VAAL UNIVERSITY OF TECHNOLOGY

VAAL UNIVERSITY
OF TECHNOLOGY
Inspiring thought. Shaping talent.

FACULTY: Applied and Computer Sciences
DEPARTMENT: Information and Communications Technology
SUBJECT: Business Analysis 3.2
SUBJECT CODE: AIBUY3A_2_2024
LECTURER: MALEFETSANE MATSELA
MODERATOR: Mr. X. Piyose
YEAR: 2024

ASSESSMENT NAME:	AI Solution Documentation
ASSESSMENT DATE:	21 October 2024

STUDENT NUMBER	INITIALS AND SURNAME	SIGNATURE
222124059	T MPHAHLELE	M.T
221874534	NN MANAVI	M.NN
221673695	MM SELLO	S.MM
222397594	BJ MANYERUKE	M.BJ
222387831	N MASONDO	M.N
222374918	JJA Santos	S.JJA

DECLARATION

We, THAKGATSO MPHAHLELE

NATALLIE NYELETI MANAVI

MAKGWALE MATSHEPHO SELLO

BANELE JOSHUA MANYERUKE

Nothando MASONDO

JOSUE SANTOS

declare that the contents of this project represent our unaided work and that the project has not previously been submitted for academic examination towards any qualification. Furthermore, it represents our own opinions and not necessarily those of the Vaal University of Technology.

Signed	M.T	**Date:**	20.10.24
Signed	M.NN	**Date:**	20.10.24
Signed	S.MM	**Date:**	20.10.24
Signed	M.BJ	**Date:**	20.10.24
Signed	M.N	**Date:**	20.10.24
Signed	S.JJA	**Date:**	20.10.24

Table of Contents

1-AI Solution

In the fast-paced educational environment of today, freshman and senior students often handle a lot of campus life challenges as well as maintain good health for their school life; this could be so worrying at times but there is an AI solution which has come out clearly that it can help us solve these issues by coming up with an all-inclusive app meant for VUT students enabling them to succeed in their academic work besides class activities. Therefore, this artificial intelligent application will improve students' academic, social as well as wellness l experiences at university so that they can have good time while studying in university.

This project aligns with the theme of "AI Solution for Industries" by targeting the education sector, a crucial industry where AI has the potential to create a significant positive impact.

- **AI Chatbot:** The core of the app's AI functionality will be an intelligent chatbot capable of providing instant responses to student queries. This chatbot will assist with everything from academic counselling to mental health advice.
- **Machine Learning Approaches:** The chatbot will use natural language processing (NLP) to understand and respond to student inquiries. Machine learning algorithms will help personalize recommendations based on user data, such as previous interactions or specific academic needs.
- **Data Utilization:** The app will collect and analyse data related to student interactions, preferences, and needs. This data will be used to continually improve the AI's responses and the overall user experience.

2- Business Objectives

Objectives

- strengthen VUT students through an AI application that provides improved social, physical, mental, and academic wellbeing tips.
- To display information about student groups, clubs, and activities for socializing.
- To promote healthy lifestyle living tips and to show available sport clubs.
- Mental wellbeing ensured through access to counselling services and real-time assistance with the help of an AI chatbot.
- Enhance student academic performance by providing resources that supplement study groups, and access to academic advisors and private extra class tutors.
- Navigation on campus should be facilitated with given instructions provided by the AI chatbot.

Business Success Criteria

- User Adoption Rate: The application should reach high adherence and user rates within the VUT community.
- Improved Student Outcomes: Students' engagement in social, academic, and wellness activities should increase.
- Positive Feedback: High rating of user satisfaction from feedback surveys about the usability, usefulness, and relevance of the app.
- Ease of Navigation: The time spent on moving around campus and accessing key services is reduced.
- Retention and Academic Performance: The actual improvement in student retention and academic performance based on the use of the app.

Business Background

- Institutional Context: VUT is a vibrant university with students making up a diverse base that need help with managing academic, demand socially and in terms of wellness.
- Current Challenges: Finding resources, groups, and services is challenging. Real-time support and guidance need to be improved for freshers and finalists.
- Market Gap: There is currently no platform that would address the needs of VUT students under one easy-to-use app in the form of a comprehensive social, wellness, academic support, and campus navigation approach.

Requirements

- Social group directories, event calendars, academic support resources, campus' directions.
- AI chatbot that responds in real-time for counselling and general student support.
- The application should be secure; students' private data should not be tampered with.
- The application should be highly reliable, especially the directions and chatbot aspects, and should load fast.

Constraints

- Budget: R10 000 initial budget for marketing and creating the app.
- Technology: The application should run on windows and macOS operating systems.
- Time of Launch: The application should go online at the start of the next academic year to ensure it achieves maximum impact.

