Project Initial Concept and Design

Introduction

Team Introduction

Team Name: MCS08

Members:

Yeoh Ming Wei	Role: Team Leader
Yew Yee Perng	Role: Quality Assurance
Toh Xi Heng	Role: Software Developer

Introduction

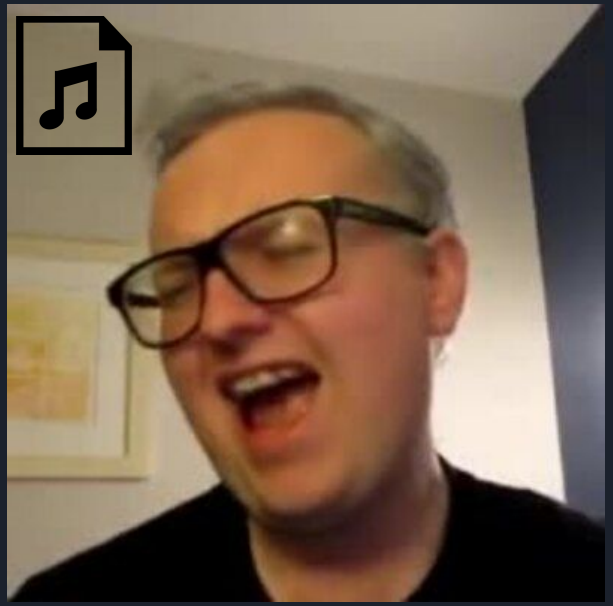
Project Topic

Singing Video Generation with Music Separation

Supervised by Dr Arghya Pal

Project Goal and Deliverables

- Decomposition of music file into two different music files. (Human voice and background voice)
- Generate a music video with a virtual avatar based on the music file .
- Virtual avatar shows emotion, lips synchronization (Humanlike)



Music Video with an avatar

Flowchart


are you
HAPPY?
yes
no
CHANGE SOMETHING.
do you want to be HAPPY?
yes
no
KEEP DOING WHATEVER YOU'RE DOING.

Flowchart (part 1)

- Preprocessing of music audio

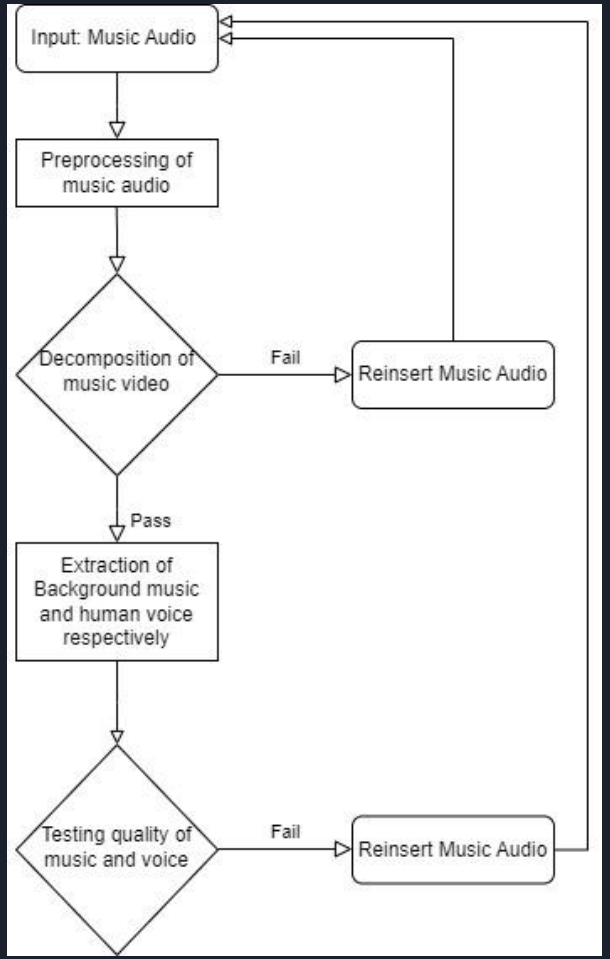
  - noise reduction, normalisation etc.

