



# DOST

## Automated Sentiment Analysis System

# Meet the team



Lorenzo Emil  
Bernal



Mark Lyster  
Marabi



Gab  
Cabangcala



Luis Lorenzo  
Lazaro

# What is CitiSense?

**CitiSense** is a smart web app for automated multilingual feedback processing and data visualization.



Mark Lyster Marabi

# Who is our client?

Information Resources and Analysis Division (IRAD) in  
DOST-STII

## What's their current situation?

- Manually analyzing feedback
- No system

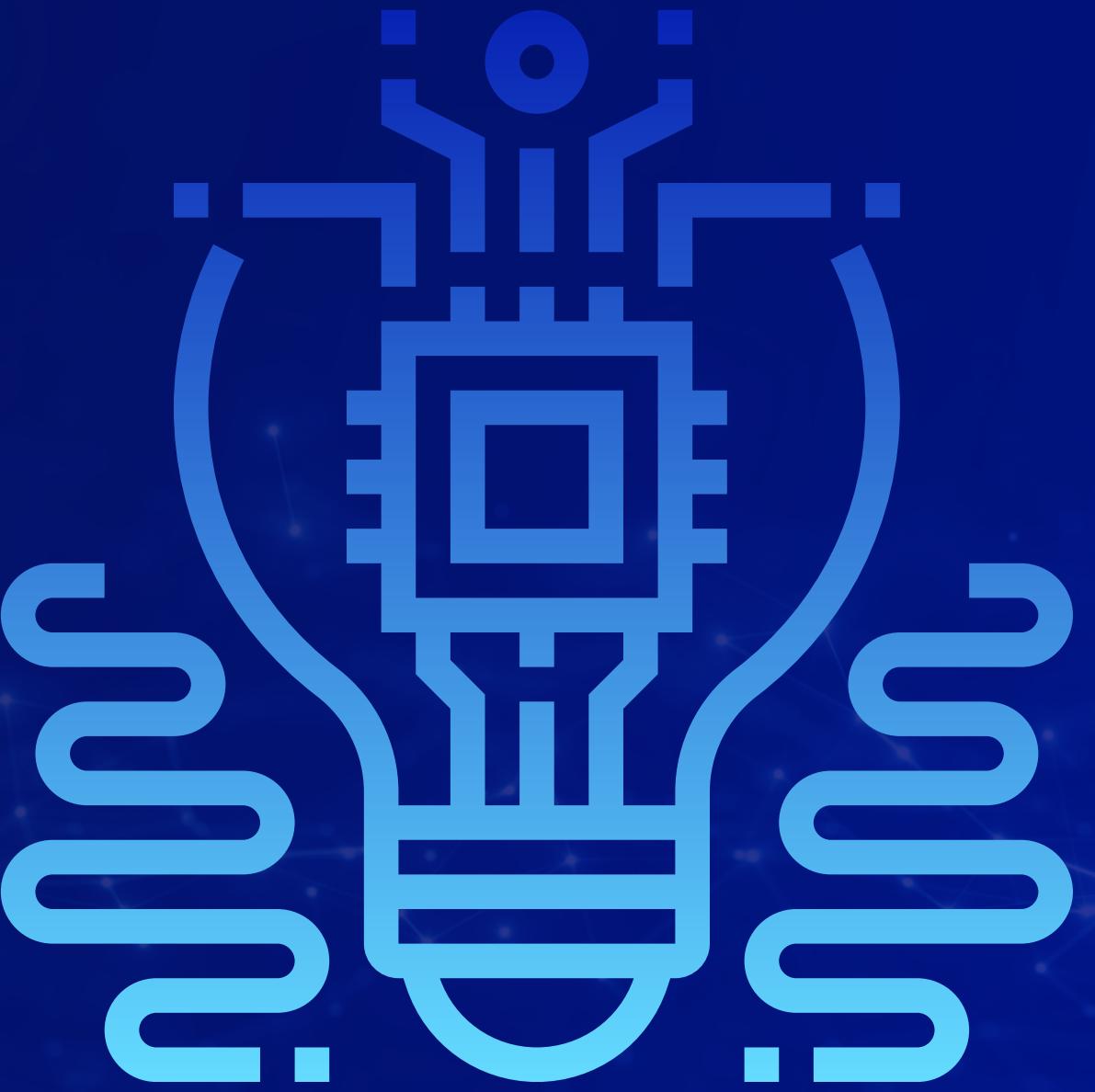


Luis Lorenzo Lazaro



# What is our clients issue?

- High volume of work with only Manual Manpower
- Language Complexity and Time Constraints
- Work becomes Repetitive



Luis Lorenzo Lazaro

# Proposed Solution

- Multilingual sentiment analysis system
- Categorizes responses into positive, neutral, and negative
- Real - time data visualization from sentiment results



Luis Lorenzo Lazaro

# Project Scope

- Web app for sentiment analysis and visualization
- Supports English, Tagalog or mixed-language input
- Uses NLP to classify feedback (positive, neutral, negative)
- Real-time dashboard for sentiment and keyword insights
- Integrated with DOST-STII IRAD's current feedback form
- Target users: data analysts, researchers, government staff



Luis Lorenzo Lazaro

# Project Objectives

## Categorized Objectives

Objective	Category	Measure
Develop a web application that uses Natural Language Processing (NLP)	System Development	CitiSense web application deployed with NLP sentiment analysis with visualization features
Accurately classify survey responses (positive, neutral, negative) in English and Tagalog	Quality	Achieve $\geq 85\%$ accuracy within a 6-month development timeline
Automate feedback processing to reduce manual workload	Efficiency	Reduce workload by $\geq 80\%$ and accelerate report turnaround time
Ensure timely, data-driven decision-making within DOST-STII's IRAD department	Information Responsiveness	Feedback reports generated in real-time
Support English, Tagalog, and code-switched input in sentiment classification	Technical	Bilingual model with $\geq 85\%$ classification accuracy



Mark Lyster Marabi

# Stakeholders



Arjay Escondo

- IRAD
- Head of the Data Analytics and Evaluation



Chester Francisco

- Management Information System
- Senior Research Specialist



Luis Lorenzo Lazaro



# Stakeholder Analysis

Name	Department / Company	Position	Advisers	Objectives, Requirements, Interests	Influence	Project Contribution
Arjay Escondo	DOST-STII IRAD	Head of Data Analytics and Evaluation in IRAD	Head of IRAD	Increase productivity and efficiency of current workflow (manual sentiment analysis), improve decision-making	High	Provides information, supports work, and approves deliverables.
Chester Francisco	DOST-STII IRAD	Senior Science Research Specialist under MIS and planning section	Head of IRAD	Efficient development of the web application. Ensure system is accurate, maintainable and scalable	High	Provides information about technology/frameworks to be used, and supports work.



