

WELCOME AND HOUSE KEEPING



- When signing into the webinars, please use your team name and your first name only e.g. <Team Name_First Name> or <TC_Team Name_First Name>
- Please respect the Code of Conduct throughout all the webinars
- Only click on links which are shared by Panelists in the chat
- Get involved! We want to hear from you, so please make use the interactive features of Zoom:
 - Q&A - please put any questions here
 - Chat - this can used for more general discussion
 - Raise hand - opportunity for attendees to be unmuted and speak
 - Polls - these will pop up at different stages during the webinars and are anonymous
- Webinars and the slides will be available to watch after this week:
<https://longitudeexplorer.challenges.org/im-a-longitude-explorer-finalist/>
- There will be three multiple choice evaluation questions at the end of the webinar which we ask all attendees to please answer

firetech



Longitude
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Department for
Business, Energy
& Industrial Strategy

INTRODUCTION

TO ARTIFICIAL

INTELLIGENCE

EXPLORING A.I AND MACHINE INTELLIGENCE



SESSION OBJECTIVES

- We're going to look at Artificial Intelligence and how it's already woven into our lives.
- We'll look at the implications of these technologies as well as the responsibilities of the companies that use them.
- I'll demo the creation of some A.I and integrate it into a web app.
- I'll demo Watson, the IBM A.I

WHAT IS A.I.?

- AI is hard to define, as it is constantly evolving. What may have been called 'AI' 50 years ago is not the same as it is today.
- However, we can broadly define AI as..

Intelligent agents, human or not, that can perceive their environments and take actions to maximize their chances of achieving some goal.

A.I AROUND US

A.I is everywhere at the moment and is used in cars, drones, voice assistants, cameras and even toothbrushes!



A.I AROUND US

- How many technologies do you have in your home that might use artificial intelligence?
- What about smart speakers?
- Smart speakers use **Natural Language Processing (NLP)**



Challenges for Speech recognition could be:

- Accents
- Regional sayings
- Slang
- Background noise
- Vocal tics (saying um a lot?)

A.I APPLICATIONS +

Computer Vision	Natural Language Processing	Smart algorithms	Robotics & Hardware
Image recognition, motion detection, optical character recognition (OCR)	E.g. language detection, text to speech, natural language generation, sentiment analysis	Recommendation tools, matching services, optimisation driven by large datasets	Combination of hardware, software and electronics to make routine processes more efficient
E.g. facial recognition cameras, AI text scanners, AI cancer diagnosis tools	E.g. Google Translate, Chatbots, AI assistants (Siri),	E.g. Uber/ Deliveroo driver matching, real-time health tracking, recommendation tools	E.g. Production line robots, delivery robots, robot assistants

HOW DOES THIS LINK TO

YOUR IDEA?

TYPE OF PROJECT

Computer Vision

Ocu-Helper
Sign-to-word AI App
Project Assist
TextSpecs
Bacteriophage
Production
Technologies (BPT)
Hello World
HydroAI
Robotic Beach Rover

Natural Language Processing

Loneliness Buddy
Theo the Therapy Dog
ClassBot
Social Kindness
Dimming Dyslexia

Smart algorithms

FreeWheelers
Learn Like You
Emergency
Vibrating Alarm (EVA)
LifeMosaic
Safe Route Home
Vivado
Polly
Waste Watcher
AI Medicine
Dispenser
My Little Memory

Tomodachi

Fall Detection
Belt
Put it down
Smart Inhaler
Dundee
Discover AI
5µm Wearable
Lifesaver
Smart Traffic
#BeMe Healthy
Eating AI

Robotics & Hardware

Theo the Therapy Dog
ClassBot
Charie
RoboAID
Tech T-Shirt
Ocean CleanUp
MedBot
EcoBin
AI Load of Rubbish
PROfish
Urban Micro Farm
Robotic Beach Rover

