

# Digital Health Platform

Read more →

PROJECT PRESENTATION



MEET THE TEAM

# DI-Boxjelly



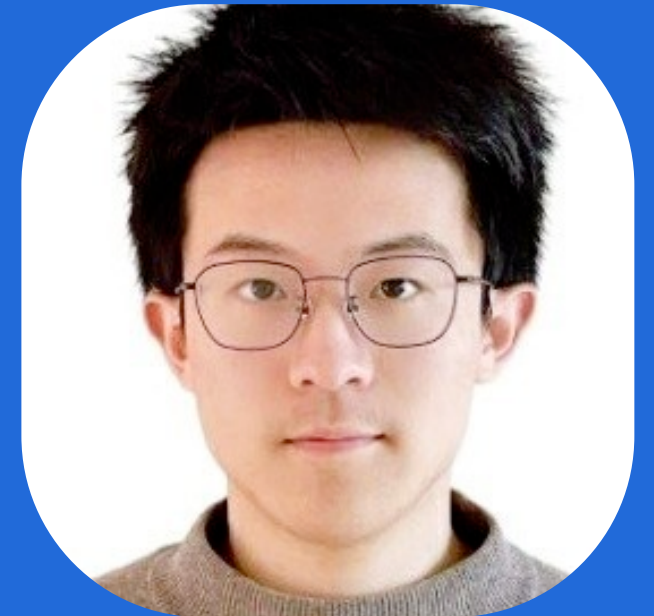
**Kunxi (Quincy) Sun**

Product Owner  
DevOps  
Backend developer



**Chenyang (Peter)  
Dong**

Scrum Master  
Backend developer



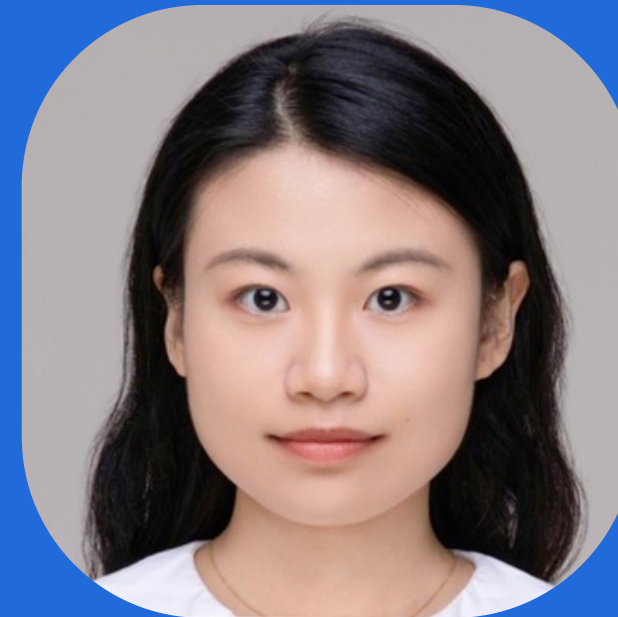
**Hanyi (Henry) Gao**

Development Team Member  
Frontend developer  
UI designer



**Yulai (Ricardo) Luo**

Development Team Member  
Frontend developer  
UI designer



**Yue (Molly) Fei**

Development Team Member  
UI/UX

MEET STAKEHOLDERS

# Supervisor



**Mauro Mello Jr**

MEET THE STAKEHOLDERS

# Client



**Dr Vlada Rozova**

Vlada is a Research Fellow in the School of Computing and Information Systems.



**A/Prof Daniel Capurro**

Daniel is a Medical Doctor and hold a PhD in Biomedical and Health Informatics from the University of Washington in Seattle.



**Dr Mike Conway**

Mike Conway is Senior Lecturer in Digital Health at the University of Melbourne's School of CIS and the Centre for the Digital Transformation of Health.

