LPU Navigator

Gaurav Khandekar

gauravkhandekar1252@gmail.com
Dept. Of CSE
LPU
Phagwara, PunjabIndia

Himanshu Mishra

himanshuu45@gmail.comDept.
Dept. Of CSE
LPU
Phagwara, PunjabIndia

Abstract
"There's a lot to explore in this new world". The world here becomes the new college where a nascent scholars comes to drive their career truly in a new direction. But before he does so he/she has to explore this new "world". And the world is developing at a great pace, the campuses and quality education of Universities are also diversifying themselves in a considerable manner. Yes, the primary step for a student to explore that "world" i.e. examining the campus of the university.
But we have made it a bit easier for the students to do the same job but with the help of technology. Technology is a very important part of our day-to-day life because it helps us to solve our problems easily and add up new features to our world. Year Now a day's technology is getting more advanced every day. And being a tech. lover, we still try to update and learn the existing with the updated one.
In our project "The navigator", we not only help the nacent scholars but also the new mob who came here for exploring the university. Here they will put wherever they have to go from any spot in the university and then the portal will direct them for the same.
Which will really aid them for navigating through the entire university without confronting any hardships.

Date of Submission: 19-11-2023   Date of acceptance: 05-12-2023

I. Introduction

As the quality of education in well established universities fetching greater heights with time, the corporations are attempting hard to provide a efficacious environment to the students, so that they can develop not only in the academic fields but also in every aspect of their personality growth. The campus of a college/university counts a lot in a whole-hearted development of a personality, and they are making it more encompassed for the scholars to examine. What if? The students get confused by the layout of the infrastructure provided by the institute and found themselves to be non-helpful in probing the same. What if? Technology interferes in between and makes the same thing easy for not only the students residing there but also for the tourists, to analyze the area more promisingly.

Mostly at the time of the addmissions in the universities, students as well as their parents also come to visit the institute, which results into high mob density in the college. So, asking or getting help of the workers or security guards working in the university also does'nt seems good and effective, because they are also busy in defining and managing the mob over the area.

So, Technology counts as an important boost for any solution to a problem more effectively and accurately. This project *"The Navigator"* allows technological techniques and real-world problems to come to the same stage for helping each other and producing an effective interface for the newcomers in the institute to explore the infrastructure. This only requires the destination and the current position or from where you want to get the help. And will give you a proper explanation in the form of a video which will guide the user well.

"The Navigator" is developed by a full-stack web development domain that consists involvement of both front and back end development.

Problem Statement

It is clearly known that people coming for the first time in the big universities came across many **difficulties whileexploring the campus**, and while getting information about theinfrastructure of the institute.

People are also not able to take help of guards/workers over there for helping getting the address of a perticular building or block due to mob stress.

Motivation

Our main motivation is to carry out the whole project in an improved manner and develop skill set the also to gain knowledge which is needed for the completion of our project. The important source for the completion of project was articles, books, research thesis, previous projects related to our project and also online databases (published by the university only).

- To help the visitors in a effective way.
- To help them about the info about the infrastructure.
- To guide them to their destination.

Proposed System

In the present day if we talk about the well established and huge universities, they are doing great for the academic developments but somewhere they are not focusing on the proper proposal of the infrastructural design for the visitors, so that they can be more comfortable with the campus. So, we created a proposed system which will properly guide anyone from one point to another in the campus of that perticular institution.

Software Analysis

"The Navigator" is an output of a blend of both frontend and backend development in a very efficient way. The main challenge in the backend was to play that guide video simultaneously on the user end. Firstly, python was used to do the same thing but the things does'nt went well then we switched to front end and then we we got the solution anyway. Pyhton's *moviepy* library was used inititially but was not able to execute the things then we switched to *openCV* library, the video was playing well but not simultaneously. Lastly, we switched back to the front end development which comes out to be great decision, we were able to play the video successfuly.

FRONTEND DEVELOPMENT

Some technologies which were being used for the front end developmentare -

React

React is open source java script library which is used for building applications and mobile apps.it is flexible ,declarative and efficient react library for building userinterface. React provides high performance, cost-efficientdevelopment, modularity, reusable wrapper components, and other benefits for rapid development.

Prime React

PrimeReact is a tool in the JavaScript Framework.PrimeReact just like CSS. it is fruitful set of source UI elements. PrimeReact has a pre-defined style and icons for each component, which can be used in our React application.

CSS

A CSS framework is a library allowing for more standards-compliant web design using the Cascading Style Sheets language.in React is used to style the React App.

VanillaJs

The vanillaJS is defined to be the lightest weight frameworks. The term vanilla script is used to refer to the plain javascript. This is much enhanced option for web performance than many other frameworks and libraries available. It provides an uncomplicated but user- friendly developing event.

Axios

Axios is a Javascript library which is being used to create HTTP requests from nodeJS. This library is used to communicate with the backend. Axiosbears the Promise API. It also has the potentiality to cancel the requests.