CASE STUDY – TESLA CARS

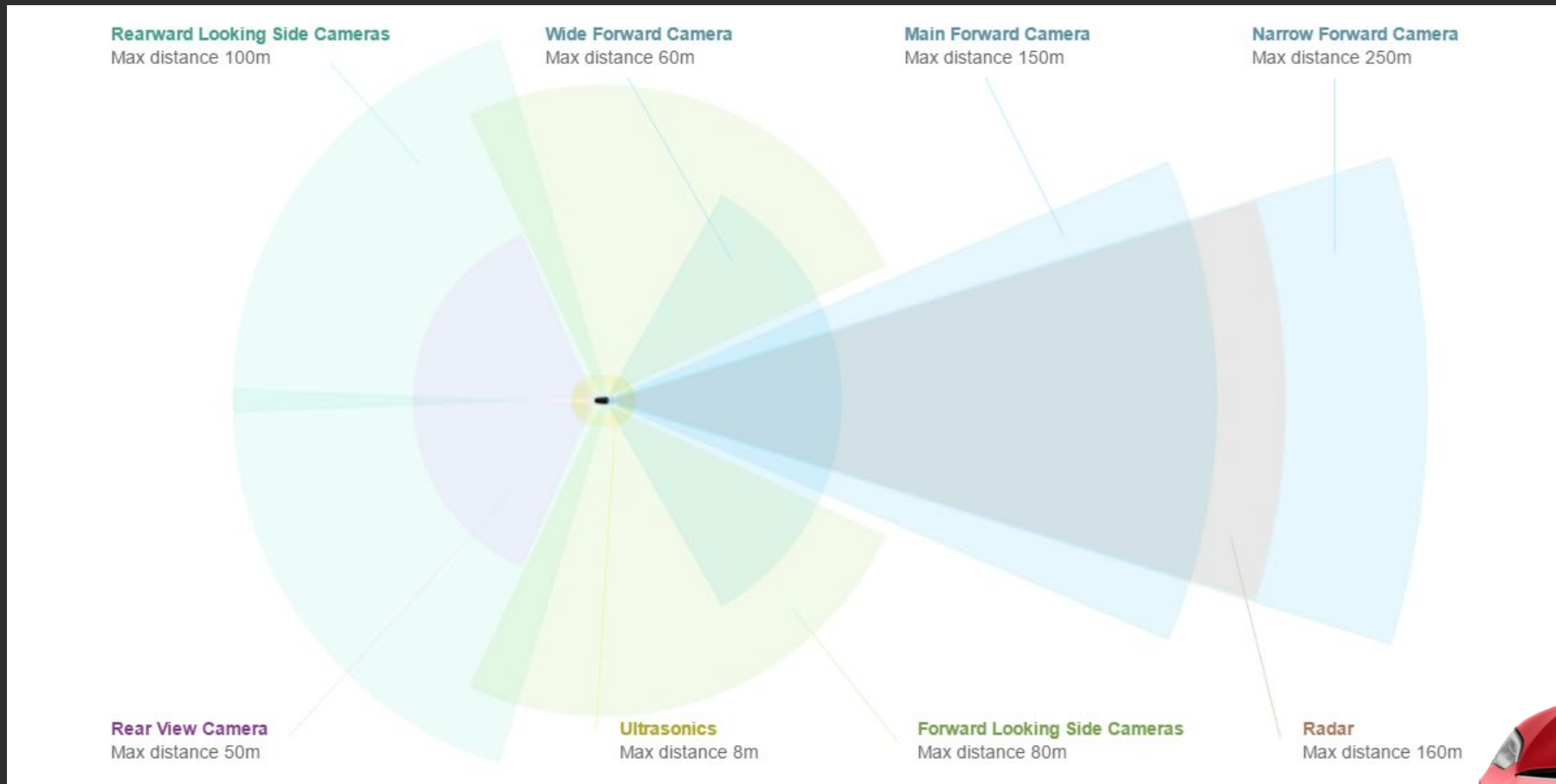
Self driving cars are increasingly becoming a technology that's accepted as the next evolution of the car.

They work by using an array of sensors and motors in and around the car.

