

A Software Engineering Project On

METABULL AI

as the partial fulfillment of

Semester - VI study

for the degree of

Bachelor of Science (Information Technology)

(Affiliated to Sarvajanik University)

during the academic year 2023-2024.

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Sarvajanik University

Shree Ramkrishna Institute of Computer Education and Applied Sciences

Behind P.T Science College, M.T.B. College Campus, Athwalines, Surat-395 001



Shree Ramkrishna Institute of Computer Education and Applied Sciences
Behind P.T. Science College, M.T.B College Campus, Athwalines, Surat-395 001.



CERTIFICATE

DEPARTMENT OF COMPUTER SCIENCE

This is to certify that
Sahid Midda

Exam no

has successfully completed his software engineering project work entitled

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Internal Project Guide

HOD
Dept. of Computer Science

Date : _____

Place : Surat

University Examination:

Examination No. : _____

Signature of External Examiners : _____



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To,
The Training & Placement Officer,
Shree Ramkrishna Institute of Computer Education and Applied Sciences

No Code No Database Certificate

TO WHOMSOEVER IT MAY CONCERN

As per our company policy, we will not deliver the source code and database of the Project. We can not disclose or divulge company confidential information to the public or any other institute. We can provide only Snapshots and videos of the projects. Please contact us if you have any questions regarding the same.

Your Faithfully,
HR Manager



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Introduction

❖ Company Profile

Name : Qodors Technologies

Qodors is a creative digital agency based in India. We are composed of creative designers and experienced developers.

Qodors is one of the top-rated software development companies based in India. We build rock-solid apps to create awesome digital presence. We are professionals in producing finest Mobile Applications, Web Applications, IoT Applications and UX/UI. At Qodors, we help our clients to transform their imaginative interests into confirmed reality. With over half a decade of profound experience, we provide cutting-edge solutions to our clients and assure to deliver substantial products. Our aim is to expand possibilities in technology space.

Services

Mobile Application

Be it IOS or Android, we have an exceptional mobile application development team to execute their task with advanced tools of technology to meet client demands as per their business needs. We aim to deliver spectacular products.

Web Application

With over half a decade of profound experience, we provide you access to our dexterous team of programmers and developers. The team which is well educated to help you improve your workflow by unifying technology service to unlock new possibilities.

User Interface

User Interface plays an important role in application design. It connects user with the system to operate app features. We design IOS and Android applications, which study behavior pattern and statistics of the user, to make the application more effective

IOT App Development

We have a highly experienced team to develop IoT applications which go through various patterns of technology. Levelling it from Speedy Custom App Development to Smart Connected Solutions. Giving elite solutions is our top priority

❖ Project Profile

Project Title :	Metabull AI
Objective :	To build a custom AI-driven motion picture production platform
Frontend Tool :	React JS
Backend Tool :	Python (Django)
Database :	PostgreSQL
Other tools :	AWS, Gitlab, etc.
Duration :	3 months & Ongoing
Team Members:	5

System Introduction

❖ Definition

The project entails developing an AI-driven platform tailored for production houses, streamlining the filmmaking process by minimizing manual efforts, management complexities, and associated costs. The objective is to deliver high-quality motion pictures suitable for theatrical release, while optimizing resource utilization and enhancing efficiency.

❖ Objective

The system aims to provide a full-fledged AI-driven platform for production houses to produce motion pictures (aka. Movies) without the extra hustle-bustle of manpower, management, traveling, etc while simultaneously reducing the cost of production by a significant amount yet a quality work eligible of theatrical release.

It is anticipated as a professional-level production platform for studios and major producers. A complete, integrated system that replaces traditional physical motion picture production with an AI system for managing, automating, and generating, all aspects of production, end-to-end.

❖ Modules/Functionality Description

The platform provides studios, producers, and individual creatives with an AI-driven approach to the production of feature motion pictures, episodic series, commercials, and other content. Through the use of the platform, studio-partners will be able to reduce production costs by up to eighty percent (80%) while expanding creative choices and bringing projects to market more quickly.

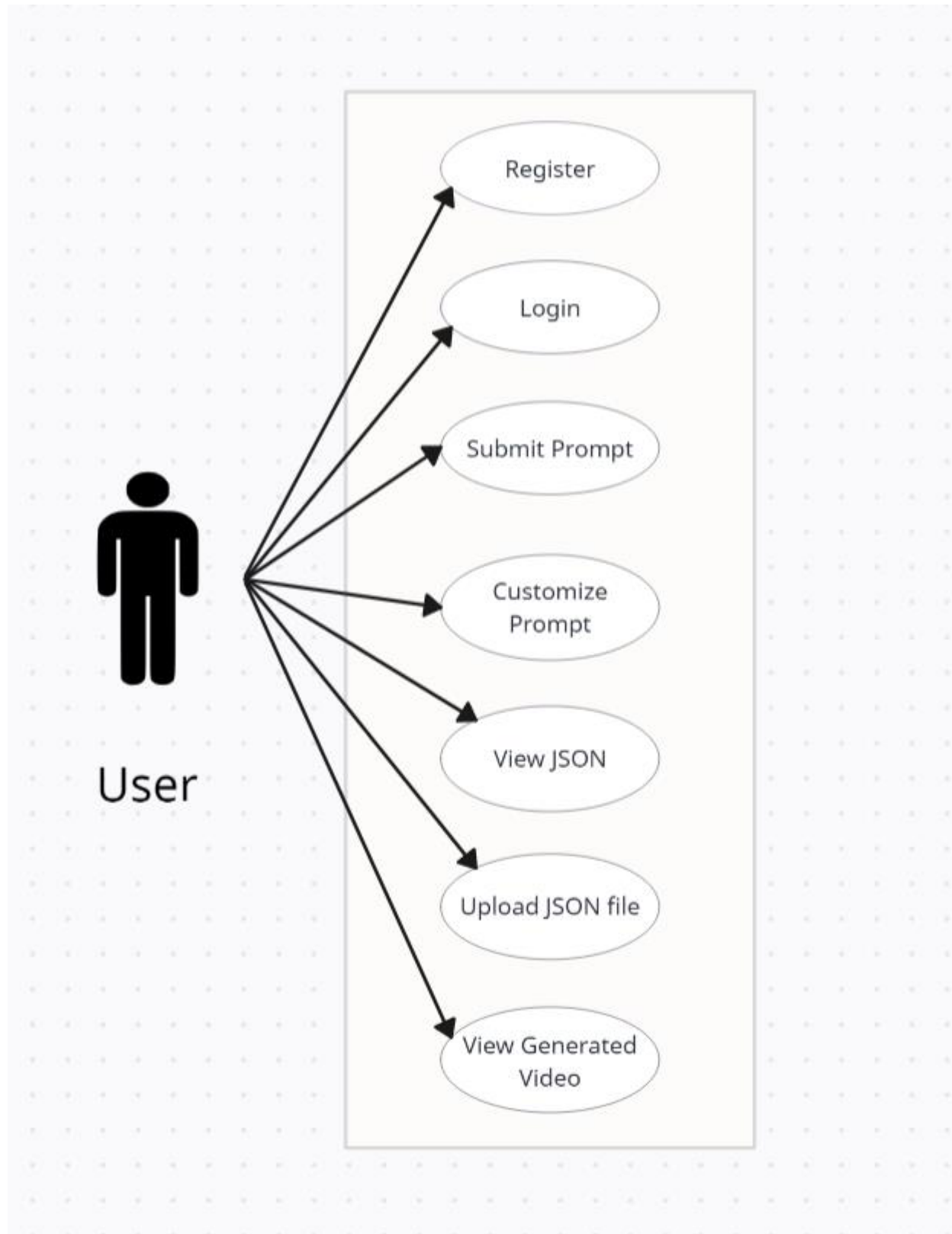
The platform currently has only a USER module which consists of the following functionalities.