- Decomposition

  - separation of music video

- Testing

  - quality, clarity etc.



Flowchart(part 2)

- Integration of virtual avatar

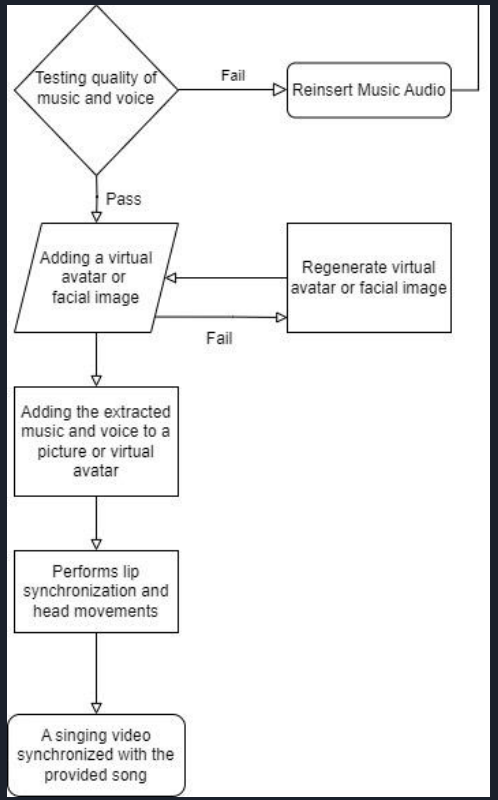
  - graphic image/ real time image

- Lip sync and head movements

  - depending on audio

- Generation of singing video

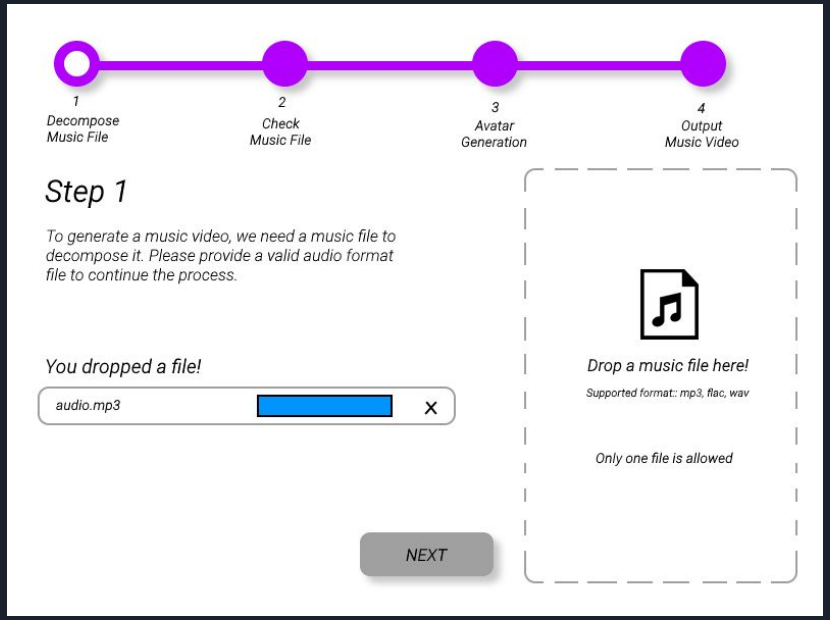
  - Video done!



