VAAL UNIVERSITY OF TECHNOLOGY

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DIPLOMA : INFORMATION TECHNOLOGY

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Lecturer	:	Mr. Matsela Mr. Matshego
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External Moderator	:	Ms. S Matyila
Total Marks	:	100
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Declaration

We, the undersigned, declare that this project titled “AI-ADVISOR: Linking Talent from South Africa to AI Jobs Worldwide” is our own original work. All sources used have been acknowledged. We understand that plagiarism is a serious academic offense and that disciplinary action may be taken against us should any part of this work be found to have been copied without proper citation.

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Total Marks = 100		**Final Mark =**	
AI Solution - DOCUMENTATION ASPECT:			
SOLUTION ***(very important to note marks, will be deducted, if the format isn’t as per the requirements, Grammarly report haven’t been included in the document, students seem to***		**EXAMINER**	**MODERATOR**

Table Of Contents :

AI SOLUTION – DOCUMENTATION ASPECT:

1. AI SOLUTION: AI-ADVISOR

Linking Talent from South Africa to AI Jobs Worldwide.

To help South African job seekers connect with global opportunities in the quickly expanding field of artificial intelligence, AI-Advisor is a clever, data-driven career guidance system.

The world needs qualified AI workers in the Fourth Industrial Revolution (4IR), but many bright South Africans are still unemployed because of a lot of different reasons, those being:

a. The lack of personalized or private career counselling.
b. Information asymmetry regarding international job markets.
c. An incompatibility between job requirements and skill sets.

AI-Advisor bridges this gap through data analytics and artificial intelligence. Based on the job seeker's credentials, experience, and skills. It matches people with the most relevant, in-demand, and profitable AI jobs by analyzing global AI job data. Connecting talent to the global AI workforce is an issue that the system directly addresses, affecting the entire industry.

2. BUSINESS OBJECTIVES

Business Objectives

- Create an AI system that suggests foreign AI positions based on user profiles.
- Lower the unemployment rate for skilled workers and recent graduates.
- Give international businesses access to skilled South African personnel.
- Provide career guidance based on data to improve job success rates.
- Save time and money by automating and streamlining the hiring process.

Business Background

South African professionals are always left behind in the rapidly growing global AI job market. Many are competent, but they aren’t certain where nor how to use their skills

abroad. Meanwhile global businesses are having trouble finding AI talent.AI-Advisor connects both parties by offering:

- Targeted candidate matching for businesses in need of AI specialists
- Customised AI job recommendations for job seekers.

These two advantages foster a mutually beneficial ecosystem amongst international employers and South African talent.

Criteria for Business Success

The following metrics will be used to measure success:

1. ≥ 80% accuracy in suggesting suitable job roles.

2. Enhanced user awareness of job suitability and the future goal being ≥ 50% of users getting interviews following AI-Advisor use.

3. Shorter time to hire and talent mismatch for recruiters.

4. Increased South African presence in global AI employment markets.

Conditions

Functional requirements:

1. User inputs, such as industry preference, experience, and qualifications.
2. The system examines global AI job datasets and makes suggestions for:
    i. Jobs that are easiest to obtain (high demand, low entry)
    ii. Jobs that pay the most
    iii. Options that are balanced
    iv. Describes each recommendation in detail.

Non-functional requirements:

1. Transparency and accuracy.
2. User-friendly interface (chatbot or CLI)
3. Scalability to new datasets
4. In agreement with data privacy and security laws.

Limitations

- Some job details are missing
- There may be user input errors or puzzling skills
- Only available datasets (CSV format)
- Salary data is mostly in USD

- Future real-time updates require the internet

1. The code:

a. only works for AI jobs
b. generates a list of applicable jobs, but does not give too much data
c. only limits the user to specific prompts used in the program

Risks

1. Inaccurate user input
2. Regional or skill-based data bias
3. Job data that has been out of date over time
4. Some users lack digital literacy

Tools And Techniques

Pandas & NumPy:

- Data cleansing and analysis

Python:

- Core programming and AI Logic Future extensions include natural language processing
- chatbot interfaces
- deep learning models

Similarity metrics (Jaccard):

- skill matching

Ranking or scoring models:

- for job relevance and demand

Heuristic modelling & time series:

- trend prediction

3. PROBLEM DEFINITION

The Issue

Even though the number of skilled workers in technology and AI-related fields is increasing, South Africa still has a high graduate unemployment rate. International businesses are also having trouble finding AI talent. This unfavourable difference arises because:

- Job searchers cannot access international markets
- Recruiting platforms do not customise job matching
- Candidates apply for positions for which they do not qualify for or ignore ones for which they do qualify for

Many competent people continue to be unemployed as a result.

