- [x] ~~i. Prepare the detailed problem statement~~
- [x] ~~ii. Prepare the software requirement (functional, non-functional) specification for your project.~~
- [ ] iii. Explore different kinds of design for the interface and choose the optimal design in terms of user friendliness, like easy navigation, minimal clicks, neat design, and consistent layouts across all web pages that belong to the web application.
- [x] ~~iv. Identify the functionalities – say Login & Registration Module, Item Module, Payment Module, Logout Module~~
- [ ] vDesign and Develop appropriate the logic based on the study objectives
- [x] ~~vi. Implement and integrate module using modern JavaScript frameworks- NodeJS for Server and other client of your choice such as ReactJS, ExpressJS etc.~~
- [x] ~~vii. Use the new features of the tool for better functionalities~~
- [ ] viii. Document the features or techniques that were not used in your project and justify why it was not used. Suggest how it can be used in the future work
- [x] ~~ix. Submit a detailed report of your project~~

# Funded Project and Resource Tracking System


## Project Design and Specifications Document

**Version 2.0**

# Problem Statement

Every year, several SSNites face issues in submitting and receiving timely responses on their funded project proposals. There is no centralized system to apply, approve and track the progress of applications.

Furthermore, there is a need to track resources available with the department and repurpose them for upcoming projects with similar requirements, as opposed to granting funds to acquire redundant components.

# Proposed Solution

We propose a centralized online system to manage internally and externally funded projects in the college. The following aspects will be handled by the system:

## Updating Project Details on the Web-Application

The web-application can be used to update and track internal funding requests. In addition, it will serve as a repository to record the status of externally funded projects affiliated to the college.

## Internal Projects

Prior to approving funds and allocating resources, the internal funding committee can find resources already available with the department, allocate them to the project and grant funds only for components that aren't already available with the department.

Faculty and students applying for internal funding must update details and status of their applications, detailing aspects about the funding authority, domain of work, budget requested, etc.

Approved projects can then be used by the applicants to record regular progress, directly visible to the research cell. The final outcomes of the projects will be added to the project in the end and archived into the database.

Intermediate and final outcomes of the projects must also be updated by the applicants, and will be archived after completion.

Upon project completion, the newly acquired resources are inventorized on the system and submitted to the department.

### External Projects

Applicants applying for external funding must update details and status of their applications, detailing aspects about the funding authority, domain of work, budget requested, etc.

Intermediate and final outcomes of the projects must also be updated by the applicants, and will be archived after completion.

### Resource Management

The system also maintains a repository of project resources already available with the system. This includes the availability status of the resources.

The department can choose to allocate these resources to newly approved applicants, whilst approving funds for other requirements alone. This ensures efficient usage and economic repurposing of the college's resources.

Faculty/Students, upon project completion, will deposit the newly acquired components with the department. These items will be inventoried on the system for reuse in future.

### Report Generation

Summary statistics of applied and approved funding projects can be curated through the system based on multiple filtering criteria.

This can prove useful during research showcases and academic year progress presentations. Furthermore, it can be pivotal in auditing research and academic activities.

# Entity Description

Project types can be one of the following types:

- Externally funded projects
    - Faculty projects
- Internally funded projects
    - Internally Funded Faculty Projects
    - Internally Funded Student Projects

Proposal/Applications can be set to one of the following statuses:

- Applied

- Shortlisted for Presentation
- Approved
- Rejected

Approved projects are maintained as a separate repository with the following possible statuses:

- Ongoing
- Completed

Regular updates and final outcomes are recorded along with the completed projects before archival. Outcomes will be represented as:

- Publications
- Link to publications project OR DBLP/GScholar page
- Patents
- Forwarded to External Funding

Resource repository to inventory components already available, categorized as:

- Resources currently under use
- Available resources
- Faulty resources

Report generation with filters, such as:

- Calendar period
- Project members
- Project domain
- Budget
- Status

Status updation interface will contain:

- Status upgrades
- Email status triggers

# User Stories

## Open Access (Unauthenticated Guest User)

- View statistics
- Generate reports and graphs
- View approved projects list

## Admin

- User and Database administration
- Status updation of applicants

## Applicant - Faculty/Student

- Updates information about funding applications on the portal
- Updates progress of projects on the web-application
- Records final outcome of projects

## Resource Manager

- Updates status and inventories resources when they are surrendered
- Monitors resource inventory managed on the website

# Software Requirements Specification

## Introduction

Research and development projects are commonly characterized by funding applications to support the project at its multiple stages. Such funding agencies exist within the university and as part of governmental organizations and other venture and incubation organizations.

Every year, several SSNites face issues in submitting and receiving timely responses on their funded project proposals. There is no centralized system to apply, approve and track the progress of applications.

Furthermore, in the case of funding within the university department, there is a need to track resources available with the department and repurpose them for upcoming projects with similar requirements, as opposed to granting funds to acquire redundant components.

We propose a centralized online system to manage internally and externally funded projects in the college. The following aspects will be handled by the system:

### Updating Project Details on the Web-Application

The web application can be used to update and track internal funding requests. In addition, it will serve as a repository to record the status of externally funded projects affiliated with the college.

### Internal Projects

Before approving funds and allocating resources, the internal funding committee can find resources already available with the department, allocate them to the project, and grant funds only for components that aren't already available with the department.

Faculty and students applying for internal funding must update details and status of their applications, detailing aspects about the funding authority, domain of work, the budget requested, etc. Approved projects can then be used by the applicants to record regular progress, directly visible to the research cell.

The final outcomes of the projects will be added to the project in the end and archived into the database. Intermediate and final outcomes of the projects must also be updated by the applicants and will be archived after completion. Upon project completion, the newly acquired resources are inventoried on the system and submitted to the department.

## External Projects

Applicants applying for external funding must update details and status of their applications, detailing aspects about the funding authority, domain of work, the budget requested, etc. Intermediate and final outcomes of the projects must also be updated by the applicants and will be archived after completion.

## Resource Management

The system also maintains a repository of project resources already available with the system. This includes the availability status of the resources. The department can choose to allocate these resources to newly approved applicants, whilst approving funds for other requirements alone. This ensures efficient usage and economic repurposing of the college's resources.

Faculty/Students, upon project completion, will deposit the newly acquired components with the department. These items will be inventoried on the system for reuse in the future.

## Report Generation

Summary statistics of applied and approved funding projects can be curated through the system based on multiple filtering criteria.

# Entity Description

1. Project types can be one of:
    - Externally funded projects
    - Faculty projects
    - Internally funded projects
    - Internally Funded Faculty Projects
    - Internally Funded Student Projects

2. Proposal/Applications can be set to one of the following statuses:
    - Applied
    - Shortlisted for Presentation
    - Approved
    - Rejected

3. Approved projects are maintained as a separate repository with the following possible statuses:
    - Ongoing
    - Completed

4. Regular updates and outcomes are recorded along with the completed projects before archival.

5. Outcomes will be represented as:

- Publications
- Link to publications project OR DBLP/GScholar page
- Patents
- Forwarded to External Funding

6. Resource repository to inventory components already available, categorized as:
    - Resources currently underuse
    - Available resources

7. Report generation with filters, such as:
    - Calendar period
    - Project
    - Members
    - Project
    - Domain
    - Budget
    - Status

8. Status updation interface

    To record and display the project updates through a centralized portal, that can be monitored by project mentors and the research cell as well.

## Purpose

The purpose of the **Software Requirements Specification** (SRS) document is to describe the external behavior of the Funded Project Tracking System proposed here. This specification defines and describes the operations, interfaces, performance, and quality assurance requirements of the Funded Project Tracker. The document also describes the non-functional requirements such as the user interfaces. It also describes the design constraints that are to be considered when the system is to be designed, and other factors necessary to provide a complete and comprehensive description of the requirements for the software. The Software Requirements Specification (SRS) captures the complete software requirements for the system, or a portion of the system.

## Scope

The Online Funded Project Tracker that is to be developed exposes a centralized online system for faculty and students to manage internally and externally funded projects in the college. The following aspects and features will be handled by the system:

- An *unauthenticated guest* user can:
    - view funding statistics
    - generate reports and graphs of applicant-wise stats
    - view approved projects list

- An *admin* user can:
    - perform user and database administration
    - update status of applicants
- An *applicant faculty/student* user can:
    - update information about funding applications on the web-application
    - update progress of projects on the web-application Records final outcome of projects
- A *resource manager* user can:
    - update status and inventories of resources when they are surrendered
    - monitor resource inventory stored on the web-application

The features that are described in this document are used in the future phases of the software development cycle. The features described here meet the needs of all the users. The success criteria for the system is based on the level up to which the features described in this document are implemented in the system.

## Definitions, Acronyms, and Abbreviations

- SSN - Sri Sivasubramaniya Nadar College of Engineering
- CSE - Computer Science and Engineering
- IFSP - Internally Funded Student Project
- IFFP - Internal Funded Faculty Project
- FPT - Funded Project Tracker

## References

This SRS document uses the following documents as references:

**Problem Statement Specification**: To specify the existing system, its pitfalls and the proposed solution along with entity descriptions and user stories are presented in the problem statement document stored here: https://www.github.com/karthik-d/Funded-Project-Tracker

**Current State of Funded Project Listings**: SSN's official website features a basic tabular display of all funded project details. This listing is basic in its functionality and does not allow resource reallocation. This webpage can be found here:

https://www.ssn.edu.in/college-of-engineering/it-newsletter-faculty-internal-funded-projects/

## Overview

This SRS will provide a detailed description of the FPT System. This document will provide the outline of the requirements, an overview of the characteristics and constraints of the system.

The next section of the SRS will provide the general factors that affect the product and its requirements. It provides the background for those requirements. The items such as product perspective, product function, user characteristics, constraints, assumptions and dependencies, and requirements subsets are described in this section.

The final section of SRS contains all the software requirements mentioned in section 2 in detail sufficient enough to enable designers to design the system to satisfy the requirements and testers to test if the system satisfies those requirements.

## Overall Description

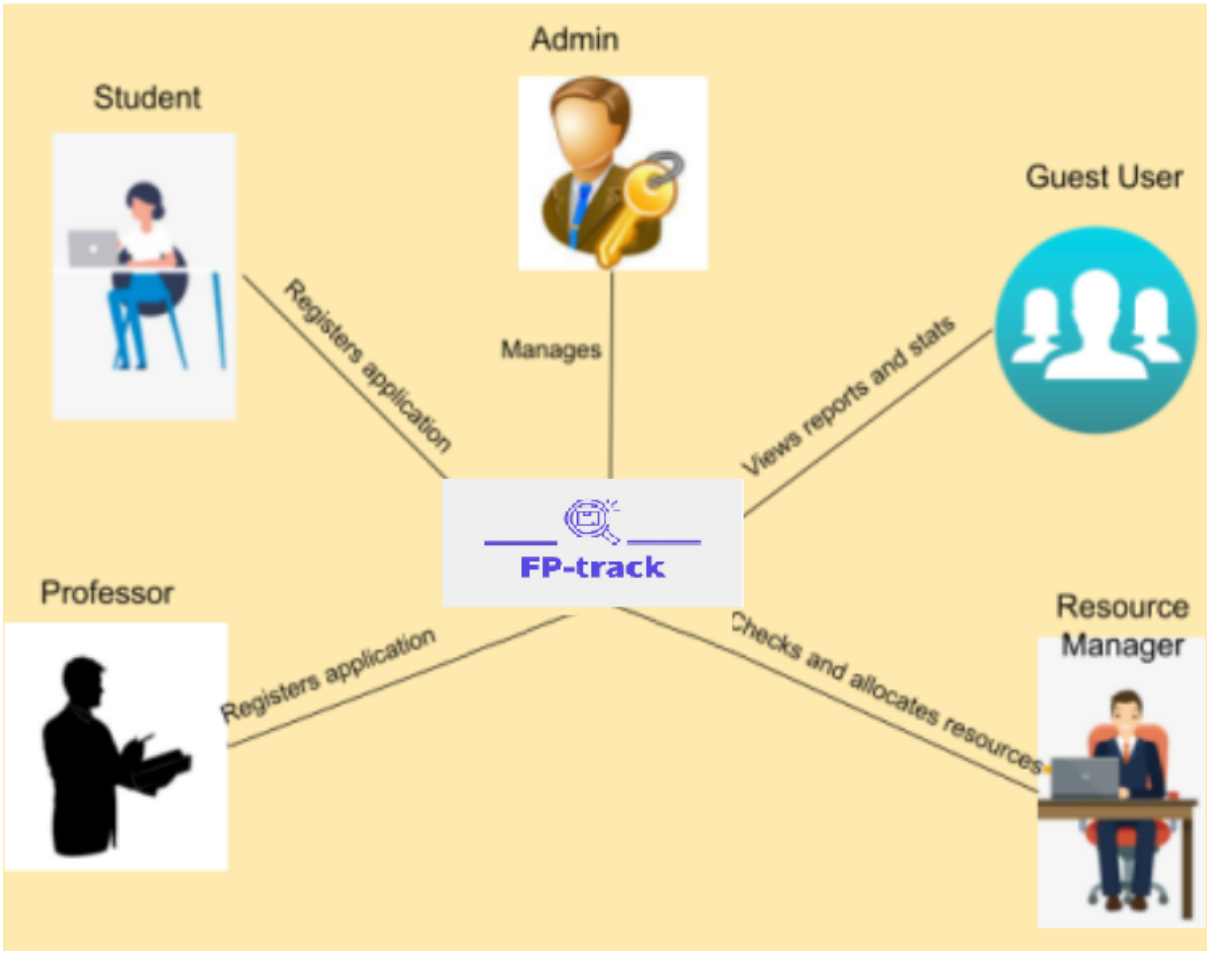
### Product Perspective

The project tracking system is a package that will be used by students as well as faculty members to upload their project ideas and get the appropriate resources required for the project. The system developed will be used by the SSN College of Engineering to manage the Internally funded projects.

The product to be developed has interactions with the following users:

- Student applying for funding
- Faculty applying for funding
- Resource manager
- Admin
- Guest user

The complete overview of the system is as shown in the overview diagram below:




## Product Functions

The Funded Project Tracking system provides online real-time information about the projects and resources for components available with the department and serves as a repository for project status and outcomes. The Product functions are more or less the same as described in the product perspective. The functions of the system include the system providing different types of services based on the type of users.

Provisions for the student/faculty to record their funding applications and project updates on the web-application and ultimately, link their outcomes on the centralized portal. Upon approval by the scrutiny team, the resource manager at the department can reallocate available resources and approve the budget for the remaining components alone.

