

# Seek Job Advertisement Assistant Agent

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# Business Background and Scope





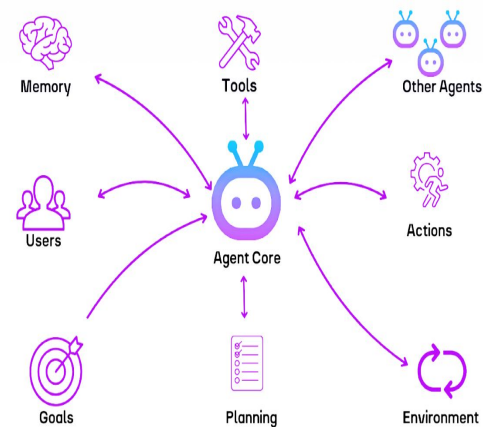
## Both employers and job seekers need assistance for job advertisement on Seek.

- There are around 16k ~ 20k job advertisements on Seek. Every months there are millions of visits from employers / recruiters and job seekers.
- Job advertisements are the base of resources that support the service of Seek, especially the recommendation system for both sides of customers to improve their customer experience.
- However, in reality, many job advertisements or job seek profiles are vague, incomplete, or inconcise, which creates challenges for Seek customers.
- With the cutting-edge techniques such as LLMs and Agentic AI building, there is an opportunity to explore the headroom to help customers with intelligent assistant.



## Using AI to improve job advertisement content analysis is the starting point to improve recommendation system.

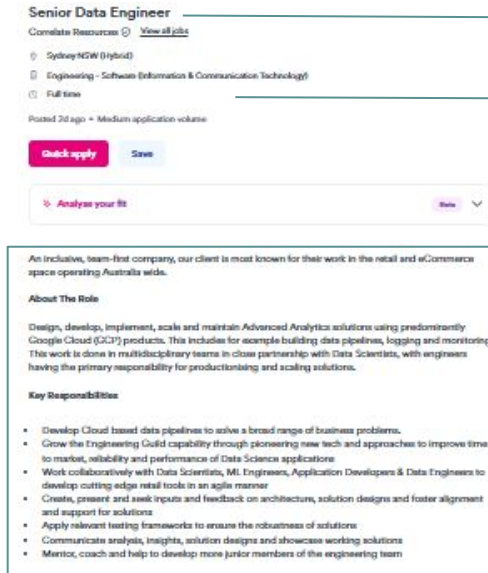
- Job advertisements usually provide key information including required skills, expected responsibilities, and other requirements.
  - Agentic AI with LLMs can provide more proactive solutions to solve the problem.
- The outputs for the above project can support the building of the whole recommendation system, especially the downstream parts:
  - Help employers improve job advertisements.
  - Help job seekers to find the suitable opportunities.



# Data Sources and Analysis



# The 50k job advertisements in the database are already structured.



**Senior Data Engineer**

Correlate Resources [View all jobs](#)

☐ Sydney NSW (Hybrid)

☐ Engineering - Software (Information & Communication Technology)

☐ Full time

Posted 2d ago • Medium application volume

[Quick apply](#) [Save](#)

[Analyse your fit](#) [Rate](#)

An inclusive, team-first company, our client is most known for their work in the retail and eCommerce space operating Australia wide.

**About The Role**

Design, develop, implement, scale and maintain Advanced Analytics solutions using predominantly Google Cloud (GCP) products. This includes for example building data pipelines, logging and monitoring. This work is done in multidisciplinary teams in close partnership with Data Scientists, with engineers having the primary responsibility for product/analytic and scaling solutions.

**Key Responsibilities**

- Develop Cloud based data pipelines to solve a broad range of business problems.
- Grow the Engineering Guild capability through pioneering new tech and approaches to improve time to market, reliability and performance of Data Science applications
- Work collaboratively with Data Scientists, ML Engineers, Application Developers & Data Engineers to develop cutting edge retail tools in an agile manner
- Create, present and seek inputs and feedback on architecture, solution designs and foster alignment and support for solutions
- Apply relevant testing frameworks to ensure the robustness of solutions
- Communicate analysis, insights, solution designs and showcase working solutions
- Mentor, coach and help to develop more junior members of the engineering team

Job Title

Metadata

Classification,  
Sub-classification,  
Area, Location, and  
Work Type, etc.