# Business Need

01

Development of a platform to assess appropriate medication prescription

02

Improve analysis of clinical documentation

03

Normalising those short strings





# Functional Requirements – From Client

## 01 Map

Clinical text to Universal Indication List

## 02 Visualisation

Show system performance and task result

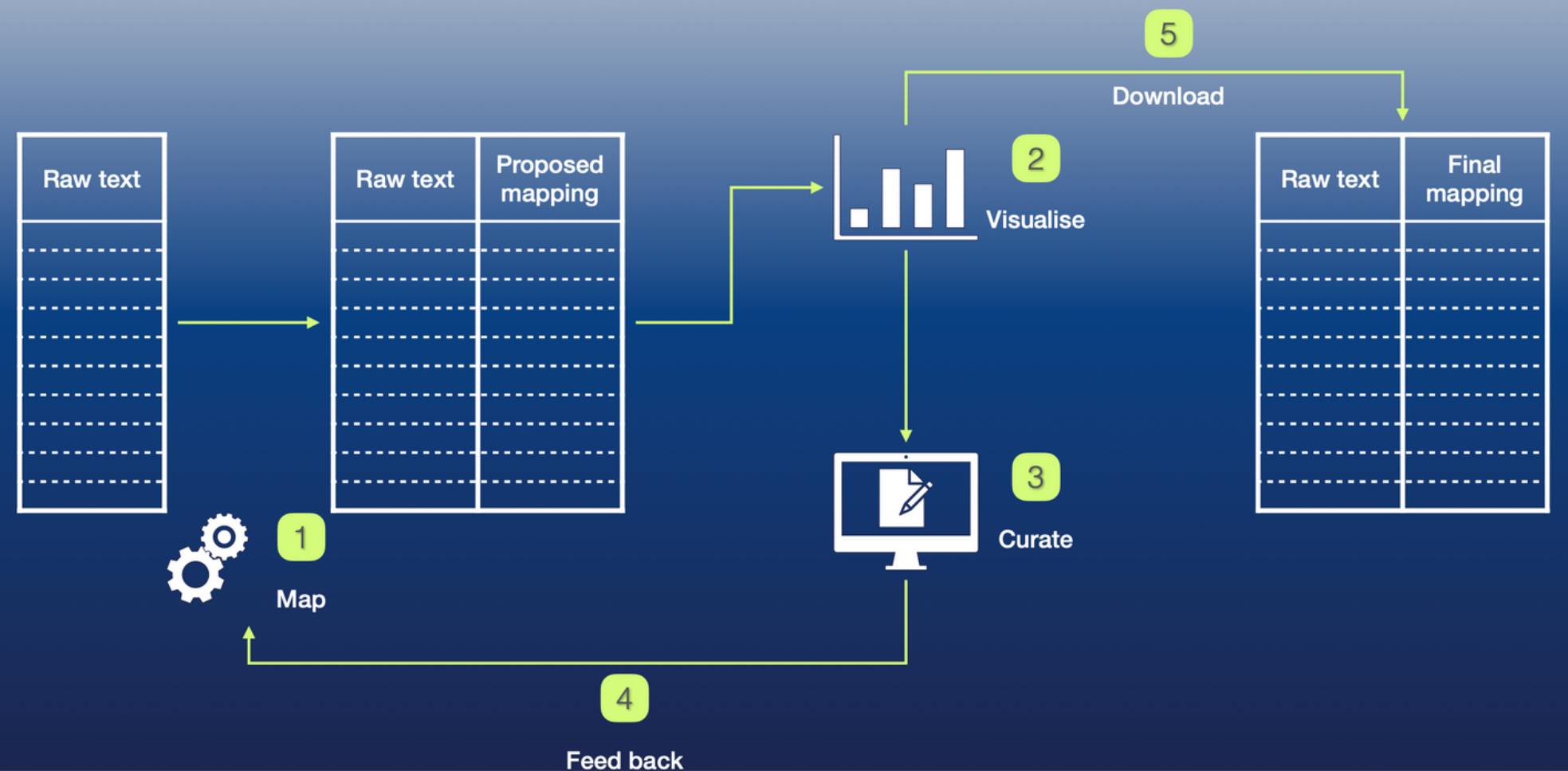
## 03 Curate & Retrain

continuously improve the system performance

## 04 Export result

Export mapping result

## Expected outcome



# Additional Functional Requirements

Derived extra functional requirements

## 05 Authentication

Credential user

## 06 Team Management

A research team

## 07 Code System Management

Universal Indication List updated continuously



# Non-Functional Requirements

## 01 Security

Sensitive clinical data