User Interface Prototype

First Step

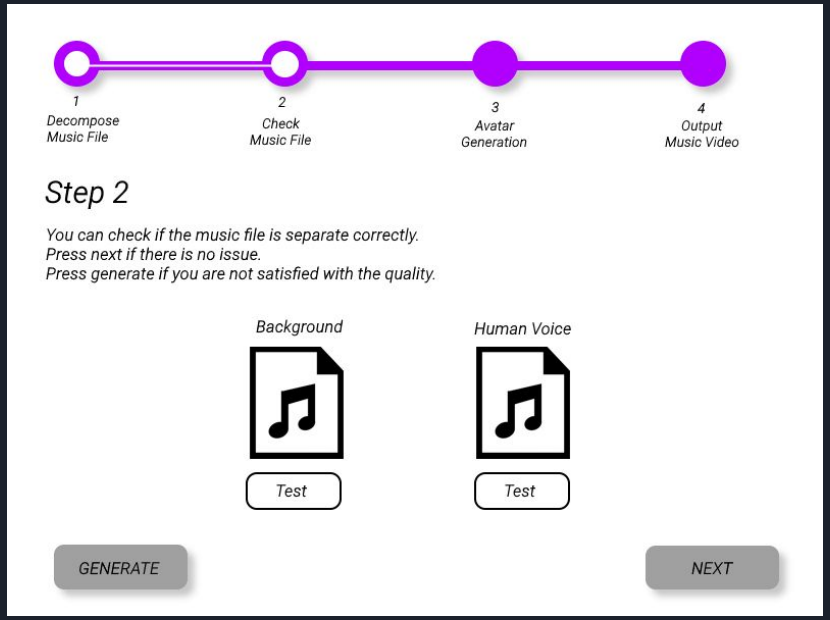
- Allow user to upload music file
- Only one file is allowed to upload
- Commonly used music format such as mp3
- Able to remove music if user made a mistake



User Interface Prototype

Second Step (After decomposing)

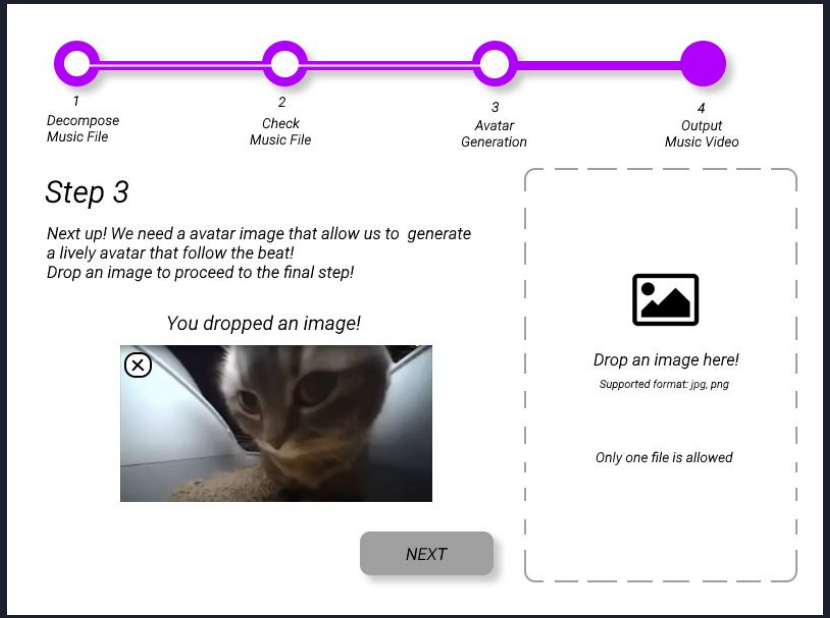
- Allow user to test the music file
- Both human voice and background music can be tested
- Press generate button to decompose again if user not satisfied



