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InstituPI :- AN API OF EDUCATIONAL INSTITUTES

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Abstract: - APIs fuel the working of the modern web by making CRUD operations of data fetching or storage easier with a single request-response cycle via the HTTP.

Through our project:- The InstituPI , we desire to create a RESTful (Representational State Transfer) convention based Application Programming Interface(API) to incorporate all information regarding educational institutes at a single platform, which would be available to all the developers to use them as their dedicated backend in their projects by calling our API.

Keywords *—Application Programming Interface (API) , REST conventions , NodeJS , ExpressJS , JSON , MongoDB, Cloud , HTTP.*

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I INTRODUCTION

InstituPI is a RESTful API designed using NodeJS , Express and MongoDB which when requested gives information regarding educational institutions worldwide in form of a JSON object.

The API is paginated to ensure quick and prompt response and features all necessary information of an educational institute, provides various filtering criteria to filter out the institutions based on plethora of filters like city, country, zip-code, courses offered, rating, tuition fees, etc

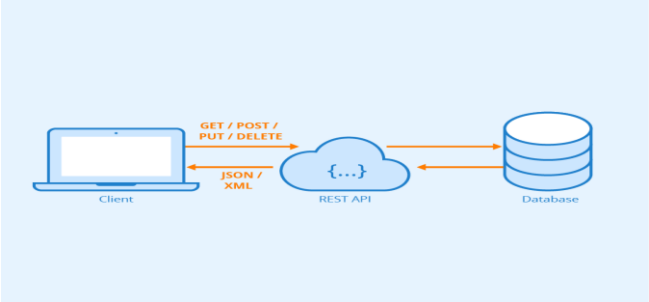
The documentation is well designed so other developers can easily integrate our API in their application.

The documentation features all the routes, the endpoints, the request type and an example explaining each endpoint of the API, which just makes the documentation and overall experience more intuitive and plug-and-play sort of UX.

The Database, the API server and the documentation are all shipped to production and deployed on server thereby following the standards of modern software development paradigm.

II PROPOSED SYSTEM

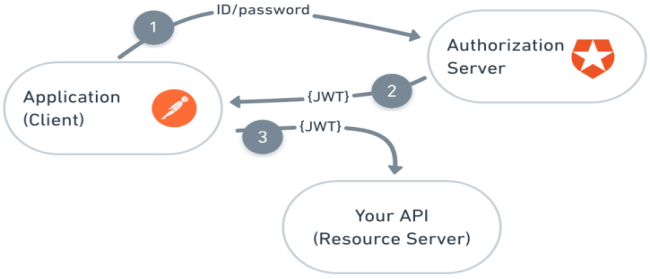
In this proposed system we will design and develop a RESTful API which would consist all the necessary information regarding training institutes across the world. So when other developers wish to build a software let it be a website, android app, or an iOS app, they can easily use our API as their dedicated backend, rather then they themselves designing it from scratch.



An abstract level overview of working of our API

The API alongside documentation will allow other developers to use our API for their projects.

The API however since will be build following the RESTful conventions will allow making changes to the codebase easier in future which will provide flexibility to the development team and robustness to the system.

