Investigating Computer Vision-Based Approaches in Lie Detection
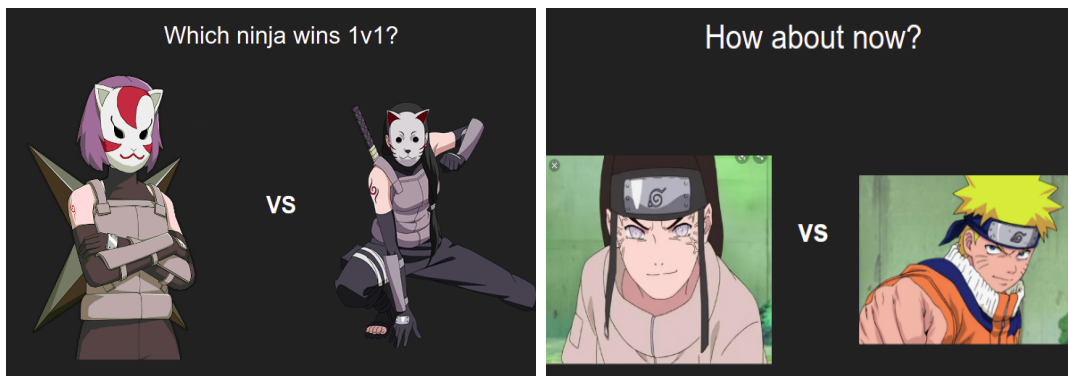
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JDF 2020/2021 Outreach Summary

The Dyson Day in 2021 was conducted online due to the COVID-19 pandemic. The outreach consists of a mix of presentations and playing a game based on AI.

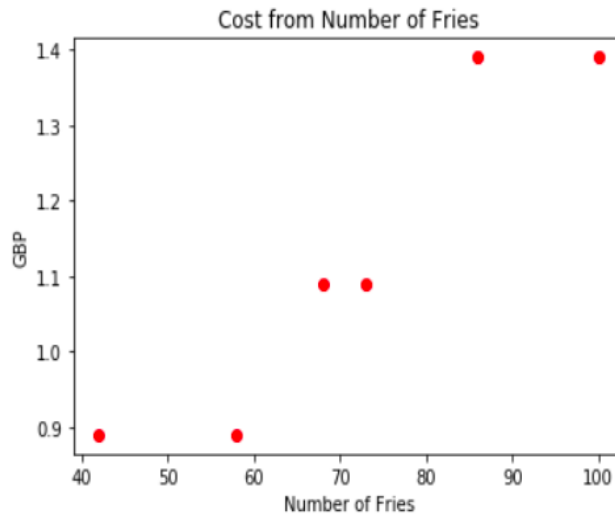## Past Data

Ninjas - 5 minutes

Firstly, the usefulness of using past data and statistics is demonstrated to students by examples. Two ninjas are presented and students are asked to guess which ninja would win in a 1vs1 fight. Then, a hint is provided to the students about which type of ninjas are more likely to win.

Afterwards, two characters from the popular Ñaruto" anime are presented and students need to guess who would win. The aim of this exercise is to demonstrate that using past data (memories of students who have seen the anime) is useful for making predictions and without it the predictions are almost random.
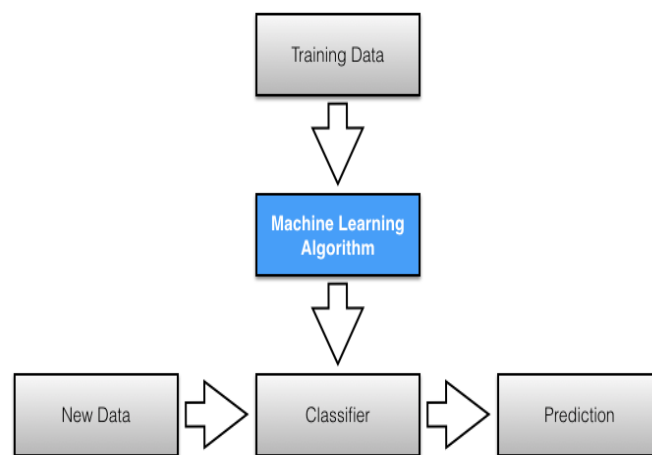

French Fries - 3 minutes

To further strengthen the point of using past data and statistics, students are asked to guess how much 80 pieces of french fries cost. Afterwards, a graph is provided of the cost from the number of pieces of french fries. Using this, students guess the cost of 80 pieces of french fries much better than without a graph.

Cost from Number of Fries

Machine Learning

Basics - 5 minutes

Making an analogy to the previous examples, students are introduced to the basic principles of Machine Learning. In particular, the principles of training data are explained. Furthermore, another example is provided of trying to predict housing prices.

Application to Pictures - 7 minutes

A case study of pictures is considered. Firstly, how a picture is represented in a computer is explained. The value of the pixel is explained, along with how they come together to form an object recognizable by humans' eyes.

Then, a case study of *cat* and *dog* classification is considered. Students are provided with possible training data, along with both features (X) values and labels (Y) values.

Afterwards, several interesting applications of Machine Learning are shown to students such as Personal Assistants and a Self-writing AI.

Game - 10 minutes

After explaining Machine Learning, students play a game created using AI. The player draws objects and the game tries to guess what the player drew.

After the students play the game, the principle behind the game is explained. In particular, data collection is considered along with what the features and labels are for the game.

Issues of AI

Finally, after demonstrating the interesting aspects of AI and its potential, students are asked to consider the dangers and issues present in AI.

General AI - 3 minutes

A discussion is held about General AI (with consciousness) with the conclusion that we are nowhere near to having General AI (yet).

Fairness in AI - 5 minutes

Fairness and bias are discussed with the students using a hypothetical example of a hiring platform and an example from an IIB Master's project.

Summary

Finally, the presentation is summarized and concluded. Students are told that there are several areas in AI which weren't discussed here.

Afterwards, a Q&A session is held.