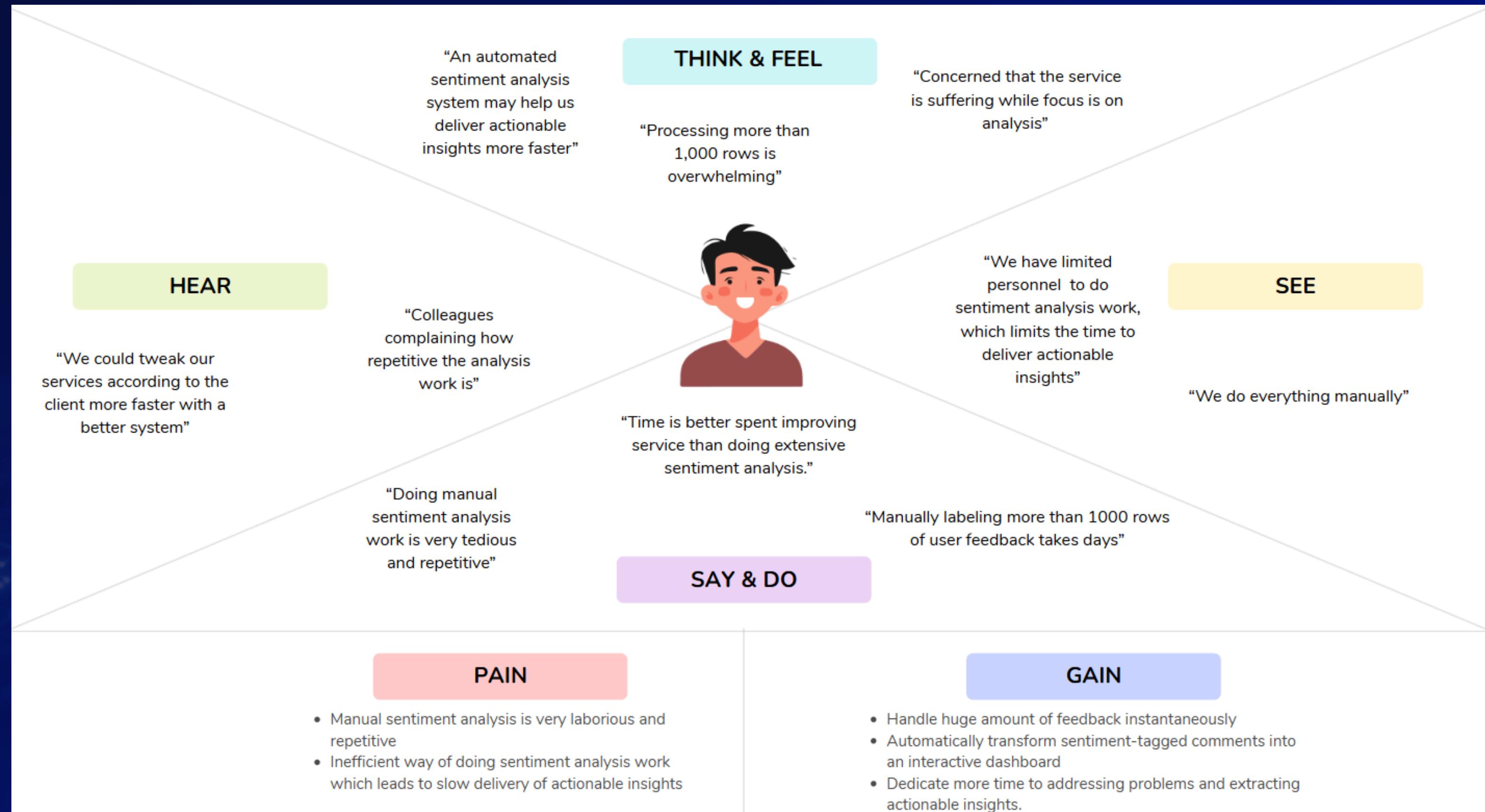
Lorenzo Emil Bernal



**QuadThink**

# Design Thinking

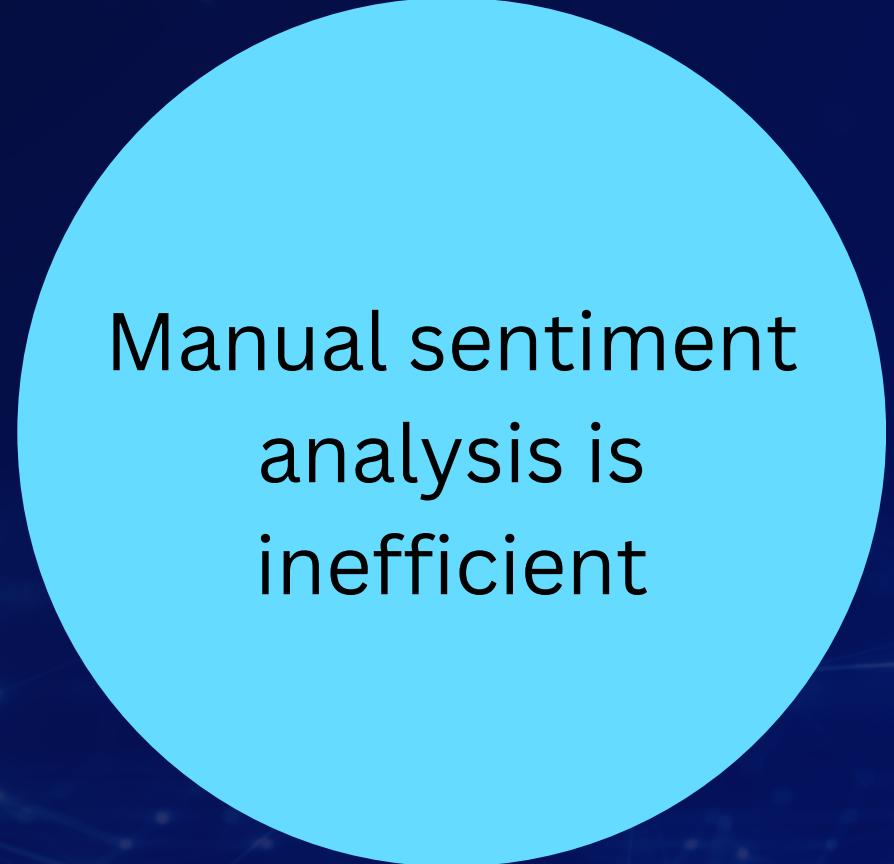
# Stage 1 - Empathy Map



Lorenzo Emil Bernal

# Stage 2 - Define

## Clustering Problem Areas



Manual sentiment analysis is inefficient



Need for an automated sentiment analysis system



Time could be better spent in improving services



Lorenzo Emil Bernal

# Stage 2 - Define

How might we reimagine...

- How might we reimagine helping IRAD employees to transform raw feedback data into actionable insights that directly improve service delivery automatically?
- How might we reimagine enabling IRAD employees to deliver greater value by focusing more on improving service delivery, instead of spending excessive time on manual sentiment analysis?
- How might we reimagine helping IRAD employees in streamlining their current manual sentiment analysis workflow?



Lorenzo Emil Bernal

# Stage 3 - Ideate

## Brainstorming

### Brainstorming

- We will design an automated sentiment analysis system that can process large volumes of feedback quickly and accurately, reducing employee workload.
- The system will also provide real-time insights and visual dashboards, enabling IRAD employees to make faster and more informed decisions.
- Web application/system that can automatically output sentiment labels on English, Tagalog, and Taglish datasets
- Automated data to dashboard visualization
- Provide IRAD staff with real-time visuals without requiring manual analysis by developing a bilingual AI-powered dashboard that automatically categorizes feedback into positive, neutral, and negative sentiments.
- Integrate keyword clustering and trend detection so IRAD employees can instantly see which feedbacks are most common, helping them prioritize improvements faster.
- Sentiment Timelines
- Able to detect both English and Tagalog



Lorenzo Emil Bernal

# Stage 3 – Ideate

## Brainstorming

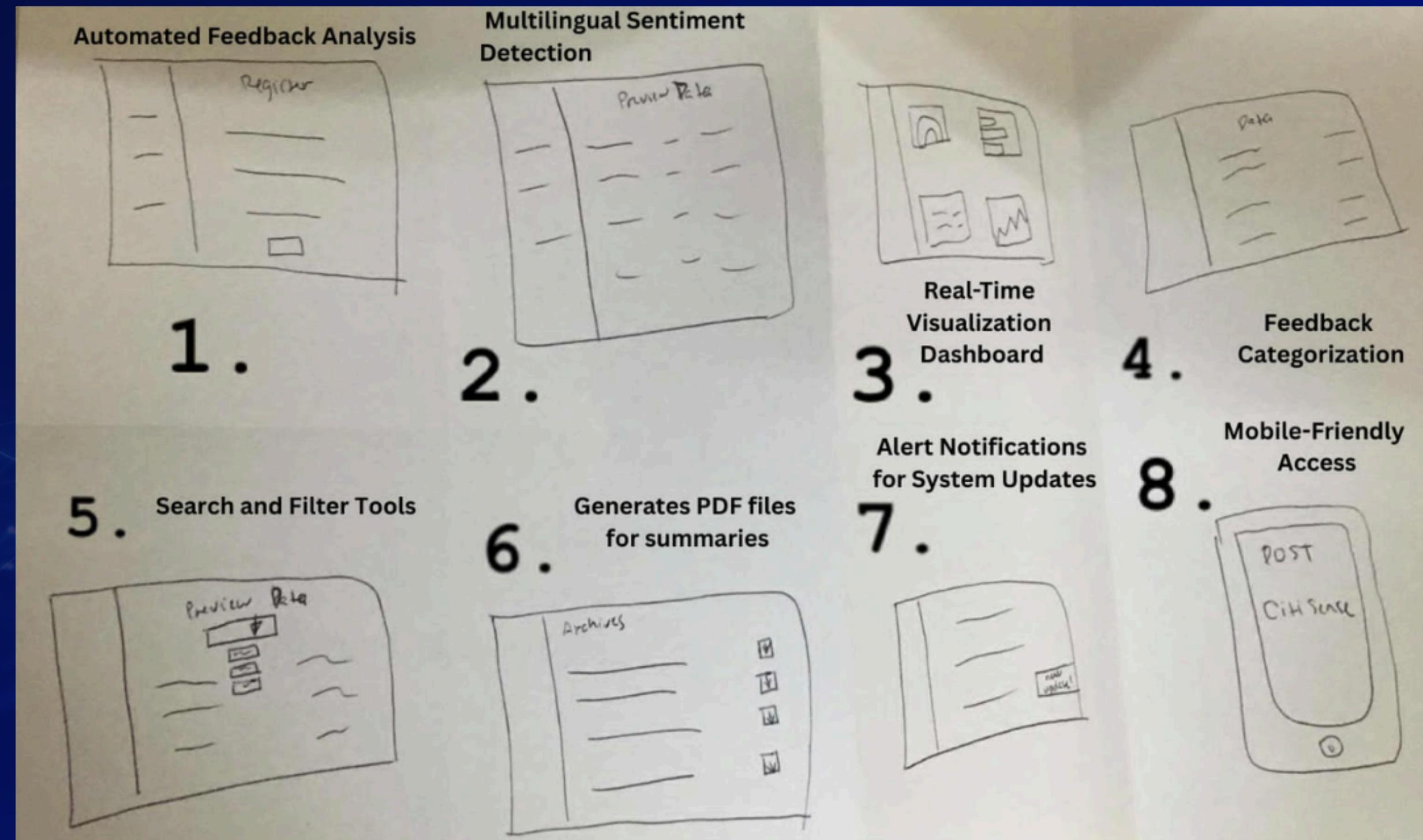
- A bilingual AI-powered sentiment analysis system that can process large volumes of feedback in English, Tagalog, and Taglish. The system will automatically categorize sentiment, detect trends, and provides real-time dashboards.



