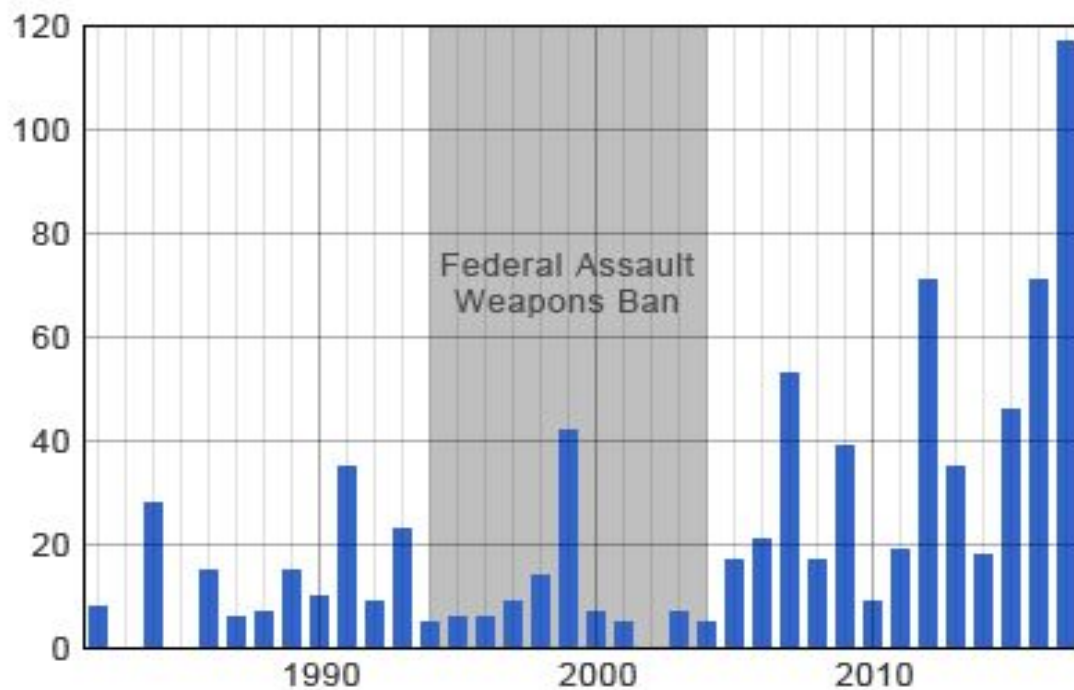# Magnus Frater (Big Brother)

Group Kii

Callum Axon,
Calum Carney,
Jordan Brightmore,
Finlay McKinnon,
Vital Harachka,
Chiaug Wing Lam

Total deaths in US mass shootings (1982-2017)

(GliderMaven, 2016)

General feeling of crime in cities in the UK (knife crime)

Open access areas are vulnerable

What can we do about it?

As Software Developers, can we do anything to help?

Aims and Objectives

RECOGNISE UNAUTHORISED PERSONNEL

TRACK MOVEMENTS & AUDIT

ADMINISTER USERS

PROVIDE SECURITY WITH ALERTS

Overview

Facial recognition software to help make campuses & organisations safer

Uses a small, integrated camera system on a Raspberry Pi (or similar)

Communicates with a database via a web based API to provide information onf locations and alerts

Managed through a front-end web interface also utilising the API

Responsibilities

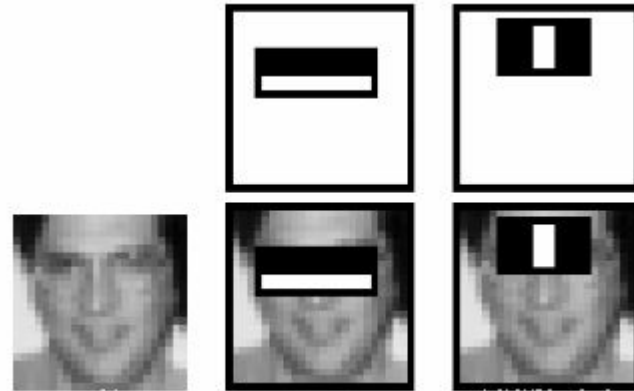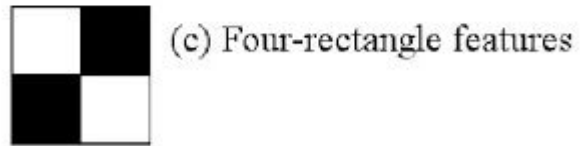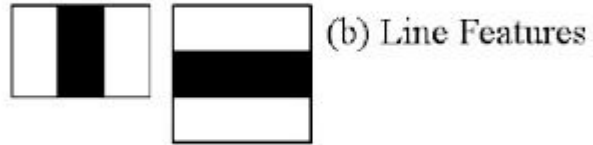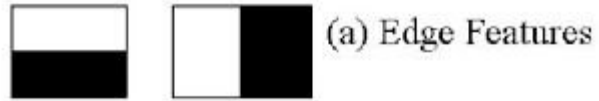**Backend API -** Callum Axon (Project Manager)

