**CCT College Dublin**

**Assessment Cover Page**

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| **Module Title:** | Machine Learning for Business |
| **Assessment Title:** | CA1 Project |
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**Declaration**

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| By submitting this assessment, I confirm that I have read the CCT policy on Academic Misconduct and understand the implications of submitting work that is not my own or does not appropriately reference material taken from a third party or other source. I declare it to be my own work and that all material from third parties has been appropriately referenced. I further confirm that this work has not previously been submitted for assessment by myself or someone else in CCT College Dublin or any other higher education institution. |

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# **Introduction**

A global trend in pedagogical approach, known as Massive Open Online Courses (MOOCs), serves as an alternative and supplement to traditional models of learning by utilizing online platforms (Sharma, 2013, p.19). It provides high-quality educational content that students worldwide can access more quickly and easily (Thuy et al., 2023, p.1-2).

Since 2012, numerous platforms have emerged for online education, among which Coursera stands out as the most popular due to its variety of courses and strong partnerships with prestigious higher educational institutions like MIT, Harvard, and Stanford (Sharma, 2013, p.19; Zotova et al., 2021, p.167).

## Motivation

During the pandemic period, MOOCs experienced a significant increase (Serravallo, 2020, p.1). This market is estimated to reach USD 22.8 billion this year, with an expectation of USD 119 billion by 2029 (www.mordorintelligence.com, n.d.), making it a lucrative investment opportunity. According to this source, the Coursera platform experienced a 640% increase during the pandemic compared to the previous period.

## Problem Domain

Questions?

Which clustering algorithm provide the best solution in identify which field’s courses from Coursera have the highest score (rating) given by the students and the level of these courses?

## Objectives

## Why this dataset?

https://www.kaggle.com/datasets/elvinrustam/coursera-dataset

## Word count

# **Clustering Algorithms**

Unsupervised learning algorithms can be characterized by their ability to make predictions when the target label is unknown; the learning process depends exclusively on resources/features (Müller and Guido, 2017, p.131). Within this framework, clustering algorithms separate objects (data points) based on specific criteria/algorithms, typically by similarity. Furthermore, this technique is useful in various business areas, including recommendations and segmentation (Avinash Navlani, Fandango and Idris, 2021, p.325).

The Silhouette score and Davies-Bouldin index (BDI) are internal performance metrics used to evaluate the quality of clustering results (Avinash Navlani, Fandango, and Idris, 2021, p.350). In clustering methods, a high score does not necessarily indicate effective clustering results, as is the case with BDI, which evaluates the compactness and separation of clusters based on the ratio of intra-cluster distance to inter-cluster distance. Better clusters are indicated by a lower BDI, while the Silhouette score measures how well-separated the clusters are, and high values suggest better clustering results (Avinash Navlani, Fandango, and Idris, 2021, p.351).



* Which clustering algorithms would you consider for segmentation, and why? Explain the differences between silhouette score and Davies-Bouldin index in the context of clustering. Compare the results obtained from any two clustering algorithms from the chosen dataset.

OPTICS + DBSCAN

## Ttttt1

## Tyyy2

# **ARMA / ARIMA model – Time Series Data**

What insights can you derive from the initial exploration of the time series data based on the provided topics? Describe any trends, seasonality, or anomalies observed. How did you determine the appropriate parameters (p, d, q) for the ARIMA model. Evaluate the performance of the ARIMA model in forecasting future values, highlighting any strengths and limitations based on your chosen dataset.

# **Assessment**

# **Conclusion**

# **References**

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