Risks

- Adoption Risk: If students are not aware of this app or the app does not meet the requirements, then it will lead to low adoption.
- Security Risk: All sensitive information about different counselling conversations would come out if there is a data leak.
- Technical Risk: directions are not completely accurate or the responses in AI chat are slow and may not be that responsive also.

Tools and Techniques

Tools

- GitHub: for project track history, and collaborative work among group members.
- python: used for coding and creating the chatbot.
- Natural Language Toolkit.
- Google Text-to-Speech
- Pygame.
- Pandas.
- Scikit-learn

Techniques

- Use of Natural Language Processing (NLP) to allow the chatbot to understand and accurately respond to student queries.
- Speech recognition.
- Text-to-Speech (TTS).
- Machine Learning.
- Time series analysis.
- Performance tracking.

3- Problem definition

Students entering or nearing the end of their university education often struggle with a variety of challenges such as navigating campus resources, social inclusion, accessing academic support and managing their physical and mental health.

Relevance to Theme:

The problem statement aligns with the AI theme in the following ways:

1. AI-Powered Solutions: Implementing AI-driven chatbots, virtual assistant, or predictive analytics to enhance student navigation, resource discovery, and support.
2. Personalized Support: Leveraging AI to provide tailored guidance, recommendations, and interventions for students.
3. Data-Driven Insights: Utilizing AI to analyse student data, identify trends, and influence decision-making.
4. Automation and Efficiency: Implementing AI to streamline administrative tasks, reduce workload, and enhance resource allocation.
5. Intelligent Systems: Developing AI-powered systems to integrate fragmented support services, improve accessibility, and reduce barriers.

Benefits:

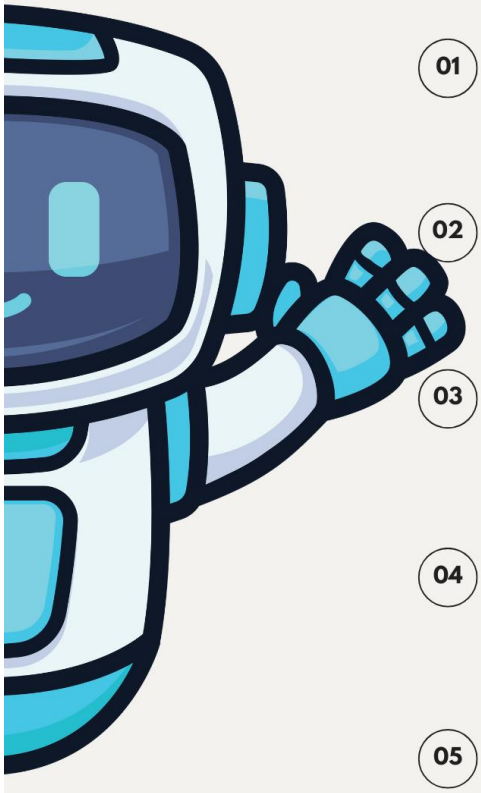
The proposed AI-powered chatbot will:

1. Enhanced navigation & resource discovery.
2. 24/7 support and availability.
3. Improved academic performance and outcomes.
4. Reduced workload & academic conflicts.
5. Enhanced student support & engagement.

Yes, the benefits of an AI University Guide Chatbot can often be clearly identified when reading the problem definition.

4. Poster

VUT AI CHATBOT



01 Overview

In the dynamic educational landscape, VUT students face challenges in managing academic, social, and wellness needs. Our AI-driven application provides a comprehensive support system to enhance their university experience.

02 Project Highlights

- AI Chatbot: Instant support for academic counseling and mental health advice.
- Personalized Learning: Uses NLP for tailored responses and recommendations.
- Data Insights: Analyzes interactions to continuously improve user experience.

03 Business Objectives

- Enhance student wellbeing with social, physical, and academic tips.
- Connect students to clubs and activities.
- Provide mental health support via real-time AI counseling.
- Improve academic performance with access to resources and tutoring.
- Simplify campus navigation through AI assistance

04 Success Criteria

- High user adoption within the VUT community.
- Increased student engagement in activities.
- Positive feedback and satisfaction ratings.
- Efficient navigation of campus services.
- Improved retention and academic success.

05 Challenges

- Current difficulties in finding resources and support.
- Lack of a unified platform for student needs.

06 Technical Aspects

- Tools: GitHub, Python, NLTK, Google Text-to-Speech, TensorFlow.
- Techniques: NLP, Speech Recognition, Machine Learning.

07 Benefits

- 24/7 support and enhanced navigation.
- Improved academic outcomes.
- Increased student engagement.

Join Us in Transforming Student Life at VUT!

For more information, visit our website or contact us!