COMP4801

AUTOMATED JOB APPLICATION TRACKER

FINAL YEAR PROJECT

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1. Background & Motivation
2. Methodology
3. Tasks accomplished (first semester)
4. Future plan (second semester)

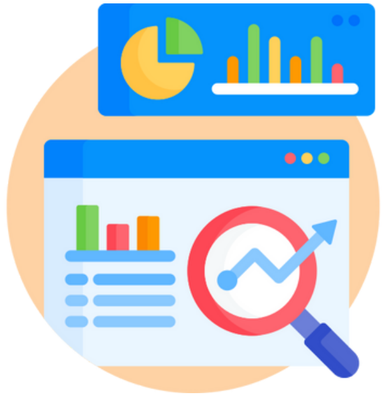
How it all started . . .

BACKGROUND & MOTIVATION

This project is motivated by the difficulty of tracking job applications across fragmented platforms and the opportunity to automate the recruitment process.

PERSONAL NEED

- Hard to track many applications
- Easy to miss important updates



ANALYSIS OF CURRENT JOB APPLICATION MARKET

- Discovery-focused platforms
- Little support after applying

BUSINESS OPPORTUNITY

- Automated tracking in one place Better visibility, better decisions

PERSONAL NEED

- Hard to track many applications
- Easy to miss important updates

COMPLEXITY ARISING FROM MANAGING MULTIPLE APPLICATIONS

PERSONAL NEED

Company	Role Title	Link to Job Advert	Application Date(dd/mm/yy)	Contact	Response (Drop Down List)	Interview Stage(Drop Down List)	Interview Time, Date & Interviewer Name
Example Firm(Delete this	Engineer	www.jobad.com/ad	2014-11-27 00:00:00	steve@ef.com	Nothing Yet	1st Face-to-face	Mon 5th Dec 2015, Jo Parker
Hang Seng Bank	Financial Systems Develc	https://careers.example.com/hang-seng-ban	2024-08-26 00:00:00	chris.wong@example.	Nothing Yet		
DBS Bank Hong Kong	Quant Developer Intern	https://careers.example.com/dbs-bank-hong	2024-11-18 00:00:00	hayden.lau@example.	Positive Phone Call	2nd Face-to-face	12:15, Mon 18 Nov 2024, Hayden Lau
ZA Bank	Full-Stack Developer Inte	https://careers.example.com/za-bank-7836	2024-06-28 00:00:00	hayden.lau@example.	Positive Email	3rd Face-to-face	10:00, Fri 28 Jun 2024, Hayden Lau
UBS Hong Kong	Financial Systems Develc	https://careers.example.com/ubs-hong-kong	2024-11-07 00:00:00	jisoo.kwok@example.	Rejection Email/Call	Telephone	10:30, Thu 07 Nov 2024, Jisoo Kwok
AQUMON (Robo-Advisor)	DevOps Engineer Intern	https://careers.example.com/aqumon-robo-a	2024-06-05 00:00:00	hayden.lau@example.	Positive Email	1st Face-to-face	18:30, Wed 05 Jun 2024, Hayden Lau
Hang Seng Bank	Financial Systems Develc	https://careers.example.com/hang-seng-ban	2024-11-09 00:00:00	morgan.yip@example	Positive Email	1st Face-to-face	15:00, Sat 09 Nov 2024, Morgan Yip
Citi Hong Kong	Junior Backend Engineer	https://careers.example.com/citi-hong-kong-	2024-06-15 00:00:00	morgan.yip@example	Positive Email	Interview Declined	17:30, Sat 15 Jun 2024, Morgan Yip
Bowtie Life Insurance (Ins	Front Office Developer (T	https://careers.example.com/bowtie-life-insu	2024-07-05 00:00:00	morgan.yip@example	Rejection Email/Call	Telephone	17:00, Fri 05 Jul 2024, Morgan Yip
Bank of China Hong Kong	Junior Backend Engineer	https://careers.example.com/bank-of-china-h	2024-10-14 00:00:00	alex.lee@example.cor	Positive Phone Call	Telephone	18:15, Mon 14 Oct 2024, Alex Lee