Website visitors will be provided an interface to view all ongoing internally and externally funded project activities along with updates and outcomes that can be filtered by calendar period, project supervisor, members, domain and budget, and also generate customized reports.

The system uses the University's Google One membership to authenticate users into the system to secure access to the facility to the users.

## User characteristics

The users of the system are students, faculty, and resource manager (who is also a delegated faculty) of the university along with administrators who maintain the system. All the users are assumed to have a basic working knowledge of computers and surfing through web pages.

The administrators of the system are expected to have more knowledge of the internals of the system and can rectify the small problems that may arise due to disk crashes, power failures, and other catastrophes to maintain the system.

The proper user interface, users manual, online help, and the guide to install and maintain the system must be sufficient to educate the users on how to use the system without any problems.

## Constraints

- The information of all the faculty/students must be stored in a database that is accessible by the FPT system. This can be linked to the Google Organization account.
- The FPT system is connected to the university intranet and is running throughout the day.
- The users can access the FPT system from any computer that is connected to SSN's intra-network.
- The users must have their correct usernames and passwords to sign in to their organizational accounts hosted on Google One.

## Assumptions and Dependencies

- The users have sufficient knowledge of computers.
- The students/faculty must update details of their funded project applications and status on the web-application
- The department's computer should have Internet connection and Internet server capabilities at least sufficient to connect to the local intra-network
- The project outcomes must be specified by the project stakeholders or the web administrator

# Specific Requirements

This section describes in detail all the functional and non-functional requirements of the system.

## Functional

### Updating Project Details on the Web-Application

The web-application can be used to update and track internal funding requests. In addition, it will serve as a repository to record the status of externally funded projects affiliated to the college.

### Internal Projects Management

Prior to approving funds and allocating resources, the internal funding committee can find resources already available with the department, allocate them to the project and grant funds only for components that aren't already available with the department.

Faculty and students applying for internal funding must update details and status of their applications, detailing aspects about the funding authority, domain of work, budget requested, etc.

Approved projects can then be used by the applicants to record regular progress, directly visible to the research cell. The final outcomes of the projects will be added to the project in the end and archived into the database.

Intermediate and final outcomes of the projects must also be updated by the applicants, and will be archived after completion.

Upon project completion, the newly acquired resources are inventorized on the system and submitted to the department.

### External Projects Management

Applicants applying for external funding must update details and status of their applications, detailing aspects about the funding authority, domain of work, budget requested, etc.

Intermediate and final outcomes of the projects must also be updated by the applicants, and will be archived after completion.

### Resource Management

The system also maintains a repository of project resources already available with the system. This includes the availability status of the resources.

The department can choose to allocate these resources to newly approved applicants, whilst approving funds for other requirements alone. This ensures efficient usage and economic repurposing of the college's resources.

Faculty/Students, upon project completion, will deposit the newly acquired components with the department. These items will be inventoried on the system for reuse in future.

### Report Generation

Summary statistics of applied and approved funding projects can be curated through the system based on multiple filtering criteria.

This can prove useful during research showcases and academic year progress presentations. Furthermore, it can be pivotal in auditing research and academic activities.

### Login Capabilities

The system shall provide the users (students and faculty) with login capabilities through Google OAuth

### Mobile Devices

The Project Tracking System will also be supported on mobile devices such as cell phones.

### Alerts

The system can alert the admin in case of any ambiguity or problem with the system

## Non-Functional

### Usability

- The system shall allow the users to access the system from the Internet using HTML or its derivative technologies. The system uses a web browser as an interface.
- Since all users are familiar with the general usage of browsers, no specific training is required.
- The system is user-friendly and self-explanatory.

### Reliability

The system has to be very reliable due to the importance of data and the damages incorrect or incomplete data can do.

**Availability**

The system is available 100% for the user and is used 24 hrs a day and 365 days a year. The system shall be operational 24 hours a day and 7 days a week.

**Accuracy**

The accuracy of the system is limited by the accuracy of the speed at which the students and faculty use the system

**Access Reliability**

The system shall provide 100% access reliability.

**Resource Utilization**

The resource inventory is updated based on the active projects and the projects that have been completed.

**Supportability**

The system designers shall take into consideration the following supportability and technical limitations.

**Internet Protocols**

The system shall comply with the TCP/IP protocol standards and shall be designed accordingly.

**Information Security Requirement**

The system shall support the FPT information security requirements and use the same standard as the FPT information security requirements.

**Maintenance**

The maintenance of the system shall be done as per the maintenance contract.

**Standards**

The coding standards and naming conventions will be as per the Indian and US standards.

**Performance**

- **Response Time**

  The information page should be able to be downloaded quickly and details must be updated in real time at regular intervals. The information is refreshed every two minutes. The access time for a mobile device should be less than a minute. The system shall respond to the member in not less than two seconds from the time of the request submission. The system shall be allowed to take more time when doing large processing jobs.

- **Throughput**

The number of transactions is directly dependent on the number of users, who may be the administrators, students, and also the faculty who use the portal

- **Capacity**

  The system should at least handle 250 users at a time.

- **Resource Utilization**

  The resources are modified according to the user requirements and also according to the requests of the users, if possible

## Design Constraints

### Software Language Used

The languages that shall be used for coding the FPT System are Node.js, MongoDB, HTML/CSS, JavaScript.

### Development Tools

Will make use of the available Visual Studio Code and will be version controlled with Github.

### Class Libraries

Will make use of the existing libraries available for Express.js, Mongoose, Tailwind CSS and Bootstrap.

### Online User Documentation and Help System Requirements

Online help is provided for each of the features available with the Funded Project Tracking System. The nature of these systems is unique to application development as they combine aspects of programming (hyperlinks, etc) with aspects of technical writing (organization, presentation).

The User Manual describes the use of the system to librarians and Employees. It describes the use of the system on mobile systems. The user manual should be available as a hard copy and also as online help.

An installation document will be provided that includes the installation instructions and configuration guidelines, which is important to a full solution offering. Also, a readme file is typically included as a standard component. The Read Me includes a “What’s New With This Release” section, and a discussion of compatibility issues with earlier releases. Most users also appreciate documentation defining any known bugs and workarounds in the readme file

# Interfaces

## User Interfaces

Will make use of the existing Web Browsers such as Google Chrome, Mozilla Firefox, Microsoft Edge or Safari. The user interface of the system shall be designed as shown in the user-interface prototypes.

## Hardware Interfaces

The existing Local Area Network (LAN) will be used for collecting data from the users.

## Software Interfaces

A firewall will be used with the server to prevent unauthorized access to the system.

## Communications Interfaces

The Funded Project Tracking System will be connected to the Intranet services of the university.

## Licensing Requirements

The usage is restricted to only Dept. of CSE at SSN College of Engineering, Chennai.

## Legal, Copyright, and Other Notices

The FP Tracking system is a trademark of the CSE department at SSN College of Engineering and cannot be used without its consent.

## Applicable Standards

The ISO/IEC 6592 guidelines for the documentation of computer-based application systems will be followed.

## Supporting Information

The use-case storyboards or the user-interface prototypes are not available.

## Design Strategies Adopted (refer to this)

# Modules Implemented

## Identification of Modules

### Conceptual Real-World Entity Category List

| Conceptual Class Category | Description |
|---|---|
| Functional Unit | Non-tangible unit of functional purpose that may not be physically perceived but contributes to the development of an intellectual (and/or) perceptible system |
| Documents | Piece of printed matter that serves as a record |
| Records | An account of the data |
| Physical Tangible Objects | Objects that can be touched or felt |
| Roles of People | Set of behaviors among the people with respect to the problem statement |
| Place | A particular position, point, or area in space |

### Identification of Real-World Entities

- Login Device
- Resource Allocation Record
- Resource
- Software resources
- Hardware resources
- Project
- Internal Project
- Internal Faculty Project
- Internal Student Project
- External Project
- Funding Organization

- User
- Person Name
- Department
- Admin
- Student/Faculty
- Guest User
- Resource manager
- Storage Room
- Storage Room In-Charge
- QR Code Scanner
- QR Code Label
- ID Card

## Elimination of Trivial Entities

| Noun Phrase | Elimination Reasoning |
|---|---|
| Person name | Is an attribute |
| Department | Is an attribute |
| Storage Room In-Charge | Duplicate of Resource Manager, Role |
| ID Card | Irrelevant to the scenario |
| Login Device | Irrelevant to the scenario |
| Funding Organization | Out of System Scope, Is an attribute |
| QR Code Scanner | Out of System Scope, Scanned ID used as attribute |
| QR Code Label | Out of System Scope, Contained ID used as attribute |

## Final List of Entities — Modeled as Modules

- Resource Allocation Record
- Resource

- Software Resources
- Hardware Resources
- Project
- Internal Project
- Internal Faculty Project
- Internal Student Project
- External Project
- User
- Admin
- Student/Faculty
- Guest User
- Resource manager
- Storage Room

## Categorization of Modules

| Class Name | Conceptual Class Category |
|---|---|
| Resource Allocation Record | Records, Documents |
| Resource | Functional Unit, Physical Tangible Object |
| Software Resource | Functional Unit |
| Hardware Resource | Physical Tangible Object |
| Project | Documents, Physical Tangible Object |
| Internal Project | Documents, Physical Tangible Object |
| Internal Student Project | Documents, Physical Tangible Object |
| External Student Project | Documents, Physical Tangible Object |
| External Project | Documents, Physical Tangible Object |
| User | Roles of People |

| | |
|---|---|
| Admin | Roles of People |
| Student | Roles of People |
| Faculty | Roles of People |
| Guest User | Roles of People |
| Resource Manager | Roles of People |
| Storage Room | Place |

## Identification of Associations between Modules

### Association Category list

An **association** is a relationship between (instances of) classes that indicates some meaningful and interesting connection. These are used to show relationships that need to be remembered and preserved for some duration

| Association Category | Description |
|---|---|
| B is a type of A | B inherits the properties of A and adds further functionality |
| A controls B | A controls and manages the operation of B and its contents |
| B describes A | B provides a detailed structured description of A |
| A is given to B | A is allocated to B for use and is expected to be released back |
| A belongs to B | B claims ownership over A |

### Associations Identified and Categorization

| Source (A) | End (B) | Relationship | Category |
|---|---|---|---|
| Resource Manager | Faculty | Generalization | B is a type of A |
| User | Resource Manager | Generalization | B is a type of A |
| User | Admin | Generalization | B is a type of A |
| User | Guest User | Generalization | B is a type of A |

| | | | |
|---|---|---|---|
| User | Student | Generalization | B is a type of A |
| User | Faculty | Generalization | B is a type of A |
| Resource Manager | Storage Room | Aggregation | A controls B |
| Storage Room | Resource | Aggregation | A contains B |
| Resource | Software Resource | Generalization | B is a type of A |
| Resource | Hardware Resource | Generalization | B is a type of A |
| Software Resource | Software Resource Details | Composition | B describes A |
| Hardware Resource | Hardware Resource Details | Composition | B describes A |
| Resource Allocation Record | Resource | Aggregation | A describes B |
| Resource Allocation Record | Resource Manager | Aggregation | A describes B |
| Resource Allocation Record | Internal Project | Aggregation | A is given to B |
| Project Record | Internal Project | Generalization | B is a type of A |
| Project Record | External Project | Generalization | B is a type of A |
| Internal Project | Internal Student Project | Generalization | B is a type of A |
| Internal Project | Internal Faculty Project | Generalization | B is a type of A |
| Project Record | Student | Aggregation | A belongs to B |
| Project Record | Faculty | Aggregation | A belongs to B |

# Definition of Associations and their notations

## Generalization

- Relationship that implements the concept of object orientation called inheritance. The generalization relationship occurs between two entities or objects, such that one entity is the parent, and the other one is the child.
- In UML modeling, a generalization relationship is a relationship that implements the concept of object orientation called inheritance
- The generalization relationship occurs between two entities or objects, such that one entity is the parent, and the other one is the child
- The child inherits the functionality of its parent and can access as well as update it
- Generalization relationship is utilized in class diagrams to specify that the child inherits actions, characteristics, and relationships from its parent

## Aggregation

- Represents an associative relationship where the child can exist independently of the parent.
- An aggregation is a subset of association, which represents has a relationship
- It is more specific then association
- It defines a part-whole or part-of relationship
- In this kind of relationship, the child class can exist independently of its parent class

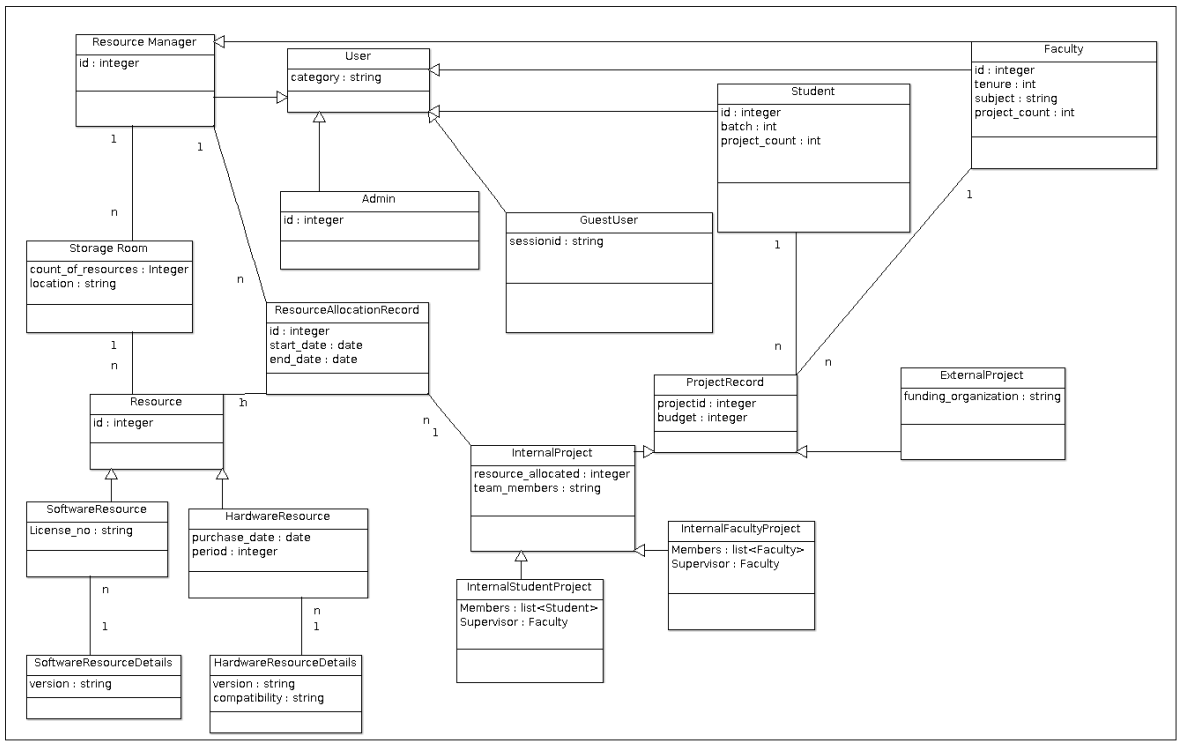
## Composition

- Represents an associative relationship where one object is the owner of another object and they are dependent on one another.
- The composition is a subset of aggregation
- It portrays the dependency between the parent and its child, which means if one part is
- deleted, then the other part also gets discarded
- It represents a whole-part relationship