USER Module Functionalities

1. The User can register themselves on the platform by inserting details such as name, email, username and password.
2. The User can login to the platform by entering their credentials (username, password).
3. The User can access the Dashboard (Prompt Entry) and Prompt tracking page after successfully logging in.
4. The User can manually type their prompt into the text area provided on the prompt entry page.
5. The User can select one of the predefined prompts.
6. The User can customize their prompt by selecting options from the advanced modal.
7. The User can upload a JSON file consisting the prompt to submit it directly.
8. The User can view the result after successfully submitting a prompt.
9. The User can track all the prompts submitted in the prompt tracking page.
10. The User can view the details of a submitted prompt.
11. The User can view the JSON generated for a submitted prompt.
12. The User can view the wav/video/blend file.
13. The User can view the cloud watch logs.
14. The User can logout.

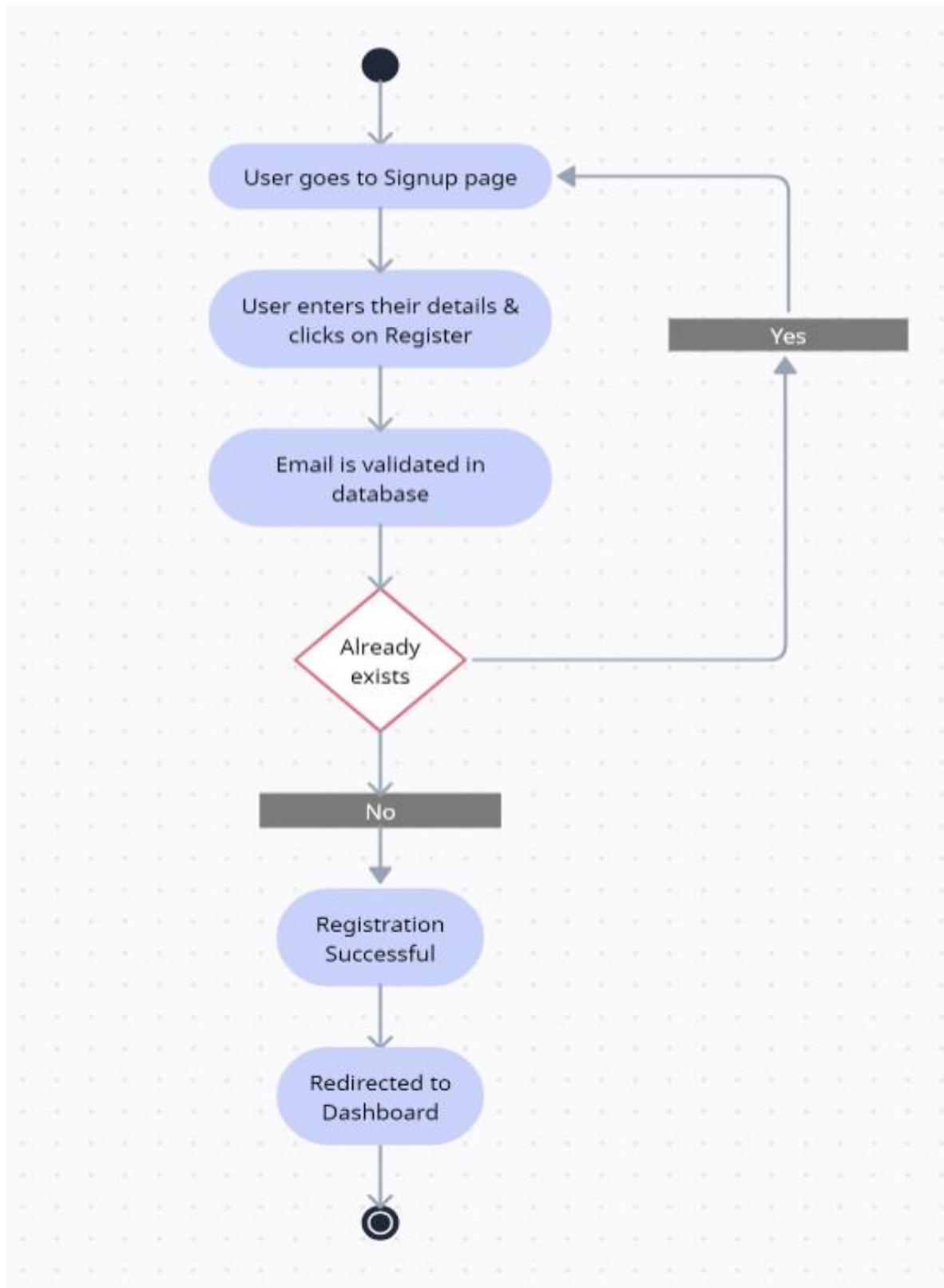
Requirement Analysis & Modelling