HSBC Hong Kong	Cloud Platform Engineer	https://careers.example.com/hsbc-hong-kong	2024-08-30 00:00:00	jordan.lam@example.	Nothing Yet		
Bowtie Life Insurance (Ins	Graduate Software Engir	https://careers.example.com/bowtie-life-insu	2024-10-22 00:00:00	hayden.lau@example.	Positive Phone Call	4th Face-to-face	10:30, Tue 22 Oct 2024, Hayden Lau
Bowtie Life Insurance (Ins	Financial Systems Develc	https://careers.example.com/bowtie-life-insu	2024-07-22 00:00:00	dana.cheung@exampl	Positive Phone Call	1st Face-to-face	16:45, Mon 22 Jul 2024, Dana Cheung
UBS Hong Kong	Software Engineer Intern	https://careers.example.com/ubs-hong-kong	2024-10-28 00:00:00	morgan.yip@example	Positive Phone Call	4th Face-to-face	15:30, Mon 28 Oct 2024, Morgan Yip
Hang Seng Bank	Infrastructure Engineer G	https://careers.example.com/hang-seng-ban	2024-08-05 00:00:00	hayden.lau@example.	Positive Phone Call	Telephone	10:00, Mon 05 Aug 2024, Hayden Lau
Citi Hong Kong	Software Engineer Intern	https://careers.example.com/citi-hong-kong-	2024-07-17 00:00:00	alex.lee@example.cor	Positive Phone Call	2nd Face-to-face	14:30, Wed 17 Jul 2024, Alex Lee
Crypto.com Hong Kong	Junior Backend Engineer	https://careers.example.com/crypto.com-hor	2024-07-06 00:00:00	jisoo.kwok@example.	Positive Email	Telephone	12:00, Sat 06 Jul 2024, Jisoo Kwok
UBS Hong Kong	Data Engineer Intern	https://careers.example.com/ubs-hong-kong	2024-06-27 00:00:00	alex.lee@example.cor	Positive Email	4th Face-to-face	15:00, Thu 27 Jun 2024, Alex Lee
Hang Seng Bank	Financial Systems Develc	https://careers.example.com/hang-seng-ban	2024-10-21 00:00:00	hayden.lau@example.	Positive Phone Call	Telephone	16:30, Mon 21 Oct 2024, Hayden Lau
J.P. Morgan Hong Kong	Trading Systems Develoc	https://careers.example.com/j.p.-morgan-hoi	2024-08-05 00:00:00	taylor.ho@example.c	Nothing Yet		
ZA Bank	Front Office Developer (T	https://careers.example.com/za-bank-7586	2024-09-12 00:00:00	chris.wong@example.	Positive Email	4th Face-to-face	13:00, Thu 12 Sep 2024, Chris Wong
ZA Bank	Data Engineer Intern	https://careers.example.com/za-bank-1044	2024-09-23 00:00:00	hayden.lau@example.	Positive Phone Call	3rd Face-to-face	14:15, Mon 23 Sep 2024, Hayden Lau
Goldman Sachs Asia	Financial Systems Develc	https://careers.example.com/goldman-sachs	2024-09-24 00:00:00	alex.lee@example.cor	Positive Email	3rd Face-to-face	10:45, Tue 24 Sep 2024, Alex Lee
Crypto.com Hong Kong	Risk Technology Analyst	https://careers.example.com/crypto.com-hor	2024-11-23 00:00:00	dana.cheung@exampl	Positive Phone Call	Telephone	11:15, Sat 23 Nov 2024, Dana Cheung
Bowtie Life Insurance (Ins	Quant Developer Intern	https://careers.example.com/bowtie-life-insu	2024-07-31 00:00:00	morgan.yip@example	Nothing Yet		