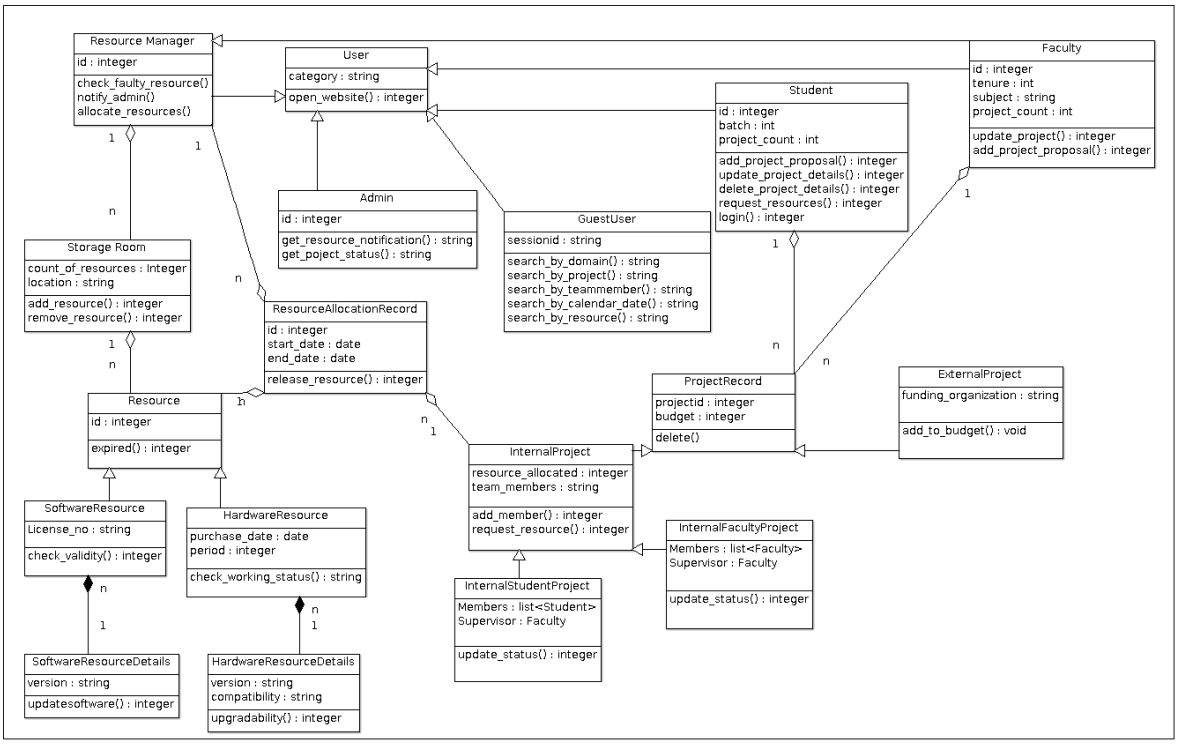
## Multiplicity Based Associations

- Multiplicity based associations
- Multiplicity defines how many instances of a class A can be associated with one instance
- of a class B
- It defines a specific range of allowable instances of attributes
- In case if a range is not specified, one is considered as a default multiplicity

# Domain View of Modules



# Elaborate View of Modules



# Logic Representation & Workflow Description

## Identified Workflows and System Logic

The following usage scenarios and consequent workflows of the system are identified for the Funded Project Tracking and Resource Management System.

### Main Workflow 1: Student/Faculty Registers Project

- Student or faculty member logs into the system
- System validates the log-in credentials
- They register details of the applied projects on the website
- The admin checks the validity of the submitted proposals
- After successful completion of IFP presentations, and the admin gets the approved projects from the Management, the admin updates the application status for the submitted proposals.
- The student/faculty gets notified of their project status

### Main Workflow 2: Request for Resources

- Once the applicant gets notified of their project approval, they file their request for the resources for their project.
- The resource manager logs into the system, and can view all the resource requests.
- The Resource manager accesses the inventory, and allocates for the requested resources.
- The admin and the applicant are notified about the allocations, and the corresponding data is updated in the project record by the system.
- The applicant can get the approved resources after mapping his profile with the resource through barcode and biometric/id mapping and use them in their project.

## Alternate Workflow 1: Student/Faculty Updates Project Progress

- The applicants can regularly update their project progress through our system
- The system validates the user by their log-in credentials
- The system automatically updates the corresponding project record in the database
- The System sends reminders if the project is at a stale point, and is not updated for a certain period of time.

## Alternate Workflow 2: Student/Faculty Records Project Completion

- The applicants log into the system and system validates them
- They provide their project outcome or project completion status to the system for the given project after regular updates done earlier.
- The system updates them to the corresponding project record automatically, and notifies the Resource manager, Admin.
- This is used for reclaiming the resources and the official documentation of the project's completion status.

## Alternate Workflow 3: Resource Manager Reclaim Resources

- Once the resource manager is notified of the project completion or resource completion.
- The resource manager gets back the allocated resources from the applicants and checks the conditions of the project.
- Then the resource manager accesses the inventory and update the resources through our system
- The system updates the project record automatically in the database
- The admin updates the IFP status as completed
- The project lead will then be notified for further formalities.

## Alternate Workflow 4: Resource Manager Reports Faulty Components

- Sometimes, a resource manager finds a faulty component in the inventory
- Then he updates the inventory and the faultiness is reported to the admin

- The admin gets notified about the faultiness of the corresponding resources mentioned by the resource manager
- The admin can further proceed to place orders or bring in domain experts to handle the problem.

### Alternate Workflow 5: Guest Generates/Views Reports

- The guest can view or generate the reports of the projects in our management system
- The reports consist all details entered by the applicants for their corresponding projects
- The dates, subject, and other important information is detailed in the reports
- This is used to generate yearly reports for the magazines , and other official documentation for the department.
- These reports can be generated from the database , as and when required.

### Alternate Workflow 6: Guest Searches for Projects

- The guest user can search their desired projects in our system
- They can search based on various filters
    - Search by domain
    - Search by members
    - Search by budget
    - Search by status
    - Search by calendar period
- The guest, or incoming project applicant uses this to extend their ideas and plan on the project ahead of time.
- The admin, uses this to reduce project replications

## Identification of Generic System States in the Workflow

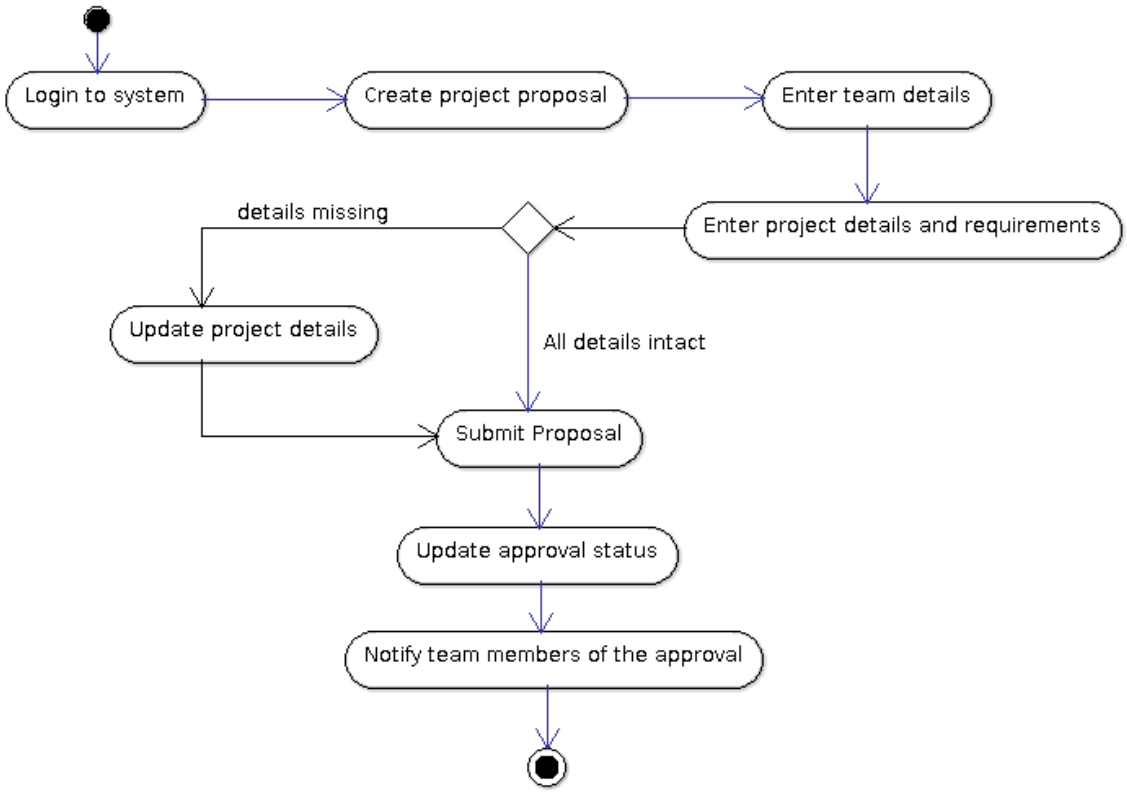
| Generic State Template | Container Workflows | Description |
|---|---|---|
| Details/Field | 1, 2, 3, 5 | State that persistently performs data |

| | | |
|---|---|---|
| Entry | | verification of entered fields and awaits completion of data entry in real-time |
| Data Entry Review | 1, 2, 3, 5 | A review state that facilitates udpation/cancellation of the details entered for a specific workflow and allows forwarding or backtracking to its immediate states |
| Guest Session | 1, 2, 3, 4, 5 | A dashboard display with response action triggers for a guest user of the website. Also provides the endpoint to transition to a logged-in session |
| Logged-In Session | 1, 2, 3, 4, 5 | A dashboard display with response action triggers for a registered user of the website — student, faculty, resource manager or admin |
| Waiting For User Action | 1, 3 | State that requires manual intervention to continue to one of the next states on the corresponding workflow |
| Dispatching Notifications | 1, 3 | State that prepares and dispatches email and/or dashboard based notification of artifact updates to the concerned stakeholders |
| Request / Complaint Registration | 2, 3 | State that compiles entered data and creates an associated entry in the database for further processing |
| Displaying Summaries | 1, 2, 3, 4, 5 | State that displays a summary of success or failure for the particular workflow, at the end of all its elemental state transitions and activities |
| Update / Check Inventory | 3, 4, 5 | State that searches and interfaces the webpage with the inventory, almost always used only by the resource manager |
| Archiving Projects | 2 | State that converts and ongoing project record to a completed project archive, in the database |
| Retrieving | 2, 3 | State that interfaces the database to |

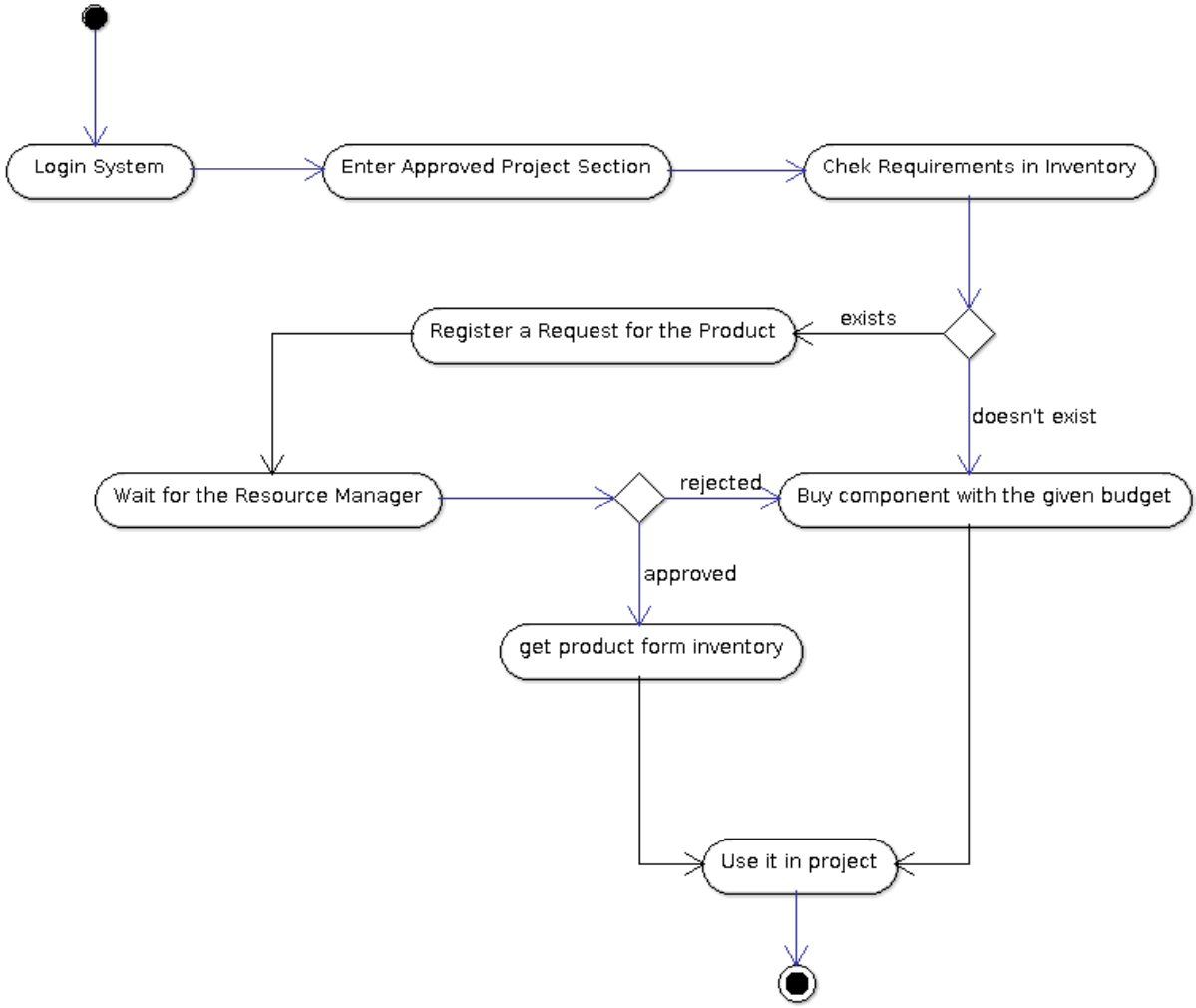
| | | |
|---|---|---|
| Projects | | retrieve projects based on search filter criteria and forwards the data for display or report generation |
| Generating Reports | 5 | State that parses details of a display page and prepares a downloadable and printable document format of the data, typically for audit, summary and statistical analysis purposes |