Lorenzo Emil Bernal

# Stage 3 - Ideate

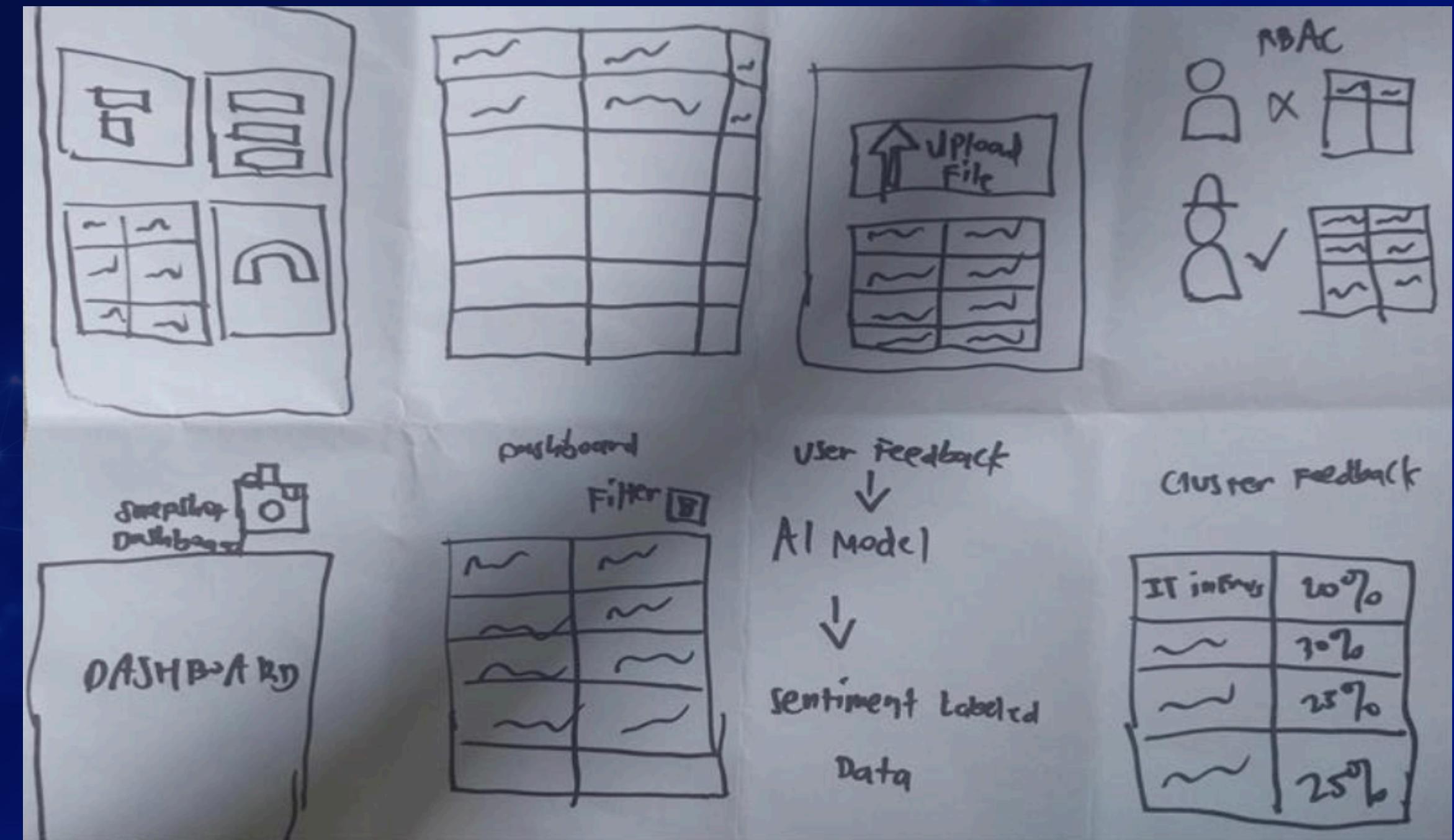
## Crazy 8's



Lorenzo Emil Bernal

# Stage 3 - Ideate

Crazy 8's

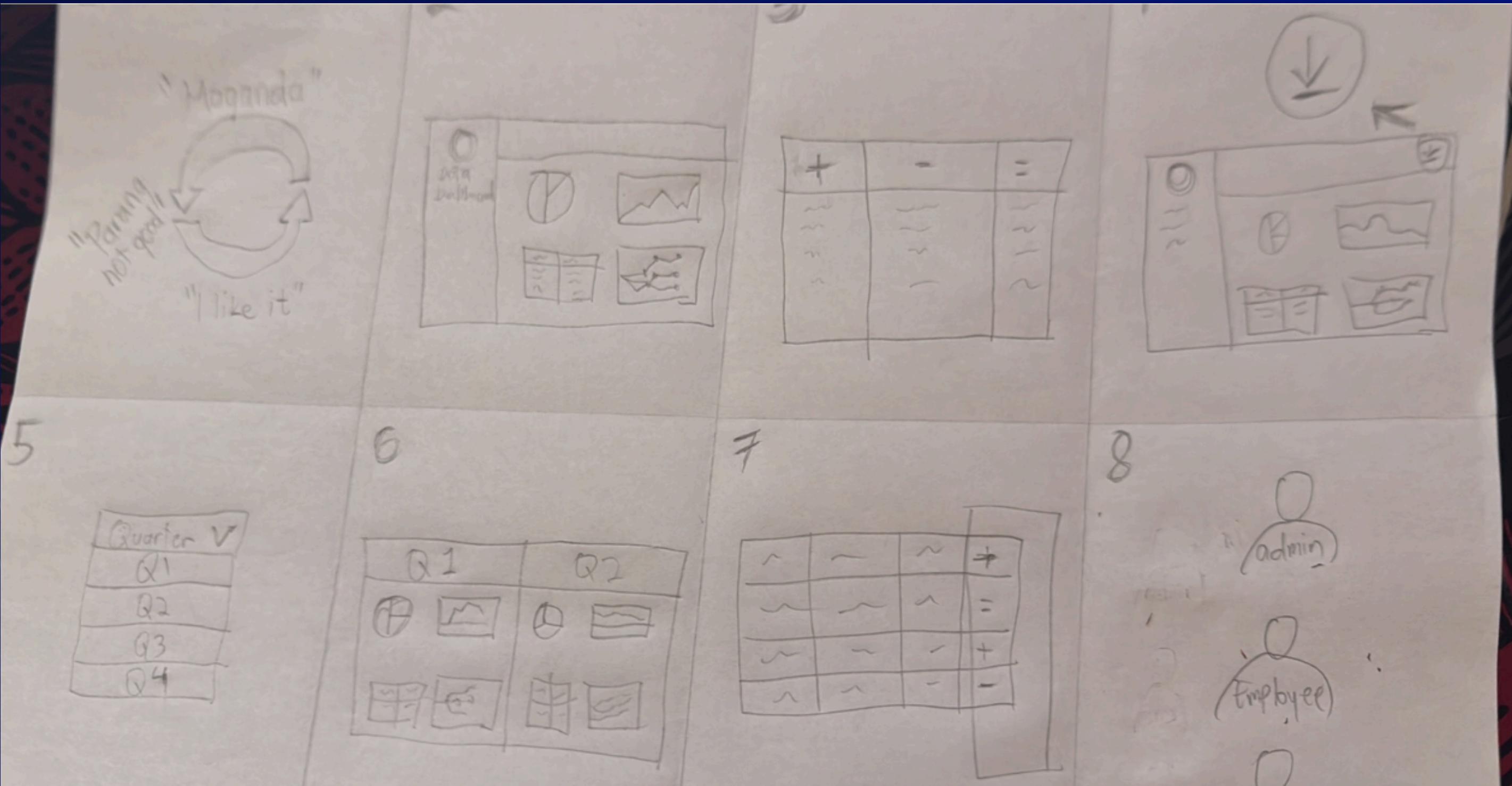


Lorenzo Emil Bernal



# Stage 3 - Ideate

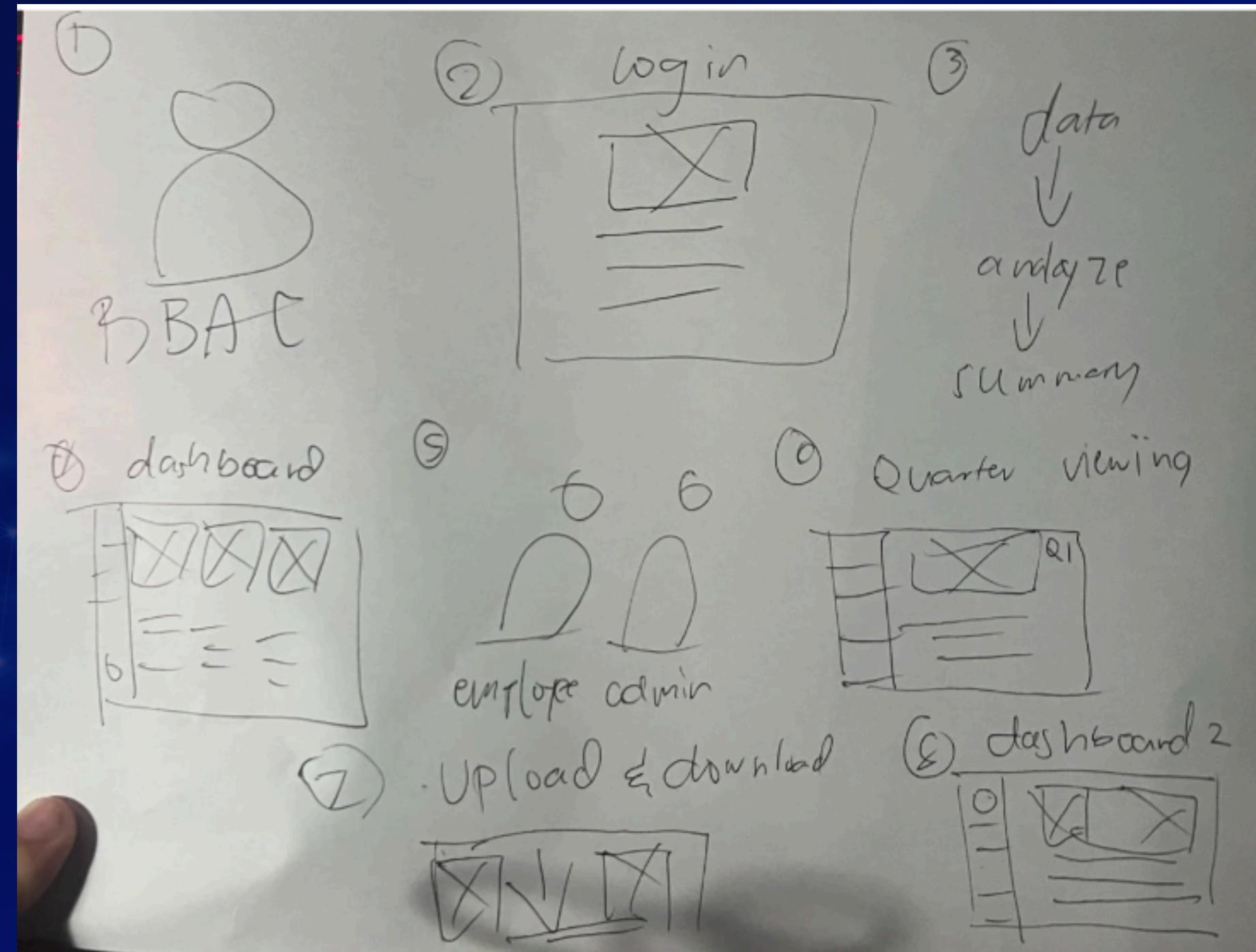
## Crazy 8's



Lorenzo Emil Bernal

# Stage 3 - Ideate

Crazy 8's



Lorenzo Emil Bernal

# Stage 3 - Ideate

## Post-it voting

### Post-it voting

Role Based Accounts

M19. Marabi, Mark Lyster C.