Interactive Brokers Hong	Financial Systems Develc	https://careers.example.com/interactive-bro	2024-06-18 00:00:00	chris.wong@example.	Rejection Email/Call	1st Face-to-face	09:45, Tue 18 Jun 2024, Chris Wong
Citi Hong Kong	Blockchain Engineer Inter	https://careers.example.com/citi-hong-kong-	2024-09-26 00:00:00	dana.cheung@exampl	Positive Phone Call	1st Face-to-face	13:15, Thu 26 Sep 2024, Dana Cheung
Goldman Sachs Asia	Platform Engineer Intern	https://careers.example.com/goldman-sachs	2024-06-29 00:00:00	hayden.lau@example.	Positive Phone Call	2nd Face-to-face	15:30, Sat 29 Jun 2024, Hayden Lau
Welab Bank	Mobile App Developer In	https://careers.example.com/welab-bank-52	2024-10-16 00:00:00	robin.ng@example.co	Positive Email	2nd Face-to-face	17:30, Wed 16 Oct 2024, Robin Ng
ZA Bank	Software Engineer Intern	https://careers.example.com/za-bank-8780	2024-08-11 00:00:00	jamie.chan@example.	Positive Phone Call	2nd Face-to-face	14:30, Sun 11 Aug 2024, Jamie Chan
J.P. Morgan Hong Kong	Site Reliability Engineer	https://careers.example.com/j.p.-morgan-hoi	2024-11-25 00:00:00	hayden.lau@example.	Rejection Email/Call	Interview Declined	17:45, Mon 25 Nov 2024, Hayden Lau
J.P. Morgan Hong Kong	Machine Learning Engine	https://careers.example.com/j.p.-morgan-hoi	2024-08-14 00:00:00	jamie.chan@example.	Nothing Yet		
Citi Hong Kong	Trading Systems Develoc	https://careers.example.com/citi-hong-kong-	2024-08-21 00:00:00	jordan.lam@example.	Rejection Email/Call	2nd Face-to-face	16:15, Wed 21 Aug 2024, Jordan Lam
Bowtie Life Insurance (Ins	Technology Analyst (Grac	https://careers.example.com/bowtie-life-insu	2024-10-15 00:00:00	dana.cheung@exampl	Positive Phone Call	Interview Declined	16:15, Tue 15 Oct 2024, Dana Cheung
Octopus Cards Limited	Cybersecurity Engineer I	https://careers.example.com/octopus-cards-l	2024-07-19 00:00:00	robin.ng@example.co	Positive Phone Call	Interview Declined	15:45, Fri 19 Jul 2024, Robin Ng
Goldman Sachs Asia	Infrastructure Engineer G	https://careers.example.com/goldman-sachs	2024-07-22 00:00:00	robin.ng@example.co	Nothing Yet		
Morgan Stanley Asia	Infrastructure Engineer G	https://careers.example.com/morgan-stanle	2024-06-16 00:00:00	hayden.lau@example.	Rejection Email/Call	3rd Face-to-face	17:00, Sun 16 Jun 2024, Hayden Lau
livi Bank	Front Office Developer (T	https://careers.example.com/livi-bank-7571	2024-08-05 00:00:00	dana.cheung@exampl	Nothing Yet		
Welab Bank	Front Office Developer (T	https://careers.example.com/welab-bank-19	2024-10-09 00:00:00	robin.ng@example.co	Nothing Yet		
Airwallex Hong Kong	Junior Backend Engineer	https://careers.example.com/airwallex-hong	2024-06-17 00:00:00	dana.cheung@exampl	Rejection Email/Call	4th Face-to-face	14:30, Mon 17 Jun 2024, Dana Cheung
Morgan Stanley Asia	DevOps Engineer Intern	https://careers.example.com/morgan-stanle	2024-09-25 00:00:00	jordan.lam@example.	Rejection Email/Call	1st Face-to-face	15:00, Wed 25 Sep 2024, Jordan Lam