## 02 Performance

Fast & Accurate

## 03 Scalability

Easy to maintain and extend

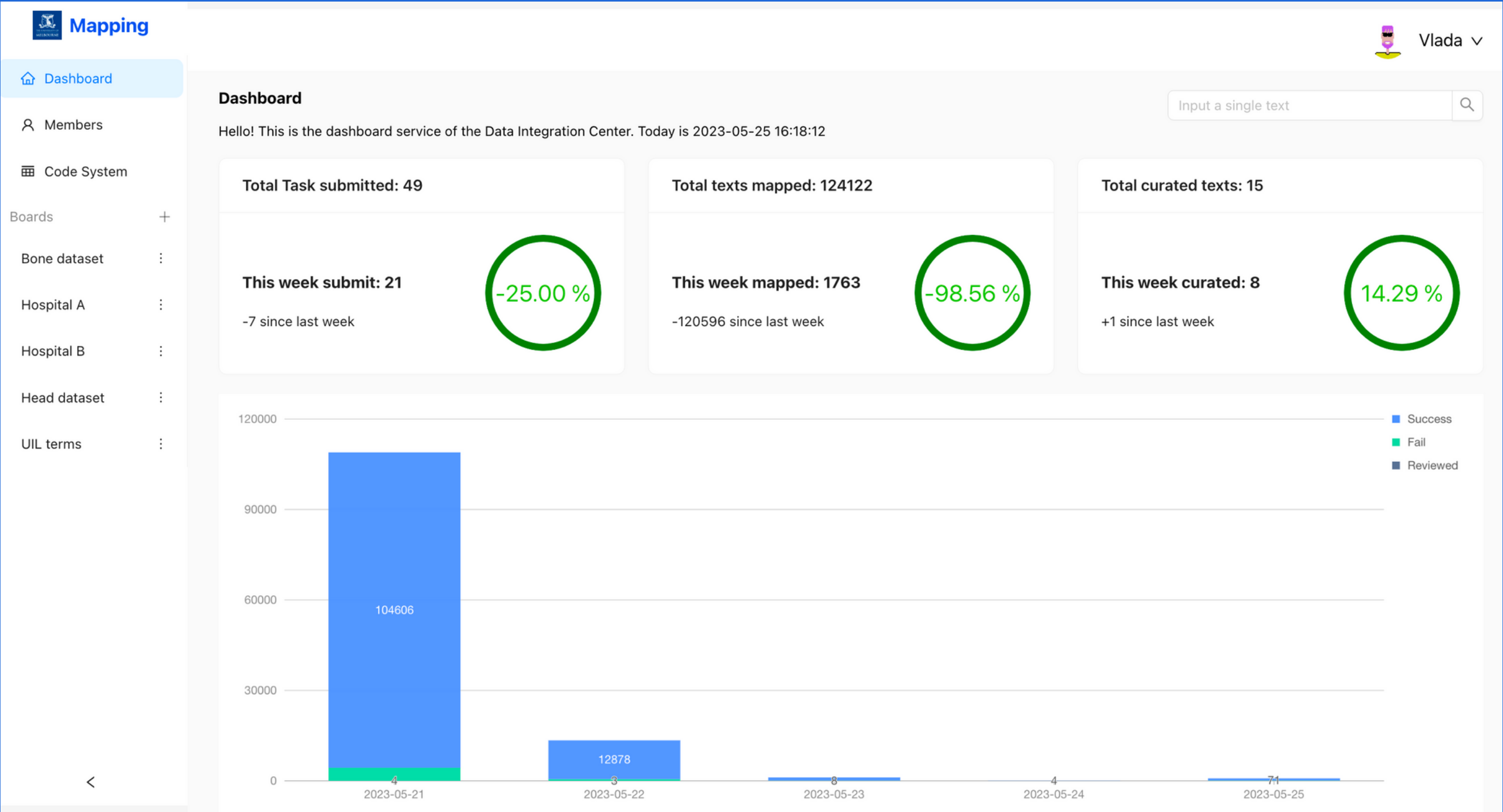




**Live Demo**


# Other Features

## Dashboard – System Overview



# Other Features

## Team Management – Credential User

 Mapping

Dashboard

Members

Code System

Boards


Bone dataset

Hospital A


Head dataset

UIL Terms

Reason Example


 Vlada

Owner

 Chenyang Dong


Memeber

Remove

 Mike Conway


Memeber

Remove

 Daniel Capurro


Memeber

Remove

 Kunxi


Memeber

Remove

 Hanyi Gao


Memeber

Remove

 Yue Fei

Memeber

Remove

 Yulai Luo

Memeber

Remove

Invite Member

Welcome to the Digital Health Platform

We're delighted to have you on board. Let's start by getting you registered. Please fill in the following information to create a new account.