Export/Save Dashboard

Lorenzo Bernal

data table

Luis Lazaro

real-time updates on dashboard based on user and sentiment data

kuromi

filter dashboard

M19. Marabi, Mark Lyster C.

Dashboard live updates

Lorenzo Bernal

Real Time Dashboard

Luis Lazaro

Quarterly Preview/Comparisons

kuromi

thematic labeling

M19. Marabi, Mark Lyster C.

Custom filters

Lorenzo Bernal

Export/Save Dashboard

Luis Lazaro

Multilingual Sentiment Detection

kuromi

code switching

M19. Marabi, Mark Lyster C.

Role Based Access Control

Luis Lazaro



Lorenzo Emil Bernal

# Stage 3 – Ideate

## Post-it voting

### Post-it voting

Role-based access control

Lorenzo Bernal

Export/save dashboard

Lorenzo Bernal

Real time dashboard

Lorenzo Bernal

Multilingual model

Lorenzo Bernal

Data Table

kuromi

Thematic labeling

Lorenzo Bernal

Filters

Lorenzo Bernal



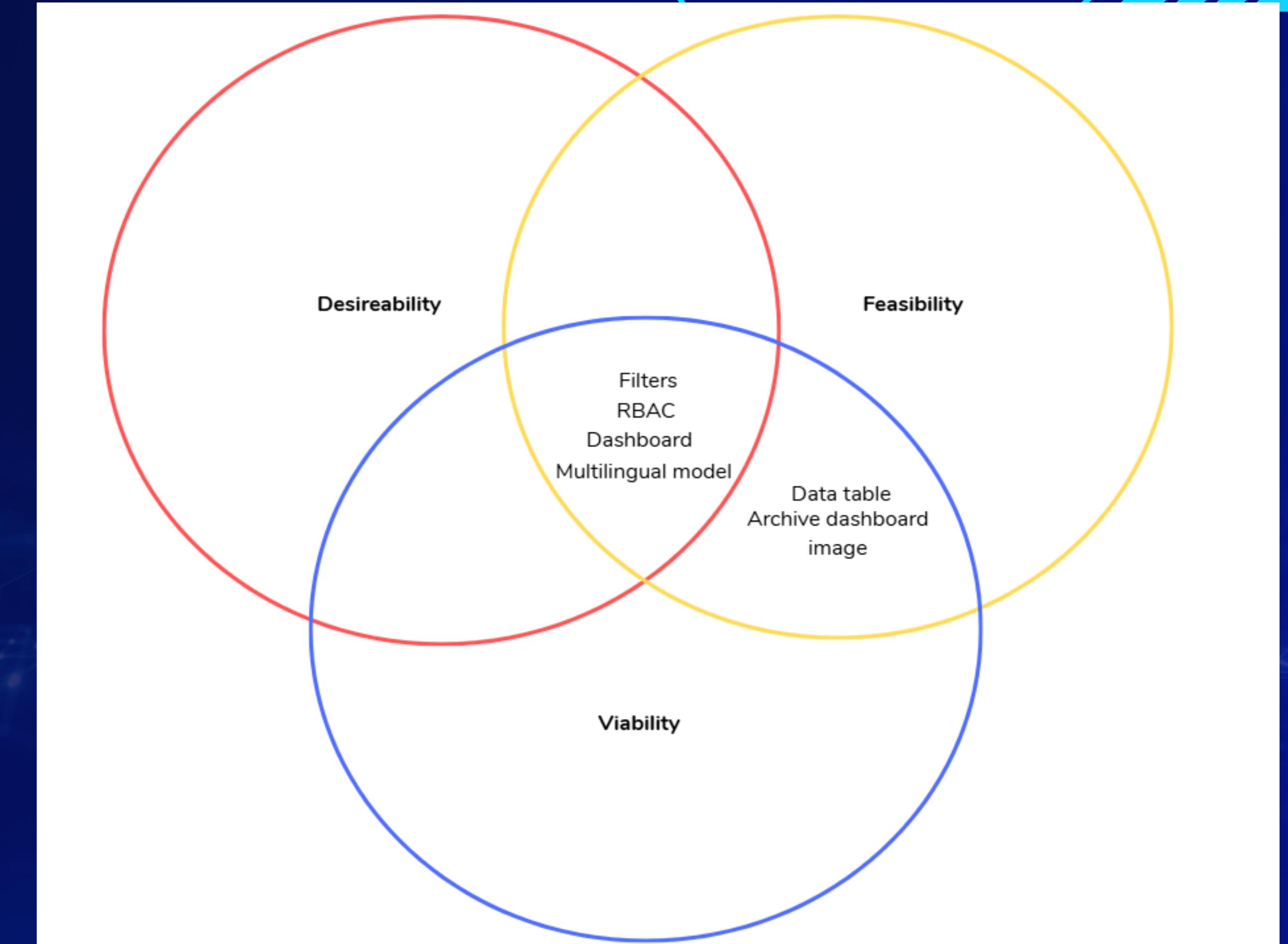
Lorenzo Emil Bernal

## Stage 3 – Ideate

D-F-V Analysis



Lorenzo Emil Bernal

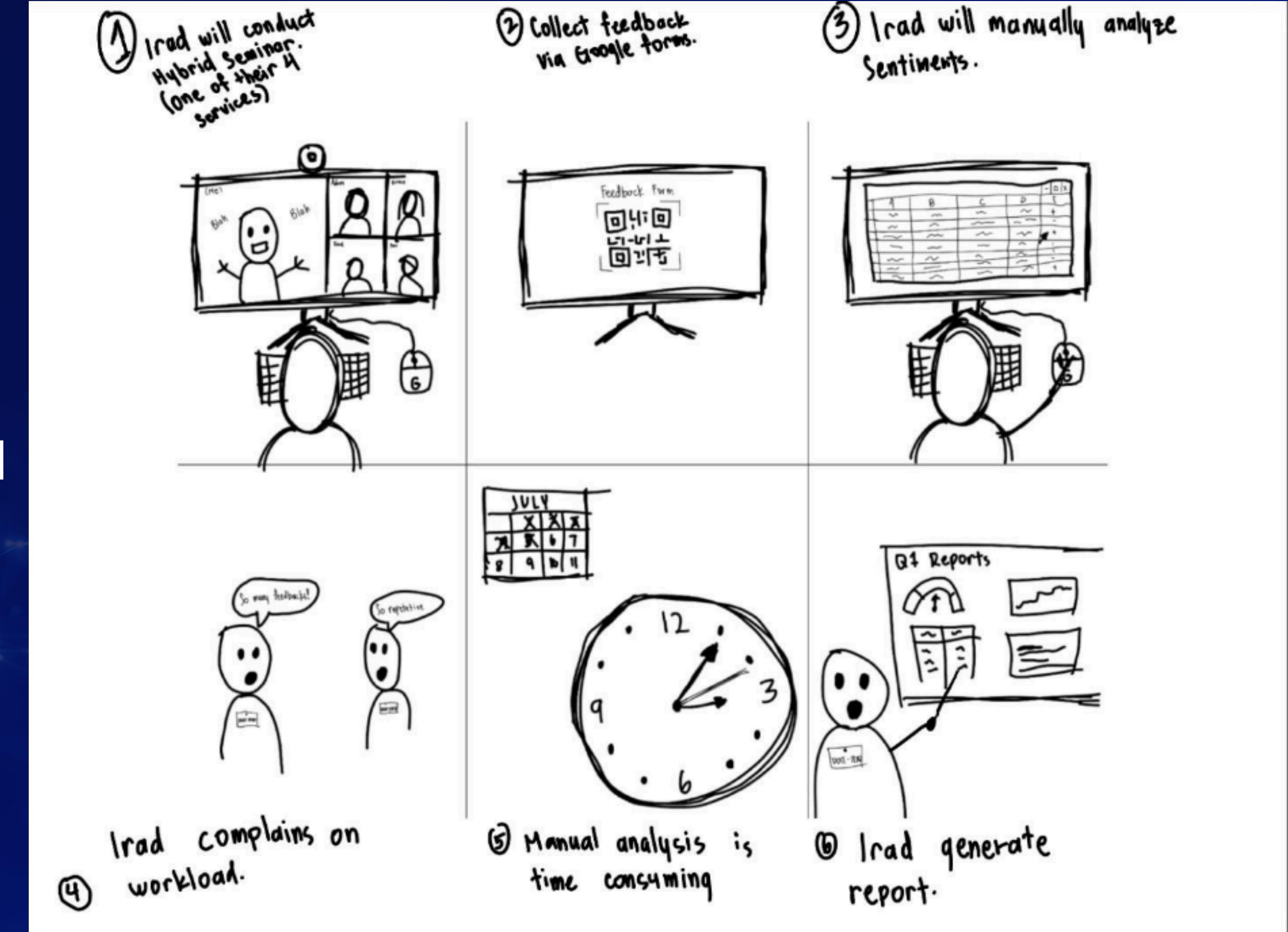




## Stage 4 – Story Board



Gab Cabangcala





## Stage 4 - Story Board



Gab Cabangcala

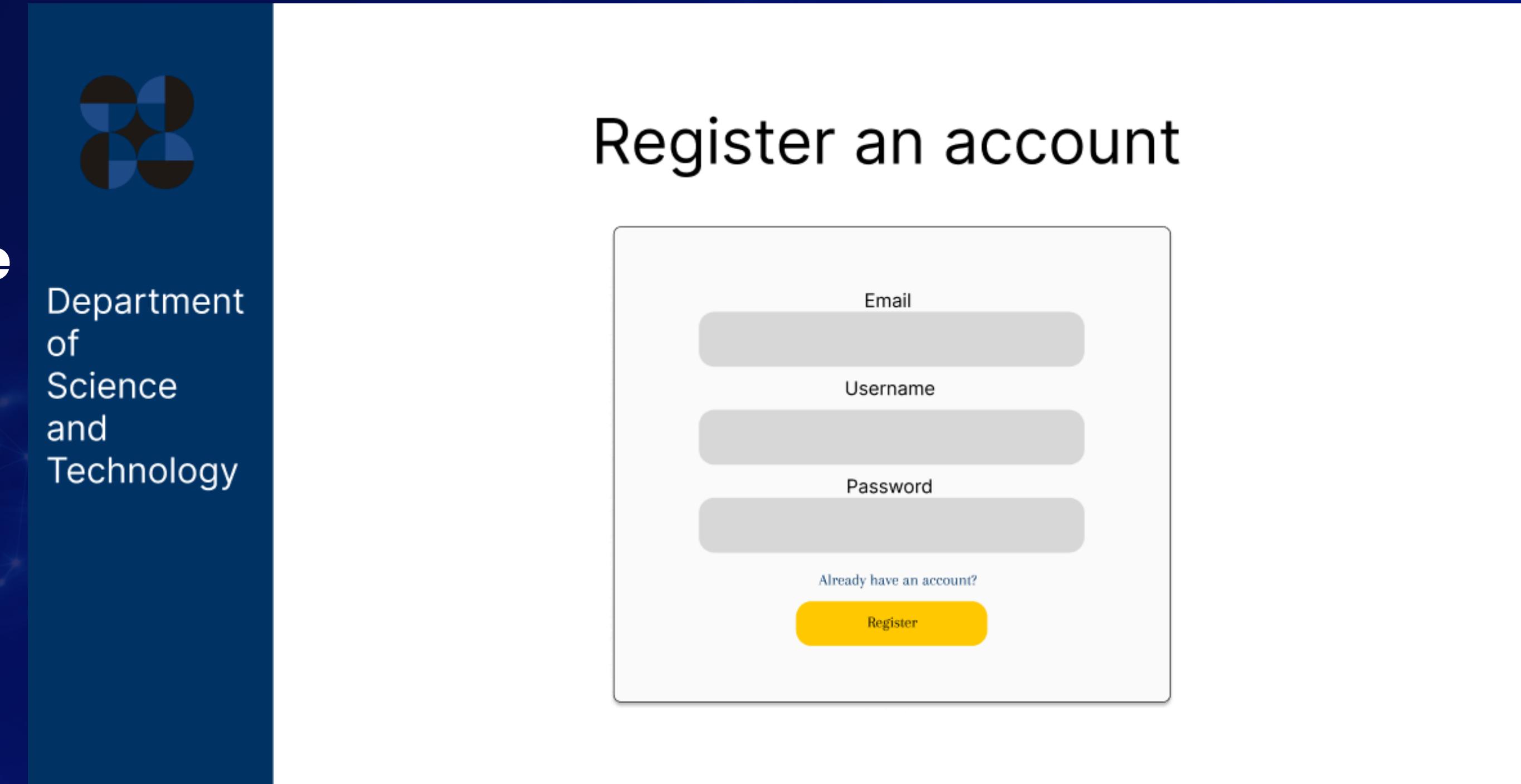


## Stage 4 - Prototype

Register Form



Gab Cabangcalan



The image shows a registration form interface. On the left, there is a dark blue sidebar with a circular logo composed of four quadrants (top-left: light blue, top-right: dark blue, bottom-left: dark blue, bottom-right: light blue) and the text "Department of Science and Technology". The main area has a white background with a blue header bar at the top. The header bar features a blue diagonal striped pattern on the right side. The main title "Register an account" is centered in large black font. Below the title is a light gray rectangular input field divided into four horizontal sections. The first section is labeled "Email", the second "Username", the third "Password", and the fourth is empty. At the bottom of the input field is the text "Already have an account?". Below the input field is a yellow rounded rectangular button labeled "Register".

Register an account

Email

Username

Password

Already have an account?

Register

## Stage 4 - Prototype

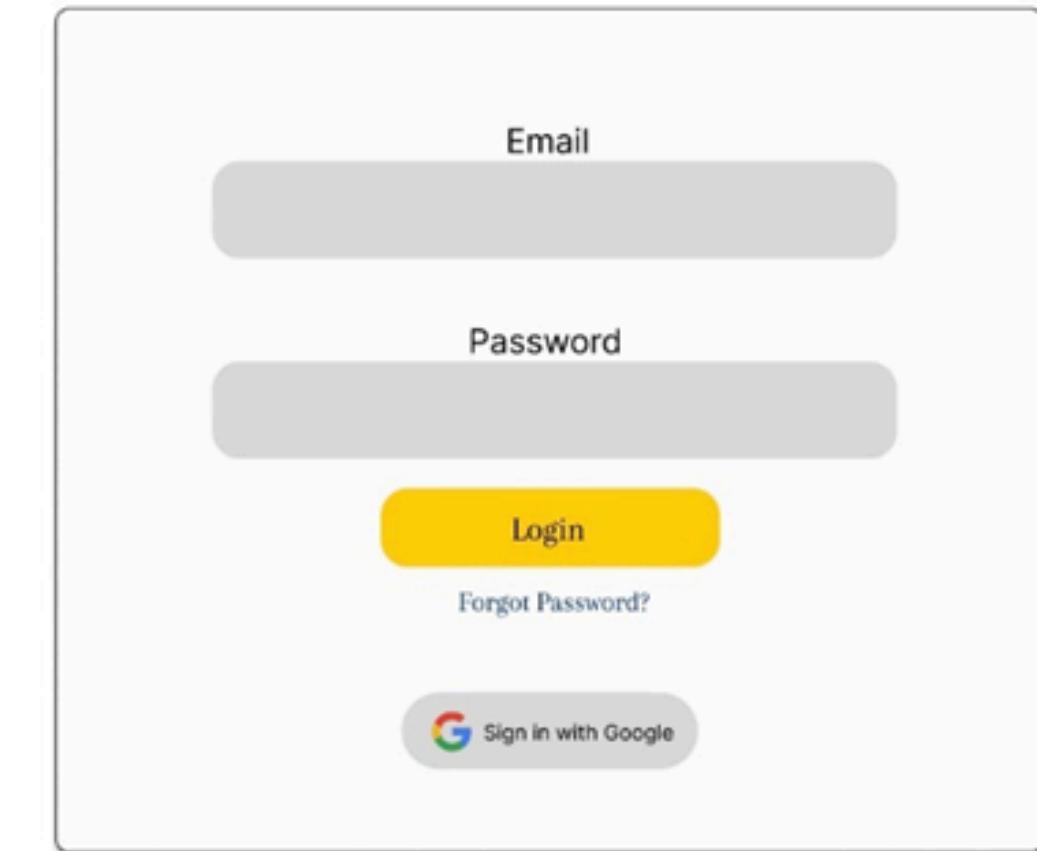
Login form



Gab Cabangcalal



DOST-CitiSense



The login form consists of several input fields and buttons. At the top, there are two light gray rounded rectangular fields labeled 'Email' and 'Password'. Below these is a yellow rounded rectangular button labeled 'Login'. Underneath the 'Login' button is a small, faint link labeled 'Forgot Password?'. At the bottom of the form is a button with the Google 'G' logo and the text 'Sign in with Google'.