* Excel sheet to keep track of job applications

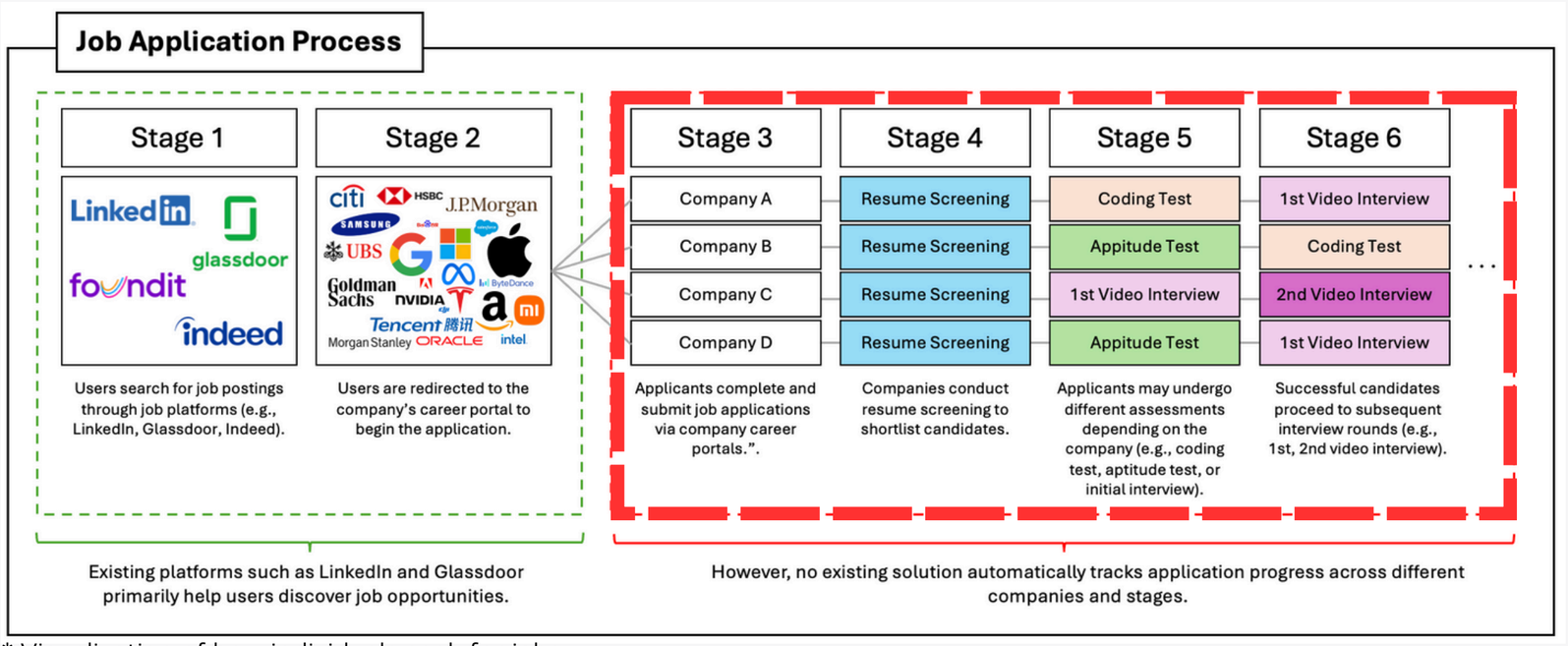
- Managing job applications manually does not scale.
- Information becomes fragmented, and important updates are easily missed.

ANALYSIS OF CURRENT JOB APPLICATION MARKET

- Discovery-focused platforms
- Little support after applying

PAIN POINTS IDENTIFIED FROM EXISTING JOB SEARCH PLATFORMS

ANALYSIS OF JOB APPLICATION PROCESS



* Visualization of how individuals seek for jobs

- As a result, applicants must manually monitor application progress across multiple companies and platforms.

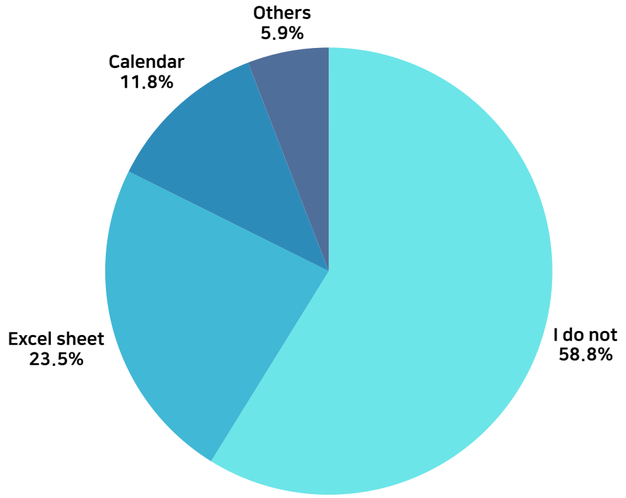
BUISNESS OPPORTUNITY

- Automated tracking in one place
  Better visibility, better decisions

IDENTIFYING AN UNMET NEED IN APPLICATION TRACKING

CREATING A PREVIOUSLY NON-EXISTENT SERVICE

How job seekers currently track their applications



Most job seekers **do not** systematically track their job applications.
→ Application information remains scattered across emails

For these users, an **automated** system that reads job-related emails and organizes application progress **in one place** can significantly reduce effort and confusion.

PROPOSED SOLUTION

SOLUTION

An AI-powered web system for centralized, automated tracking of post-application job progress

A **web application** to help job seekers automatically track and understand their **post-application progress** by analyzing **job-related emails**, while also providing **insights** and **recommendations** to manage applications more effectively.

