase 1, we trained an image-classification model and wrote an algorithm that would apply this model to detect a face, then detect if there’s a smile within this face and thus predicting whether the person is smiling or not.

We used a dataset of 16,847 images (49.7 MB), consisting of 5,656 smiling faces (11.3 MB) and 11,191 non-smiling faces (38.4 MB).

A test accuracy of 90.5% was achieved.

**Phase 2:**

In the Phase 2 of the project we applied our model to the webcam. As soon as we run the algorithm, it will start the webcam and detect the face and smile.  
  
If it detects smiling face it will start counting the duration and will let know if someone is smiling less than usual, same as usual or more than usual when compared with person’s average smile duration.  
Here, we set Average Smile Duration for 5 seconds.  
  
  
**3. HOW TO RUN THIS FILE:**I.Copy this folder to your computer.

II. As it uses TensorFlow framework, you need to create TensorFlow environment in anaconda.

III. And install the following libraries  
 1. OpenCV

2. Matplotlib

3. Numpy

4. Sklearn

5. Imutils

IV. Launch Jupyter lab in tensorflow environment.

V. Train the model (training\_model.ipynb) and then from the terminal run (smile\_detector\_webcam.py)  
  
**4. REFERENCE VIDEOS:**

1. <https://www.youtube.com/watch?v=uLY5JSE5WAU>
2. <https://youtu.be/jl47mE8aQmc>