## Workflows — Flowchart Representation

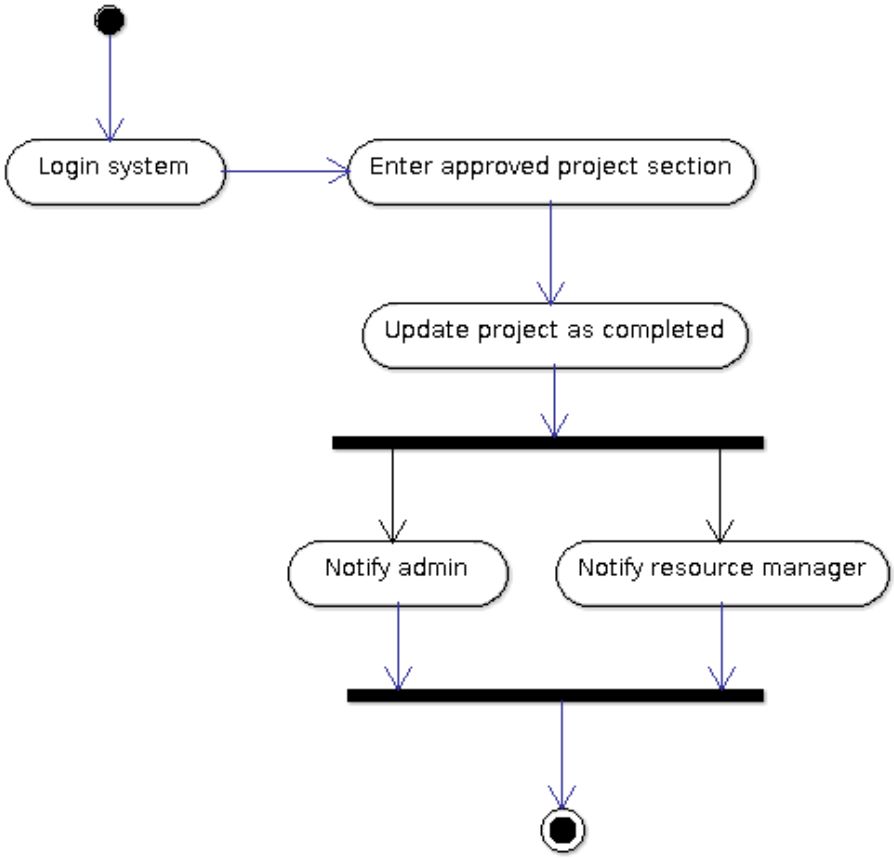
### Workflow 1: Record Project Application



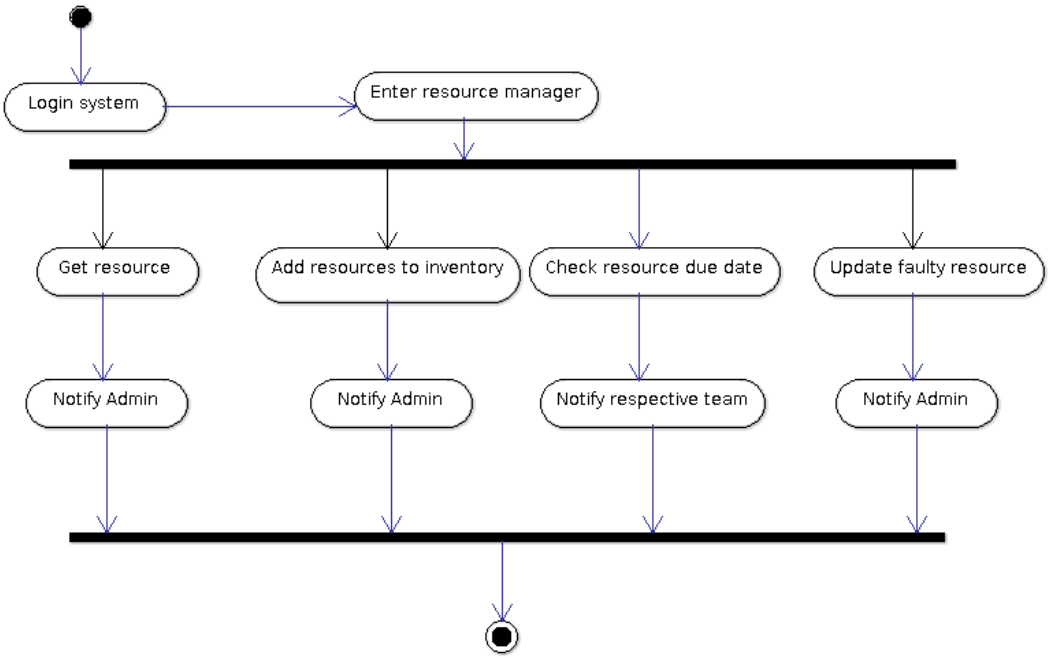
## Workflow 2: Resource Allocation Request



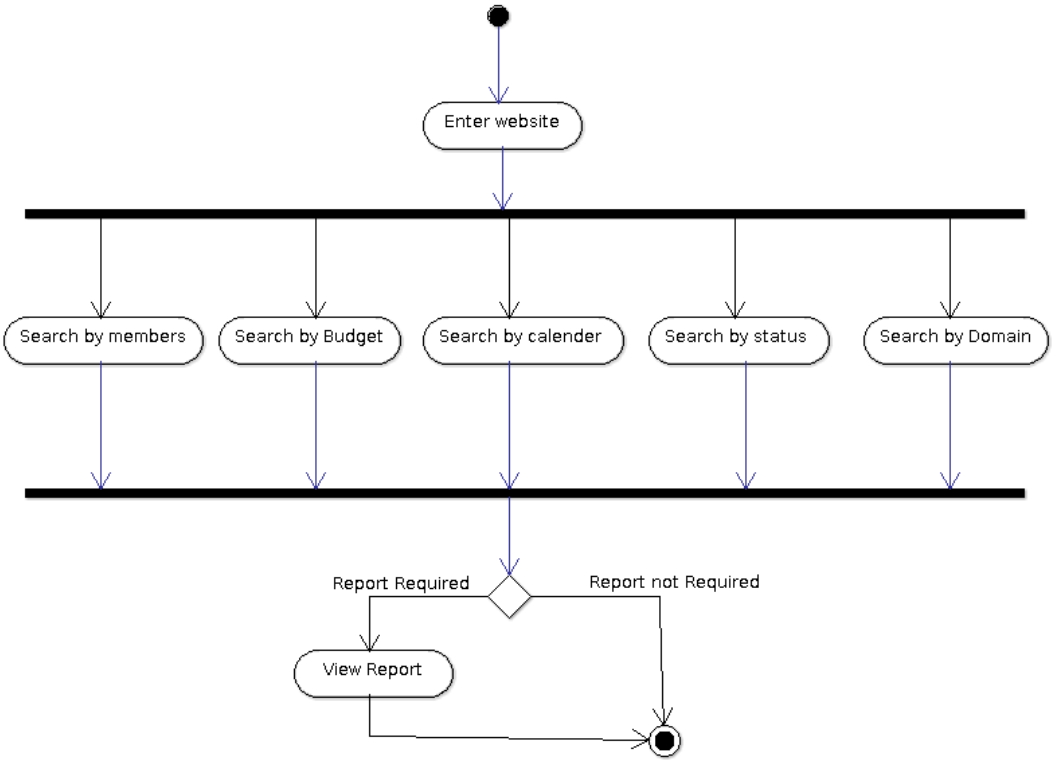
## Workflow 3: Project Milestones and Completion Updation