❖ Use Case Diagram

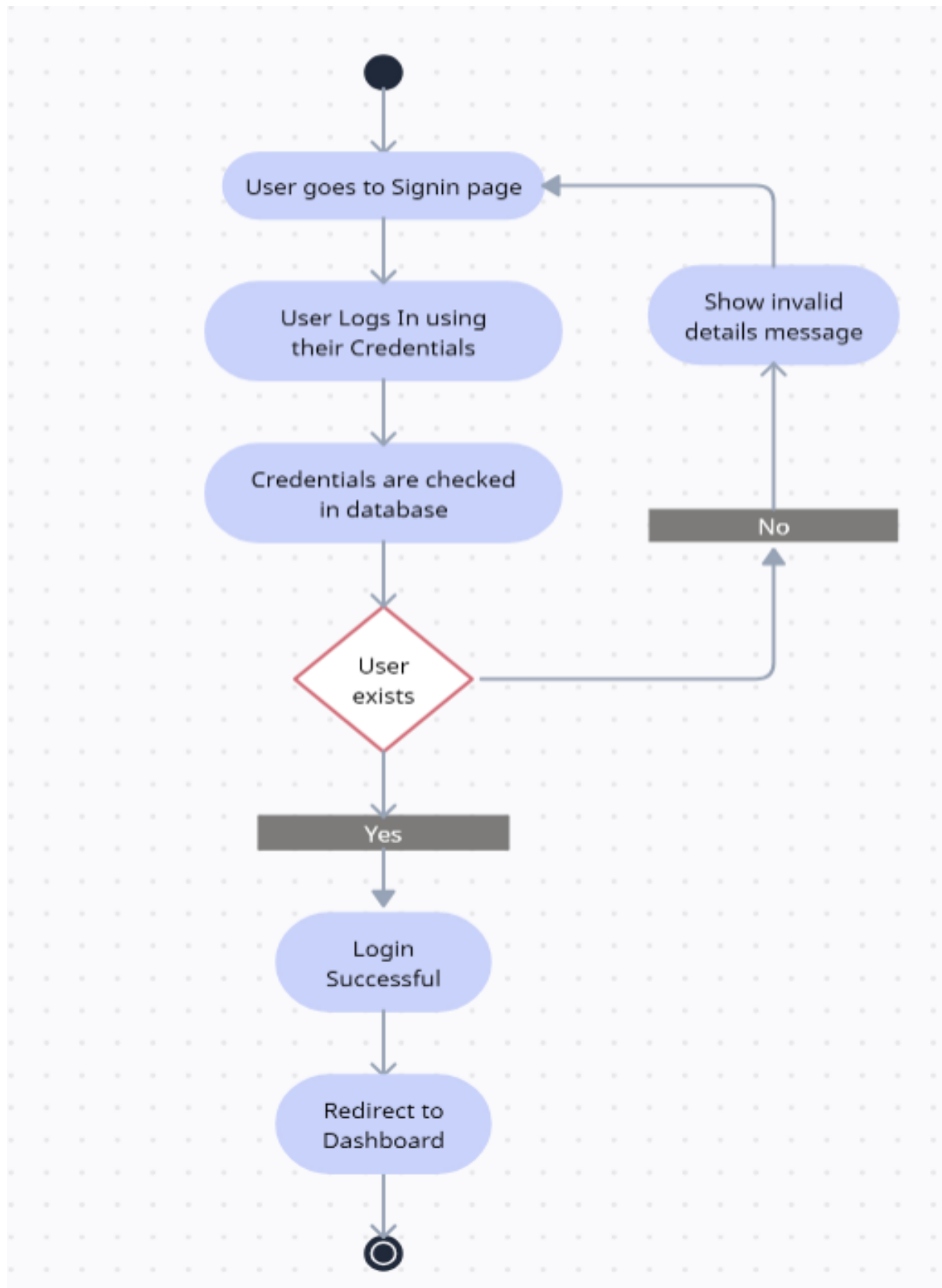


❖ Activity Diagram

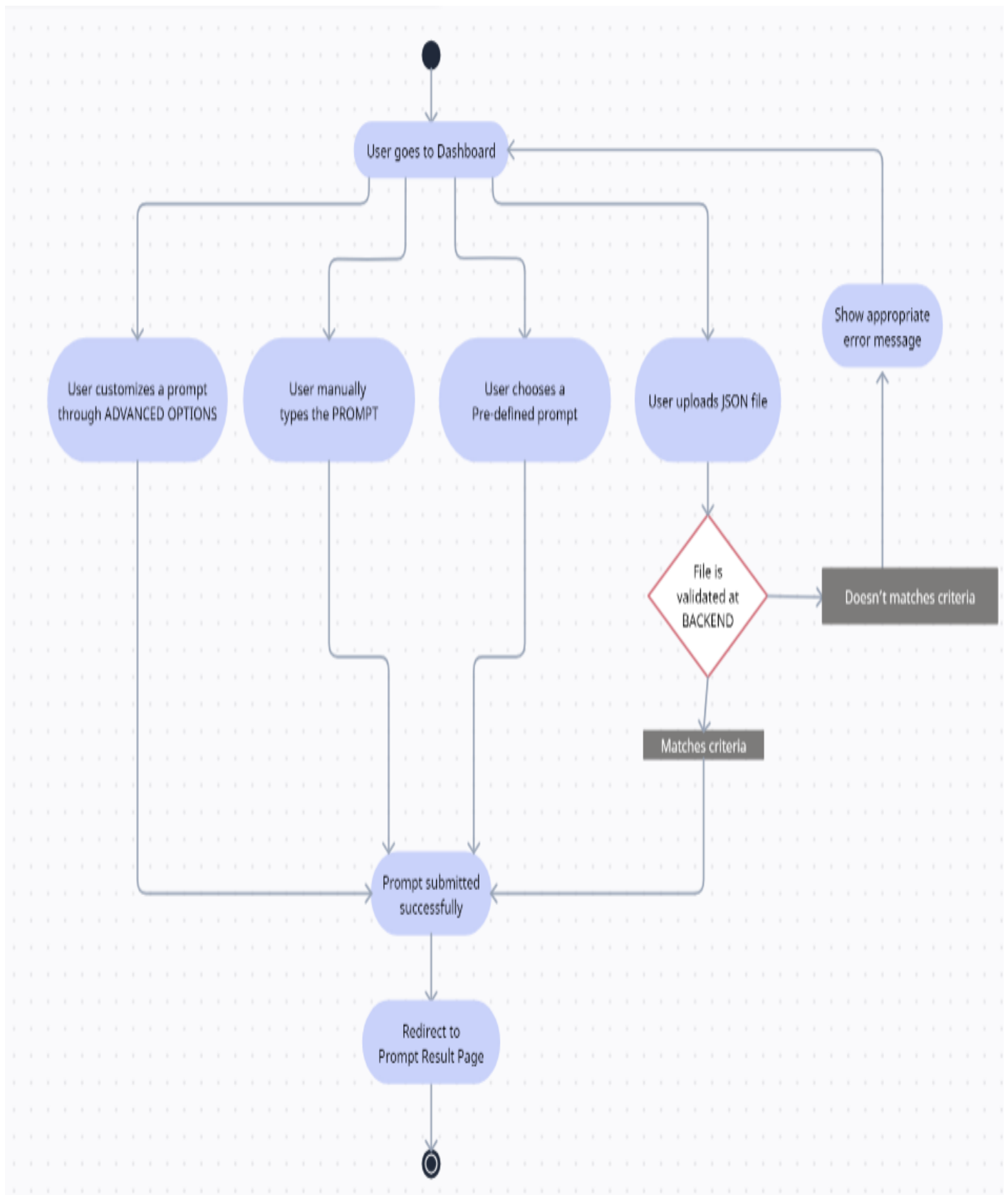
Register Activity



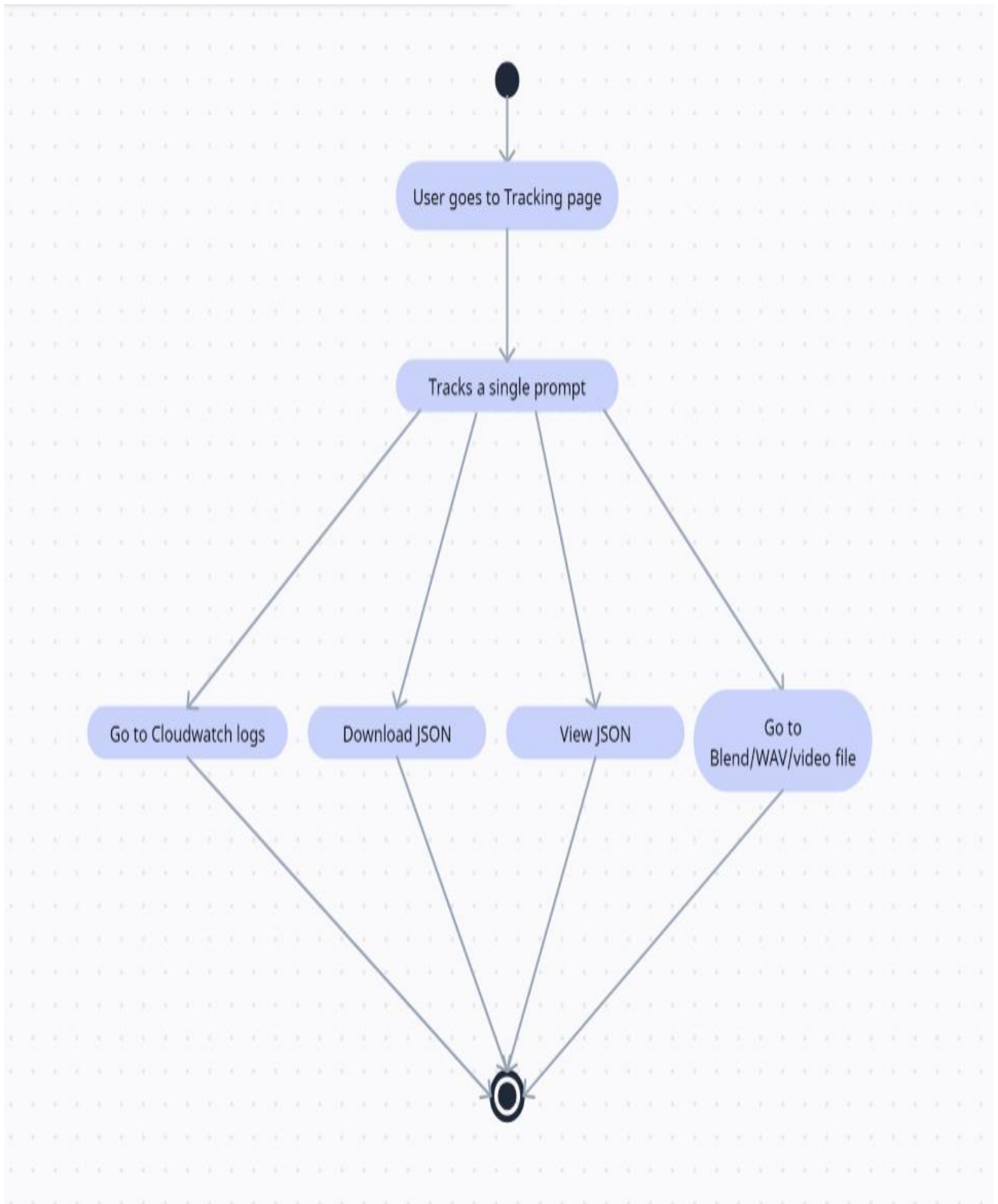
Login Activity



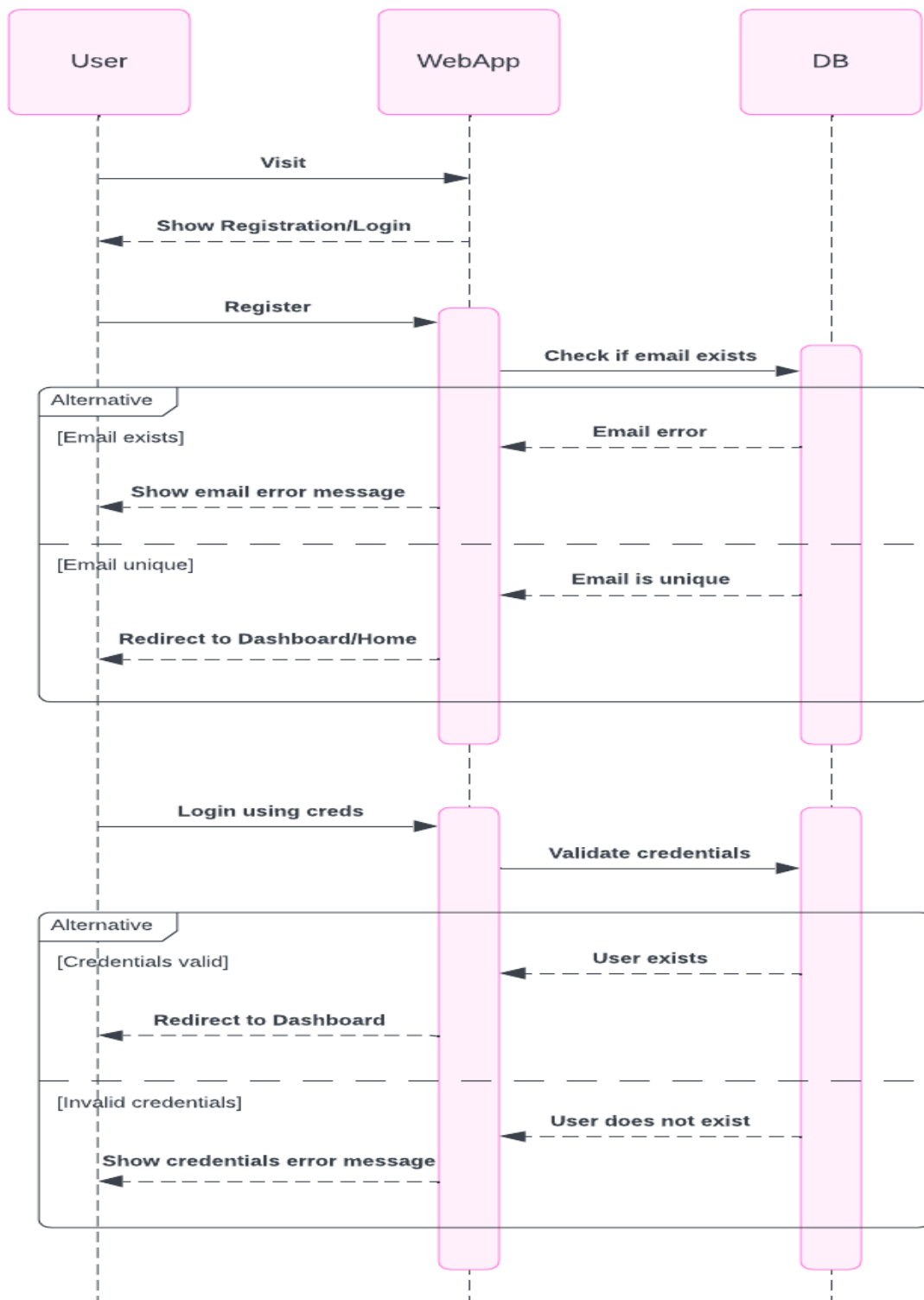
Dashboard Activity



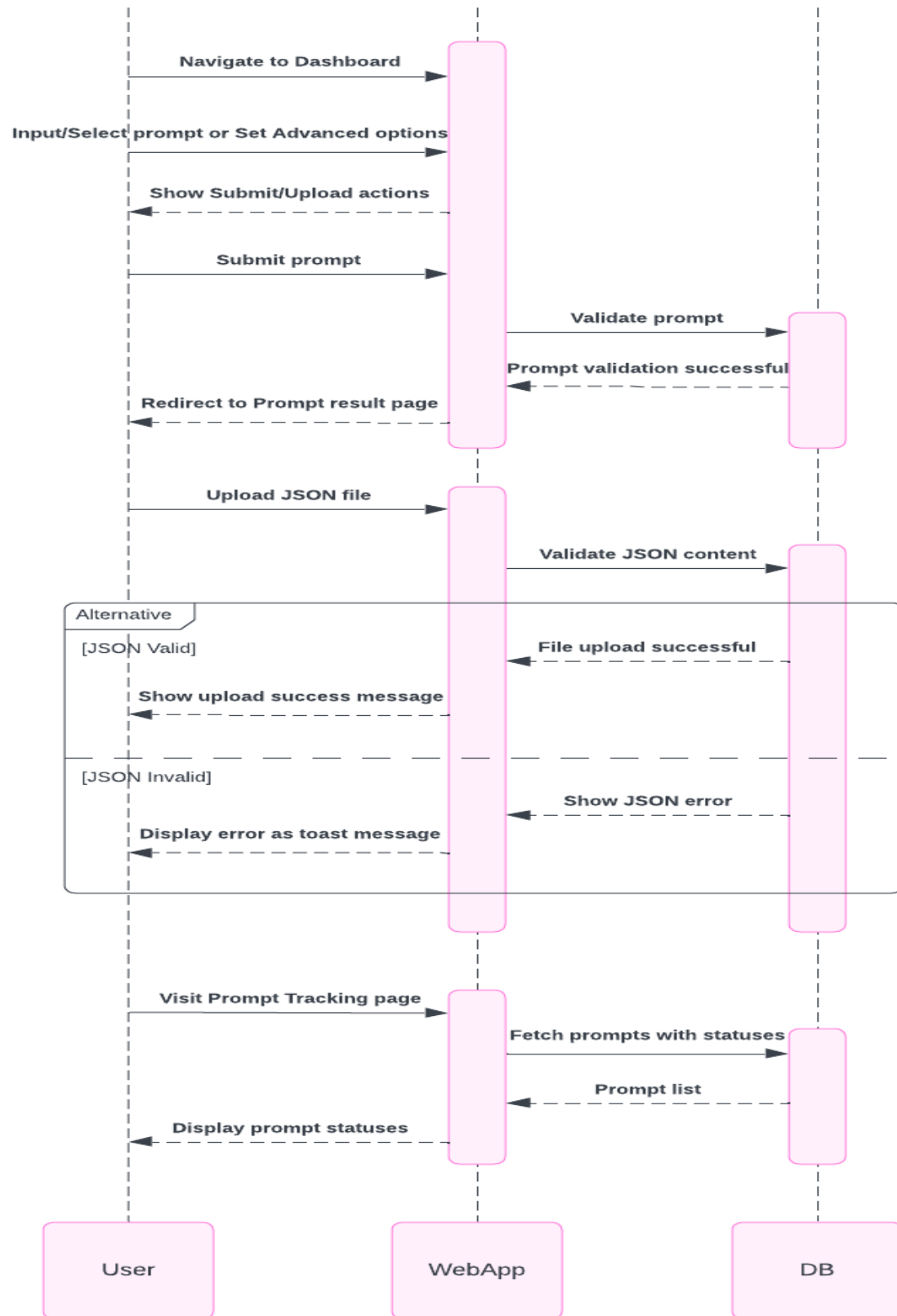
Tracking Activity



❖ Sequence Diagram



Continued...