# Stage 4 - Prototype

Data table



Gab Cabangcala



**Preview data**

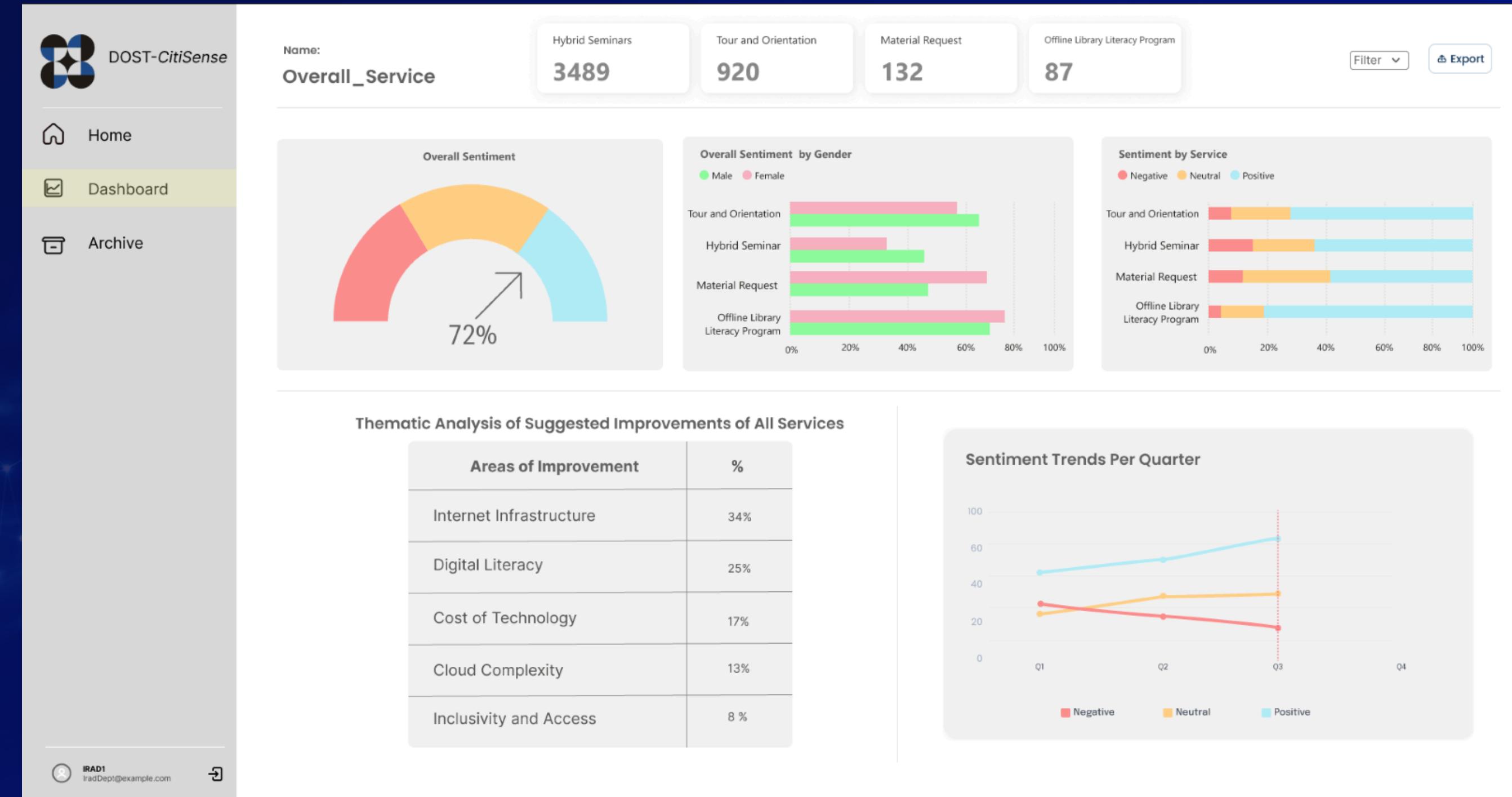
Service	Offline Library Literacy Program					our key takeaways	Comments	Were there any aspects of the library	Suggestion for Improvement
	Hybrid Seminar	Tour and Orientation	Material Request						
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:57:44	Male	Librarian Staff	Academic Library	REGION XII	.	.	.
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:58:12	Female	Librarian Staff	Academic Library	REGION III	.	.	.
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 16:00:07	Male	Librarian Staff	School Library	REGION IV-A	NA		
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 16:00:16	Female	Librarian Staff	School Library	REGION III	NA	N/A	
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 16:00:16	Female	Librarian Staff	Academic Library	REGION IV-A	.		
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 16:00:19	Female	Librarian Staff	School Library	REGION VIII	key performance indicators		
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 16:00:23	Female	Students	Non-library Institution	REGION X	NA	NA	
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 16:00:23	Female	Professors/ Instructors/	Non-library Institution	REGION IV-A	Many		
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 16:00:24	Male	Librarian Staff	Special Library	REGION IV-A	thank you for the coolection	thank you for the	
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 16:00:24	Male	Professors/ Instructors/	School Library	REGION IV-A	N/A		
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:59:33	Female	Librarian Staff	Special Library	REGION X	My key takeaways from the	The hybrid format	
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:59:38	Female	Librarian Staff	Public Library	REGION XI	.		
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:59:40	Female	Professors/ Instructors/	School Library	NCR	VERY INTERESTING TOPIC	NONE	
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:59:46	Male	Librarian Staff	School Library	NCR	Collection development is a	NA	
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:59:46	Male	Private Employee	Non-library Institution	REGION X	To review the collection	Hopefully, in the	
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:59:46	Female	Librarian Staff	Special Library	NCR	NA		
Hybrid Seminar	The Art and Science of Collection Develo	8/20/2024 15:59:47	Male	Librarian Staff	Academic Library	REGION IV-A	Prioritize community needs		