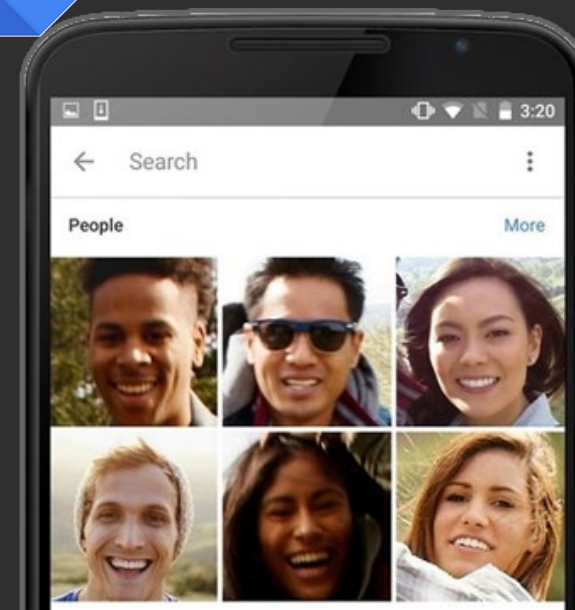
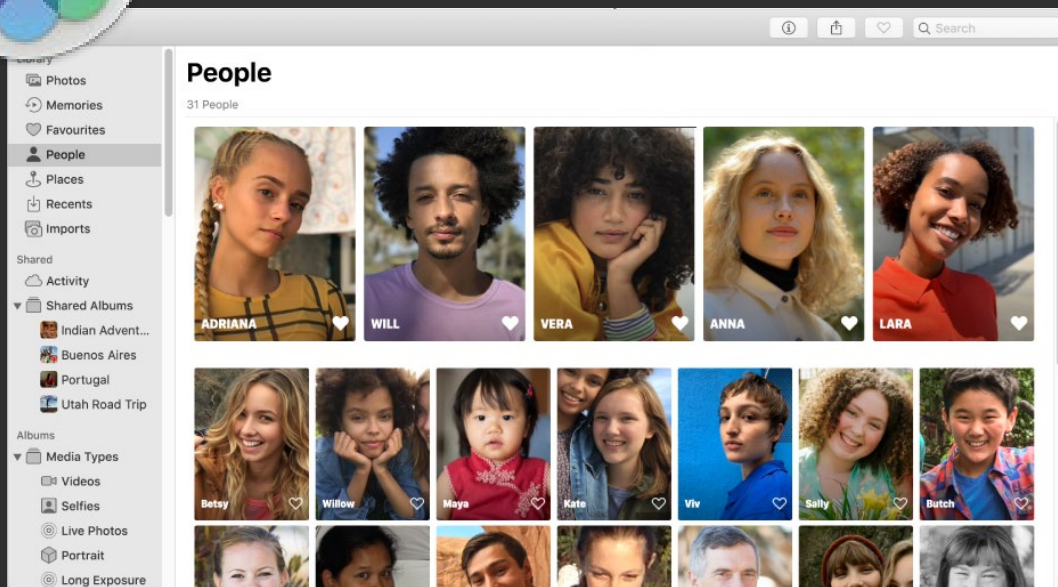
Sensors they use consist of:

- Radar
- Ultrasonic
- Cameras

CASE STUDY – TESLA CARS



FACIAL RECOGNITION



MEET ED_



Name : Eduardo
Age : 38
Likes : Space
Works : European Space Agency
Location : Paris
Born : [link to birth place](#)

WHAT CAN MACHINES DO?

Generally what machines can do well can be split into four main topics.

1. Prioritisation: making lists
2. Classification: putting things into categories
3. Association: finding links between things
4. Filtering: removing unwanted data

CLASSIFICATION

Let's look at the idea of **classification**.

Classification is when things are put into categories.

If we use colours for example and we **HAD** to classify things are **black** or **white**?

What would you classify these colours as?