## Workflow 4: Resource Management

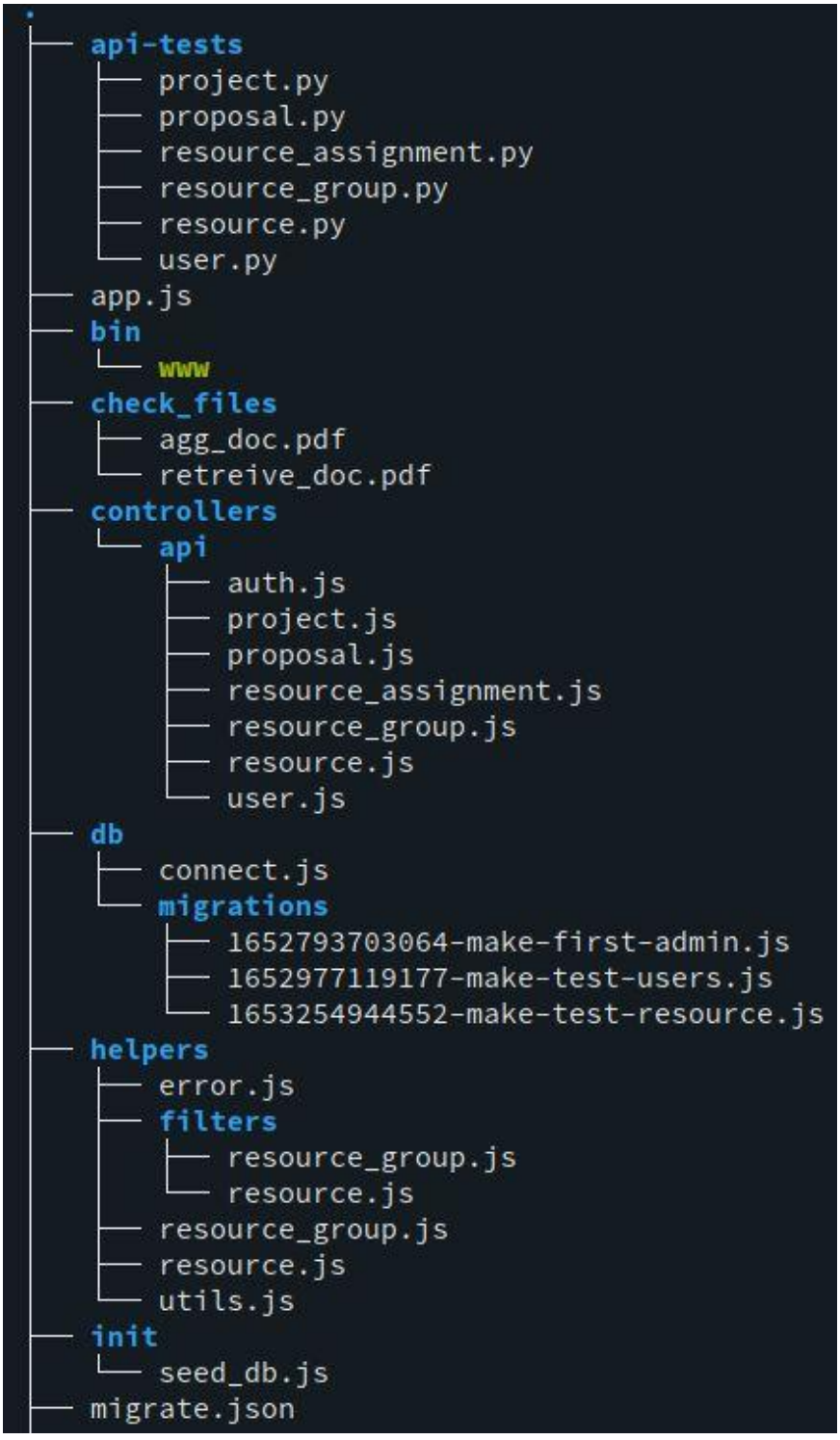



## Workflow 5: Project Search and Report Generation



# Components of the Integrated Implementation

Backend — NodeJS with Express


.
api-tests
project.py
proposal.py
resource_assignment.py
resource_group.py
resource.py
user.py
app.js
bin
www
check_files
agg_doc.pdf
retreive_doc.pdf
controllers
api
auth.js
project.js
proposal.js
resource_assignment.js
resource_group.js
resource.js
user.js
db
connect.js
migrations
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resource.js
resource_group.js
resource.js
utils.js
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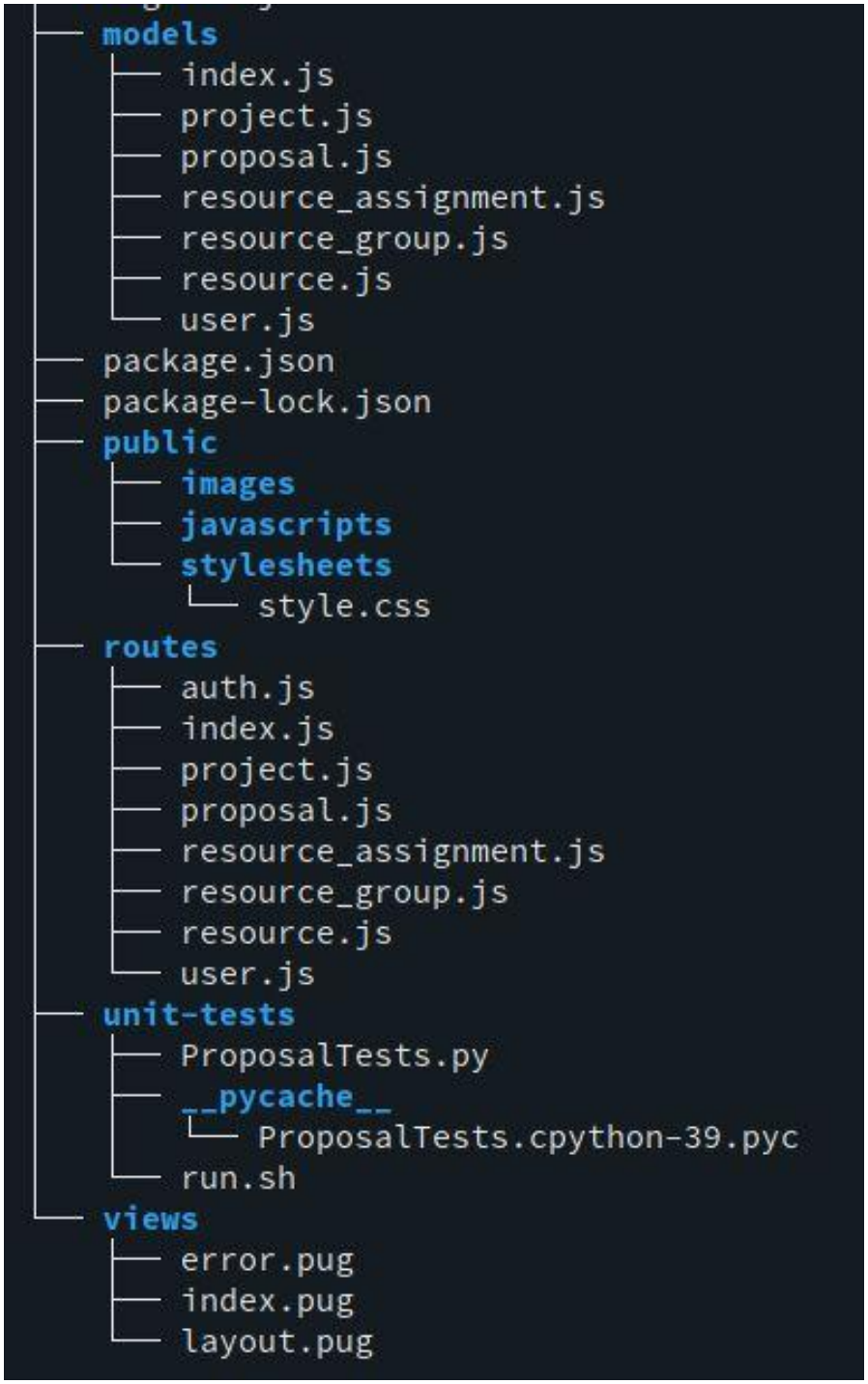
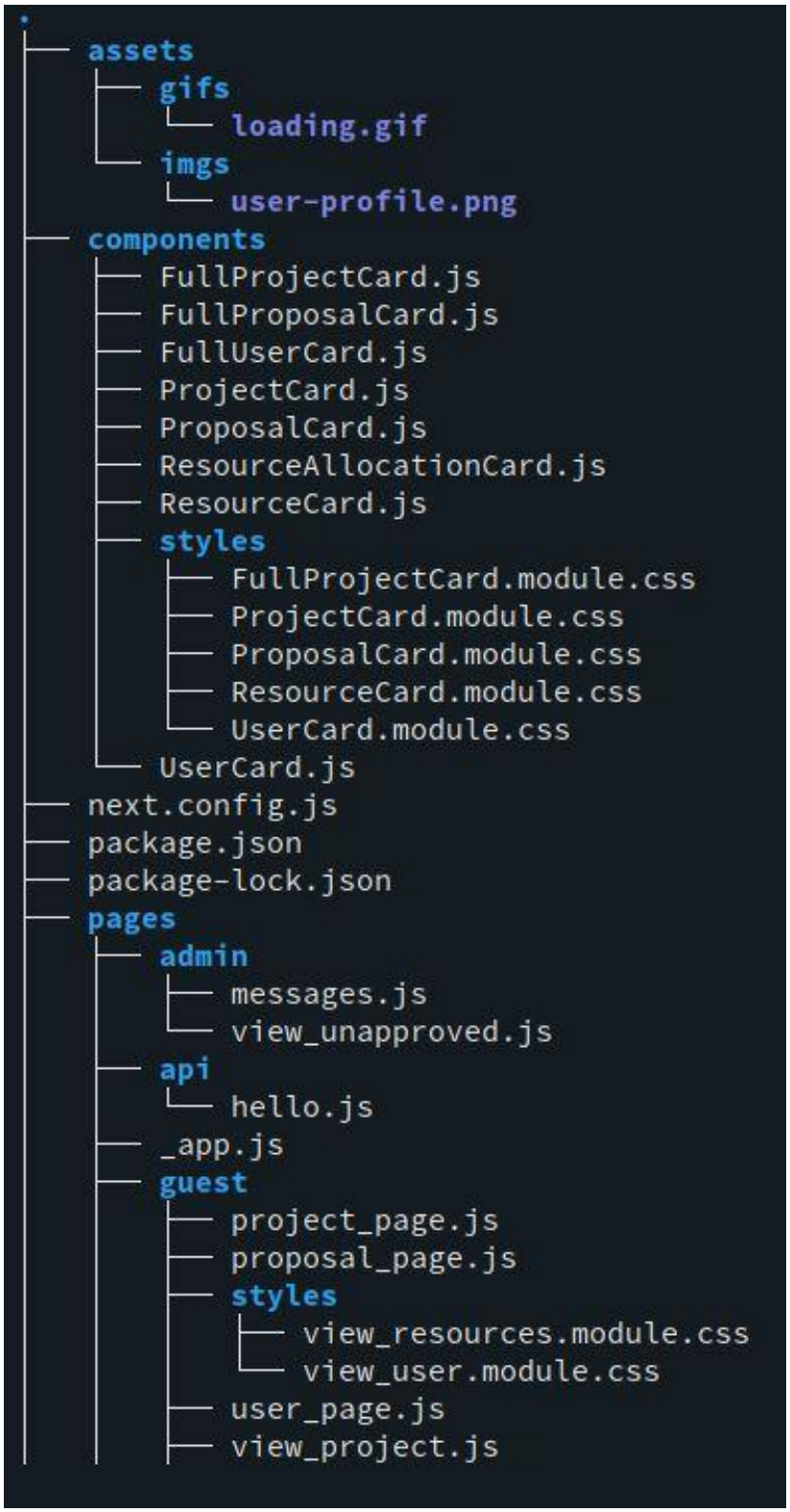
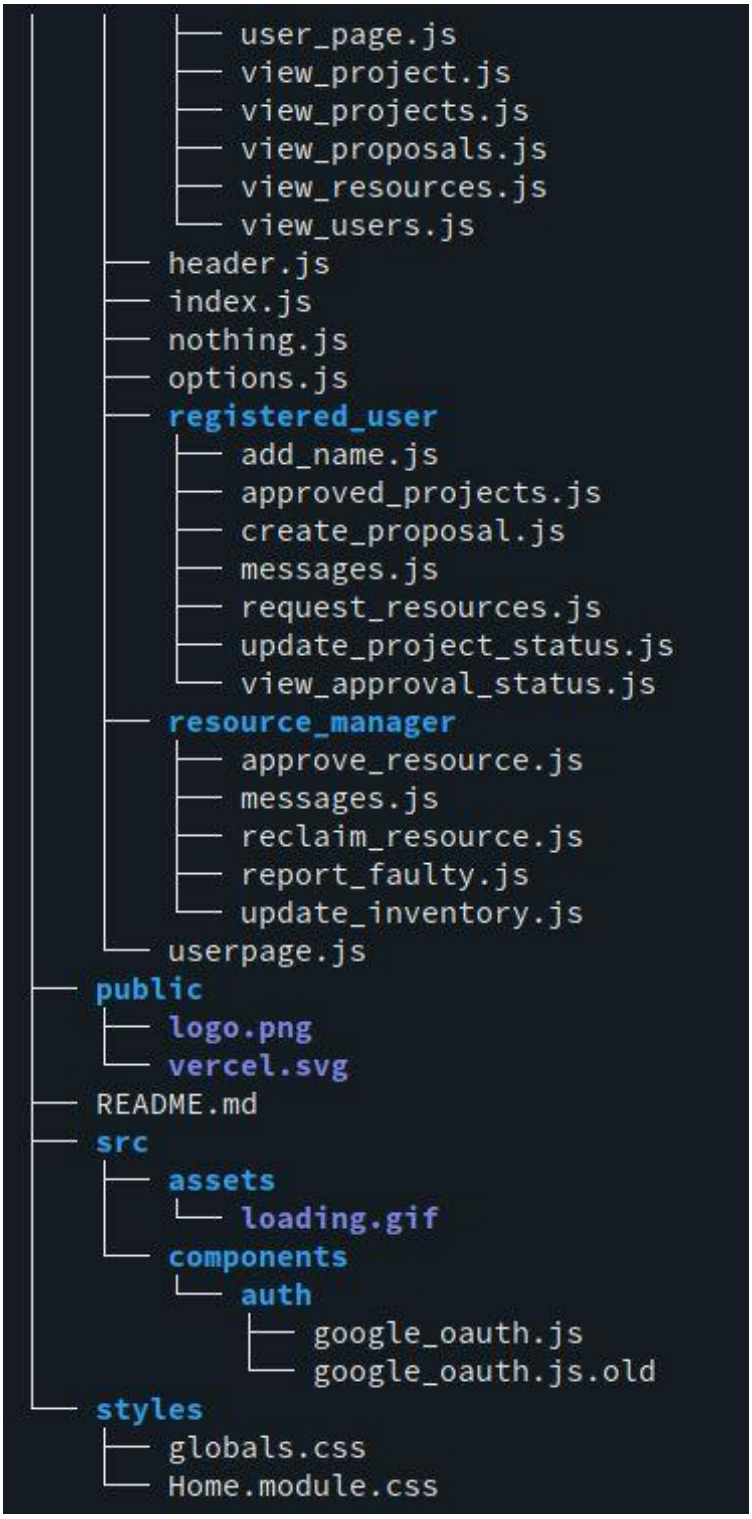
seed_db.js
migrate.json


models
index.js
project.js
proposal.js
resource_assignment.js
resource_group.js
resource.js
user.js
package.json
package-lock.json
public
images
javascripts
stylesheets
style.css
routes
auth.js
index.js
project.js
proposal.js
resource_assignment.js
resource_group.js
resource.js
user.js
unit-tests
ProposalTests.py
__pycache__
ProposalTests.cpython-39.pyc
run.sh
views
error.pug
index.pug
layout.pug

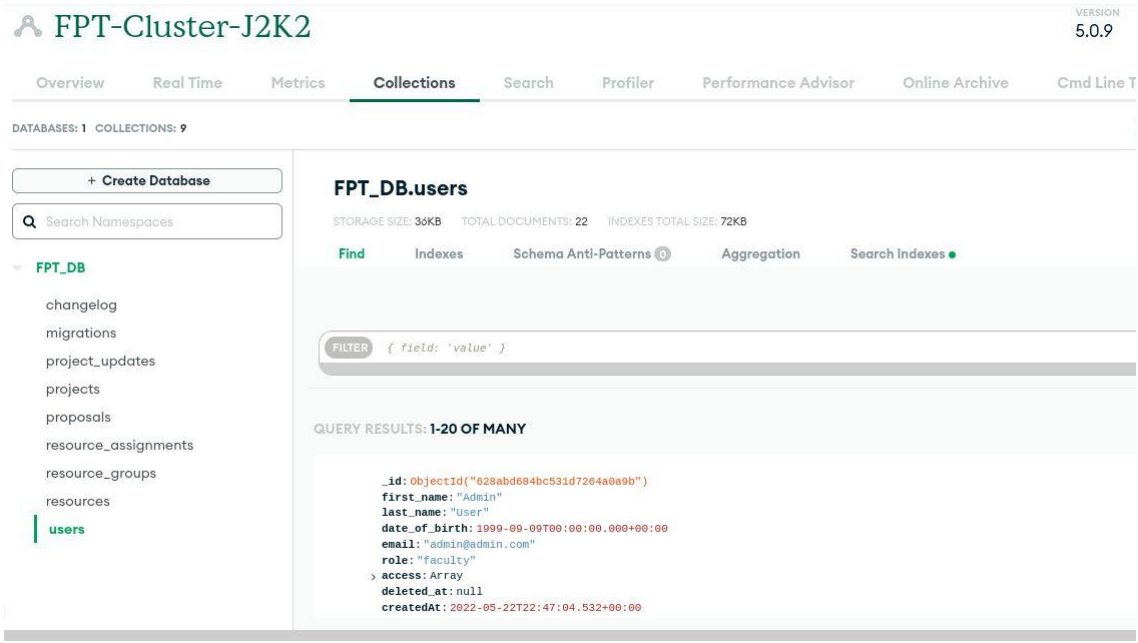
Frontend — ReactJS with Next



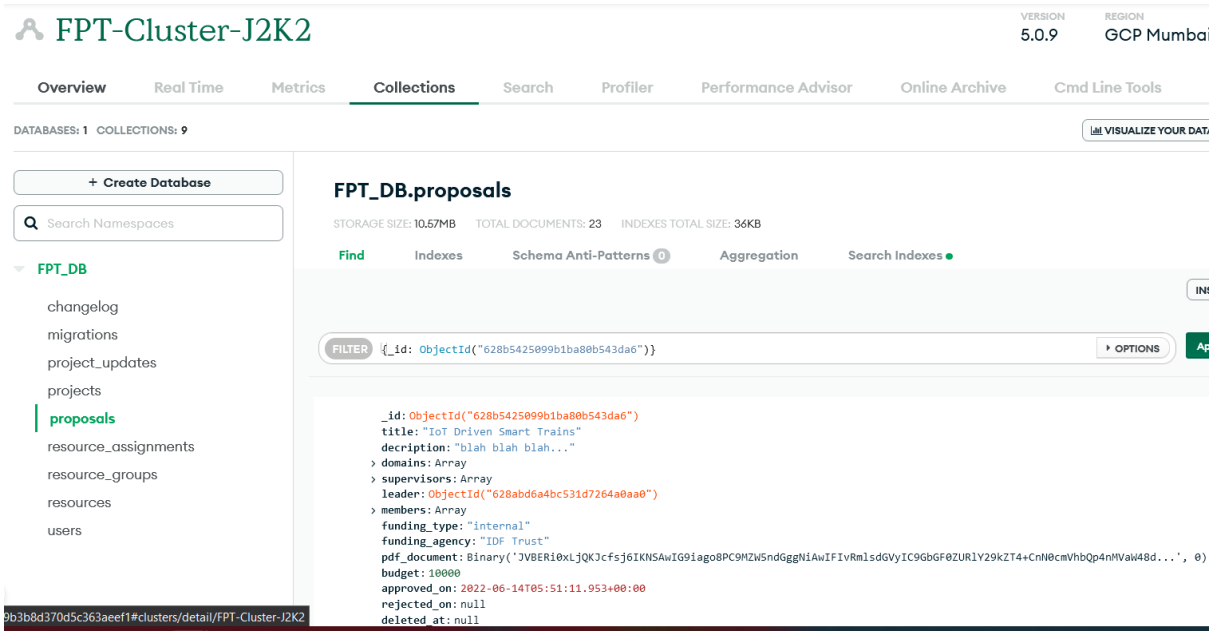

user_page.js
view_project.js
view_projects.js
view_proposals.js
view_resources.js
view_users.js
header.js
index.js
nothing.js
options.js
registered_user
add_name.js
approved_projects.js
create_proposal.js
messages.js
request_resources.js
update_project_status.js
view_approval_status.js
resource_manager
approve_resource.js
messages.js
reclaim_resource.js
report_faulty.js
update_inventory.js
userpage.js
public
logo.png
vercel.svg
README.md
src
assets
loading.gif
components
auth
google_oauth.js
google_oauth.js.old
styles
globals.css
Home.module.css