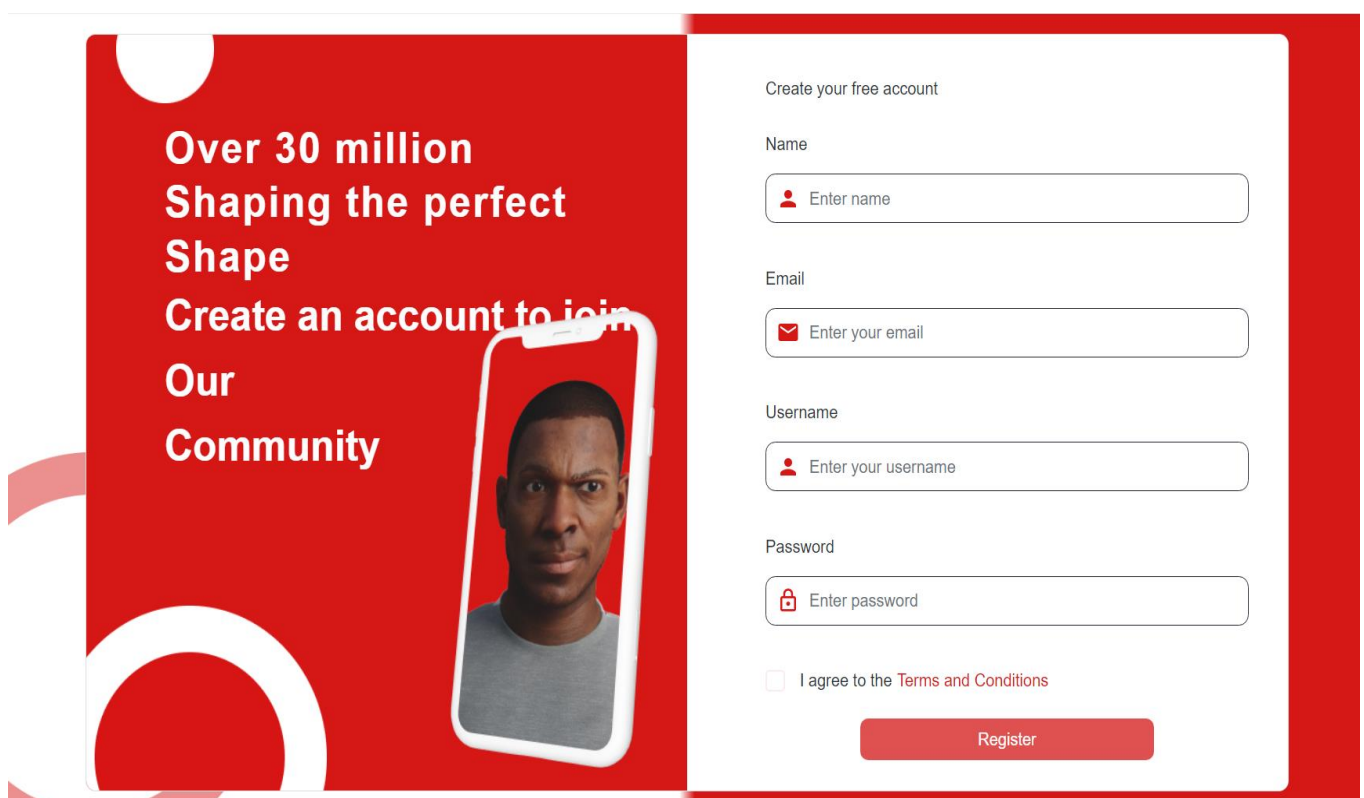


System Design

❖ Interface design

Registration Page:

The user can navigate to “/signup” to register themselves by entering details such as name, email, username and password.



The registration page features a vibrant red background with white circular accents. On the left, a white smartphone displays a portrait of a man. The text on the left reads: "Over 30 million Shaping the perfect Shape Create an account to join Our Community". On the right, a white registration form is titled "Create your free account". It includes input fields for Name, Email, Username, and Password, each with a corresponding icon (person, envelope, and lock). Below the fields is a checkbox for "I agree to the Terms and Conditions". A red "Register" button is at the bottom right.

Create your free account

Name

Email

Username


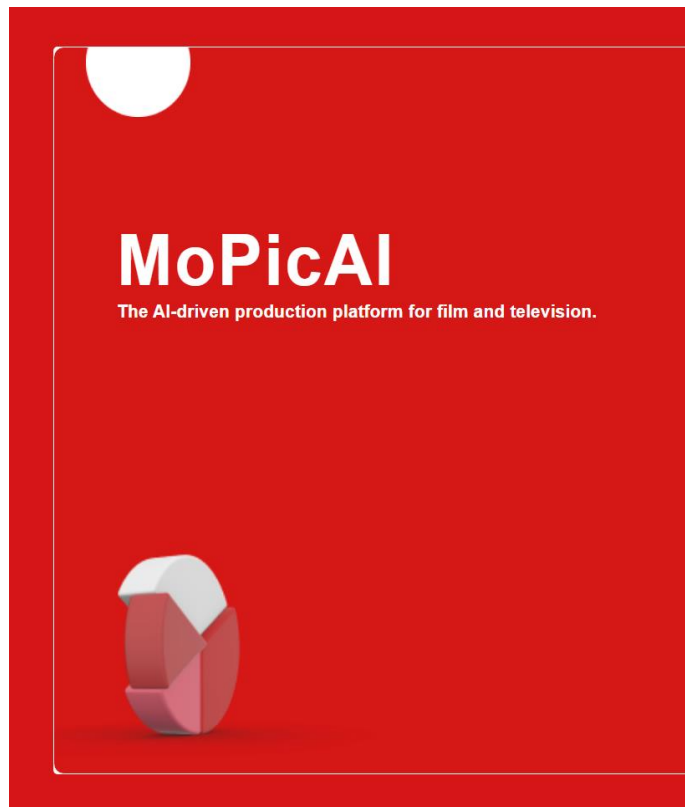
Password

☐ I agree to the [Terms and Conditions](#)

Register

Login Page:

The user can navigate to “/signin” to login using their credentials (username, password).



MetaBull.ai

Username

Password

☐ Remember me

Login

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Prompt Entry Page (Dashboard):

The user can visit the dashboard to submit prompts for video generation either by typing the prompt manually or choosing one of the predefined prompts or making a prompt using the advanced options modal. User can also directly upload a JSON file.

MetaBull.ai

[Prompt Entry](#)

[Prompt Tracking](#)

[Logout](#)

There are three ways to create a prompt:

- 1) Manually paste or type your prompt directly into the prompt entry box below.
- 2) Select one of the six predefined test prompts from the options below.
- 3) Create your own prompt using the advanced prompt interface. Click [+] to access.

Paste or type your prompt here +

Click **Clear** to erase or **Submit** to process your prompt.

[JSON](#) [Clear](#) [Submit](#)

Predefined Prompts

[Base Standing Prompt](#) [Base Walking Prompt](#) [Base Tracking Prompt](#)

[Reverse Tracking Shots](#) [Coverage Single Prompt](#) [Multiple Dialog Prompt](#)

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Advanced Prompt Options Modal:

The user can customize the prompt by selecting options from the advanced modal.

2) Select one of the six predefined test prompts from the options below.

Click [+] to access.

Advanced Options

The following drop downs provide you with the ability to auto-generate the prompt by simply selecting desired options.

Note: options in red are in development

Location

Interior/Exterior

Day/Night

Character

Placement

Action

Emotion

Camera Controls

Frame

Position

Motion

Dialog

Speaker

Language

Paste or type character dialog here.

Styles & Output

Styles

Output

Lighting Schemas, Compositing, and Hash-Tags are not currently supported with advanced prompting.

Once you have selected all options and entered the dialog, click the **Submit** button to process your prompt. Or select **View** and your prompt will appear in the main prompt edit window where it can be further edited.