Front End - Callum Carney & Finn

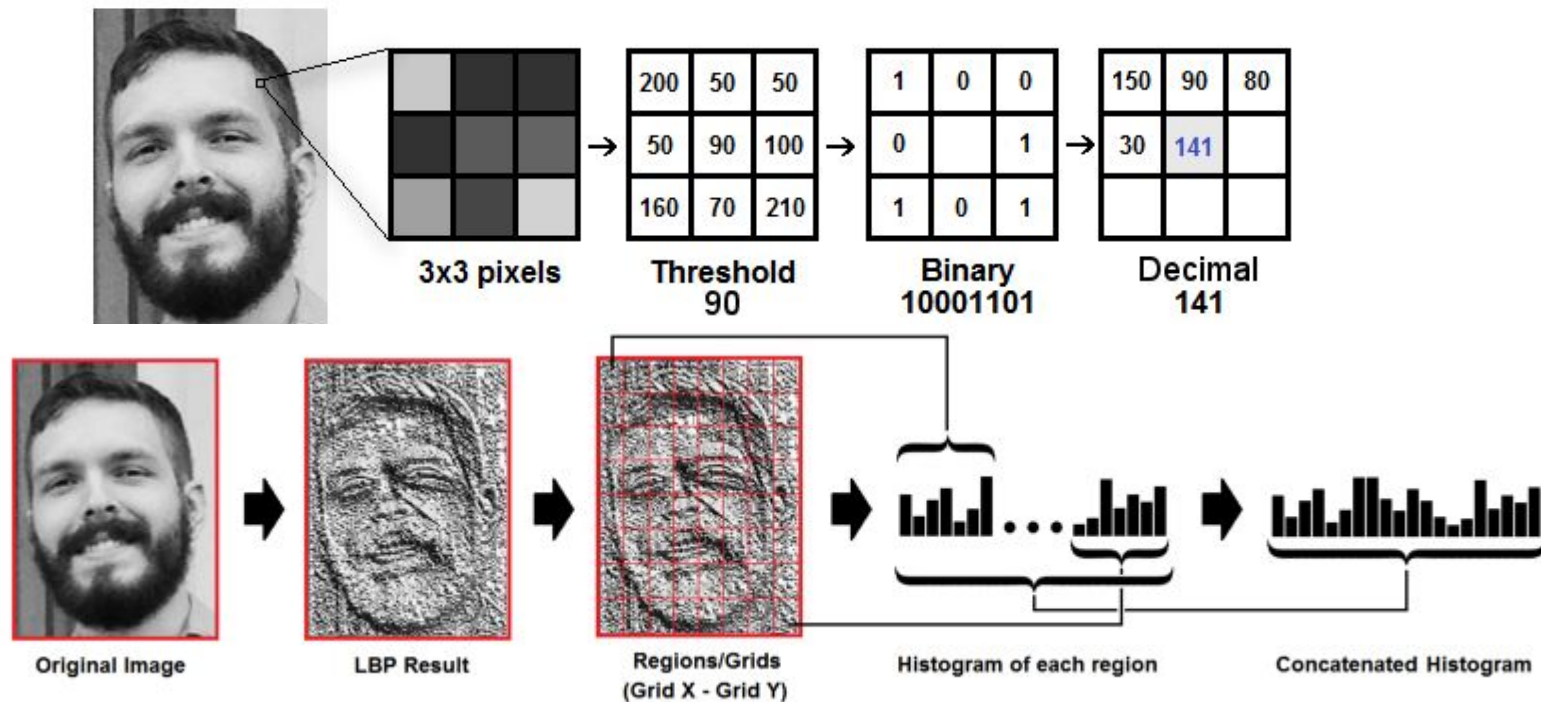**Documentation, Time Management & Analysis** - Vital & Wing

Facial Recognition - Jordan

Facial Detection

(a) Edge Features

(b) Line Features

(c) Four-rectangle features

Facial Recognition

3x3 pixels → Threshold 90 → Binary 10001101 → Decimal 141

Original Image → LBP Result → Regions/Grids (Grid X - Grid Y) → Histogram of each region → Concatenated Histogram

Backend API

Consists of a lightweight PHP microframework using MVC to manipulate a MySQL database

Provides solid interface for interaction with database, acting as a server for the facial recognition algorithm and acts as a data source for the front-end application