# Remote Database — MongoDB

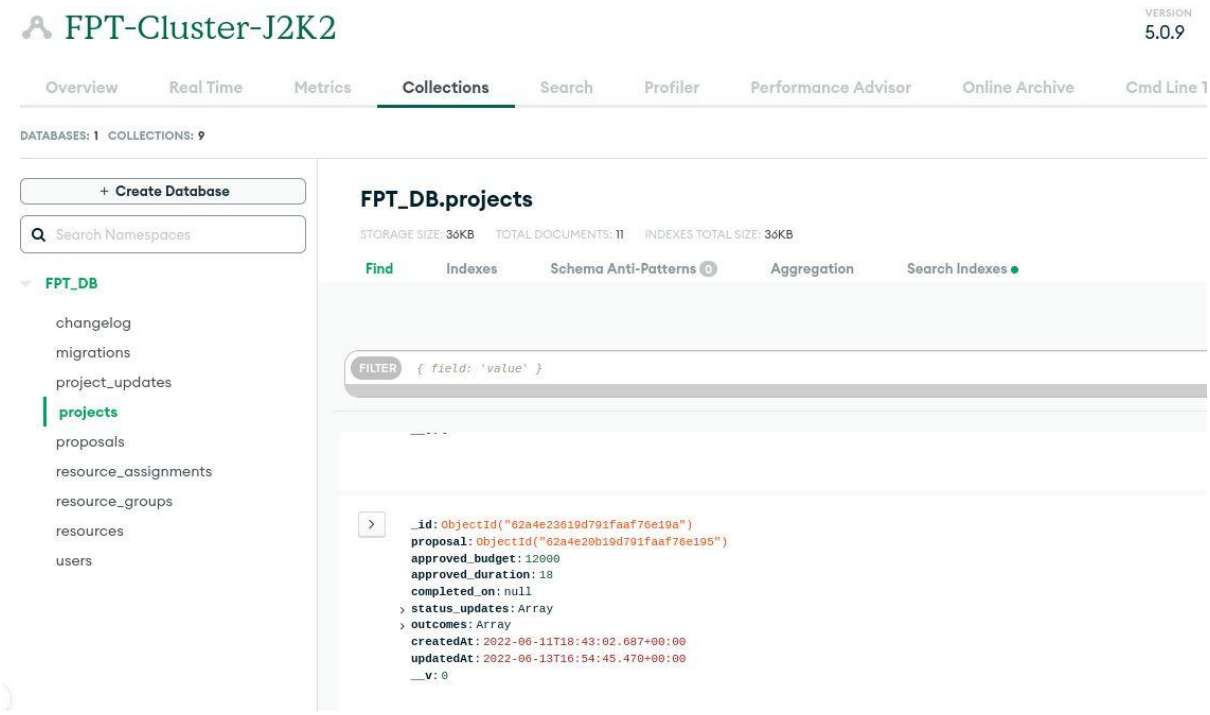
## Users



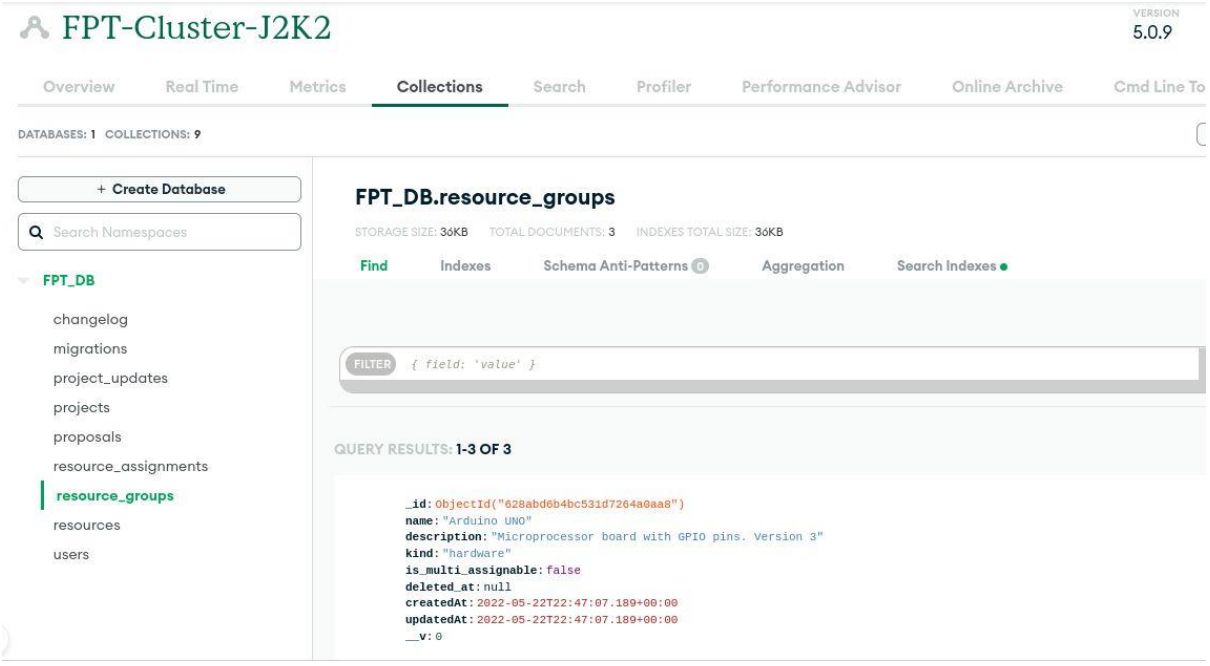

## Proposals



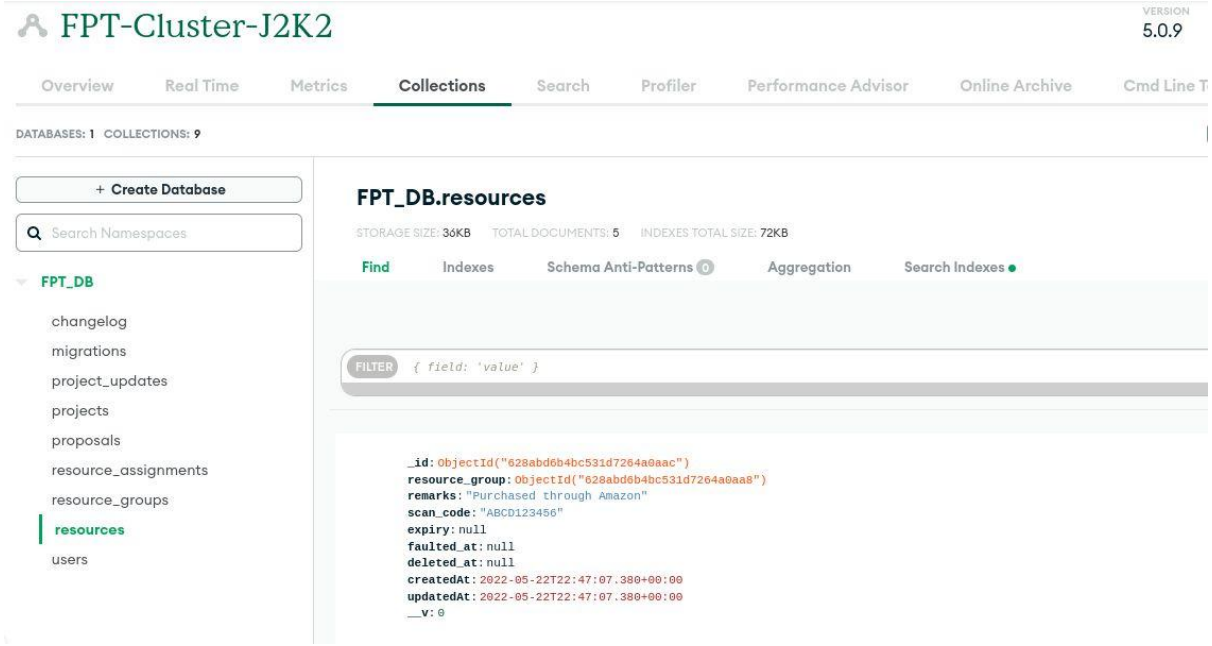
## Projects



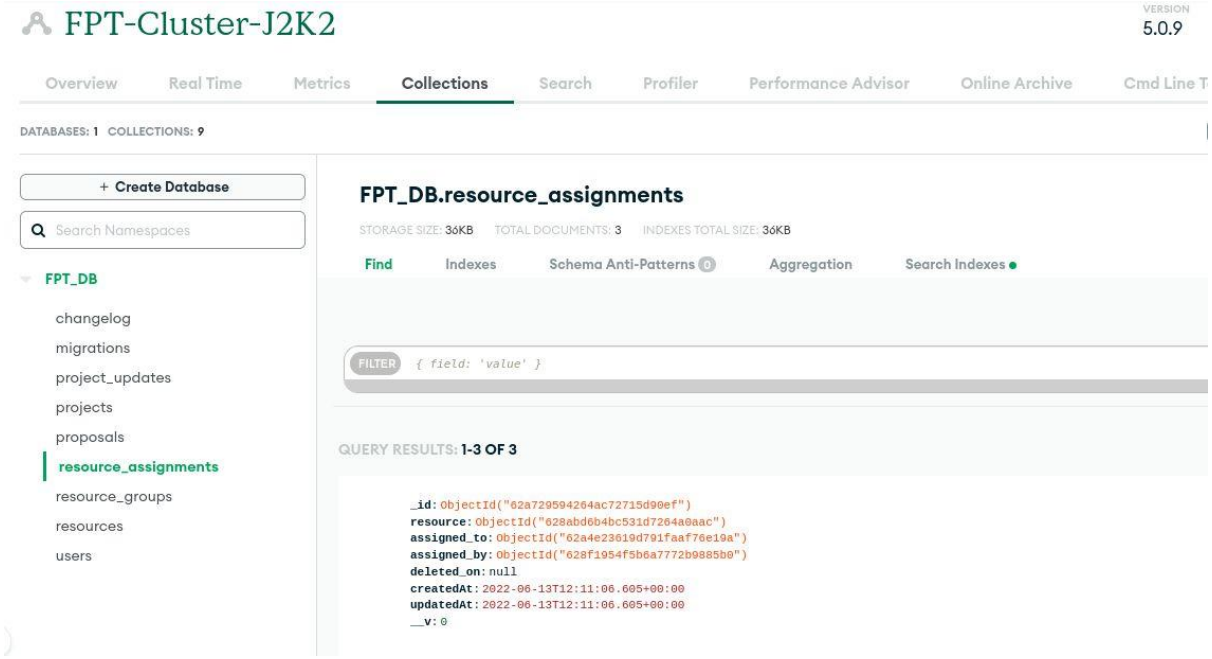

## Resource Groups



## Resources

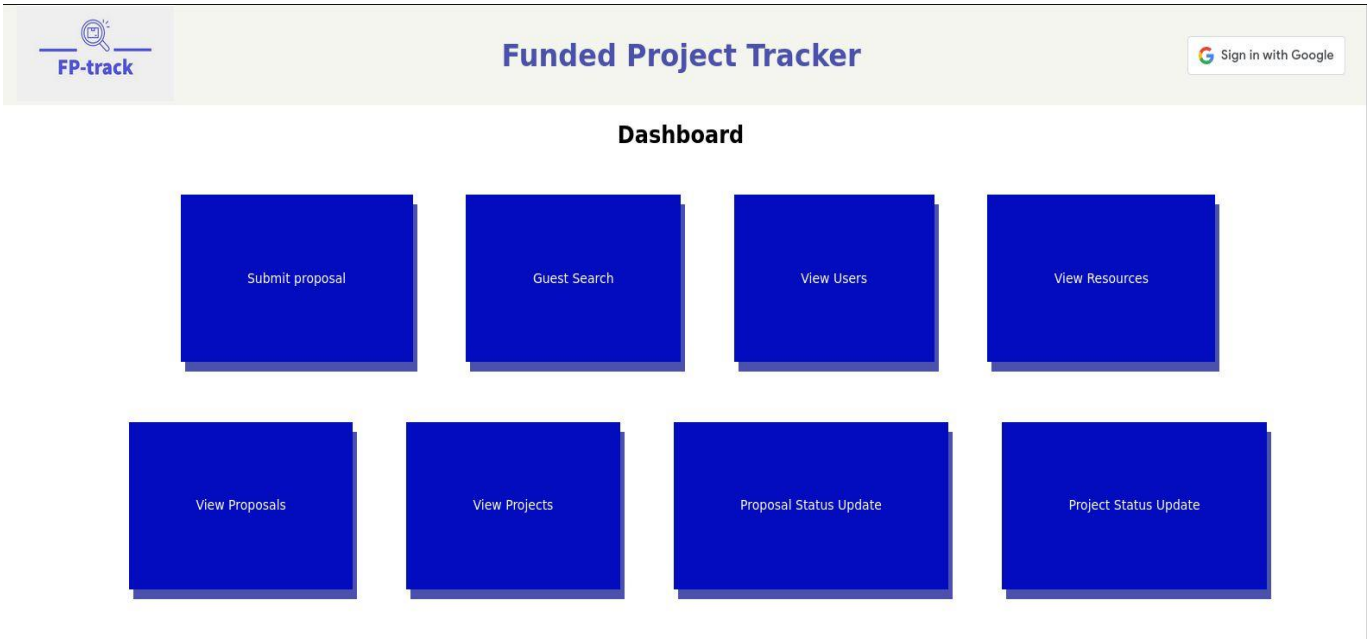



## Resource Assignments

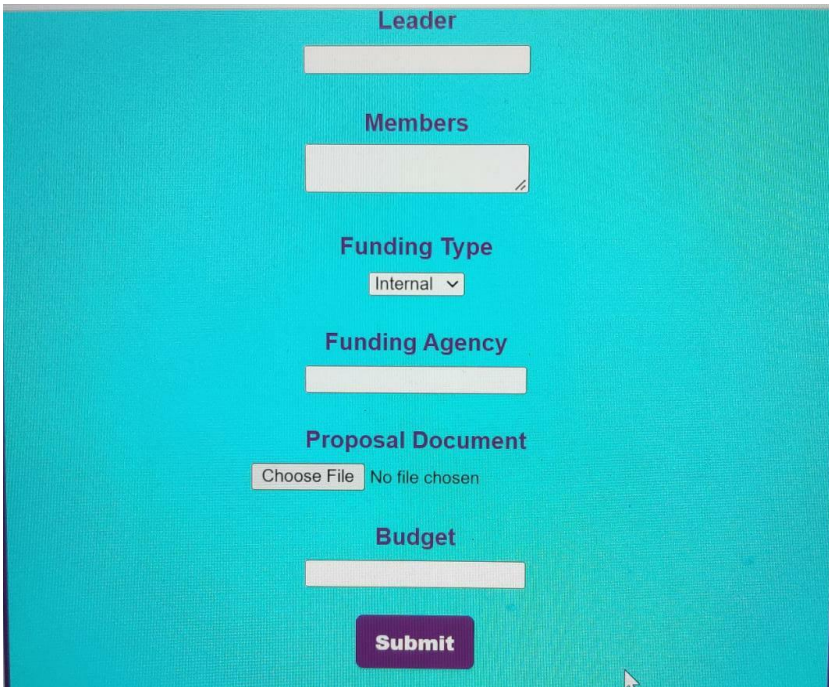


# End-User Interface

User Dashboard

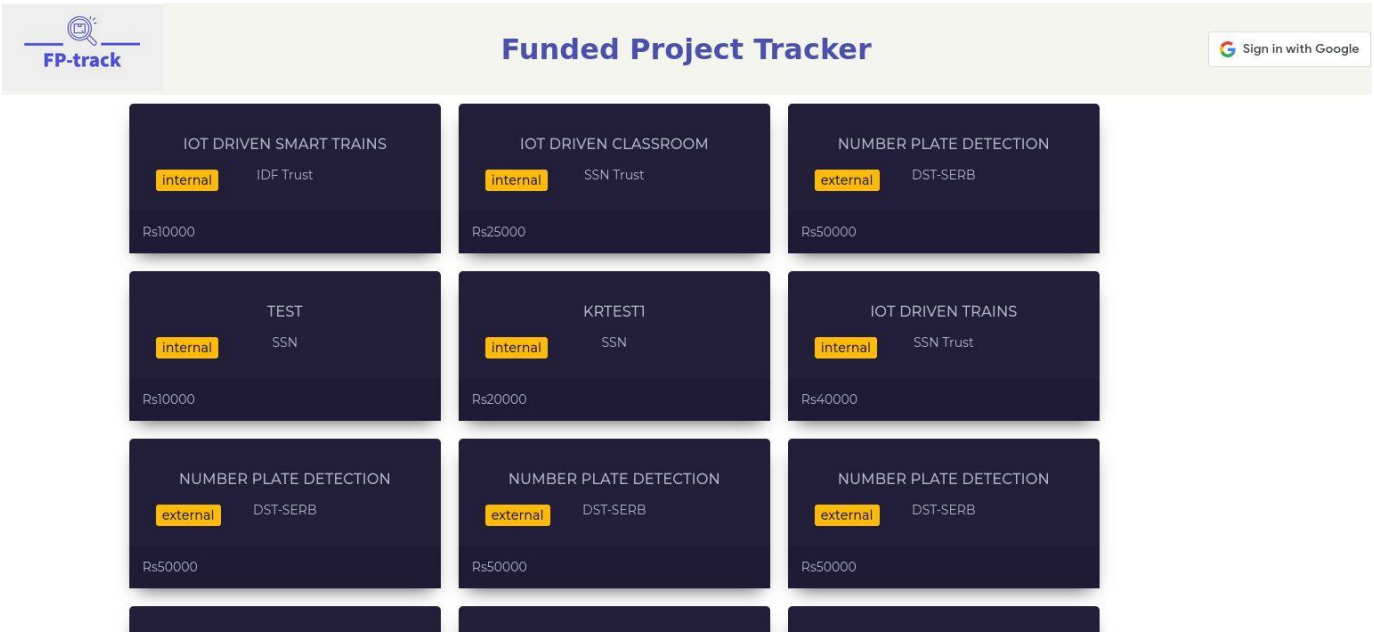