SYSTEM DESIGN OVERVIEW

METHODOLOGY

This project follows a structured, step-by-step methodology to design, implement, and evaluate an automated job application tracking system. Each stage focuses on **transforming real-world job application data** into **meaningful insights** while ensuring accuracy, usability, and data privacy.

REQUIREMENT & FEATURE DECISIONS

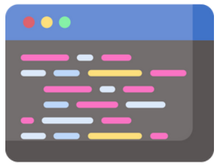
Define the core features needed to help users track and manage their job applications efficiently.

DATA & PATTERN ANALYSIS

Analyze email patterns to identify different stages of the recruitment process.

BACKEND PIPELINE DESIGN

Build a secure system that automatically retrieves and processes job-related emails with Gmail OAuth 2.0



FRONTEND VISUALIZATION & UX DELIVERY

Design an intuitive interface that clearly displays application progress.

INTEGRATION, TESTING, AND DEPLOYMENT

Integrate all components, test system reliability, and prepare for deployment.

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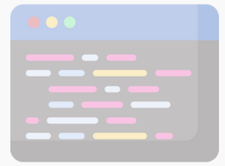

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TASKS ACCOMPLISHED

REQUIREMENT & FEATURE DECISIONS

Define the core features needed to help users track and manage their job applications efficiently.

DEFINING THE SYSTEM SCOPE AND DESIGN CONSTRAINTS

REQUIREMENT & FEATURE DECISIONS

Detailed plan to guide

SYSTEM SCOPE

1. Recruitment Stage Definitions
2. Minimum Viable Product (MVP) Features
3. Data Storage & Privacy Boundaries
4. Evaluation Criteria

TASKS ACCOMPLISHED

REQUIREMENT & FEATURE DECISIONS

Define the core features needed to help users track and manage their job applications efficiently.

STANDARDIZING THE RECRUITMENT PIPELINE

REQUIREMENT & FEATURE DECISIONS

1. Recruitment stage definitions

Stage	Description	Detection Signals
Application Submitted	Initial application confirmation	"thank you for applying", "application received", "we've received your application"
Aptitude Test	Psychometric/cognitive assessments	Plum, Pymetrics, SHL, Wonderlic, "personality assessment"
Simulation Test	Job simulation exercises	Forage, "virtual experience", "job simulation"
Coding Test	Technical programming assessments	HackerRank, Codility, CodeSignal, "coding challenge"
Video Interview	One-way pre-recorded video interviews	HireVue, Willo, SparkHire, "pre-recorded video"
Human Interview	Live interviews (phone/video/onsite)	"interview scheduled", "meet with", "assessment centre"
Offer	Job offer received	"pleased to offer", "offer letter", "congratulations"
Rejection	Application unsuccessful	"unfortunately", "not proceed", "regret to inform"

TASKS ACCOMPLISHED

REQUIREMENT & FEATURE DECISIONS

Define the core features needed to help users track and manage their job applications efficiently.

IDENTIFYING ESSENTIAL FEATURES FOR THE MVP

REQUIREMENT & FEATURE DECISIONS

2. Minimum Viable Product (MVP) Features

CORE FEATURES

- One-click Gmail OAuth 2.0 authentication
- Automated email scanning with date range selection
- AI-powered company and stage classification
- Dashboard with application statistics
- Visual pipeline representation (Sankey diagram, funnel chart)
- Application timeline view
- Real-time processing progress indicators
- Manual application entry
- CV analysis
- Chatbot

DEFERRED FEATURES (FUTURE VERSIONS)

- Interview calendar integration
- Email notifications for stage changes
- Export functionality (CSV, PDF reports)
- Multi-email provider support (Outlook, Yahoo)

TASKS ACCOMPLISHED

REQUIREMENT & FEATURE DECISIONS

Define the core features needed to help users track and manage their job applications efficiently.

ESTABLISHING DATA STORAGE AND PRIVACY BOUNDARIES

REQUIREMENT & FEATURE DECISIONS

3. Data Storage & Privacy Boundaries

DATA STORED

Data Type	Storage Location	Retention
OAuth tokens	Server-side (Render)	Session-based, cleared on logout
Extracted metadata	Local cache (JSON)	Permanent until manual clear
Company names	Local cache	Permanent
Stage classifications	Local cache	Permanent
Application dates	Local cache	Permanent

DATA NOT STORED (PRIVACY CONSTRAINTS)

- Raw email body content (processed in-memory only)
- Email attachments
- Personal identifiable information beyond email address
- Passwords or credentials

TASKS ACCOMPLISHED

REQUIREMENT & FEATURE DECISIONS

Define the core features needed to help users track and manage their job applications efficiently.

