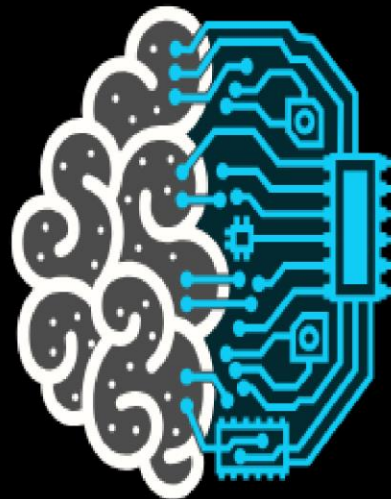


10/21/2024

Business Analysis 3.2 Group Assignment



CEREBROBRAINS

Artificial Intelligence

Table of Contents

AI Solution	3
Problem definition.....	3
Business Overview	4
Business objectives:.....	4
Success Criteria:.....	4
Key features:.....	4
How the AI works:	5
Advantages:	5
Challenges:.....	6
Risks:	6
AI Tools and Techniques:.....	6
POSTER	6
Grammarly results.....	Error! Bookmark not defined.

DECLARATION

We (Senwana MN, Malatjie VK, Khambane TL, Molewa P, Mathebula P) hereby declare that this document (CerebroBrain document) Is our original group work, except for cited sources and acknowledge contributions. We have not previously submitted this work for any academic or professional purpose. We understand that plagiarism and academic dishonesty will not be tolerated.

Signed:

INITIALS &SURNAME	STUDENT NUMBER
Senwana MN	222086645
Khambane TL	221486534
VK MALATJIE	221982418
Molewa P	221348158
Mathebula P	221867082

Date: 21/10/2024

CerebroBrains

AI Solution

The AI solution that we have proposed is the AI assistant for universities' online application system. Our AI Assistant is called UNIPLY. The aim is to simplify the online application process for universities and assist applicants in navigating university requirements efficiently and accurately. Uniply will provide course recommendations based on the applicant's results that they use to apply (grade 11 or matric results), and bursary opportunities aligned to the courses. It helps the applicant make informed decisions, making career exploration less difficult.

Problem definition

Manually searching through university prospectuses manually for courses that you qualify for can be time-consuming and stressful. Applicants may end up applying for courses that they do not even meet the minimum requirements. For instance, you would find an applicant whom it is their first time applying at the university choosing or applying for postgraduate courses instead of undergraduate courses. This would be stress causing because the applicant will be having high hopes of being accepted by the university while their application will not even be considered. Most university applicants do not have relevant information about bursaries that are offered related to their courses. You would find out that sometimes an individual is accepted at the university but they do not have funding. With the proposed AI online application assistant, most matriculants and prospective students will benefit by making informed career decisions applying for courses that they qualify for increasing their chances of being accepted at the university and be able to further their studies.

Business Overview

CerebroBrains was founded by a group of students from Vaal University of Technology in August 2024. The company is an AI-based solution provider focused on transforming the university online application process for matriculants and prospective students. Our main focus will be building this AI online application assistant for VUT. The aim is to simplify the online application process by creating an AI online application assistant that assist applicants apply for courses they are qualified for, saving time for students to go through prospectus, and reducing errors and stress for students while increasing their chances of acceptance by aligning their results with the right courses.

Business objectives:

Simplify the application process to eliminate challenges faced by students when applying online. Uniply will guide applicants ensure they provide accurate information and apply for courses they qualify for.

Enhance accessibility by filtering relevant information from the university prospectus and presenting courses that align with the applicant's academic achievements. Reduce errors, such as applying for postgraduate courses, which end up cause frustrations and stress.

Success Criteria:

To measure the achievements and business objectives, we will evaluate the performance and progress of our business by identifying areas that can be improved through feedback from our users to make our business marketable to other universities. Establish partnerships with other service providers like ITS because our system will work hand in hand with VUT's online application process.

Key features:

User friendly interface.

Admission Points Score (APS) Calculation – calculating APS after the applicant has entered their results.

Course Matching – the AI will analyze the applicant's results and APS to recommend suitable VUT courses.

Bursary Matching – Uniply will also suggest bursaries that align with the chosen course, removing the hustle of searching multiple sources.

How the AI works:

The applicant will have to enter their subjects and level for each subject, then the AI will calculate the APS and, based on certain course specification for certain subject level, Uniply will only show courses the applicant qualifies for and filter out the courses they do not qualify for. The courses will be categorized by faculty to make them easily readable and for the applicant to know under which faculty the course they choose falls. Uniply will also make some bursary suggestions for certain courses that are funded by that bursary, making it easy for applicants to have funding suggestions.

Advantages:

Avoid invalid Applications – Uniply ensure students do not apply for courses they do not qualify for, preventing wasted time.

Save time and effort – applicants won't need to go through prospectus causing complications.

Simplified bursary search – Uniply will suggest bursaries aligned to the courses you qualify for removing the need to search through papers or internet.

Challenges:

Lack of experience – as students and not being exposed to the corporate world of AI implementation, Uniply won't be as advanced as it should be due to use of outdated tools and techniques.

Limited resources – due to financial constraints, we won't have all the necessary tools needed for the development.

Time constraints – time will be a big factor in measuring the success of our project as we will be focusing on finishing the project on time and not having enough time to explore other resources that could be useful.