Invite Token

92d5e032-1aa6-415b-9e23-6832465cc9e1

Username

Username

Email

Email

Password

Password

Confirm Password

Confirm Password

First Name

First Name

Last Name

Last Name


Gender

Gender

Register

# Other Features

## Code System – Version control

 Mapping

Dashboard

Members

Code System

Boards

Bone dataset

Hospital A

Hospital B

Head dataset

UIL terms

UIL

All

Bone and Joint

Cardiovascular system

Central Nervous System

Ear nose and throat

Eye

Gastrointestinal

Genital

Intra-abdominal

Oral and Dental

Other

Prophylaxis - medical

Prophylaxis - surgical

Respiratory

Sepsis and bacteraemia

Skin and Soft Tissue

Version 19...

+

 Code SystemDelete

Indication	User Alias	Tags
Acne	Acne	acne vulgaris, pimple, Skin and Soft Tissue
Actinomycosis infection	Actinomycosis infection	cervicofacial actinomycosis, IUD infection, pelvic actinomycosis, intrauterine device, craniofacial actino, pulmonary actino, Systemic infections
Acute acalculous cholecystitis	Acute acalculous cholecystitis	inflamed gallbladder, Intraabdominal, Intra-abdominal
Acute calculous cholecystitis	Acute calculous cholecystitis	inflamed gallbladder, Intraabdominal, Intra-abdominal
Acute Chlamydial conjunctivitis	Acute Chlamydial conjunctivitis	neonatal conjunctivitis, Eye, ophthalmia neonatorum
Acute cystitis, pathogen unknown	Acute cystitis, pathogen unknown	urinary tract infection, UTI, Urinary tract, bladder, empiric
Acute cystitis; other pathogen(s)	Acute cystitis; other pathogen(s)	multidrug-resistant gram-negative bacteria, MDR, gram-negative, urinary tract infection, UTI, Urinary tract, bladder
Acute cystitis: Enterococcus species	Acute cystitis: Enterococcus species	Enterococcus faecalis, urinary tract infection, UTI, Enterococcus faecium, Urinary tract, vre, bladder
Acute cystitis: Escherichia coli	Acute cystitis: Escherichia coli	urinary tract infection, UTI, Urinary tract, e.coli, ESBL, ecoli, bladder
Acute cystitis: Klebsiella pneumoniae	Acute cystitis: Klebsiella pneumoniae	urinary tract infection, UTI, Urinary tract, bladder, ESBL
Acute cystitis: Proteus mirabilis	Acute cystitis: Proteus mirabilis	Urinary tract, UTI, urinary tract infection, bladder
Acute cystitis: Pseudomonas aeruginosa	Acute cystitis: Pseudomonas aeruginosa	urinary tract infection, UTI, bladder

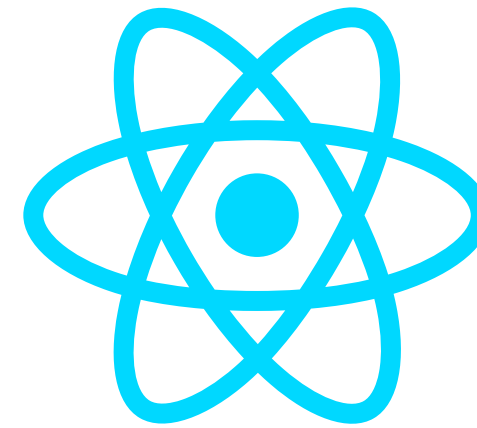
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SYSTEM DESIGN

