Dear Hiring Team,

I am a recent graduate from University College London with a Masters of Engineering in Computer Science with a specialisation in Machine Learning. I am coming out of university with a passion for Data Science and new technologies. I am a trustworthy and dedicated individual always looking for a challenge. Most importantly, I am looking for an opportunity to learn more about data science and analytics. I am an outgoing and extraverted individual who likes to spend his time working with others. Through my year as a teacher, I have also gained valuable communication skills. I can effectively explain complex ideas to others and confidently talk in front of small audiences. In this cover letter, I have summarised my recent data science projects with links to the research papers and some screenshots.

Sentiment Analysis Project

During my internship at Deutsche Bank, in a team of four we developed a dashboard to analyse FTSE 100 companies for a trader in the business side using ReactJS for visualisation and Python Flask on the Back-End. My team used Sentiment Analysis models to build different graphs that would enable traders to look at the news in a new way. The tool had two interfaces. First, a sentiment analyser where the user can copy & paste an article and get an entity analysis of the article, a sentiment score, and a ranking of the most meaningful sentences (Positive and Negative) in the article. Screenshot:
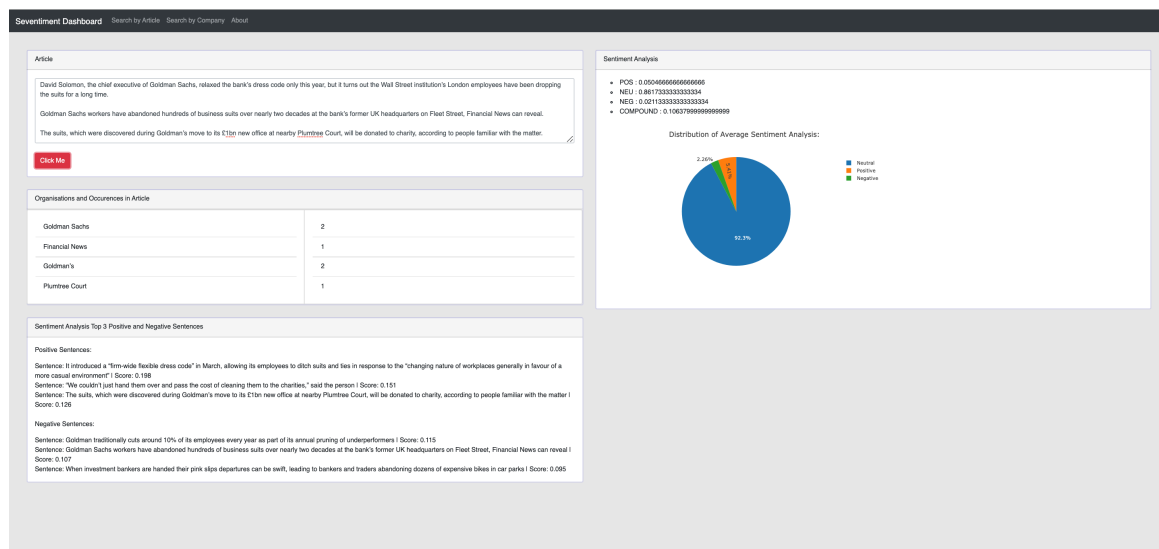
The second is interface is used to analyse the historical news about all the companies in the FTSE100. The user selects a company and on clicking submit receives a thorough analysis of the news articles published about the company over the last year. The interface consists of overall score analysis over the last year, a monthly analysis (number of positive vs negative vs neutral articles) in the last year, a top five headlines feature and also a count from source. Screenshot below (note: the original database belonged to Deutsche bank here the image shows dummy data).
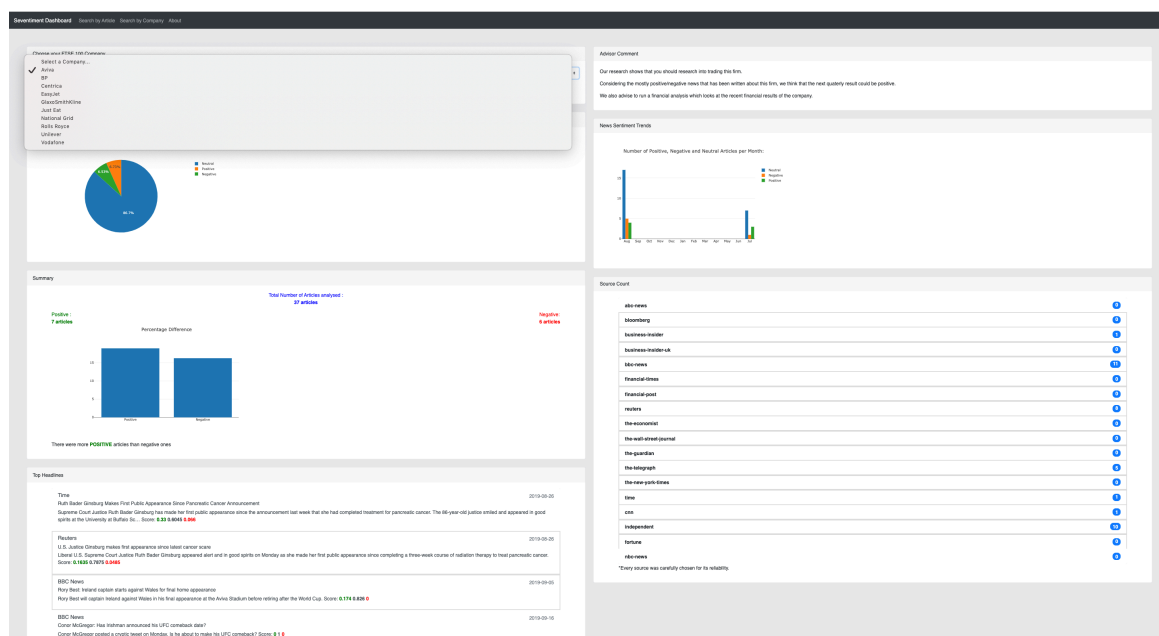
Overall, our platform was incredibly successful at displaying useful information and was selected as the best intern project. The project served as a proof of concept for real life application which is now being used by traders.