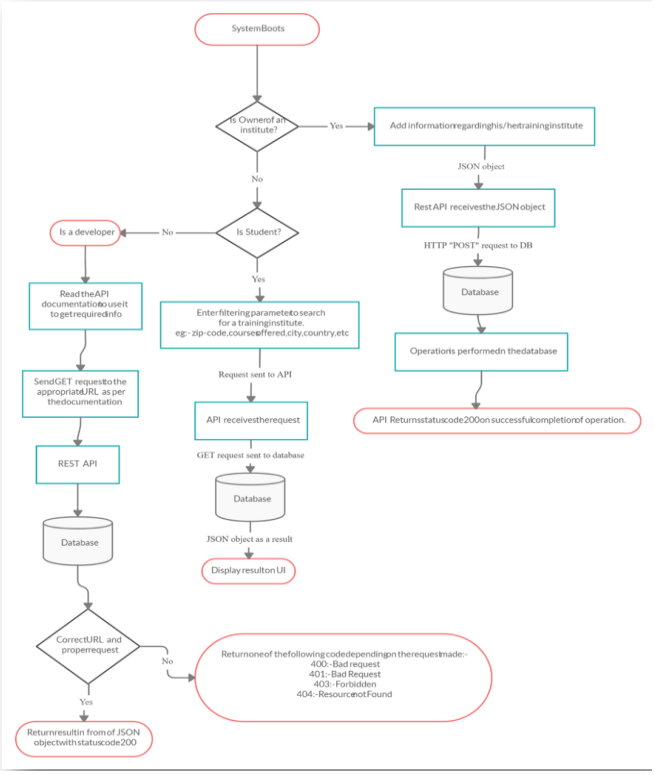


Using JSON Web Tokens (JWT)
1. The application requests authorization by submitting the required credentials
2. The authorization server returns an access token to the application.
3. The application uses the access token to access a protected resource (like an API)

The working of our API will initiate when the request is made to the API server from the client side application.

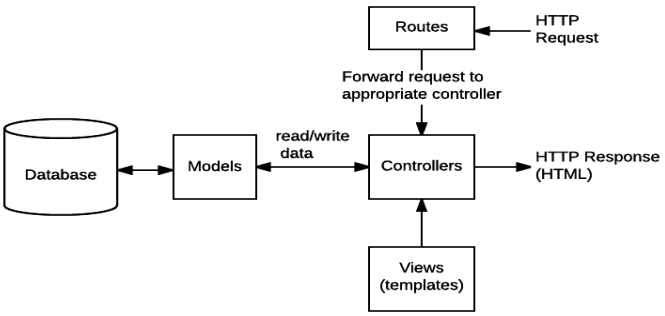
The request will be passed to API server which will be the core component of our system which will be build using Express JS ,NodeJS and MongoDB with Mongoose package as our ODM/ORM for modelling the data with our Schema Models.

The API server would either save the passed data to the DB or it'll retrieve the data depending on the request made by the client and will return a JSON object consisting of Status-Code and required data.



For developers , the in-depth documentation will guide them to use our API ,with in-depth explanation of each routes and endpoints , showcasing it with an example of a request made and the JSON reponse with which the API replies.

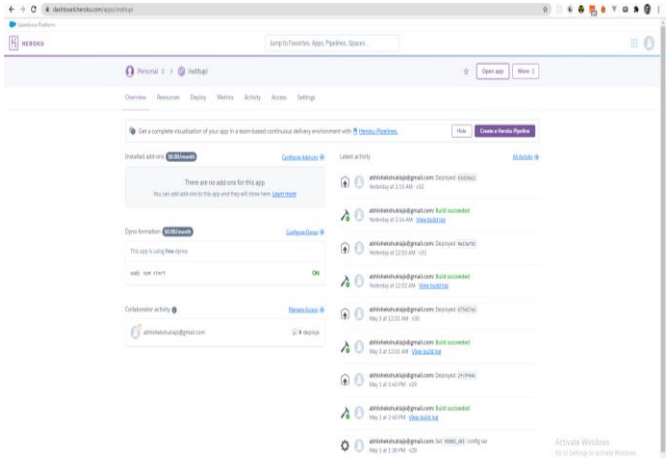
Methodology and implementation



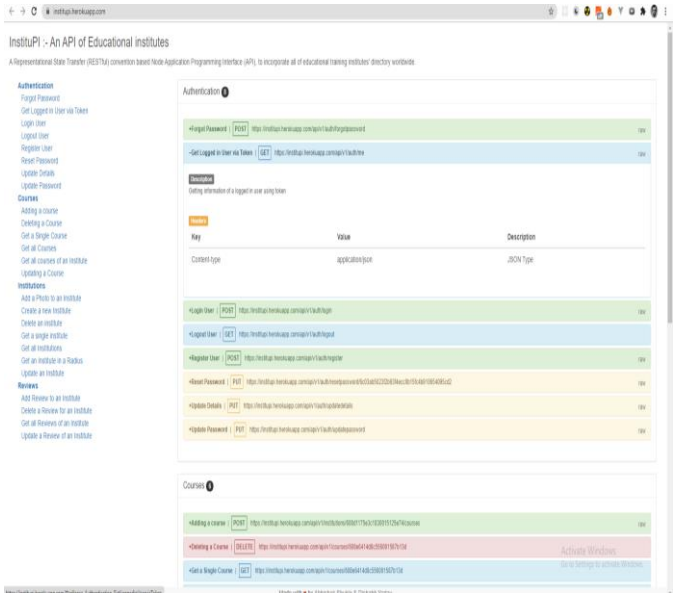
1) The figure explains the entire structure of how our API would work.
2) The Views/Templates would be a client-side interface application which the developers wants to use our API with.
3) The views will make a request to our API which will be handled by our controller.
4) Wherein the controller decides where(which route/endpoint of the API) to pass on this request, based on the type of request.
5) Then based on route/endpoint hit, the data will be inserted or retrieved from the database onto our models via the Mongoose ODM
6) Now the controller will again pass the response as a JSON object along with a status-code to the client , which the developer user our API can render on his client side application
7) All of the above process will be carried on by JWT(JSON Web Token) Authentication and Authorization Technique.
8) The API features SMTP MailTrap feature to implement the forgot password feature.
9) The API is protected against all sorts of cyber-attacks ranging from the XSS, NoSQL injection,