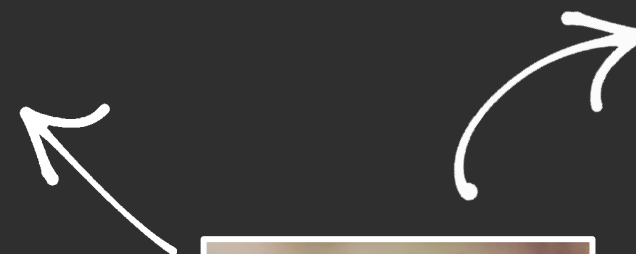
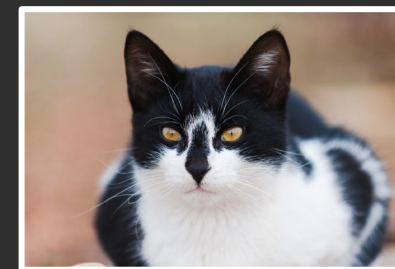


CAT OR DOG

DOG



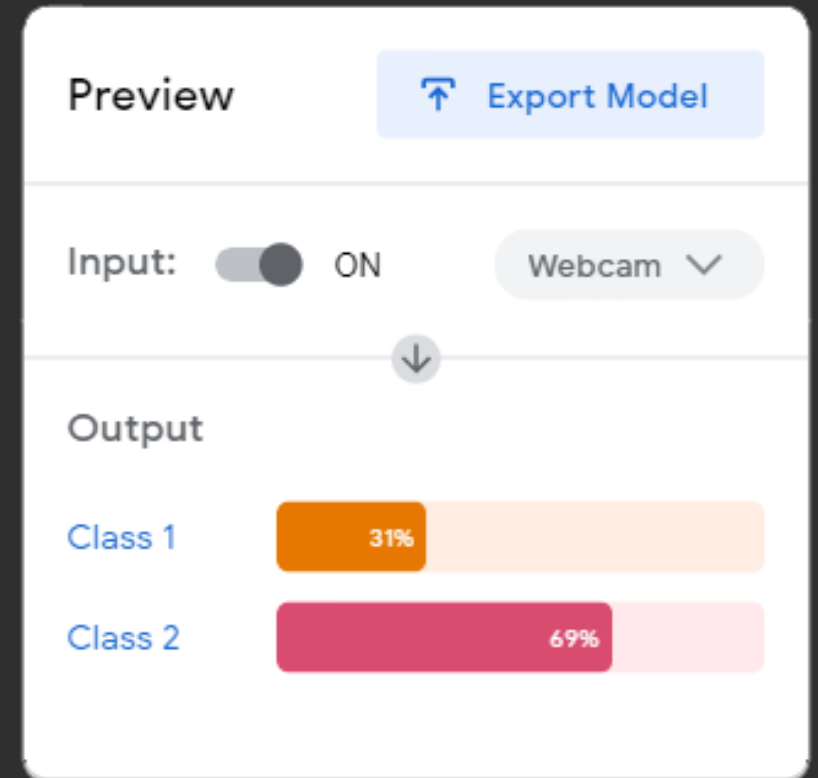
CAT



HOW CONFIDENT ARE YOU?

Machine learning models have a confidence level this is how they communicate how confident they are that they've got it correct.

In rubbish sorting 75% might be a good level of confidence, but in medicine you may want to set it to something like 98% or even higher!



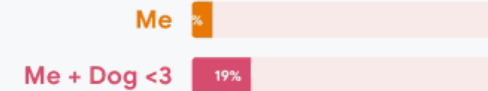
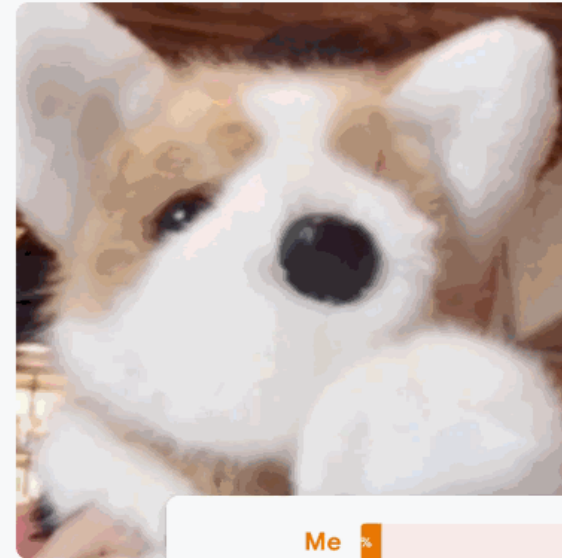
TEACHABLE MACHINE

Teachable Machine

Train a computer to recognize your own images, sounds, & poses.