Submit Proposals



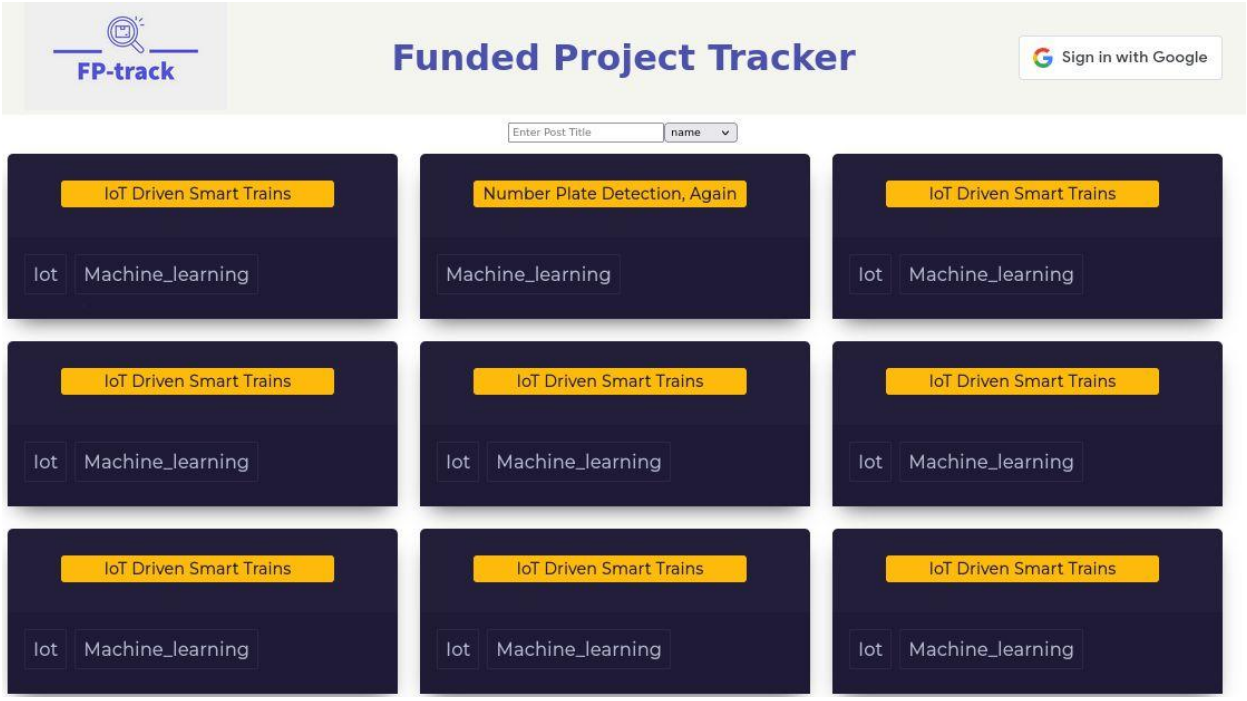
## View Proposals

An overview of pending project proposals with filters by multiple fields



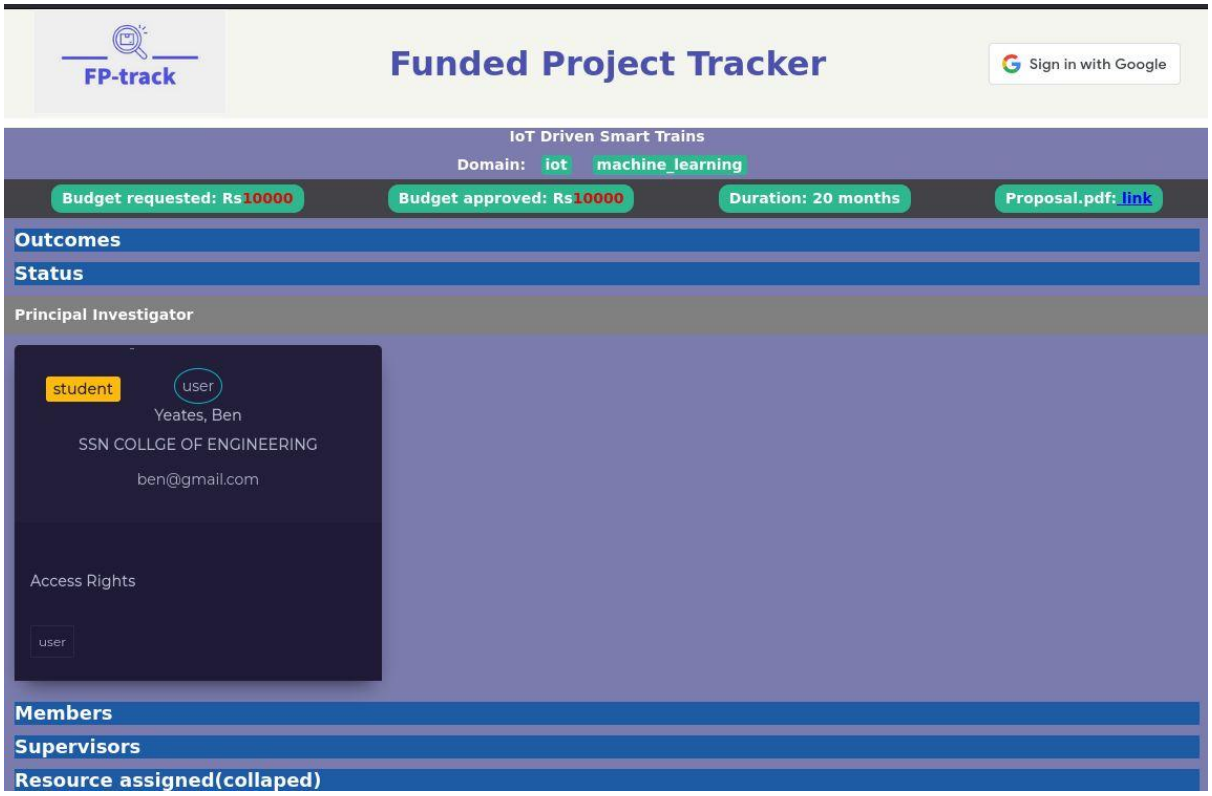

## View Projects - Overview

An overview of ongoing and completed projects with filters by multiple fields

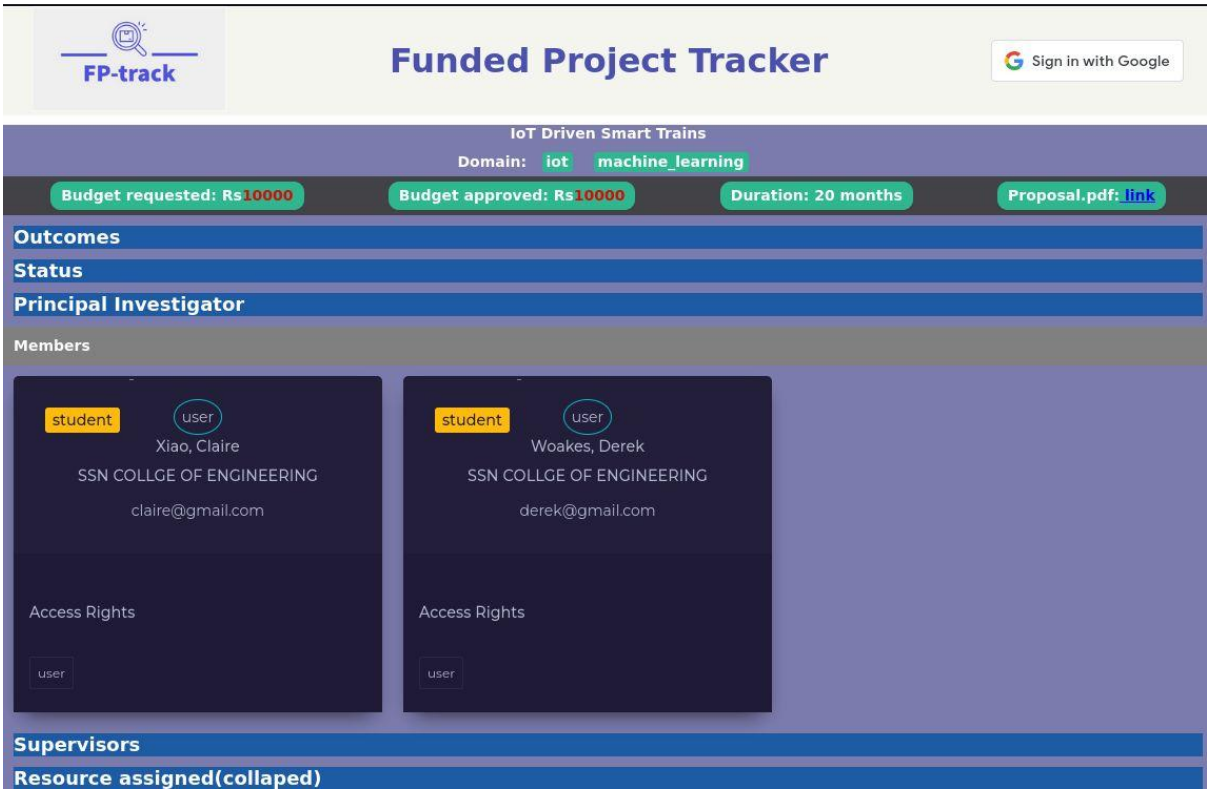


# View Projects - Detailed

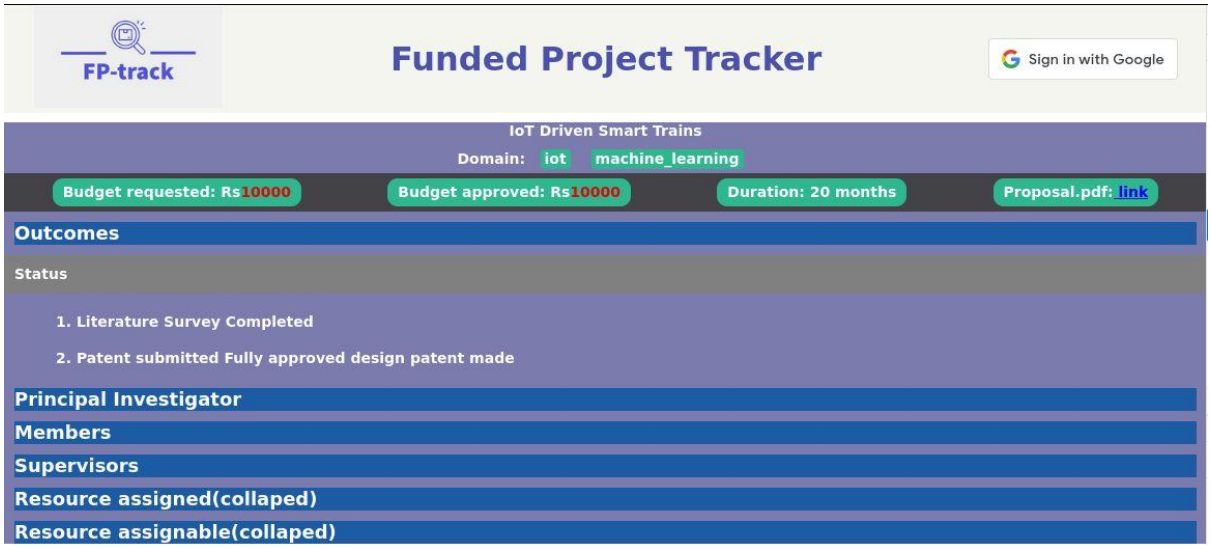
Expanded view of the Principal Investigator of the project



