Investigation into omnichannel experience of Third Level education in a Post Pandemic Era

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Introduction

As blended learning allows institutions to accommodate more people and give more offers, a need to digitize and automate the education sector becomes more necessary for alumni and staff.

This project focuses on the information students need before and during the attendance of their third level. It also provides a foundation for databases and webapps that could potentially assist both, students and professors, throughout their academic lives.

To do this, we used Spiders to extract and gather large amounts of data from websites and existing databases. The textual part of the data was then parsed for information retrieval and categorisation for potential ML/AI modeling.

Aim

1. Collect data relevant to students applying to third level (A) and students already in third level (B).
2. Collect and parse Qualifax data to help machines understand it and to build a cleaner directory and a better experience for finding courses. (A)
3. Collect and parse UL data, for creating web applications for UL students.(B)
4. Create a web-application for UL students to help in streamlining the beginning of the semester. (B)
5. Investigate the data retrieved and detail points of interest and trends that currently exist in third level education in Ireland.

Method

Using frameworks available for Python (a programming language), we extracted data from sources like timetable.ul.ie, bookofmodules.ul.ie, and qualifax.ie. We then deployed crawlers onto websites to extract more information and save it in a usable format.

With 300 timetables and 800 modules extracted from UL sources, we facilitated the webapp, which uses information submitted by students to create a calendar that displays the timetable of the modules they're enrolled in. It can then be downloaded to their devices.

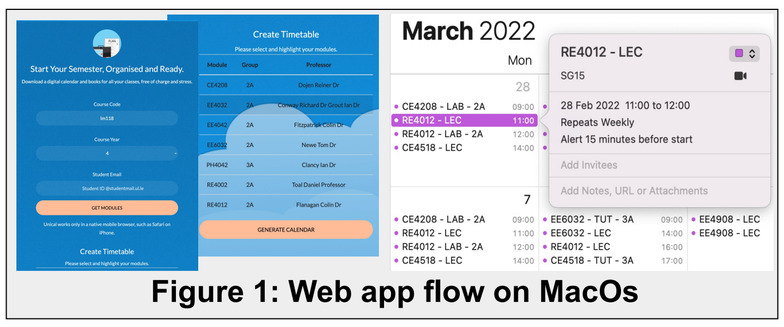

Figure 1: Web app flow on MacOs

The entire stack was built from HTML, JavaScript and Python for free and is explained in this report so students can create APIs of their own.

With textual data on 15k courses extracted from qualifax.ie (course content, subjects, etc.), we created a method to analyse the text and derive important words and meaningful phrases.

By calculating the importance of each word and its rarity among the data itself and similar documents, we can make educational documents easier for computers to interpret, by preparing a training set for its application in fields like artificial intelligence and semantics analysis.

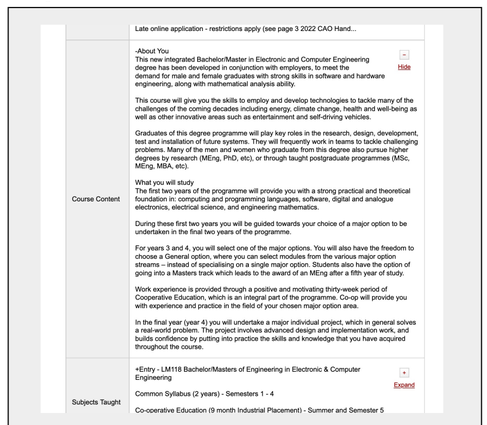

Figure 2: LM118 on Qualifax.ie

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The analytical report is based on Data from CAO, UL and Qualifax. We use it to investigate how the Pandemic affected education, such as through UL module delivery changes, number of courses listed on Qualifax, and trends of CAO points, offers and acceptances.

Results

1. Two kinds of Spiders were created to overcome challenges arising from how the spiders interact with webpages. One automated a Chrome browser to crawl dynamic websites and the other simply requested and read HTML documents. 15k Qualifax courses and 800 UL modules were extracted.

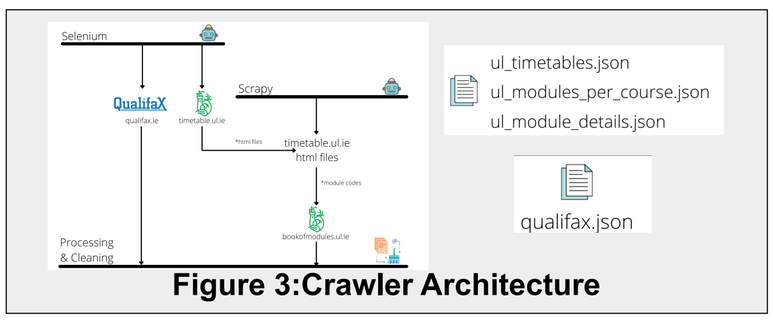

Figure 3:Crawler Architecture

2. In SEM1/21, 43% of the 600 visitors to the webapp submitted their course details, showing that students are open to utilising apps built by other students. This research can encourage students to create tools and institutions to provide resources/data to support creators.