DEFINING MEASURABLE EVALUATION METRICS

REQUIREMENT & FEATURE DECISIONS

4. Evaluation Criteria

Metric	Target	Measurement Method
Stage Classification Accuracy	>85%	✅ Manual verification against 50+ labeled emails
Company Extraction Accuracy	>90%	✅ Cross-reference with known applications
False Positive Rate (non-job emails)	<5%	✅ Count misclassified emails / total processed
Processing Latency	<60s for 100 emails	✅ Timestamp comparison (start to dashboard render)
Cache Hit Performance	<2s	✅ Measure cached data retrieval time

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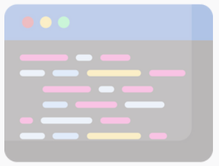


FRONTEND VISUALIZATION & UX DELIVERY

Design an intuitive interface that clearly displays application progress.

INTEGRATION, TESTING, AND DEPLOYMENT

Integrate all components, test system reliability, and prepare for deployment.

TASKS ACCOMPLISHED

DATA & PATTERN ANALYS

Define the core features needed to help users track and manage their job applications efficiently.

DESIGNING A TWO-LAYER EMAIL CLASSIFICATION STRATEGY

DATA & PATTERN ANALYSIS

How do people keep track of their job applications?

LAYER A: FAST FILTER (RULE-BASED)

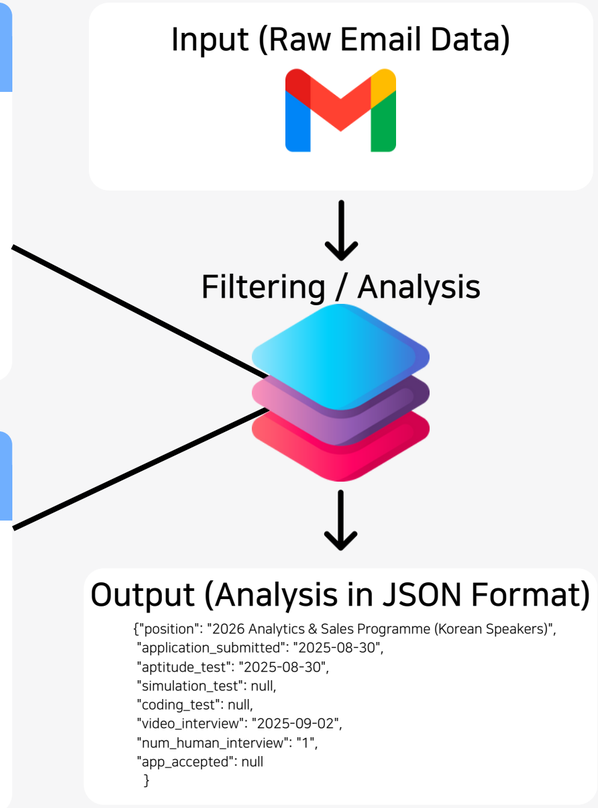
Purpose: Quickly eliminate non-job emails and pre-classify obvious cases using deterministic rules.

Output: Filtered email list (job-related only), Pre-detected stages (high confidence), Sender domain classification.

LAYER B: AI REFINEMENT (LLM-BASED)

Purpose: Handle ambiguous cases, extract company names from ATS emails, and provide nuanced stage classification.

Model: Azure OpenAI GPT-4o-mini



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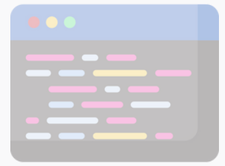