Open Street Maps Research

In my last year of Bachelor (2017-2018), I was involved in a data science group project led Professor Licia Capra on the Open Street Map (OSM) Dataset. OSM is the second biggest crowd platform in the world after Wikipedia making this project a very fun real life experience to have worked on. The goal of our research was to look at the impact of big data imports from corporations/companies on the activity of individual contributors in 7 major European cities. For example, the picture below shows a screenshot of bus stop imports from Transport For London (TFL) in London.


In this research, we asked three major questions: would individual users decrease their amount of contributions after imports, would users change their object of contributions (ex: from restaurants to park benches) and would contributors change the type of contributions they make (update more than create). Our group was awarded a first for this project.

Link to report: https://rdumon.github.io/Group_Report.pdf

Predicting S&P500 Stock price and Volume

During my master (2018-2019), I led a project which involved looking at Reddit News articles in order to predict changes in price and volume of the S&P 500 with two other students. The idea was to give a daily trader an edge over other traders by using Reddit news from the previous day to predict what would happen in the following day. Screenshots below show a picture of the dataset, a graph of the S&P500 price over 8 years and lastly a graph of the volume traded of S&P500 changing over time.
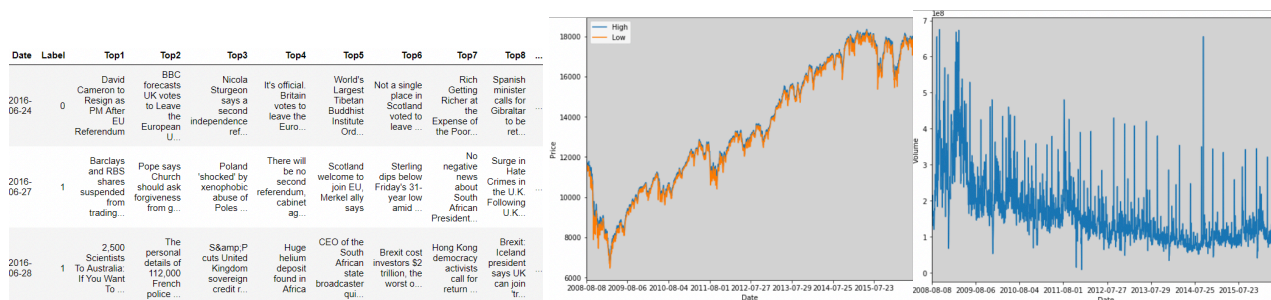
A lot of research had been done on predicting the changes in price for the next day but much less on predicting volume traded on the next day. Our hypothesis was that news would predict changes in volume more effectively than changes in price. We regarded both problems as classification tasks and used the XGBoost algorithm and the LSTM neural network to predict volume and price changes. The results of this

research confirmed our hypothesis although we would not advise a trader to take it for granted. We received a first class grade for this research.

Link to report: https://rdumon.github.io/NLP_report.pdf

Quantitative Study of Differentiable Neural Computer

For my master thesis, I studied the Differentiable Neural Computer (DNC) by Alex Graves et al. from Deepmind. My research was divided into 2 parts. First, I looked at the history behind the model and also explained the neuroscience theories which were used to build the model. Secondly, I looked at the difference in performance between the DNC and the BrsDNC (an augmented DNC) on the bAbI NLP dataset. To test my hypothesis, I had to developed two new synthetic datasets. Screenshot below shows examples of the type of questions feature in each of the respective datasets I built.

Example Task 21: Listening to one specific person

Focus on Yann.
Yann is saying that Daniel went back to the kitchen.
Winona is saying that Mary and Sandra journeyed to the garden.
John is saying that Daniel and Mary went back to the garden.
Brian is saying that then he moved to the bedroom.
What did Yann say ? Daniel went back to the kitchen

Example Task 22: Location Reasoning

Greg travelled to Madrid , Rome , Sarajevo , Dublin and London.
Emily travelled to Bern , Berlin , Kiev , Prague and Paris.
Daniel travelled to Lisbon , Amsterdam , Belgrade , London and Copenhagen.
Where did Emily travel to before Prague?   Kiev

These tasks are synthetic in that any researchers wanting to use them in the future would be able to run a Python Script to recreate these datasets. I was rewarded by obtaining a first class grade for this research. Through this research, I have proven that I can understand complex machine learning models and work with state of the art research.

Link to report: https://rdumon.github.io/finalproject.pdf

Looking forward to hearing back from you,

Romain Dumon