Uses secure access tokens for authentication over HTTPS

Front End Monitoring Application

The monitoring of known users' locations

Alerts for unknown people

Adding people to the known database

Checking the status of cameras and their administration

General statistics and aggregation
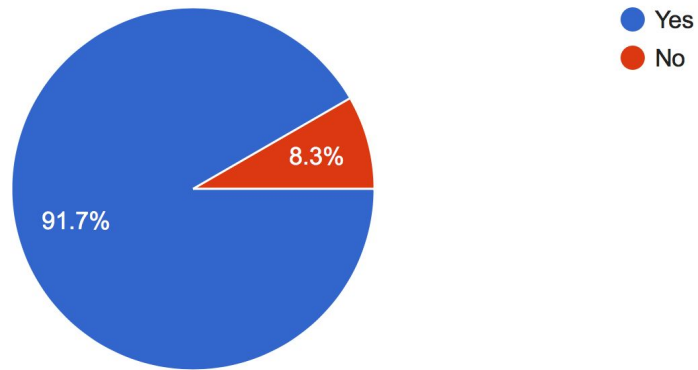
Ethical Concerns

Privacy

What the dictionary says:

"The state of being free from unwanted or undue intrusion or disturbance in one's private life or affairs; freedom to be let alone: Tourists must respect the tribe's privacy."
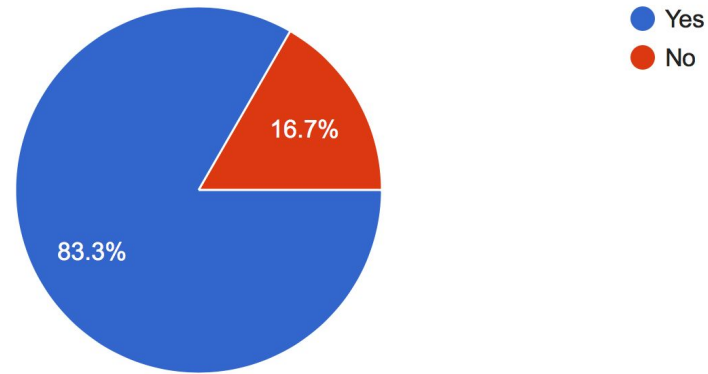
Dictionary.com. (2018).

Would you personally consent to having your face scanned when entering a location?
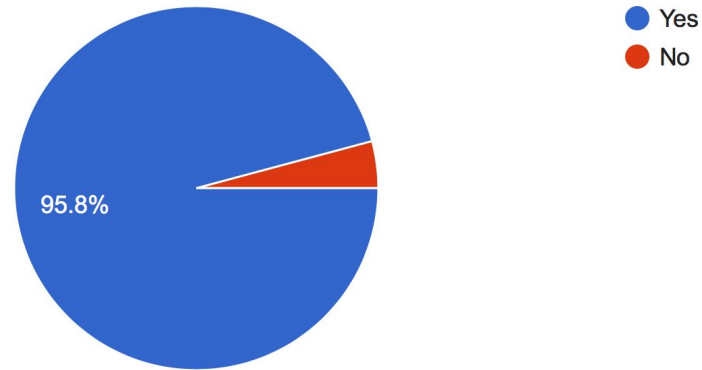
24 responses

- Yes
- No

91.7%

8.3%

Would you personally consent to having your location tracked through the use of facial recognition?

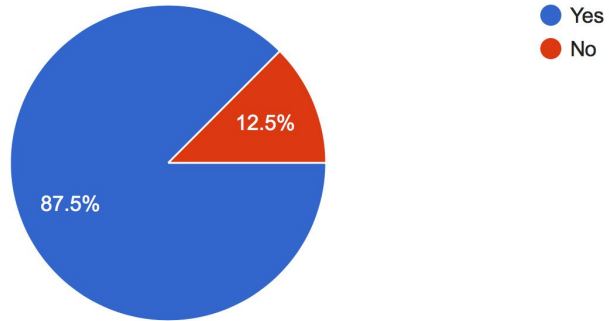24 responses

- Yes
- No

16.7%

83.3%

Would you feel safer at a location if you knew that Facial Detection was occurring (where faces are compared ...ople and unknown people are flagged)

24 responses

- 🔵 Yes
- 🔴 No

95.8%

Would you personally consent to your tracking data being aggregated and used for statistical purposes?

24 responses

- Yes
- No

87.5%

12.5%

Questions?

References

GliderMaven. 2016. "Total Deaths in Us Mass Shootings." *GliderMaven*. Wikipedia. https://commons.wikimedia.org/w/index.php?curid=50124456.

https://docs.opencv.org/3.4.1/d7/d8b/tutorial_py_face_detection.html

Kelvin Salton do Prado. 2017. "Face Recognition: Understanding LBPH Algorithm".
https://towardsdatascience.com/face-recognition-how-lbph-works-90ec258c3d6b