# Stage 4 - Prototype

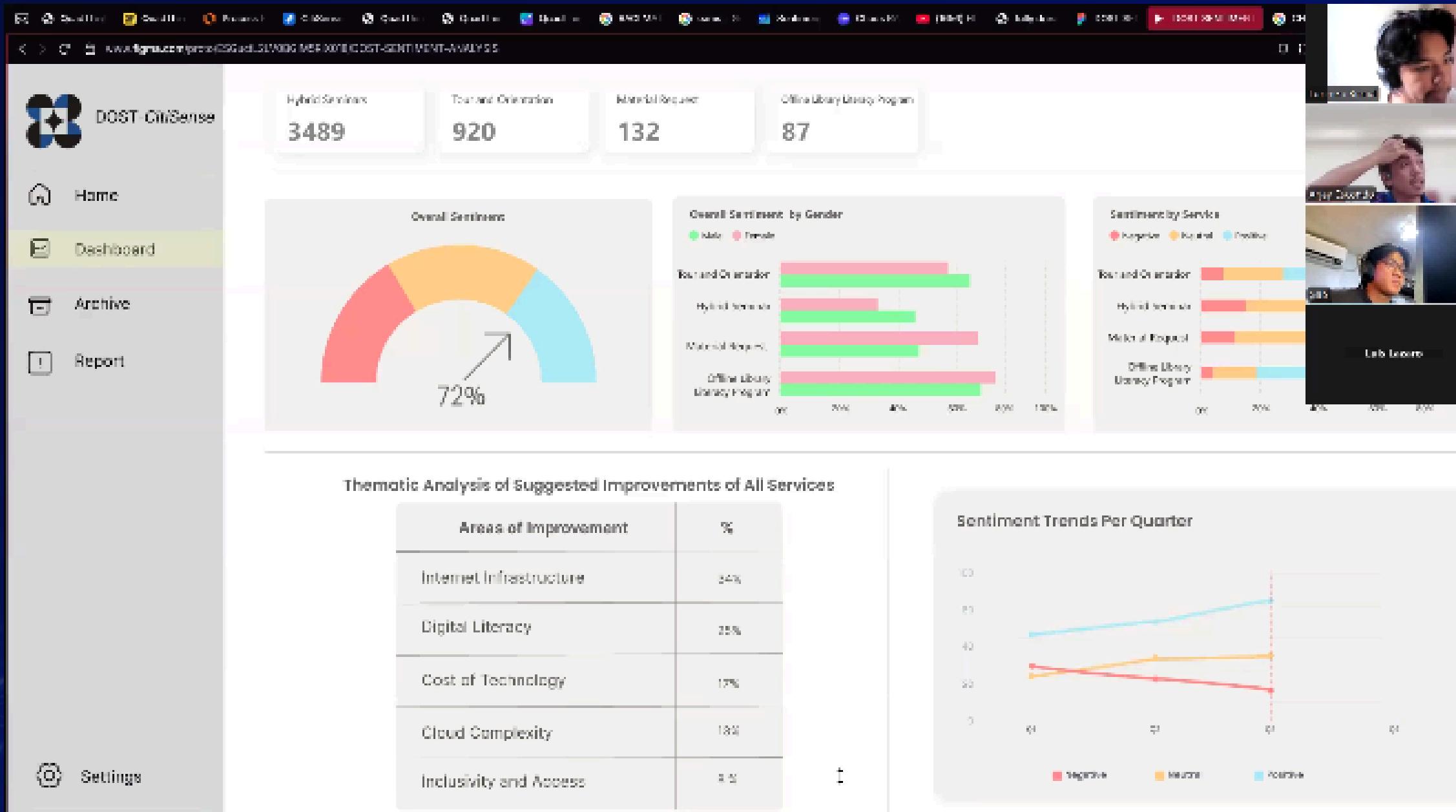
## Dashboard



Gab Cabangcala



# Stage 5 - Test



## Testing of mockup design

- In the dashboard page, add another filter that is based on per quarter



Lorenzo Emil Bernal

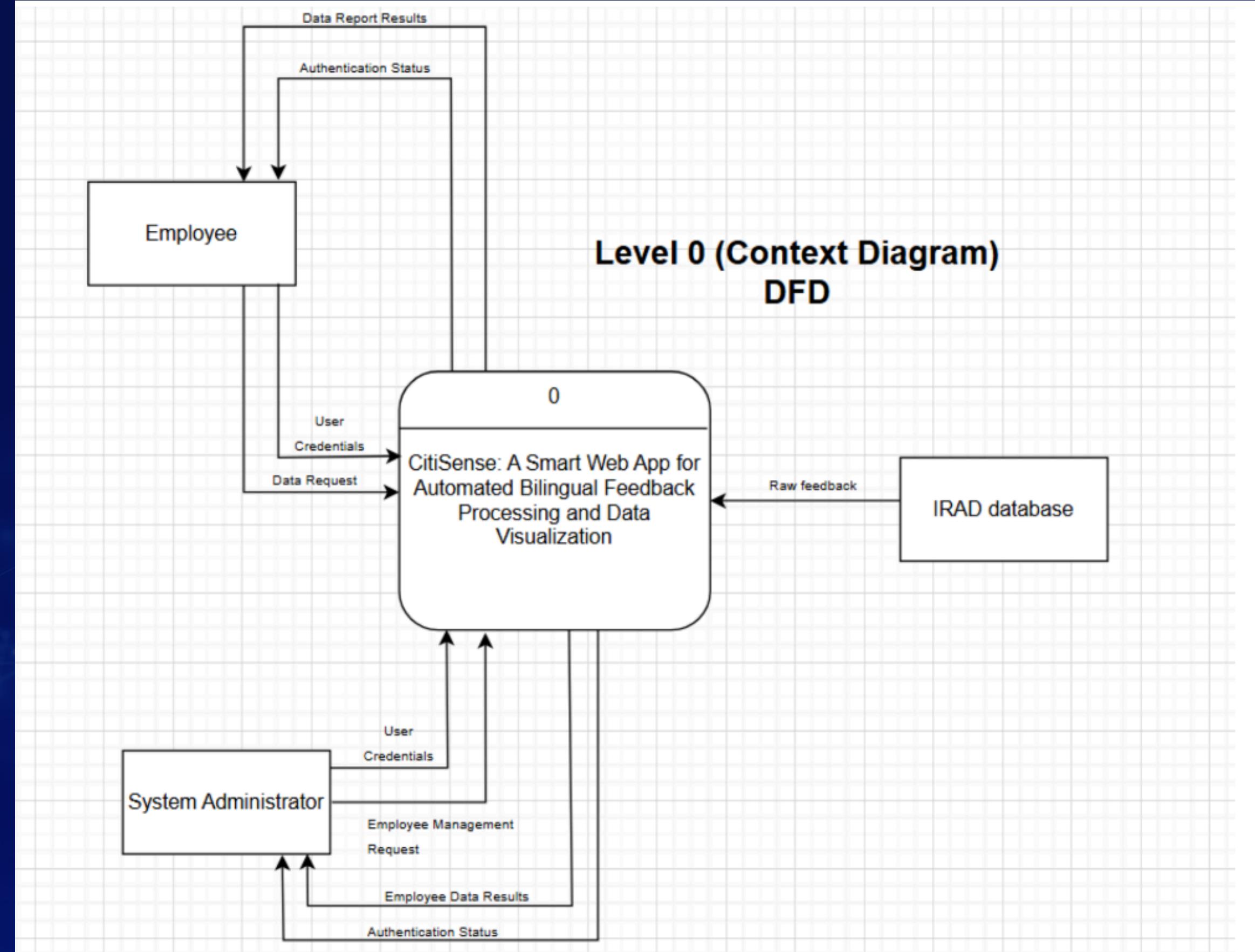


**QuadThink**

# Data Flow Diagram

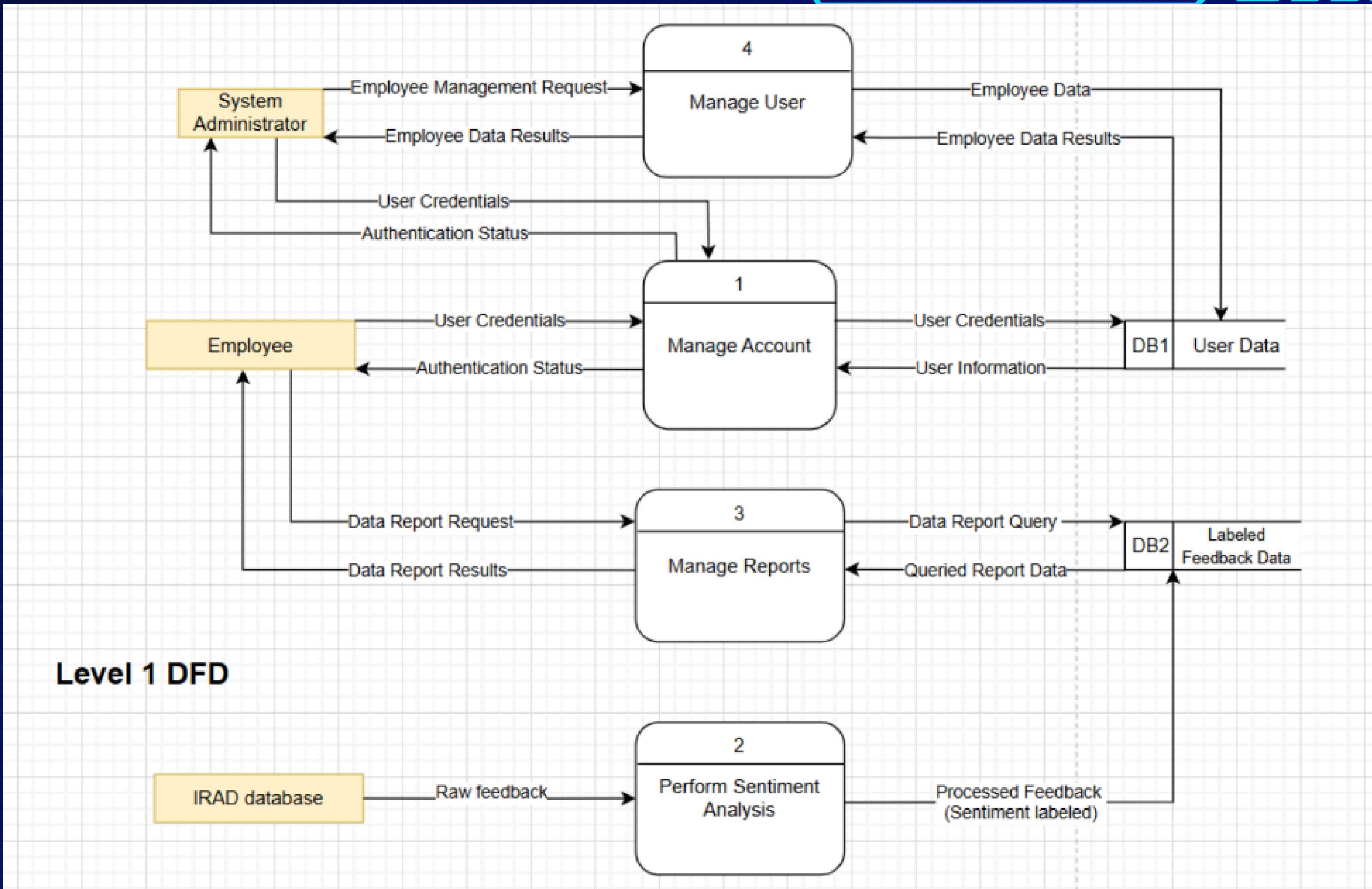


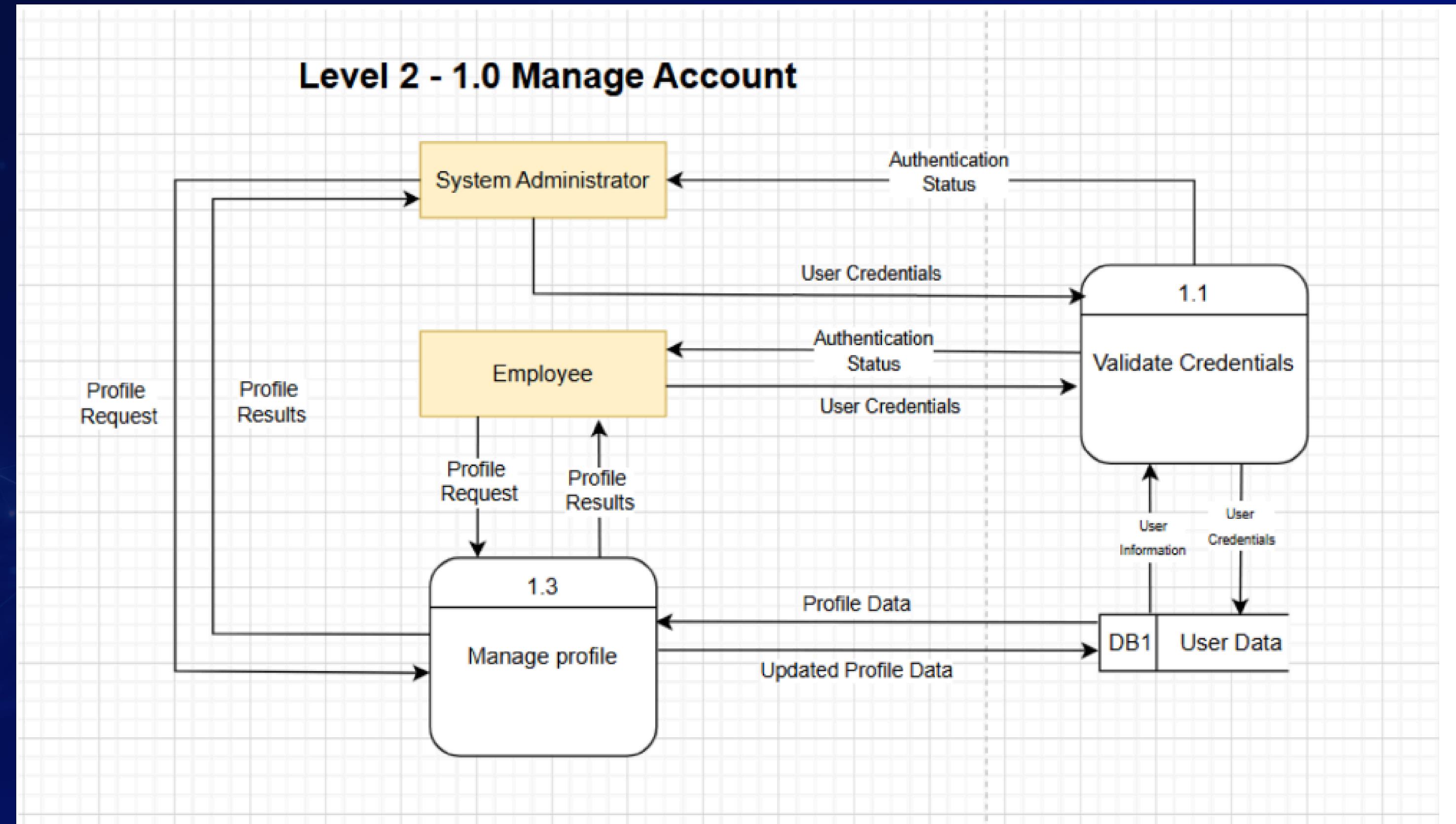
Gab Cabangcala





Gab Cabangcalal



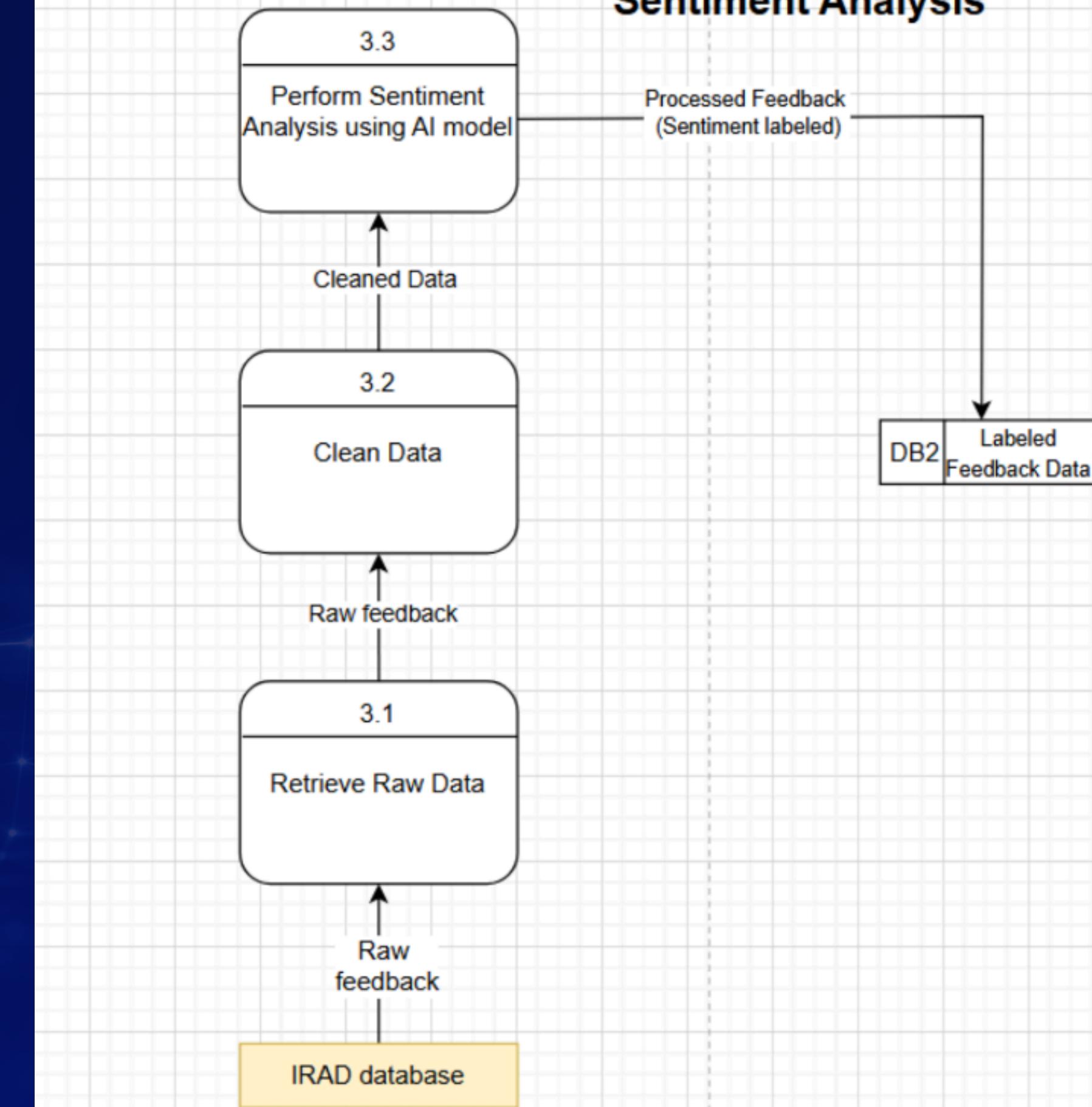


Gab Cabangcalal



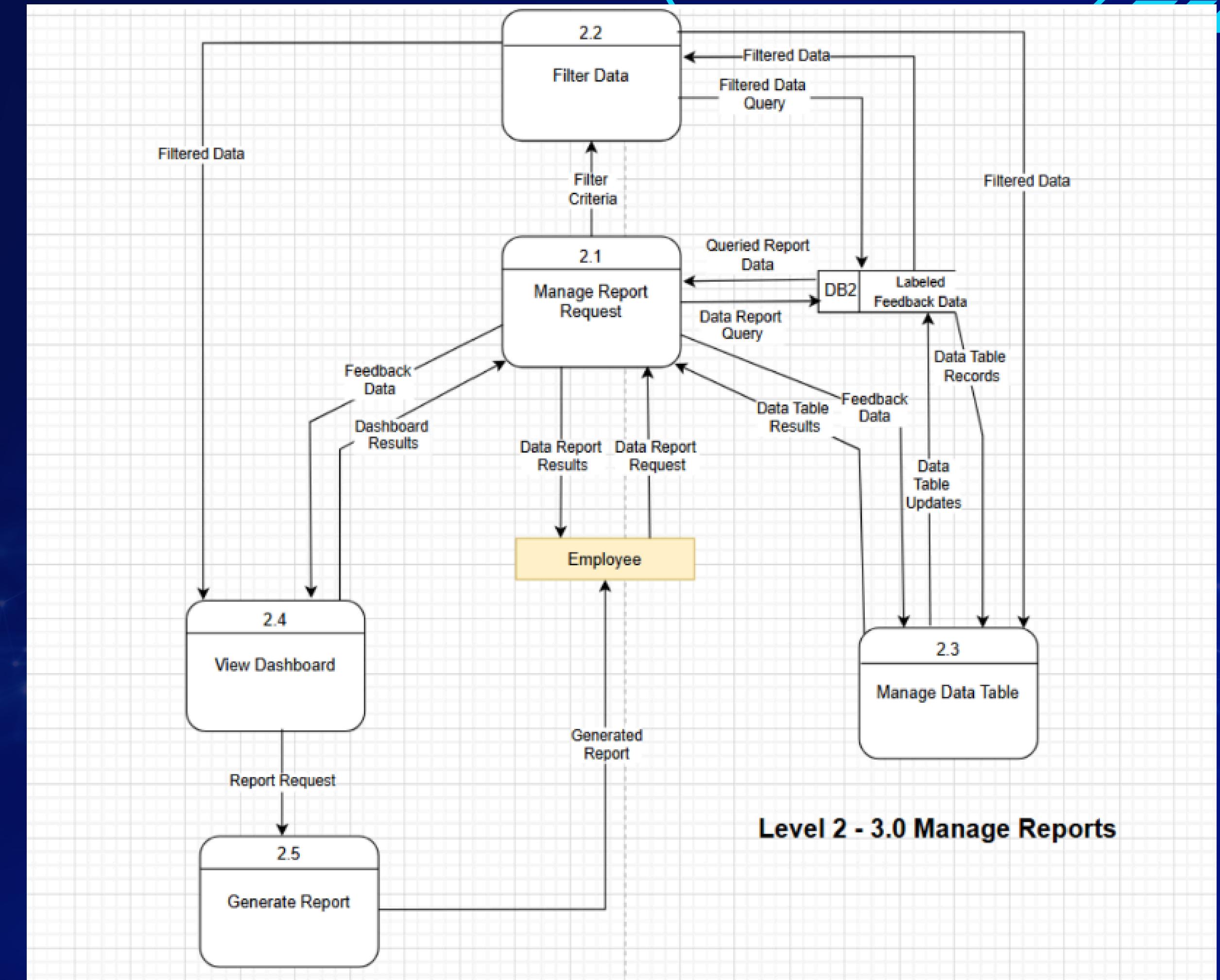
Gab Cabangcala

## Level 2 - 2.0 Perform Sentiment Analysis



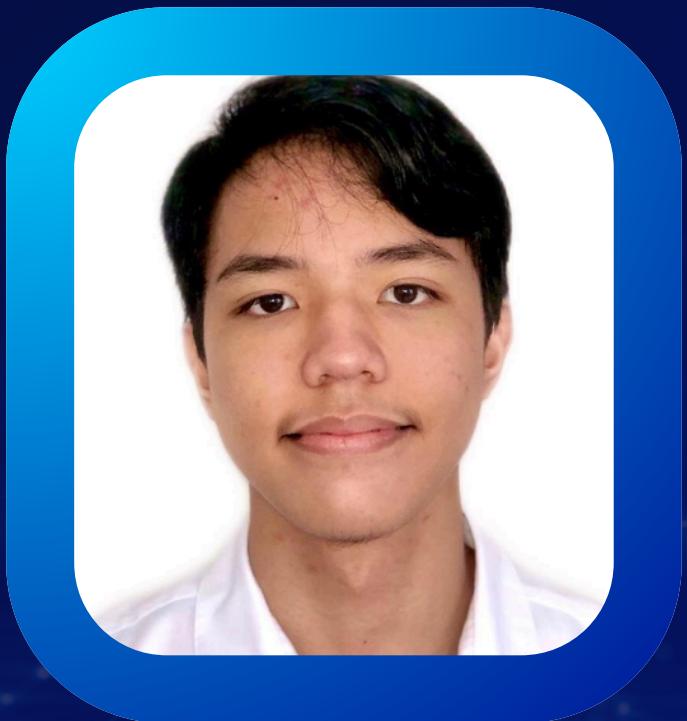