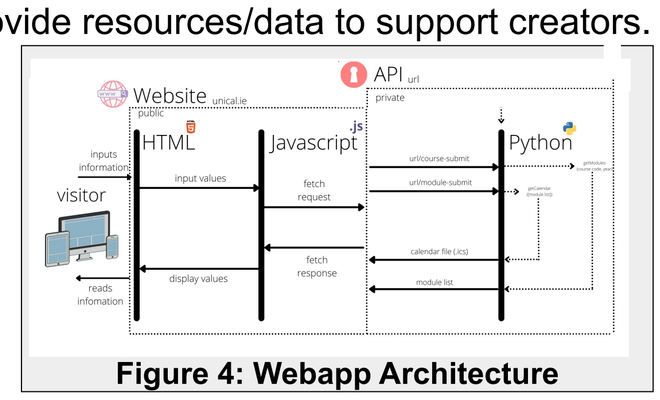

Figure 4: Webapp Architecture

Students creating apps for fellow students would relieve institutions of the competitive development of useful tools. Institutions should embrace this and allow students to utilise their APIs to create better, more integrated applications.

3. Textual analysis reveals the most popular keywords, their frequencies, rarity and importance in documents.

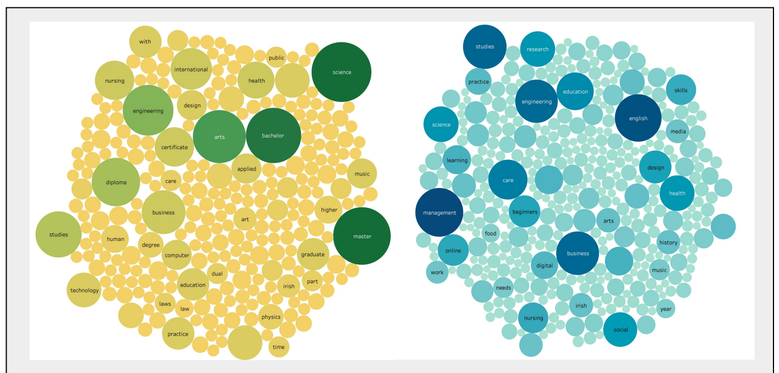

Figure 5: Most prominent words among UL (left) and Qualifax (right) course names.

4. In 2020, 28.1% of modules in UL increased tutorial hours. In CAO, there was a 6.7% increase in acceptances, but only a 3% increase in population. There was no real change in required points for courses on Qualifax. As more people qualify for third level, more institutions will need to rely on self & blended learning, especially with housing and campus space becoming more limited.

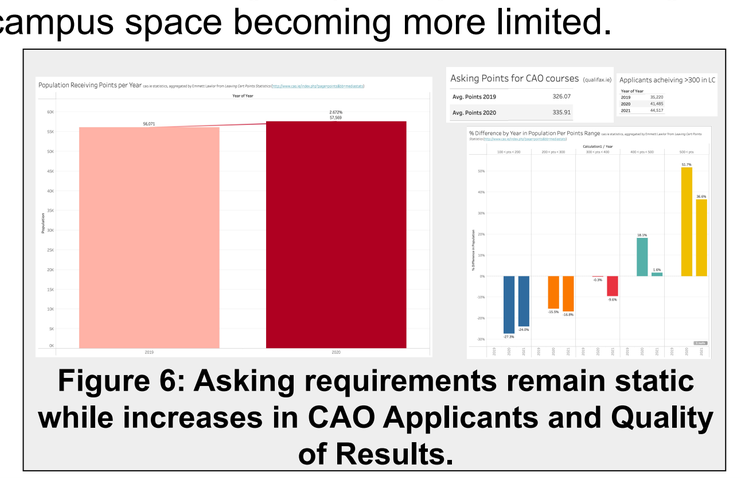

Figure 6: Asking requirements remain static while increases in CAO Applicants and Quality of Results.

Conclusion and personal reflection

I explored applications which could assist institutions to adapt in the future;

1. Spiders to find and aggregate relevant information for current and potential students.
2. A template for people to build APIs for students providing useful resources for their institutions alumni and staff.
3. Creating textual training sets for AI and Machine Learning modelling.

I found I have improved my technical skills and have overcome my first ever personal project to be used publicly. I demonstrated creativity, by overcoming problems and seizing opportunities

I hope to continue building a suite of useful tools and resources for current and aspiring students and staff.

Acknowledgements

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Sources; UL, CAO, Qualifax

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