SUBMIT

VIEW


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Prompt Tracking Page:

The user can visit the prompt tracking page to view the status of all the prompts submitted till now.



⌚ Prompt Entry

📈 Prompt Tracking

↶ Logout

Prompt Tracking


Keep track of all your prompts

Search with ID..

1715776815	<div>📺 Processing video</div>	<div>📅 2024/05/15 12:40:18 PM</div>	▼
1715756162	<div>📺 Video is ready</div>	<div>📅 2024/05/15 06:56:05 AM</div>	▼
1715714631	<div>📺 Processing video</div>	<div>📅 2024/05/14 07:23:53 PM</div>	▼
1715701100	<div>📺 Video is ready</div>	<div>📅 2024/05/14 03:38:23 PM</div>	▼
1715645748	<div>📺 Processing video</div>	<div>📅 2024/05/14 12:15:51 AM</div>	▼

Single Prompt Tracking Detail:

The user can see the detailed status of a single prompt and even access the video/wav/blend file generated. Go to CloudWatch logs and also view/download the JSON.



⌚ Prompt Entry

📈 Prompt Tracking

← Logout

Prompt Tracking

Search with ID..

Keep track of all your prompts

1715776815

📺 Processing video

📅 2024/05/15 12:40:18 PM

⬆

📄 JSON ID : 1715776815

📅 2024/05/15 12:40:18 PM

📄 Blend File : Generating

📄 Wave File : Generating

📄 CloudWatch Logs, Overview : [Go to CloudWatch Logs](#)

📄 CloudWatch Logs, SceneIO : [Go to CloudWatch Logs](#)

📄 Complete Status : Pending

📺 Generated Video : Pending

📄 View JSON

📄

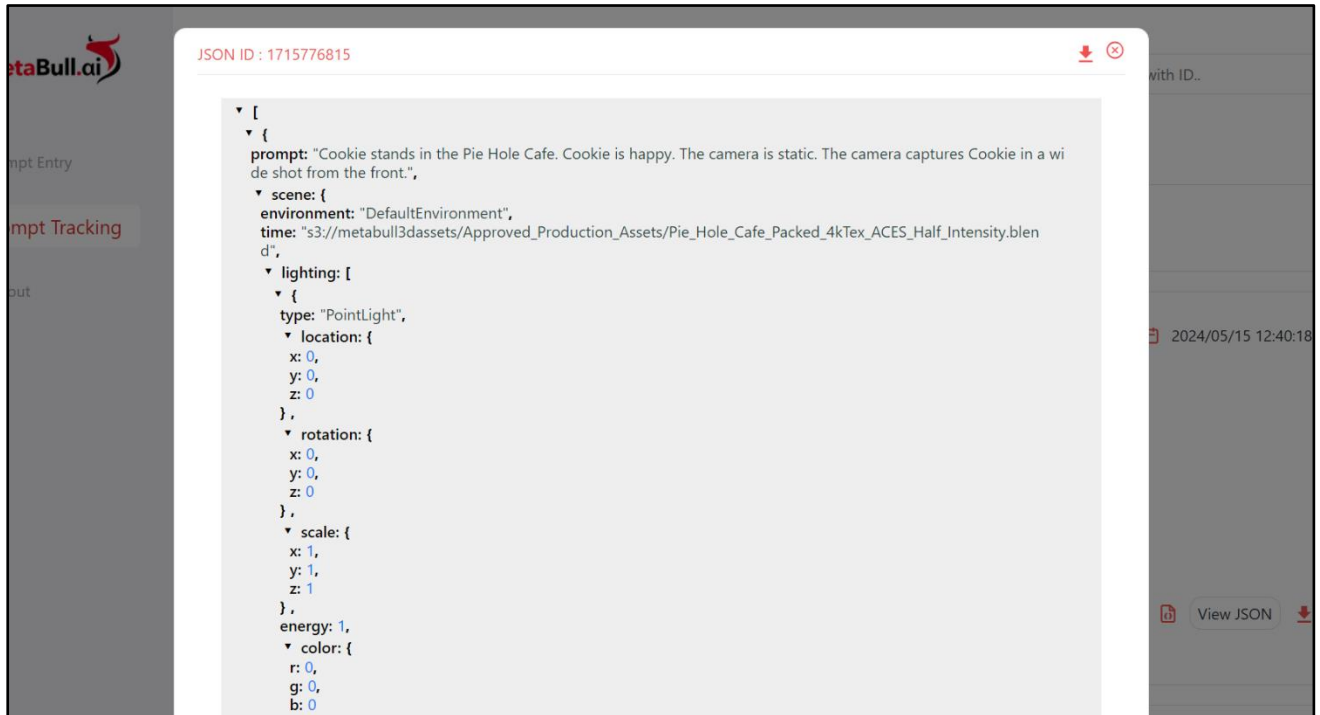
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Single Prompt Details Json Modal:

The JSON generated can be viewed in a modal window.



❖ System architecture

The system architecture refers to the structural design of the software or platform being developed, detailing how various components interact and function together to achieve the project's objectives.

1. **Frontend Interface:** This component includes the user interface (UI) through which production house personnel interact with the platform. It is a web application.
2. **Backend Infrastructure:** This layer consists of servers, databases, and other backend systems that support the platform's functionality. It handles tasks such as data storage, processing, and communication between components.
3. **AI Algorithms and Models:** The core of the platform's intelligence, this component comprises machine learning algorithms and models for tasks such as script analysis, casting recommendations, scheduling optimization, and post-production editing assistance.
4. **APIs and Integration Points:** These are interfaces that allow the platform to interact with external systems and services. For example, integration with cloud storage services for media files, payment gateways for financial transactions, or third-party APIs for data enrichment.
5. **Security and Authentication:** This aspect ensures that the platform is secure and only accessible to authorized users. It includes mechanisms such as user authentication, role-based access control, encryption of sensitive data, and protection against common security threats.

6. **Scalability and Performance:** The architecture is designed to scale seamlessly as the user base grows and handle varying loads efficiently. This involves strategies such as load balancing, caching, and horizontal scaling of resources.
7. **Monitoring and Logging:** Implemented mechanisms to monitor the platform's performance, track usage metrics, and log system activities for troubleshooting and analysis purposes.
8. **Deployment and DevOps:** Processes and tools for deploying new releases of the platform, managing infrastructure, and automating development workflows. This includes continuous integration/continuous deployment (CI/CD) pipelines, containerization (e.g., Docker), and configuration management.