Content

Detailed description  
of required skills and  
responsibilities.

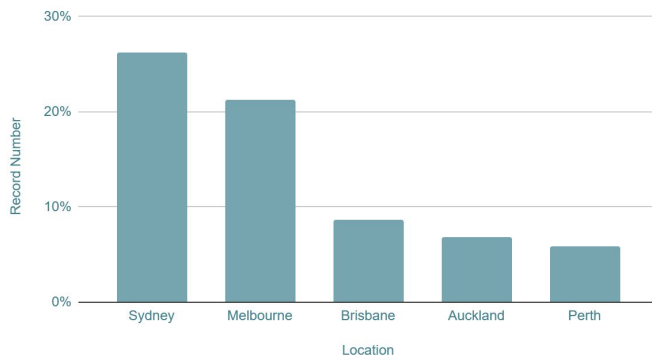
Image Reference: [Senior Data Scientist](#)





# The overwhelming majority of the jobs locates in Australia and New Zealand.

Job Advertisements Number VS Locations



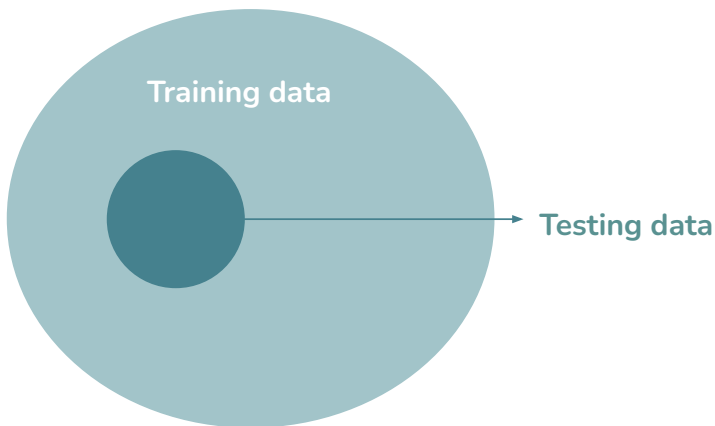
- Accordingly, English is the most popular job advertisement language.
  - However, there are still few job advertisements from Middle East & Asia, Europe & Russia with non-English languages.
- 70% of jobs are full-time opportunities.

# Agent Design and Settings





## Build datasets based on given job advertisements for both training and validation.



The testing data will be separated during the early development stage.

- In future, it can be manually labelled to create a golden dataset.
- It will be valuable to prove the RoI of AI products.

It is good to create a testing dataset where each classification has some samples based on the original percentage. (stratified sampling)

- However, in this use case, we temporarily use typical random train-test splitting to save time.



## The following tools are used to build AI assistant for job advertisement analysis and consumption.

**Language Models:** GPT family

- popular, good performance.

**Frameworks:** LangChain + LangGraph

- compatible, open-source, memory and thread management, conditional control.

**Vector Store:** ChromaDB

- Cheap, light-weight, good for local development, compatible with cloud environment.

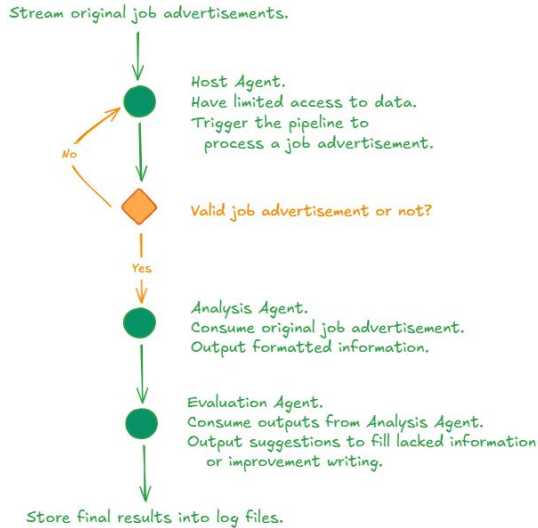
**Orchestration:** LangFuse

- Transparent tracing.