User Interface Prototype

Third Step

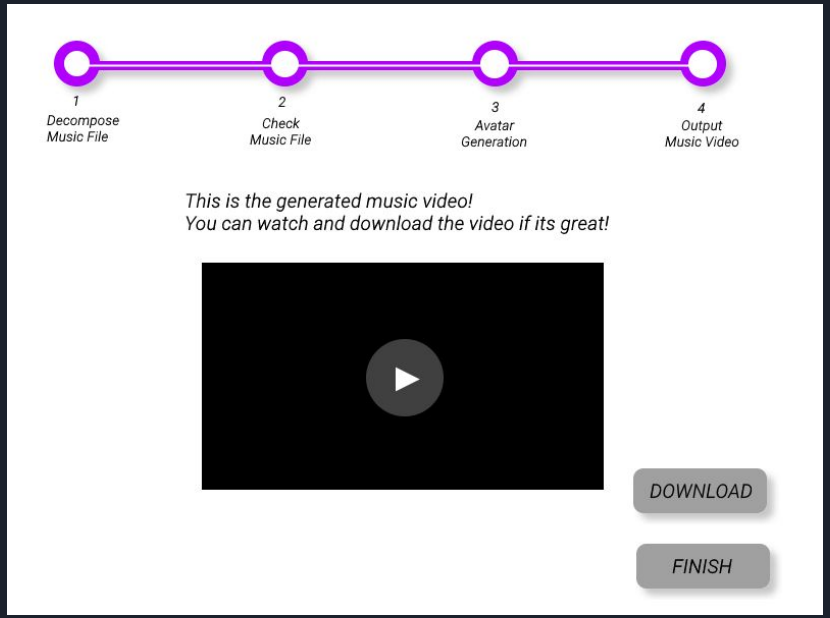
- Allow user to upload an image
- Only one file is allowed to upload
- Commonly used image format such as jpg and png
- Able to remove the image



User Interface Prototype

Last step (After generating music video)

- Able to see the preview video
- Able to download video
- Press finish to generate another different music video.



Software and hardware specification

Software:

- Operating system
- Programming Language
- Software libraries
- Programming language environment
- Frontend programming language
- Backend programming language
- Cloud platform service
- Cloud storage
- Version control
- Project management tool

Hardware:

- Student’s laptop
- Graphics Processing Unit (GPUs)

