Project Title	**AI-Powered Talent Intelligence & Workforce Optimization Suite (T-IQ)**
Skills take away From This Project	**A learner finishes this project knowing how to:** • **Use Python fundamentals (loops, lists, functions, classes, files, debugging)** • **Handle data with Pandas, JSON, complex nested files** • **Use SQL for joins, windows, ACID transactions** • **Clean textual and tabular data** • **Perform full EDA (plots, distributions, statistical summaries)** • **Build classification, regression, clustering, and recommendation workflows** • **Apply PCA, LDA, and other dimensionality reduction techniques** • **Use PyTorch for deep learning—MLP, CNN, RNN, LSTM** • **Use Transformers for resume parsing and job-matching** • **Integrate LLMs (GPT models) for summarization and chatbot tasks** • **Apply prompt engineering**

	• **Deploy an end-to-end HR AI solution**
Domain	**Humanresource**

Problem Statement:

HR teams suffer from:

1. High attrition
2. Slow hiring cycles
3. Manual resume screening
4. Skill mismatch between job roles and employees
5. Inconsistent interview evaluation
6. Low employee engagement visibility
7. Difficulty forecasting staffing requirements

This project builds a unified AI system to solve these workforce challenges.

Business Use Cases:

1. 25–40% reduction in hiring time
2. 30–50% improvement in candidate-job matching
3. Early detection of potential attrition leads to a better retention strategy
4. Automated resume ranking removes 70–80% manual screening
5. Chatbots reduce HR email load by 40–60%
6. Time-series forecasting stabilizes team capacity planning

Approach:

1. Collect datasets from HRMS systems, resumes, job descriptions
2. Clean employee databases, resumes, skill descriptions
3. Perform EDA with histograms, box plots, scatter plots, stacked bars
4. Use SQL for master table creation (joins, normalization, window ops)
5. Prepare features
6. Numeric scaling
7. One-hot encoding
8. Text cleaning (tokenization, lemmatization)
9. Skill embeddings (Transformers)
10. Build ML models
11. Attrition prediction
12. Performance prediction
13. Build NLP systems
14. Resume parsing
15. Sentiment classification
16. Interview summarization
17. Deep learning
18. MLP for workforce score prediction
19. CNN for fraudulent document detection
20. LLM chatbot
21. GPT-powered HR assistant
22. Evaluate using ML, DL, and NLP metrics
23. Build dashboards & reports
24. Package system as a Talent Intelligence Suite

Results:

1. Attrition prediction accuracy: 80–92%
2. Resume–job match accuracy: 85–95%
3. Sentiment classification accuracy: 90%
4. Time-series workload forecast error: <10–15%
5. LLM interview summaries reduce evaluation time by 60%

Project Evaluation metrics:

1. **Classification:** accuracy, precision, recall, F1, ROC-AUC
2. **Regression:** RMSE, MAE, R^2
3. **Clustering:** silhouette score
4. **NLP:** BLEU, perplexity, sentiment accuracy
5. **Document OCR/CV:** CER, WER
6. **LLM:** helpfulness rating, hallucination rate

Technical Tags:

Python, Pandas, NumPy, SQL, Matplotlib, Scikit-Learn, PyTorch, Transformers, BERT, GPT, OCR, NLP, Deep Learning, LLMs, Talent Analytics, HRTech

Data Set:

1. **IBM HR Analytics Attrition Dataset** (Classic HR dataset)
2. **Resume Dataset (Kaggle)** – for name, skills, education, roles
3. **Job Descriptions Dataset** – for skill matching
4. **Glassdoor/Indeed Reviews dataset** – for sentiment analysis
5. **HRMS Synthetic Dataset** (create JSON files)
6. **Interview transcripts** (synthetic)
7. **Document OCR datasets** (for detecting fabricated ID cards, experience letters)

Data Set Explanation:

- **Structured employee data** – demographics, salary, tenure, satisfaction

- **Textual resumes** – unstructured, require cleaning & embedding
- **Job descriptions** – used to compute similarity scores with candidates
- **Employee reviews** – input for sentiment NLP models
- **Time-series workload logs** – used for forecasting
- **Document images** – used for CNN-based fraud detection
- **Nested JSON HRMS records** – used to practice complicated parsing

Pandas operations will cover: merging, groupby, pivot tables, datetime analysis.

Project Deliverables:

1. 10 Jupyter Notebooks (1 per use case)
2. EDA notebook with visualizations
3. SQL scripts (joins, ACID examples, window functions)
4. Data cleaning & transformation pipeline
5. ML models (attrition, performance, churn, clustering)
6. Deep learning models (MLP + CNN)
7. NLP pipelines (resume parsing, sentiment classification)
8. Transformer-based skill matching system
9. GPT-powered HR chatbot with prompt engineering
10. Final project report + architecture diagrams

Project Guidelines:

- Start with Python basics: lists, loops, functions, classes, debugging
- Use file handling to load resumes, logs, JSON files
- Apply list comprehensions, lambdas, iterators
- Use Pandas for scraping, merging, groupby, cleaning
- Use Matplotlib for charts (histograms, donut, stacked bars, scatter)
- Work with SQL: joins, normalization, DML, window functions
- Apply ML fundamentals: regression, classification, clustering
- Use SVM, Random Forests, Decision Trees
- Explore dimensionality reduction (PCA, LDA)
- Move to PyTorch for MLP & regression
- Build CNN for document fraud detection
- Use Transformers (BERT/RoBERTa) for resumes & job descriptions
- Apply RNN/LSTM for sequence modelling if needed
- Integrate LLM APIs (GPT-3.5/4) for chatbot and summarization
- Evaluate everything carefully
- Build a simple UI or dashboard for demonstration

Timeline:

10 days

PROJECT DOUBT CLARIFICATION SESSION (PROJECT AND CLASS DOUBTS)

About Session: The Project Doubt Clarification Session is a helpful resource for resolving questions and concerns about projects and class topics. It provides support in understanding project requirements, addressing code issues, and clarifying class concepts. The session aims to enhance comprehension and provide guidance to overcome challenges effectively.
Note: Book the slot at least before 12:00 Pm on the same day

Timing: Monday-Saturday (4:00PM to 5:00PM)

Booking link :https://forms.gle/XC553oSbMJ2Gcfug9

For DE/BADM project/class topic doubt slot clarification session:

Booking link : https://forms.gle/NtkQ4UV9cBV7Ac3C8

Session timing:

For DE: 04:00 pm to 5:00 pm every saturday
For BADM 05:00 to 07:00 pm every saturday

LIVE EVALUATION SESSION (CAPSTONE AND FINAL PROJECT)

About Session: The Live Evaluation Session for Capstone and Final Projects allows participants to showcase their projects and receive real-time feedback for improvement. It assesses project quality and provides an opportunity for discussion and evaluation.
Note: This form will Open only on Saturday (after 2 PM) and Sunday on Every Week

Timing:

For BADM and DE
Monday-Saturday (11:30AM to 1:00PM)

For DS and AIML
Monday-Saturday (05:30PM to 07:00PM)

Booking link : https://forms.gle/1m2Gsro41fLtZurRA


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