Gab Cabangcala



Level 2 - 3.0 Manage Reports

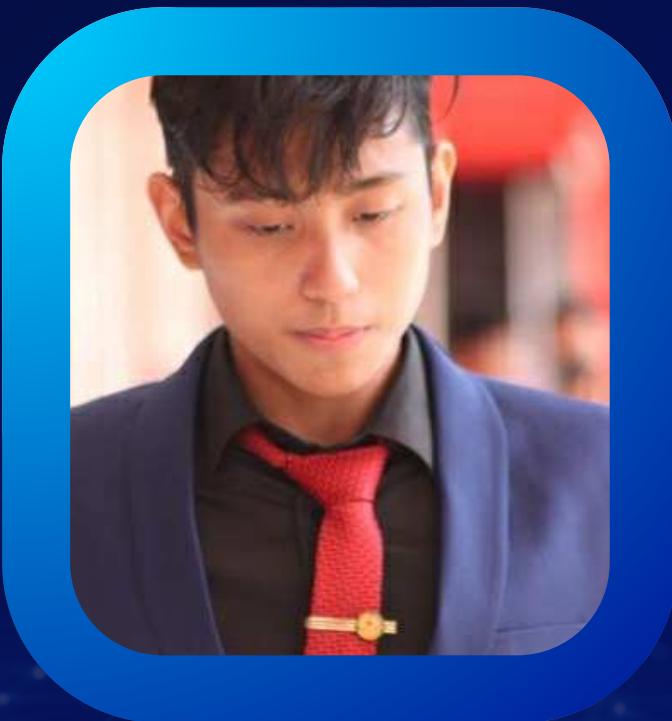
# Member Contribution



Lorenzo Emil Bernal

- Product Roadmap
- Chapter 2 - Stakeholder Analysis
- Product prototype
- Chapter 2 and 3 - OpenProject activities
- Design Thinking Stage 1 - Pain & Gain
- Design Thinking Stage 2
- Design thinking Stage 3 - Brainstorming and Crazy 8s
- Design Thinking Stage 5 - Testing (Product Prototype)

# Member Contribution



Mark Lyster Marabi

- Project Objectives
- Design Thinking Stage 1 - 5 Whys
- Design Thinking Stage 1 - Empathy Map
- Design Thinking Stage 1 - Customer Jobs
- Design Thinking Stage 2
- Design Thinking Stage 3 - Brainstorming & Crazy 8
- Openproject Activities

# Member Contribution



Gabrielle Cabangcalan

- Design Thinking Stage 1 - Empathy Map
- Chapter 2 - Scope
- Product prototype
- Chapter 2 - OpenProject activities
- Design Thinking Stage 1 - Say and Do
- Design Thinking Stage 3 - Brainstorming & Crazy 8
- Dataflow Diagram

# Member Contribution



Luis Lorenzo Lazaro

- Product Roadmap
- Product Prototype
- Chapter 2 - Charter
- Chapter 2 - OpenProject activities
- Design Thinking Stage 1 - Pain & Gain
- Design Thinking Stage 1 - Empathy Map
- Design Thinking Stage 3 - Brainstorming & Crazy 8

Thank you for  
listening!