Operating system

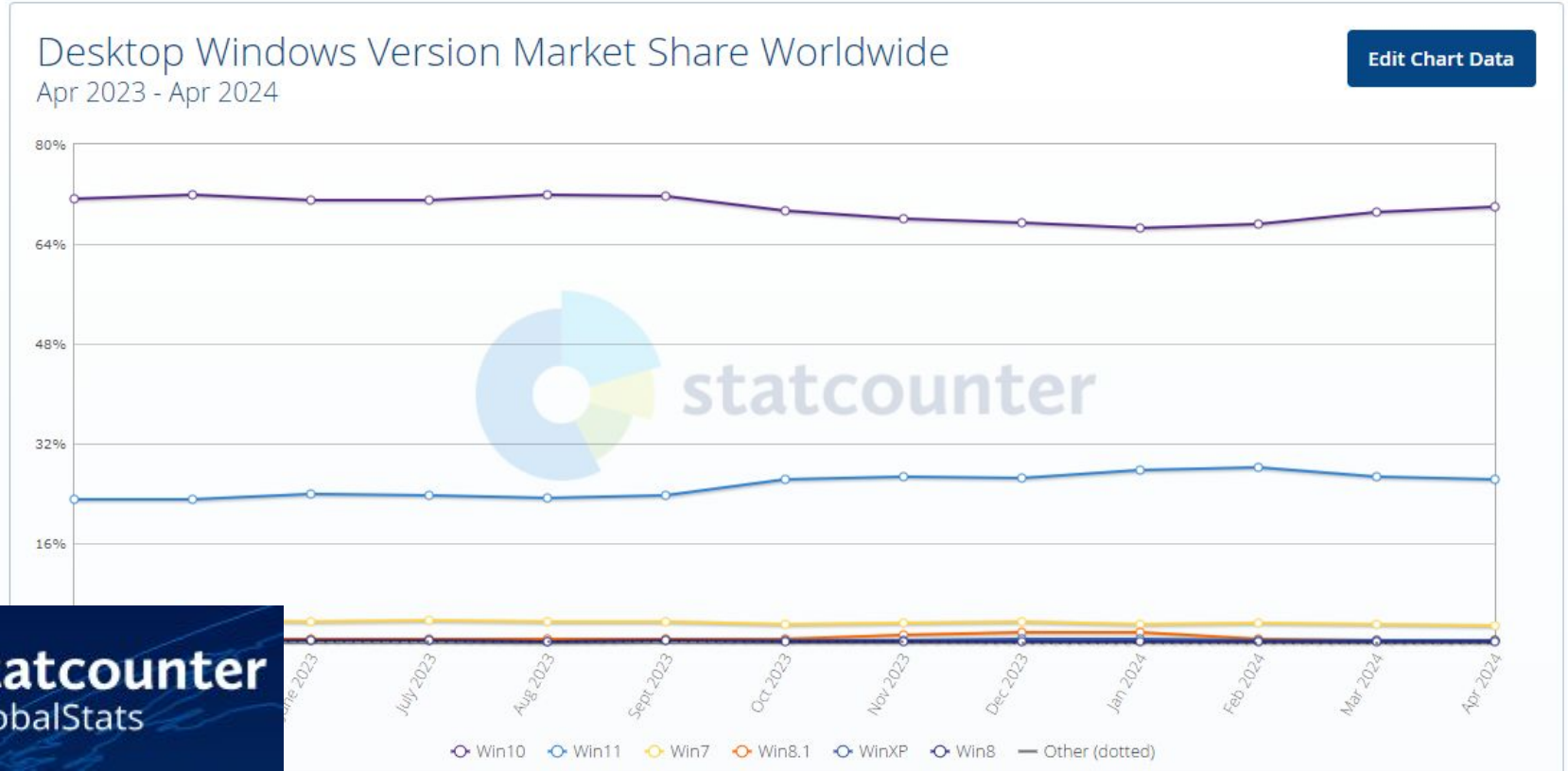
Windows 10 or later

- Most commonly used by user.
- More user-friendly compared to Linux and MacOS

Windows 10

Win10	Win11	Win7	Win8.1	WinXP	Win8
69.89%	26.19%	2.81%	0.43%	0.33%	0.26%

Desktop Windows Version Market Share Worldwide - April 2024



statcounter GlobalStats

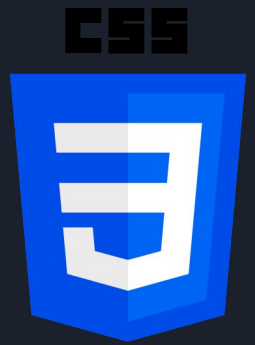
Programming Language

Backend programming language:

- Python

Frontend programming language:

- HTML
- CSS



Software Libraries

PyTorch

- *Used to build and train deep learning models for separating human voice and background music*
- *Facilitate the creation of models that generate a lifelike singing face synchronized with the separated vocals*
- *Used to integrate various components of the project into a cohesive pipeline*

Spleeter

- *Used to separate human voice and background music*

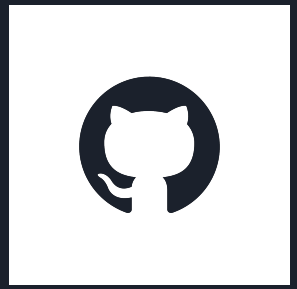
Programming Language Environment & Version Control

Programming language environment - VS Code

- Support multiple languages
- Can clone repository with GitHub
- Can do live coding