Risks:

Inaccurate user information – the system may be affected by outdated information, for example, suggesting bursaries that no longer accept applications, giving the applicant false hopes of funding.

Data privacy – applicant's data being compromised.

Linking the VUT database with our AI solution - VUT data privacy may be compromised as we will be having access to their database information.

AI Tools and Techniques:

Python will be used as the main programming language for building the entire project.

Natural Language Processing will be employed to process and analyze user inputs, enabling the AI to understand qualifications and courses.

Text-to-text generation, this will allow the AI to provide detailed and personalized responses to users.

Machine Learning Approach

The machine learning approach for UNIPLY focuses on recommending courses and bursaries based on users' academic qualifications.

- Recommendation system – we are going to use this machine learning approach with collaborative filtering technique allowing UNIPLY to suggest relevant courses and bursaries by analyzing both user data.
- Supervised learning – we are also going to use classification model Random Forest to classify applicants into suitable courses based on their APS and results. RandomForestClassifier algorithm is used to build models that predict which course an applicant qualifies for and which bursary they might be eligible.
- Pandas - will be used to load the dataset, manipulate it, and analyze the data for course recommendations and bursary suggestions.

Data

Data to be used in this solution:

- Information on courses, prerequisites, and course requirements.
- Data on available bursaries, including eligible criteria.
- Historical data from applicants including their academic results.
- Historical acceptance rates of successful and unsuccessful applicants.

Model

The AI model will be evaluated based on:

- Accuracy and Precision – the model's ability to correctly recommend courses for which an applicant is eligible, measured by the number of successful applications and assessing how accurately the model identifies relevant courses and bursaries, and effectively it avoids recommending unsuitable options.
- F1 Score – missing a qualifying course can be a high-stakes error, the F1 Score will help and balancing the precision and recall for courses and bursary recommendations.
- Means Absolute Error(MAE) – will help access the error margin, ensuring accuracy for APS calculation.
- Counter – Uniply also uses the collections module form the counter class to find the most common or course, which can help suggest high-demand courses or the most popular bursary to applicants.

Time Series Analysis on Data

Time series can be applied to:

- Application Trends – by examining yearly changes in application data, UNIPLY can adjust recommendations according to trends in popular courses and evolving bursary offerings. This analysis will ensure recommendations remain timely and beneficial for applicants.
- ARIMA Model – this model will help predict course demand patterns, enabling proactive recommendation adjustments based on recent trends.

Solution Techniques

Solution techniques for maintaining and improving AI model include:

- K-Nearest Neighbor – this algorithm in the UNIPLY project involves using applicant's data including their academic results to match them with suitable courses based on similarities with past successful applicants.
- Use metrics like accuracy, precision, recall, and F1 score to assess the model's performance in recommending courses.
- Train_test_split – splits the dataset x(features) and y(target labels) into a training set and a testing set. 20% of the data will be used for testing and 80% for training.

Natural Language Processing

The AI will use NLP techniques to:

- Understand user queries
- Extract and present relevant information from the university's prospectus.
- Enable conversational feedback, making UNIPLY an intuitive guide for applicants.

NLP serves as the foundation for natural interaction with the AI, making the application process feel more interactive and responsive

Deep Learning

The solution employed deep learning models to improve the model over time with complex, layered data. Recurrent Neural Networks (RNN) for understanding text-based inputs in a more precise manner, supporting NLP functions within UNIPLY.

Other Features

Our AI solution's softbot will act as a virtual assistant, guiding students through the university application process. Here's what it will do:

1. Calculate APS (Admission Point Score) based on students' academic results.
2. Match students with qualifying courses and bursaries based on their APS and academic background.
3. Provide personalized course and bursary recommendations.
4. Assist with application processing and documentation.

The softbot streamlines the application process, ensuring accuracy and efficiency, and provides students with tailored guidance and support.

POSTER

OUR AI GUIDES STUDENTS THROUGH UNIVERSITY APPLICATIONS, MATCHING THEM WITH COURSES AND BURSARIES BASED ON THEIR ACADEMIC RESULTS

Manual application processes are time-consuming and stressful for applicants



VAAL UNIVERSITY
OF TECHNOLOGY

Apply now using UNIPLY

AI online application assistant that assist applicants apply for courses they are qualified for.



CEREBROBRAINS
Artificial Intelligence

UNIPLY AI ASSISTANT

The aim is to simplify the online application process

Calculated APS: 35

You qualify for the following courses:

- Chemical Engineering (Faculty: Engineering & Technology)

Available bursaries:

- * NSFAS: National Student Financial Aid Scheme bursary for eligible students
- * ESKOM: Bursary for students enrolled in engineering courses.



Displays available bursaries too!



Founded by VUT students, focused on AI-driven application solutions.

GRAMMARLY RESULTS



AI
Paraphraser



AI Grammar
Check



AI Translator

Business Overview
Cerebrobrains was founded by a group of students from Vaal University of Technology in August 2024. The company is an AI-based solution provider focused on transforming the university online application process for matriculants and prospective students. Our main focus will be building this AI online application assistant for VUT. The aim is to simplify the online application

Check
Text

Upload File

982/1,000
Words
(Get up to
10,000 [here](#))

Grammar & Spell Checked

Table of Contents

CerebroBrains: 2

AI Solution: 2

Problem Definition: 2