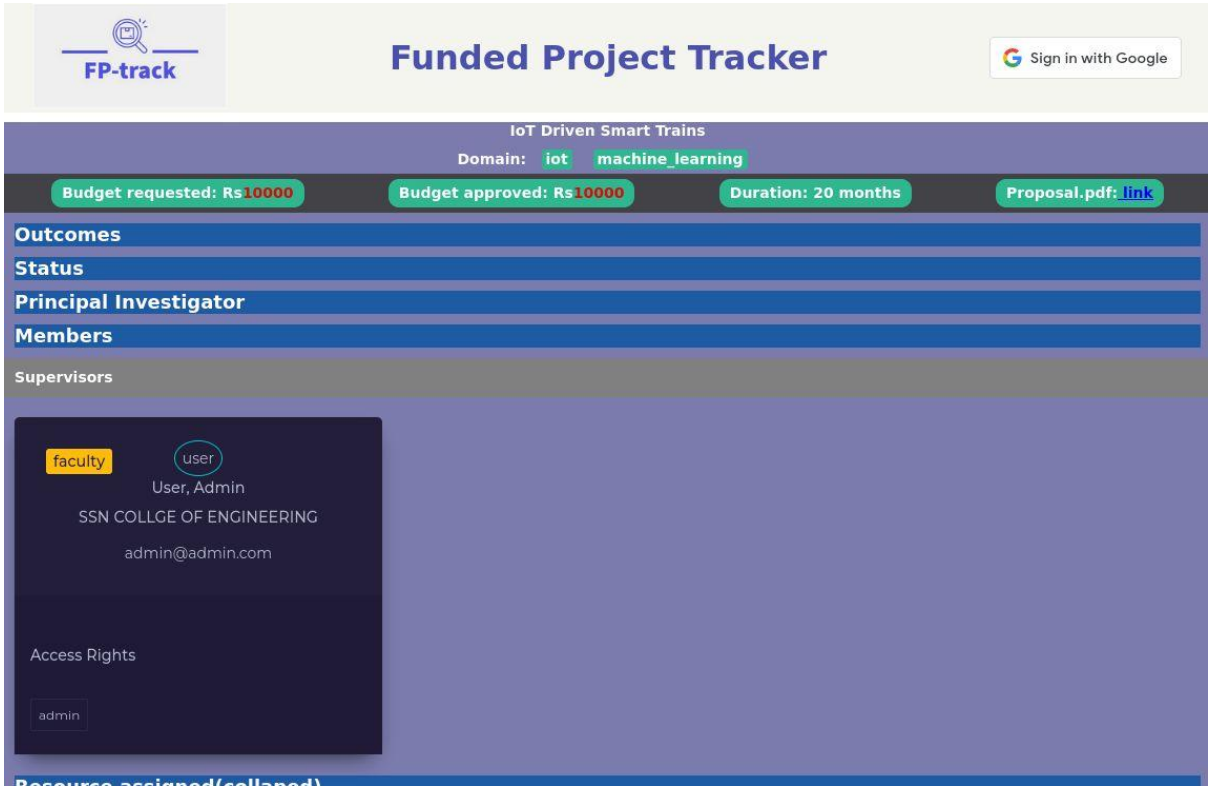

Expanded view of Members of the project



Expanded view of Status Updates of the project

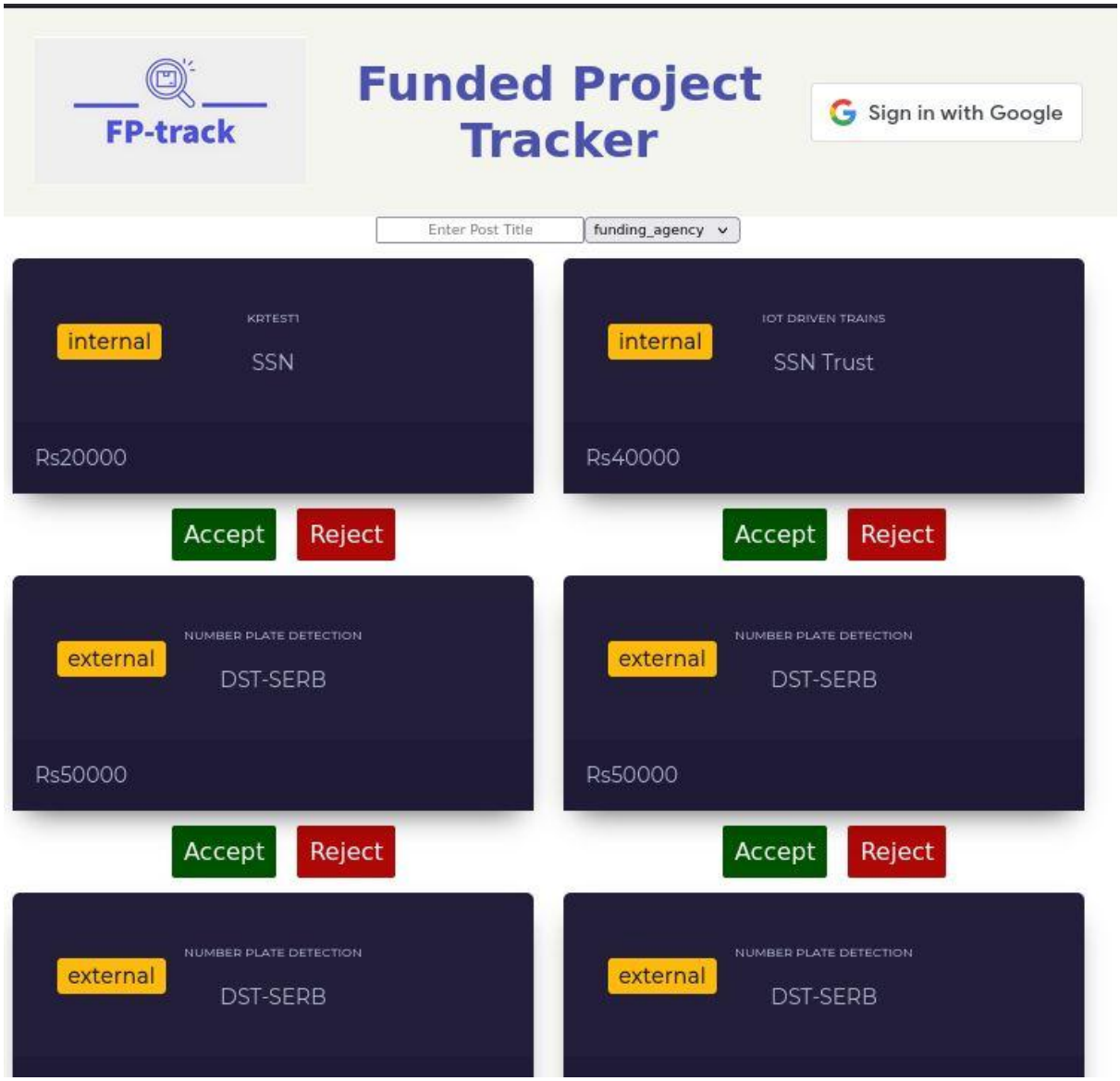



Expanded view of Supervisors of the project



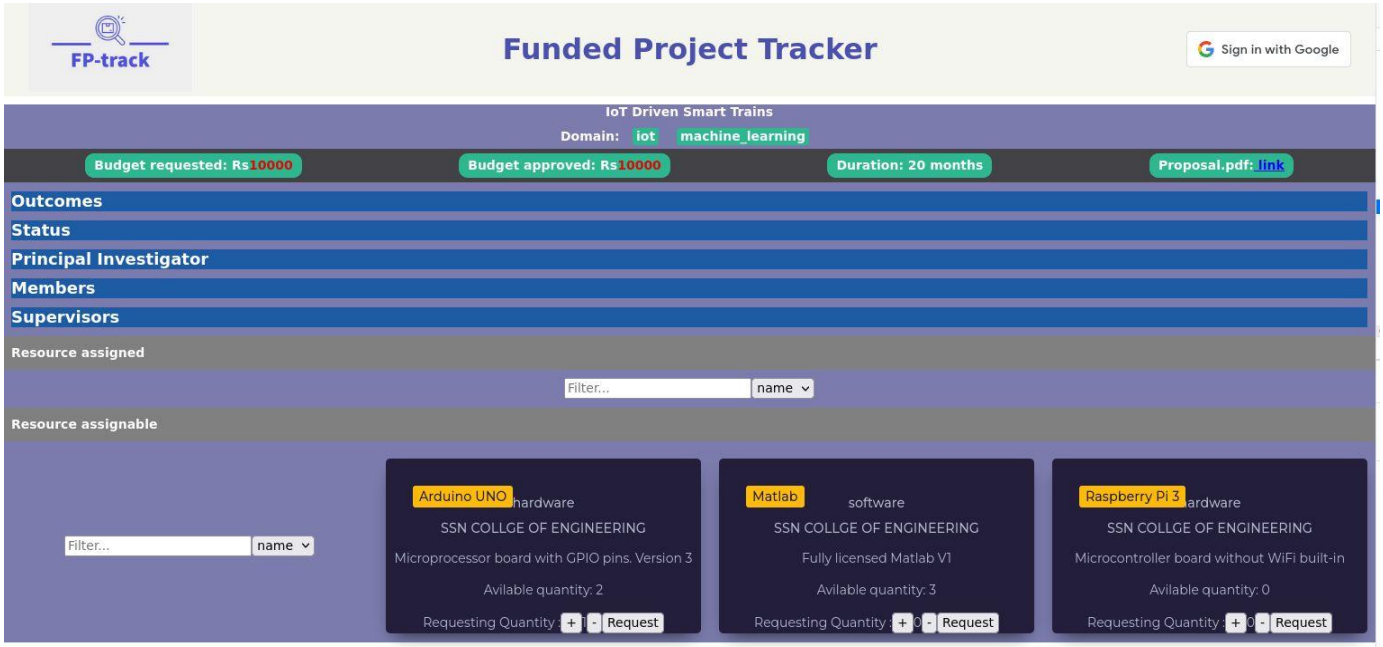
## Approve/Reject Proposals [Admin]

Admin console to approve or reject proposal based on decision from the funding authority

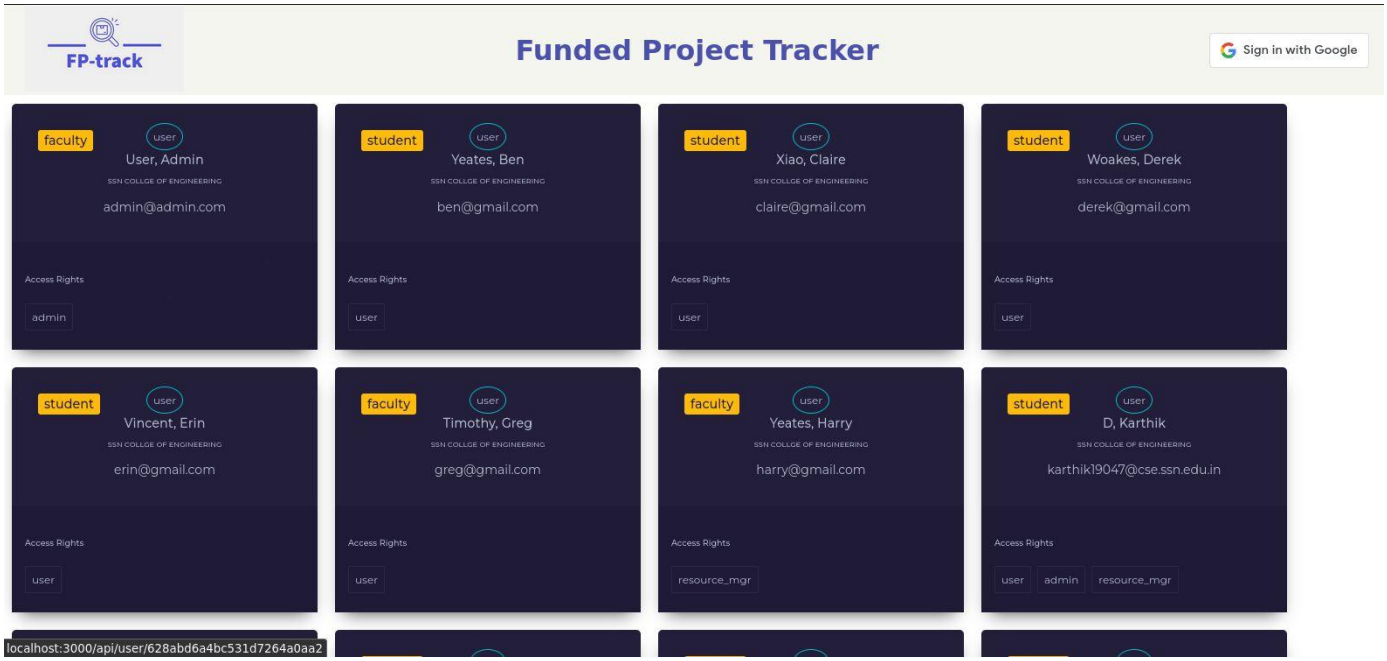


## Allocate Resources for Project [Resource Manager]

Interface for resource manager to allocate resources for a project from the inventorized database




## User Management [Admin]



# Future Improvements (refer to this)

Features and Techniques not Implemented

Suggested Improvements