# Third report of Open Banking Data Analysis Project

Team 45 24/1/2020

## Update for prototype 1:

We have finished prototype 1 as well as some deliverables during the holiday. Named Icy Banking, our app follows MVC design as discussed in our previous meeting. The current prototype allows users to link multiple bank accounts to their user profiles. These account ids are stored in Django sqlite database. The app then extracts data of all accounts from MarkLogic database and presents them on centralised page. PowerBI also uses the data to present data visualisation dynamically. More detailed summarisation of current product can be found in deliverables including the elevator presentation, preliminary work video and report website: http://students.cs.ucl.ac.uk/2019/group45/

We had several meetings with both NTT Data and Dr. Mohamedally to set the goals of the second term. In term 1, we had been working on WebApp development instead of data analysis. We will be focusing on analysing the data and bringing meaningful insights of data to users. These insights may include:

- Financial management tips
- Embed dynamic and live visuals for better financial insights
- Categorisation of different expenditure
- Analysis of direct debits and salary to provide a monthly spendable income
- Implement the feature that allows users to input their credit card and overdraft accounts info to prevent them from overspending
- Creation of imaginary pots to help users save money
- Look into algorithms to provide further insights (e.g. spending predictions)
- Possibly ensure the privacy of data

To achieve these goals, here are the list of technologies we are planning to use:

- Natural language processing will be a must for categorisation of spending
- Look into the feasibility of blockchain for the safety of data
- Build of algorithm and model for data analysis

Difficulty facing:

- We still could not get data except self-generated test data
- A large amount of data is necessary for model training

# Individual progress and plan:

## Raghib:

**Current Progress:**

- Created basic website needed as part of the deliverables in Jan, used basic bootstrap template, took most of the JS and CSS out so it's just a clean but plain html file.
- Started a Django web-app from scratch. Learned about some fundamental concept
- required to start Django from YouTube tutorials and Django "getting-started" guide.
- Implemented fully working login and registration using Django's pre-existing libraries
- Also implemented "forgot password" feature
- Implemented bootstrap front end designed by Lib into the Django framework
- Worked out how to load data from the database into the Python dictionary and then push it into the front end.
- Learned how to deploy Django application on azure using git, not a lot of help features to do this for Django projects so decided to swap to raw ssh method using a generic Linux server on azure- was having difficulties using certain ports on my laptop so got Yuheng to help with this as she has a mac - > able to use apache to deploy our web app.
- Set up secure ways of information hiding- on a local machine using environment variables, and on the apache server using a secure JSON file.
- Wrote algorithms to take data from database, arrange it into rows and then display it on dynamic web pages on the front-end using Django
  - > also wrote code so that different users' data can be accessed- added "userId" field to profile class I previously made in Django, the app compares this user id and runs a query to get the database if one exists under this id, if it doesn't, a clean output is produced showing that no data was found – made sure server doesn't just crash.
- set up HTTPS on our server using let's encrypt
- set up a cron job to renew ssl certificate every month (free certificate expires after 90 days)- ensured it renews at 7:30 am on the first of every month.

**Plan:**

- Write new code that supports one user being able to connect multiple different bank accounts to their single "Icy bank" account.
- Learn principles of NLP to write algorithms that can sort transactional data categorically
- Write algorithms that can use data from user's bank account to then give financial tips such as the best account to use for savings, where to take a loan from and which debts to clear first.

## Yuheng Wang

**Current progress:**

- Fully functional MarkLogic database deployed on Azure.
- Port for REST server set up. It allows data to be added via curl command and extracted via url query.
- Generated dummy data in json files based on open banking api specification and added them to MarkLogic database for testing.
- Wrote the structure for user profiles and account id to be stored in the sqlite database in Django
- Connected MarkLogic database to the webapp using account id with python script to convert the json file to dictionary for further data processing.
- Ability to add multiple account ids under one icy banking account

**Plan:**

- Generate data for different use cases. Either use open banking project sandbox api or generate data from our own card info.
- Have a meeting to discuss what kind of insights we want to provide the users with.
- Start building the algorithm and model for the analysis.
- Meanwhile, look into the use of blockchain and decide if we should use it in our project.

## Lib Kai Pneh:

**Current Progress:**

- Modified and completed deliverable website with the content specified by our professor using the clean bootstrap template provided by Raghib
- Revised a Bootstrap template to match our expectations for the UI of our web app
- Wrote a Python script to directly import data from the MarkLogic database using a REST API into Power BI for visualisation generation
- Tried to implement Power BI visualisations into web app but could not because we were not authorized to sign up for a Power BI account
- Modifying the UI as required based on what functionalities are completed or work in progress

**Plan:**

- Generate data for different users using the format provided by NTT DATA
- Research further on other data visualisation tools
- Discuss concrete use cases regarding insights and intentions
- Read up on Natural Language Processing (NLP) and Blockchain to assist Raghib and Yuheng if required
- Start thinking about how to categorize data and what algorithms would be useful to provide financial insights
- Continuously update our web app UI