# CreepyEye

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## Introduction

CreepyEye is an attempt to implement several data mining and machine learning techniques from multiple sources in order to process an image from several perspectives and identify relevant elements in the image accordingly.

The components which comprise CreepyEye can detect:

- human faces
- up to seven emotions including
  - surprise
  - neutral
  - fear
- up to 80 general objects including a
  - book
  - teddy bear
  - bed

## Rationale

According to DOMO's Data Never Sleeps 7.0, users on Instagram post 55,140 images every minute of every day which amounts to more than 20 million images in a year and that's still just a fraction of all digital images generated.

We believe the ability and experience of working with such pervasive and unstructured data is a key skill for any aspiring data scientist and undertook this project as a skill-building challenge.

## Sample Output

**A.**

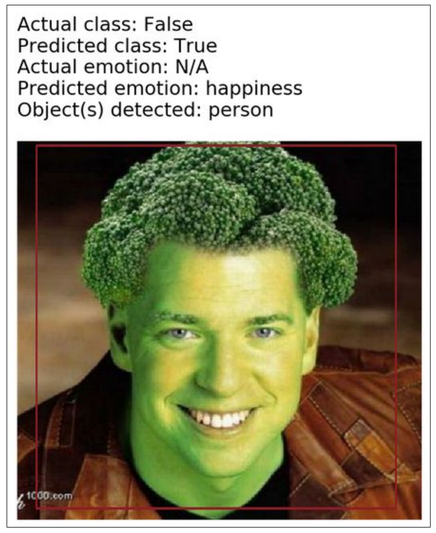


**Image A.** Photoshopped image of a man

**B.**

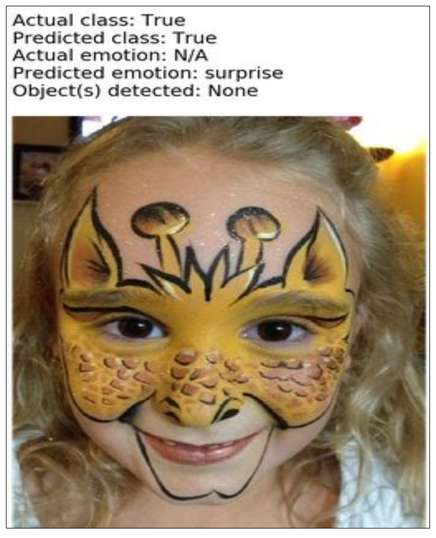


**Image B.** Child with face painted

**C.**

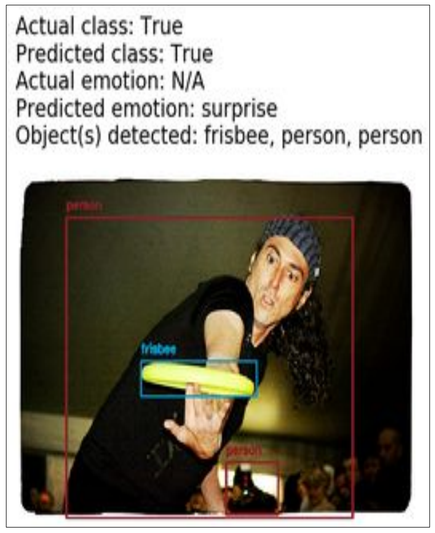


**Image C.** Person with frisbee

**D.**

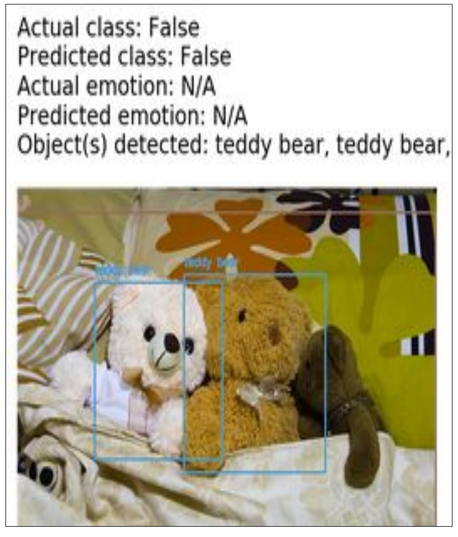


**Image D.** Teddy bear stuffed toys

## Methods

1) Face Detection:
   a) Used face_detection python package
   b) Built on dlib's (c++) state-of-the-art face recognition algorithm
   c) 99.38% accuracy on the standard LFW face recognition benchmark

2) Emotion Detection:
   a) Used a pre-trained VGG (Visual Geometry Group) convolutional neural network

3) Object Detection:
   a) Used cvlib python library
   b) Yolov3 model pre-trained on the popular COCO dataset
   c) 1000x faster than R-CNN

## Summary of Results

- The face detection component achieved recall of 0.985 and precision of 0.927 on 800 images.
  - 400 were known "true human faces"
  - 400 were known "false/non-human faces" or objects
- The object detection model achieved a mAP of 57.9% on the COCO test-dev dataset

## Future Directions

- Improve performance of emotion detection model.

## References

Infographic. Domo. https://www.domo.com/ learn/data-never-sleeps-7

Eye image by mohamed Hassan from Pixabay: https://pixabay.com/images/id-2387853/

Pre-trained emotion detection model by Priyanka Dwivedi from GitHub: https://github.com/priya-dwivedi/face_and_emotion_detection

Computer vision library by Arun Ponnusamy from GitHub: https://github.com/arunponnusamy/cvlib