# Backend Frontend Separation



**JS** Frontend



React



Ant design

**Python** Backend



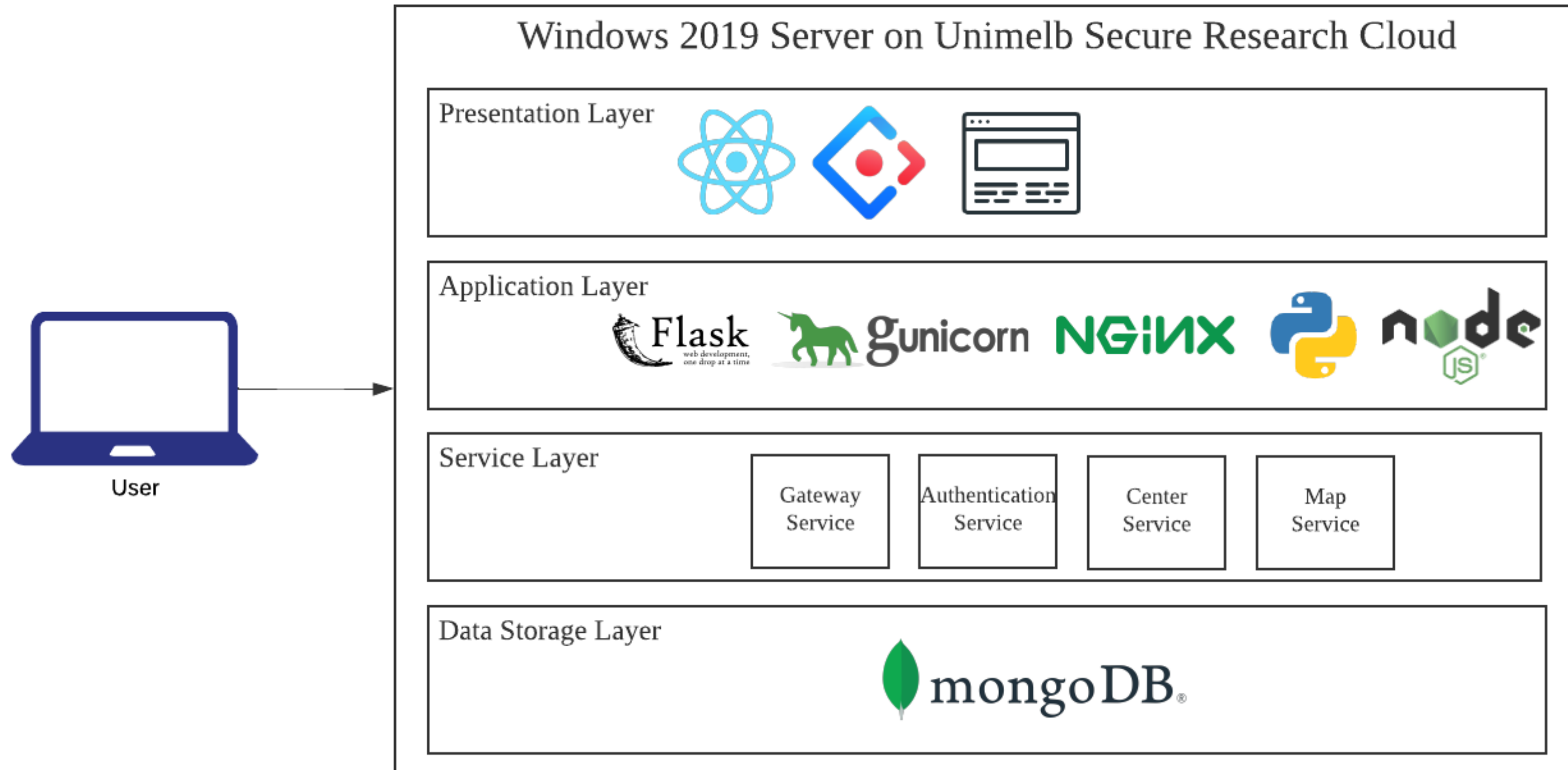
Flask



MongoDB

SYSTEM DESIGN

# System Diagram





SYSTEM DESIGN

# Microservice

Service Layer

## Gateway

Control the request and  
response

## Auth

User, team and login

## Center

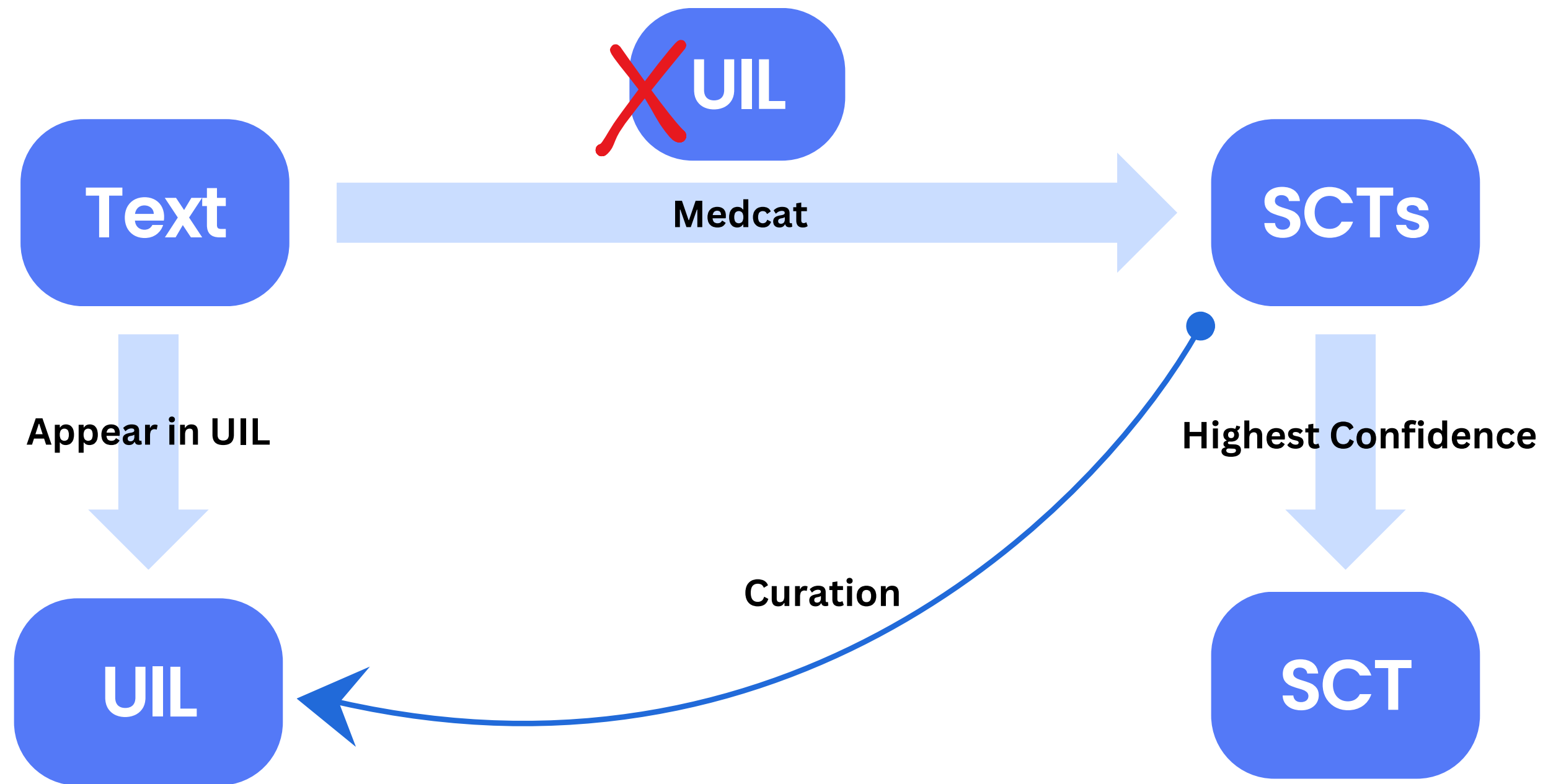
Code system, task, visualisation

## Mapper

Map, curation, retrain

M A P P E R

# Mapping Process



M E D C A T

# Clinical Text → SNOMED-CT

<https://github.com/CogStack/MedCAT>

## What is Medcat?

**Medical Concept Annotation Tool**

**Pre-trained Model on SNOMED-CT**

**MIMIC-III Clinical Database**

**Named Entity Recognition + Linking (NER+L)**

M A P P E R

# SNOMED-CT → Universal Indication List

"Sinusitis, maxillary / UTI"



Maxillary sinusitis

Urinary tract  
infectious disease

1

0.563

attempt



UIL

SYSTEM DESIGN

# Key challenges

**Lack of data**

**CI/CD**

## KEY CHALLENGES

# Lack of data

No training data

Text

Medcat

SCT

Curation

UIL

Text



UIL



## KEY CHALLENGES

# CI/CD

**Continuous Integration? Yes !**

**How? Github Actions & Ansible**

**Continuous Deployment? No**

**Why? No Production Server**

SYSTEM DESIGN

# Accomplishments

**User-friendly web interface**

**Highly scalable microservices architecture**

**Fast and accurate mapping based on MedCAT**

**Continuous integration via Github Actions**

**Follow the SOLID software principles**

**Thank you so much!**

**Q & A time**