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TASKS ACCOMPLISHED

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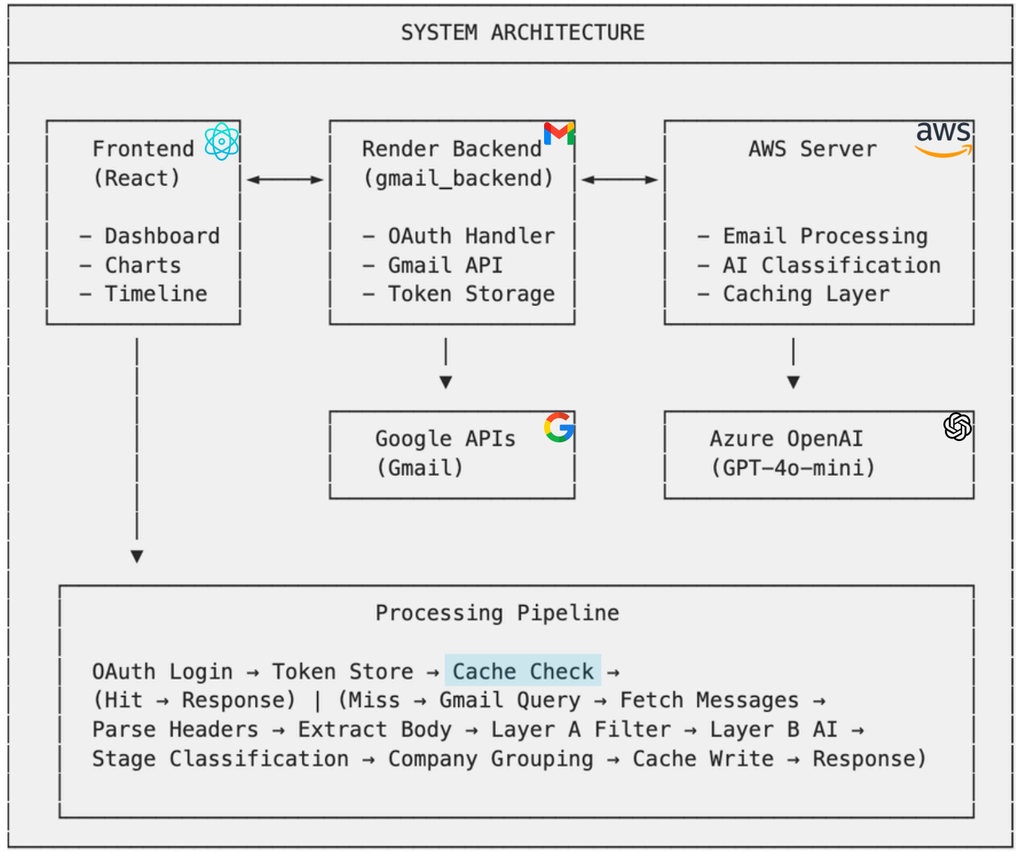
DESIGNING THE END-TO-END BACKEND ARCHITECTURE

BACKEND PIPELINE DESIGN

End-to-End Architecture



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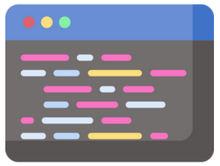

FRONTEND VISUALIZATION & UX DELIVERY

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INTEGRATION, TESTING, AND DEPLOYMENT

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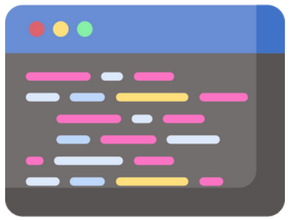
TASKS ACCOMPLISHED