A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.

Get Started



INTRODUCING P5.JS

Why P5.js?

- Built on javascript and Web technologies HTML and CSS
- Web technologies are accessible via any device that has a browser
- Which makes it compatible with Android, iOS, OSX, Windows and linux

bit.ly/nesta-ft

bit.ly/nesta-ft2

p5*

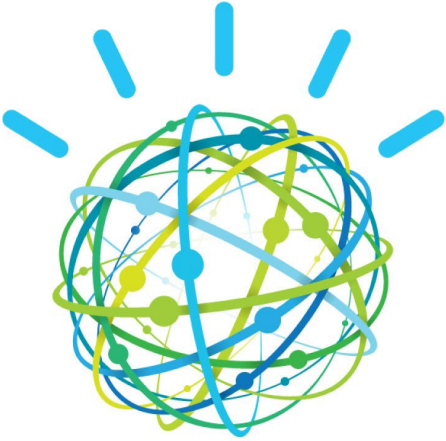
IBM - WATSON

Why Watson?

- Huge list of built in resources
- Free access to commercial tools
- Built in data sets
- Can be hosted on IBM cloud

Why you might want to use teachable machine over Watson

- If you don't need a data set
- Website is difficult to navigate
- Difficult to integrate



IBM **Watson**™



WHAT ARE THE ETHICAL

IMPLICATIONS ?

CASE STUDY – TESLA CARS

Questions about AUTOPILOT, don't put answers in the chat.

- What happens if the car has a crash?
- Who's at fault the driver or TESLA?

FACIAL RECOGNITION



TRUST IN MACHINES

- We place a trust in machines that some think is unwise, and by trusting these technologies blindly we open ourselves and others up to these kind of potentially life changing mistakes.
- This kind of trust might be placed in your apps / websites.

MACHINES AND ETHICS

- Machines are not evil, nor are they good. What we do with them determines how they are viewed by the world.

For example:

- GPS was invented to launch nuclear missiles but now helps drivers deliver take away food and internet shopping orders.

DATA – KEEP IT SAFE

- Remember that when you're creating applications and especially A.I models you'll probably be collecting data on individuals.
- Maybe you want them to sign up for your services or app. You'll need to keep that data safe.
- Make it clear what you'll be using their data for and be prepared for questions.

ETHICS AND MY PROJECT

Computer Vision

THE USE:
Face detection that changes the settings of lights in a room

THE DILEMA:
Could your algorithm / program be used to track people?

Natural Language Processing

THE USE:
Translation app that lets you speak in one language and then plays the audio in another for use in hospitals

THE DILEMA:
What if this language processor gets things wrong and some one's life is affected by its decision.

Smart algorithms

THE USE:
Bike sharing app with GPS tracking

THE DILEMA:
Could your algorithm / program be used to track people?

Robotics & Hardware

THE USE:
A robotic head that talks to you when you're lonely?

THE DILEMA:
How do you monitor the learning of the algorithm, so the head doesn't start being offensive and making things worse?

ETHICS CHECKLIST

Computer Vision

Natural Language
Processing

Smart algorithms

Robotics &
Hardware

- Where are you going to get your test data from?
- Will you be storing any data? if so where?
- Make sure test data is broad and inclusive.
- Always try different variations of your model
- Could your model make things worse if it goes wrong?
- Make sure users would be happy with the app (ask people you know if they'd use it)

QUESTION TIME

WWW.FIRETECHCAMP.COM

BEFORE YOU GO...

To help us continue to improve these sessions, please answer these three short multiple choice polls which will pop up on your screen now.

Thank you!



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