Project Proposal: Job Recommendation Engine for SEEK

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1. Background

In the dynamic job market, SEEK targets to bring the right positions to the right people. To realise this ambition, SEEK is building a job recommendation engine to increase the view and application rates of the jobs on the market by:

- Accurately predicting a job seeker's likelihood to **view** and **apply** for a job.
- Ranking recommendations based on **relevance** and predicted application **likelihood**.

Our goal is to achieve a 10–15% increase in application and view rates through personalized recommendations.

2. Data Sources & Tools

Data sources

- Job Ads
    - Size: 50k records
    - Format: JSON file (semi-structured, with missing values, outliers)
    - Field scope: Description, Title, Location, Salary, Work type, Classification, etc.
- Job Event
    - Size: 4.3M records on 2021-05-01
    - Format: csv file (structured, with duplicates)
    - Field scope: Timestamp, Resume_id, Platform, Kind, etc.

Tools

- Python processing and packages
    - Data exploration and cleaning: *pandas*, *nltk* (for text)
    - ML modeling: *sklearn*, *tensorflow* (for Neural Network)
    - Data visualization: *matplotlib, seaborn*
- Google Colab
    - Free online IDE
    - Model training
- GitHub
    - version control
- Google Cloud Platform
    - pipeline implementation

3. Proposed Solution

A. Hybrid Recommendation Approach

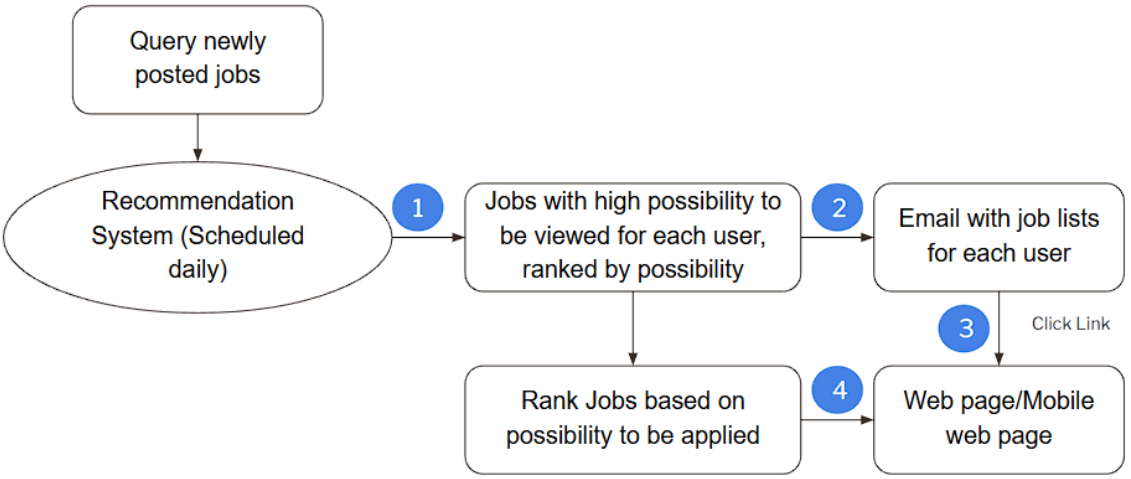
- **Predictive Models:** Binary classification (VIEW likelihood and APPLY likelihood) using **Random Forest** and **Neural Networks** .

B. Feature Engineering

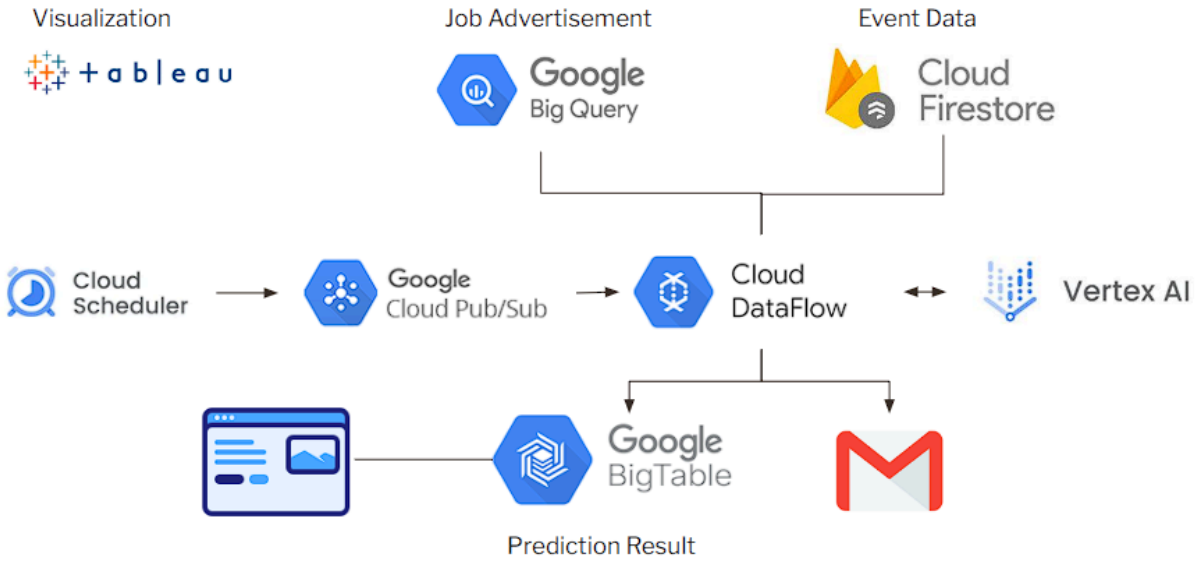
- Remove duplicated rows
- Add coordinate info through external API
- Text features (via TfidfVectorizer and regex).
- Aggregated metrics (job location and distance to applicants).

C. Pipeline

- **Functional Pipeline**



- **Technical Pipeline**



4. Evaluation & Validation

Metrics

- Model performance
    - **F1-score** (balance precision and recall rate)
- Business impact
    - Short-term: A/B test **application rates** and **view rates**
    - Long-term: (for employee) Using cohort to track **user retention rate** before and after releasing the recommendation engine, (for employer) Conducting NPS survey to collect **satisfaction rates**

Risks Mitigation

- Fallback: If the model F1-score< 0.5 (a predefined threshold), use heuristic rule instead.
- Bias checks: Keep monitoring recommendations for fairness across demographics.

5. Implementation Plan

This implementation plan should be feasible technically but may not perfectly be aligned with SEEK's tech stacks.

Phase	**Deliverables**
Architecting data pipeline	Draw pipeline architecture Diagram, develop ETL workflow.
Develop data models	Model logic documentation, Model training and evaluation.
Deployment	Deploy CI/CD pipelines on Jenkins, code on Bitbucket.
Monitoring	Integrated with data visualization tool Tableau/Power BI, monitor real-time dashboard.

6. Expected Outcomes

Outcomes	**Success metric**	**Validation Method**
Application/View Rate increase	15%, vs. status quo	A/B testing
Candidate retention increase	10% increase in D7, D14, D30 retention rates	Cohort analysis
Employer satisfaction rate increase	20% increase in NPS score	NPS survey