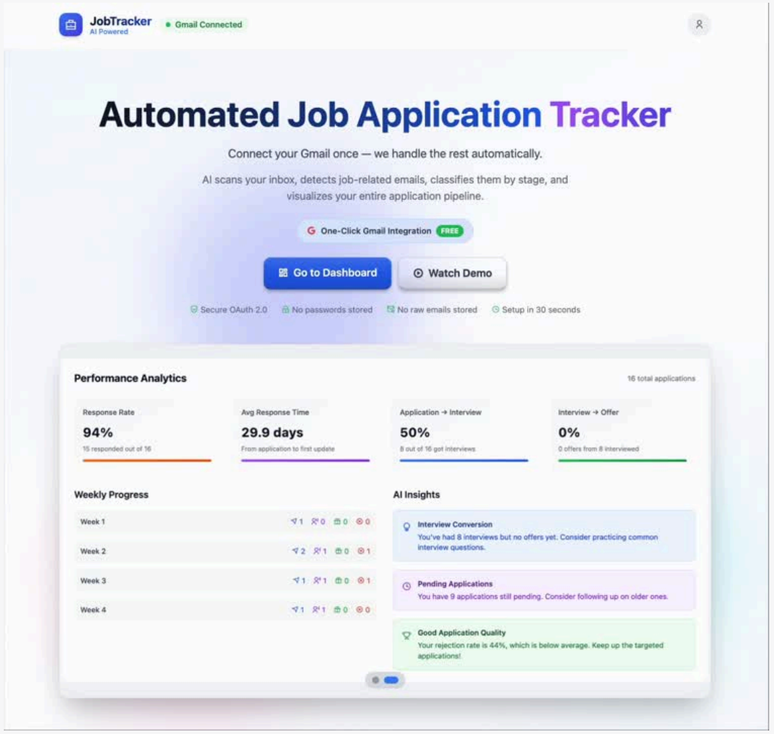


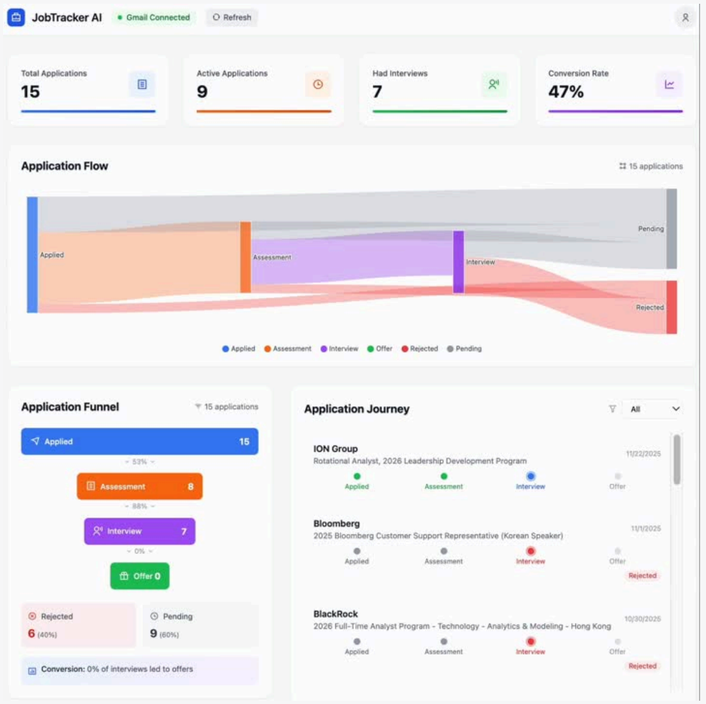
FRONTEND VISUALIZATION & UX DELIVERY

Define the core features needed to help users track and manage their job applications efficiently.

DELIVERING AN INTUITIVE USER INTERFACE FOR APPLICATION TRACKING

FRONTEND VISUALIZATION & UX DELIVERY





A PICTURE IS WORTH A THOUSAND WORDS

PRODUCT DEMO

Live demonstration of current full stack web application built.

PROJECT PROGRESS OVERVIEW

TASKS ACCOMPLISHED

Overview of completed system components and remaining implementation tasks.

100% COMPLETE

SCOPE & STAGE DEFINITION

Define the core features needed to help users track and manage their job applications efficiently.

100% COMPLETE

DATA & PATTERN ANALYSIS

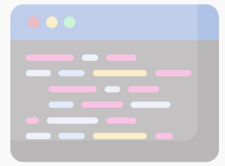
Analyze email patterns to identify different stages of the recruitment process.

100% COMPLETE

BACKEND PIPELINE DESIGN

Build a secure system that automatically retrieves and processes job-related emails.

70 % COMPLETE



VISUALIZATION & UX DELIVERY

Design an intuitive interface that clearly displays application progress.

0 % COMPLETE

INTEGRATION, TESTING, AND DEPLOYMENT

Integrate all components, test system reliability, and prepare for deployment.

NEXT DEVELOPMENT STEPS

FUTURE PLANS

Future plans focuses on completing system integration, improving reliability, and preparing the application for deployment.

SCOPE & STAGE DEFINITION

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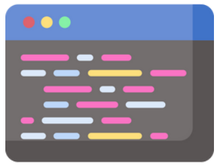
BACKEND PIPELINE DESIGN

Build a secure system that automatically retrieves and processes job-related emails.



VISUALIZATION & UX DELIVERY

Design an intuitive interface that clearly displays application progress.

INTEGRATION, TESTING, AND DEPLOYMENT

Integrate all components, test system reliability, and prepare for deployment.

Manual application entry

CV analysis

aws Deployment

THANK YOU

Q&A SESSION