**Evaluation and Metrics:**

- Cost and Time
- ROUGE and Bert Score
- Customised Metrics

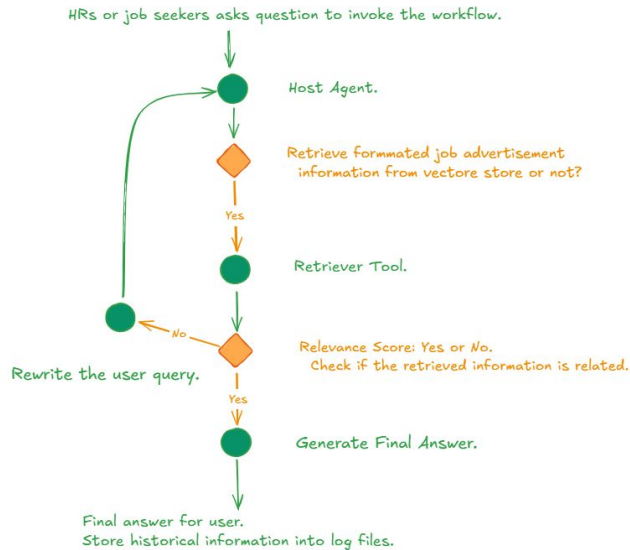
# AI workflow design consists of 2 pipelines with prompt engineering and RAG techniques.



## Key features:

- It streams job advertisement from dataset.
- It uses control edge to process invalid requests.
- It uses prompt engineering to reduce hallucination and ensure output format.
- It builds local log files and datasets to store information.
- It controls workflow historical records by windows sliding.

# The outputs from job advertisement analysis can help with customers with huge flexibility.



## Key features:

- It uses prompt engineering + RAG to reduce hallucination and uses pydantic tool to ensure output format in some specific steps.
- It builds local logs and datasets to store information.
- It uses another LLM based agent to evaluate the retrieving quality.

# Demo and Outputs





# The sample outputs of both pipeline are as follows.

## Job Advertisement Analysis

- Job title, skills, responsibilities, requirements, classification, salary, location, and work type
- The evaluation and suggestions of above information
- Workflow invoke time and thread id – for version management

## Client Assistant

- User's question
- Final answer
- Workflow invoke time and thread id – for version management
- Retrieving tool calling number and Rewriting user's question number – for customised metric



# There are 3 groups of metrics to evaluate the AI workflows.

## LangFuse Tracing

- Cost per job advertisement analysis: ~ **0.03 AUD**.
- Time consumption per job advertisement analysis: ~ **12 seconds**.

## Accuracy

- Bert Score for semantic accuracy and meaning
  - how generated analysis is semantically similar to the original one **0.73 (precision)**
  - how original advertisements are captured by generated analysis **0.59 (recall)**
- ROUGE for word-Level similarity
  - Combined results: **0.65 (F1)**
- Customised Retrieval Quality **0.50**
  - Defined as *the number of good retrieve calling evaluated by agent / the number of retrieval tool calling*

# Further Improvements and Plans





# Considering future scalability, there are some steps we can further explore.

## Classification-specific job analysis

- Currently the AI workflow relied on LLM's ability to deal with all job advertisements.
- In future, the job advertisements can be divided based on their classification, and the workflow can be horizontally expanded and process different classifications in parallel, which can improve the quality and reduce time consumptions.

## Language

- Currently the assumption is most of the advertisements are English.
- In future, with prompt engineering or further agent setting, the workflow can deal with multi-language.

## Design and evaluation

- Build the golden dataset for validation and testing.
- Add refreshment function for vector store with version control.
- More user-friendly UI.

# Resources





## Useful links are attached.

- [GitHub Repository](#)
- [Google Sheet with Charts](#)

**Thanks a lot for  
Watching!**





**The deck will be shared offline. Please list any questions and concerns in the following part. We will answer them!**

- TBC.