Relevance to the Theme

The project demonstrates the 4IR mission, which is to use AI to promote innovation, employability, and inclusive growth. AI-Advisor shows how AI can be used as a catalyst for opportunity and economic transformation in addition to being a tool for automation.

Benefits to the Community

AI-Advisor, beyond the individual level, adds value by:

- lowering unemployment
- bringing in foreign revenue for local communities
- preparing young people for digital and AI readiness
- promotes socioeconomic growth through exposure to other countries

4. OVERVIEW OF THE POSTER

Title: AI-Advisor: Linking South African Skilled Workers with International AI Positions

Issue: International AI talent shortage versus local unemployment

The answer is an AI-powered career advisor that uses demand data, skills, and qualifications.

Inputs: Qualifications, experience, and skills.

Procedure: Gathering data, analyzing it, assigning a score, and then ranking the suggestions

Results: Appropriate job recommendations with justifications

Benefits: Employment opportunities, upskilling advice, and worldwide job access

Technology: chatbot (future), ranking models, dataset analytics, and Python

Impact: Encourages digital transformation, empowers youth, and decreases unemployment

AI SOLUTION - THEORETICAL ASPECT:

1. THE MACHINE LEARNING APPROACH

AI-Advisor employs a pipeline for scoring and ranking that is comparable to that of a machine learning system, such as:

1. Preprocess employment information
2. Sort by experience and qualifications
3. Use Jaccard similarity to match skills
4. Determine demand scores using employment trends
5. Use the average salary as a signal for ranking
6. Use weighted formulas to combine results for the following:
    - Balanced roles
    - Easy to Get
    - Highest Paying

While making effective use of the data at hand, this hybrid machine learning plus heuristic approach guarantees accuracy and explainability.

2.DATA

The datasets utilised were ai_job_dataset.csv and ai_job_dataset1.csv.

includes the following:

• Job titles, pay (USD), necessary education, training, and experience

• Industry, company size, remote ratio, and posting dates

Data Types:

• Organised (experience, salary)

• Time-based (posting_date)

• Textual (skills)

• Categorical (job title, degree)

These datasets are appropriate for recommendation modelling and faithfully represents actual AI job postings from various nations.

3. MODEL

Accuracy is assessed using the following methods:

• Job demand and salary ranking

• Degree and experience validation

• Skill match (Jaccard index)

Testing includes running the model on several user profiles, comparing suggestions with professional expectations, and measuring actual results from user applications in the future.

4. TIME SERIES ANALYSIS ON DATA

AI-Advisor can forecast demand for particular roles (such as data scientists and ML engineers), identify seasonal hiring spikes, detect trends in AI job availability, and modify recommendation weights in response to current demand by examining the posting_date field.

As a result, the system can remain current and relevant to changes in the labour market.

5. SOLUTION TECHNIQUES

Key methods include:

1. degree normalisation
2. skill tokenisation
3. similarity scoring
4. data cleaning and merging
5. weighted scoring models.

Potential enhancements to accuracy include:

• Time-series trend weighting

• Dynamic ranking weight adjustment

• Integration of user feedback

• Larger, more varied datasets

• ML classifier for better forecasting

6. NATURAL LEARNING PROCESSING, SPEECH RECOGNITION OR SPEECH SYNTHESIS

By interpreting user inputs in free text, extracting skills from job descriptions, and enabling a conversational chatbot interface, natural language processing (NLP), improves usability.

Future Features: Text-to-speech for users with low literacy levels; voice interaction for accessibility

7. DEEP LEARNING

Possible Improvements:

- Deep learning-based recommendation engine
- neural networks for job role classification and clustering
- predictive modelling of job success probability
- outlining skill matching with embeddings (e.g., BERT)

As a result, AI-Advisor will become more clever, flexible, and prepared for widespread use.

8. OTHER FEATURES

Users can chat with AI-Advisor to share their information, and the system will conversely suggest jobs. Future plans include integrating web widgets or WhatsApp. This enhances user experience, engagement, and accessibility.