   CORS, request-rate limiter , DDoS , etc.
   The way we counter these attacks and threats is by using various node-packages which can be easily found in the package.JSON file in the github repo linked above.
10) The API is then shipped to production with the help of 'npm build' and mongoDB Atlas.

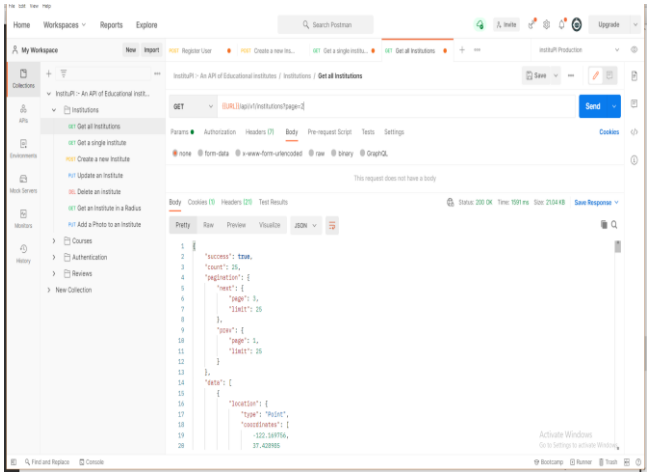
11) The Production-ready API is then deployed onto the Heroku which is ready to be used by other developers.

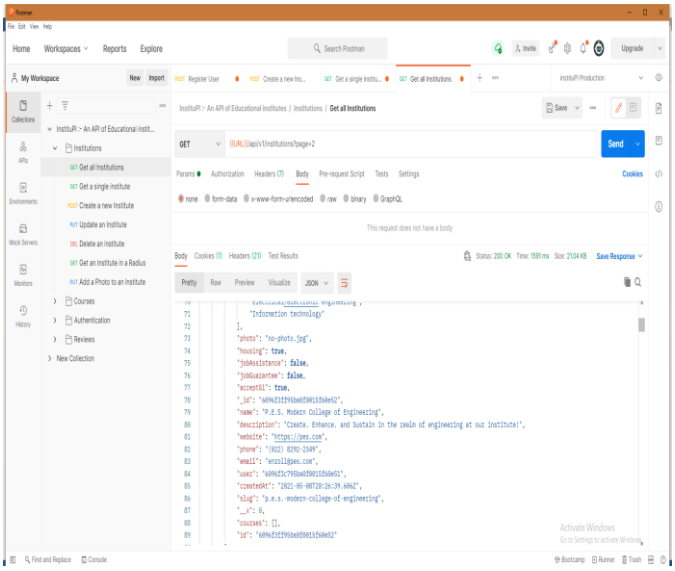


Heroku configuration and dashboard of our deployed API server on the heroku cloud



Our deployed API documentation on the heroku cloud , created using HTML,CSS and Bootstrap 4.





A sample JSON reponses from our API ,when we request to one of it's route endpoint to demonstrate its working.

The API sends in a JSON response of all the institutes in the Database with pagination.

IV.CONCLUSION

Thus we create such a full-fledged API which would provide all the information regarding educational institute.

Which would be open sourced to the people, so that the institute owners or higher authorities can themselves add information about their institute onto our API , or we can simply crowd-source it to en-corporate every single institute of the world.

The most important outcome from this project is the API which would benefit countless other developer whose projects revolves around this concept but they lack availability of data , this would help the developers community immensely and will help then to quickly , easily and efficiently develop robust applications and allows them to focus more on their client-side application.

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