Version control - GitHub

- Easy to clone repository to VS Code
- Able to review the commit history



Cloud Platform Service & Cloud Storage

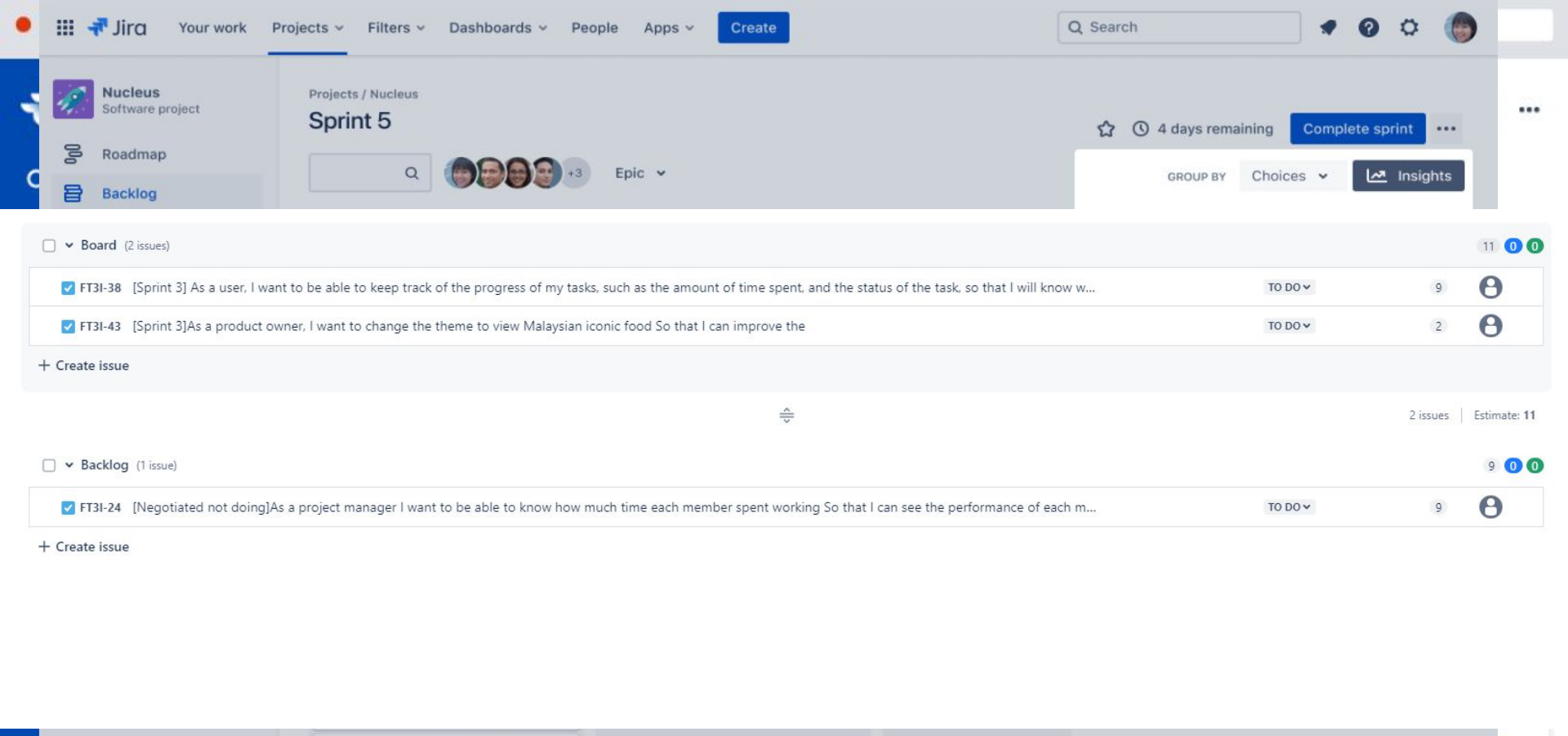
Cloud Platform Service - Google Colab

- access to GPU(Graphics Processing Unit) and TPU (Tensor Processing Unit) resources
- avoid needing powerful local hardware
- RM47.16 for pro version

Cloud Storage - Google Drive

- Google Colab has integration with Google Drive

Project Management Tool - Jira


Jira
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
Nucleus
Software project
Roadmap
Backlog
Projects / Nucleus
Sprint 5
4 days remaining
Complete sprint
Epic
GROUP BY
Choices
Insights
Board (2 issues)
FT3I-38 [Sprint 3] As a user, I want to be able to keep track of the progress of my tasks, such as the amount of time spent, and the status of the task, so that I will know w...
TO DO
FT3I-43 [Sprint 3]As a product owner, I want to change the theme to view Malaysian iconic food So that I can improve the
TO DO
Create issue
2 issues
Estimate: 11
Backlog (1 issue)
FT3I-24 [Negotiated not doing]As a project manager I want to be able to know how much time each member spent working So that I can see the performance of each m...
TO DO
Create issue
Mobile button trigger improvment
NUC-339
Search pagination v1
NUC-348
You're in a team-managed project
Learn more

Hardware

Student laptop

- do prototyping
- do testing for code

Graphics Processing Unit (GPU)

- used to train the deep learning models
- using the GPUs via Google Colab

THANK YOU