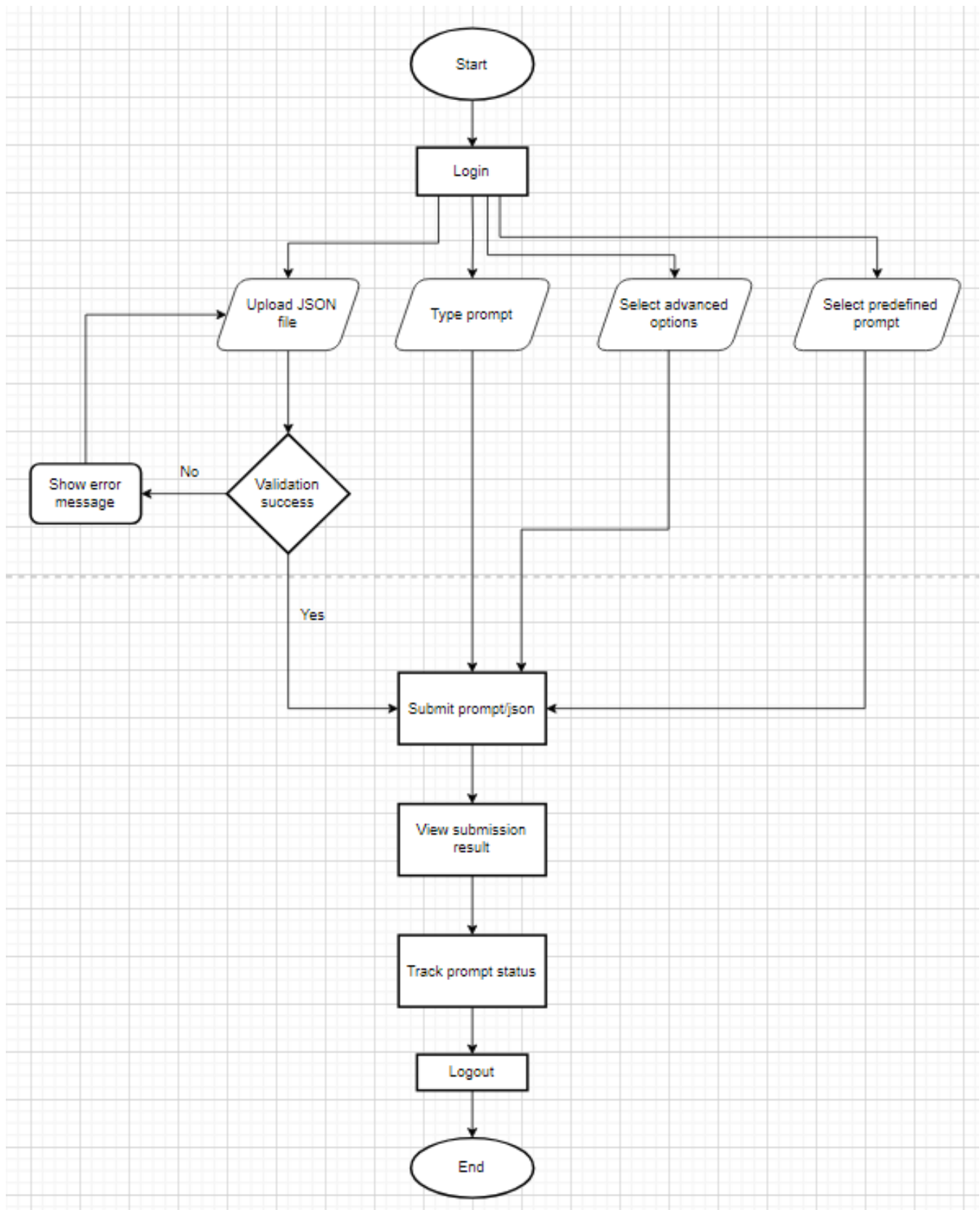
Major architectural components:

1. **Front-End Services:** This manages access to the system and processes the text prompt entered by the user. It uses React on the frontend and produces a JSON output from the initial prompt entry. This JSON is submitted to the AI Services.
2. **AI Services:** The microservices use the text prompt as their input. Each service then creates an output based on that input. The output (data) is added to the Production Decision List (PDL).
3. **Production Decision List (PDL):** It is a file of detailed instructions for assembling the 3D scene. Everything needed to assemble a particular scene is generated automatically by the

microservices and included in the PDL: the dialog, characters, objects, placement details, camera angles, etc. This output is in the form of data and links to assets. The PDL for a given scene/cut is saved automatically and a Lambda process to build the scene is triggered.

4. **SceneIO Module:** It uses MetaBull's proprietary code together with the data and links from the PDL to assemble each 3D scene. This assembly and related rendering is fully automated.

❖ System flowchart



Code Methodology

❖ **Code rules/guidelines/style**

- We use MUI and Bootstrap for Front-End design with React
- We also use ES-Lint for front-end
- For error handling we use try-catch block
- We also follow ES6 which is a scripting language specification that is standardized by ECMA Script International in ECMA-262 and ISO/IEC 16232. It is used by applications to enable Client-Side Scripting

Testing

❖ Unit Testing

Unit testing is a software testing technique where individual components or units of a software application are tested in isolation from the rest of the application.

Test ID	Case	Input Data	Expected Outcome	Actual Outcome	Result
1	Registration	Name Email Username Password	Successfully Register	Registration Successful	PASS
2	Registration	Name	Successfully Register	Shows empty fields error	FAIL
3	Login	Username Password	Login and redirect to Home page	Login Successful	PASS
4	Login	Username & wrong password	Login and redirect to Home page	Shows invalid credentials error	FAIL
5	Submit Prompt	Prompt Text	Submit prompt	Prompt submitted	PASS
6	Advanced Prompt	Prompt Options	Create prompt text using prompt options	Prompt text created	PASS
7	Predefined Prompt	Predefined prompt	View and submit predefined prompt	Viewed and submitted predefined prompt	PASS
8	Upload JSON	JSON file	Submit JSON file	Submitted successfully	PASS
9	Upload JSON	Empty/Invalid JSON	Submit JSON file	Shows invalid file error	FAIL
10	View prompt JSON	null	Able to view Formatted JSON of submitted prompt	JSON viewed	PASS
11	Logout	null	Log user out	User Logged out	PASS

Future Enhancement

❖ Future Enhancement

- We can show users a sample scene generated using the platform.
- We can give users the ability to further customize their prompt inputs.
- We can add more advanced and custom pre-defined prompts tailored according to the user.
- We can reduce the overall cost of cuts/scene generation by expanding the technical aspects of the platform.
- We can also reduce the time needed to produce a 3D scene or cut.
- We can do parallel processing to bulk create scenes reducing the wait time.

Bibliography & References

References are as follows:

- <https://react.dev/>
- <https://stackoverflow.com/>
- <https://mui.com/>
- <https://getbootstrap.com/>
- <https://ant.design>
- <https://npmjs.com>