BACKEND DEVELOPMENT
For appending the back end development we used **The Pathway Algorithm**.
The Pathway Algorithm Uses Breadth First Search And Dynammic Programmic For Bringing In The Shortest Path From A Particular SourceTo Destination.

This Algorithm Uses A Typical Approach Of Prefetching The Shortest Distance From A Source To Every Particular Destination And Then Using Those Prefetched Values To Find The Shortest Path From Any Source Any Destination In The Map. The Most Major Factor Of This Algorithm Is Flexibility, After Prefecthing The Distance Values, The Algorithm Just Takes Minute Calculations To Bring OutThe Shortest Path.

Basically Pathway Algorithm is dividedinto three modules -

The Populator

The Populator Is The Module Of Pathway Algorithm, Which Uses Breadth First Search And Dynammic

Programming To Populate The Shortest Distance From All Sources To All Destinations. Breadth First Search Is Used Instead Of Depth First Search Because Depth First Search Can Reach A Worst Case N!, Where N is equal to the number of nodes. But This Complexity Can Be Reduce To A Big Amount By Using Breadth First Search
+ Dynammic Programming. The Complexity Of Our Populator (Which Uses Breadth First Search Along With Dynammic Programming) Is N^3 In Worst Case, Where N is equal to the number of nodes. This Module Is Named Populator Because It Is Used ToPopulate All Source To DestinationDistances.

Path Finder
This Module Basically Uses The Shortest Distance From The Source To The Destination To Find The ShortestPath. The Algorithmused In ThisModule Is Somewhat Similar To TheNearest Neighbourhood Algorithm, Which Finds The Nearest Neighbour Which Is The Most Favourable. So Basically, We Move From Source ToAny Other Node, If That Node Has TheSmallest Shortest Distance TowardsThe Destination, When Compared ToAll The Shortest Distance Towards Destination Of The Connected NodesOf The Source.

Edge Blocker & Edge Adder

A Good Consideration That We Took In This Algorithm Is The Flexibility. The Edge Blocker Basically Blocks A Particular Edge From Being Traversed. In The Real Case Scanerio,

There Can Be lot many Reasons that An Edge Can Be Blocked. So After Blocking A Particular Edge, It Is Not Taken Into Consideration, while Finding A Path. Vice Versa Edge Adder Is Used To Release A Edge That Is Blocked.

Working
This Project *"The Navigator"* will actually provide a structured layout or a plan to the user with a video simultaneously running over the userend for the better comprehension. The user has to input two things, one i.e. from where he/she is, second, where he wants to go in the perticular university or institute.Then this will give a structured guide in the form of video to the user how to reach to the destination.
The Modified & Effective Dijkstra's Algorithm Returns only the shortest distance between the 2 points, and due to it, we have to take a stack type of approach (Keep an extra array) to get the path From the Algorithm, which would make it a bit complexAnd Not So Flexible.
Our Project would be initilialized once at the start, and would be accepting, queries on the go. The Runtime Of Dijkstras that we are trying to implement is n*kLog(E). Which Means, If The Queries Frequency Will Get Higher, ThisAlgorithm Runtime Will Get Slower,Relatively To The Original Dijkstra's

Algorithm, Which uses, Dynamic Programming And Does NotRequire Calculation For The Redundant, Query Sub-Calculations.
A Distance Table, Which contains distance between all the points to all other points will result in just 5*10^3 Integer Data At Max. Which Is VeryLess. And Runtime Will Be Much Better While Simultaneous Queries.
The Algorithm Proposed By Me, Is Very Useful In The Case Of Large Nodal Points, For Example 10^4 Along With Limited Calls. But WhichIs Way Less Than, Nodal Points Of Ours (80 At Max).
Just Like The Case That Insertion sort Is Way Better Than Any Other Sorting Algorithm, When Data Is Less

Than64.

For This Project, As The Data Is Less, Shifting Towards A Relatively Clear Approach Made It Better And Flexible.

Implementation

As per the requirement of the visitors who came for visiting the institute we have guide them in a way. So, we have to provide the layout how one can displace from one point in the institute to another and simultaneously we will have to play videos through front end development which is bit easy to comprehend from the end of the visitor also.

Screenshots

Step 1 : On the interface you have to select the source and destination so that it can guide you more efficiently.
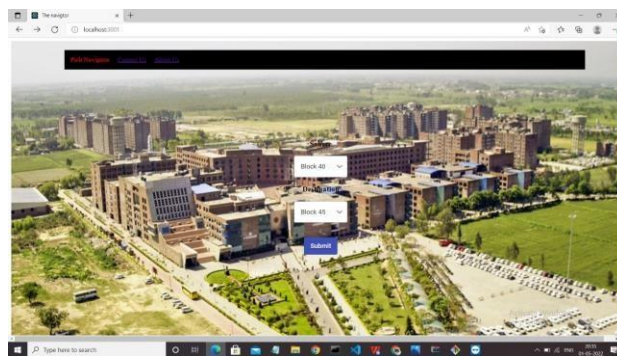
Step 2 : For selection of the blocks dropdown menu is available.
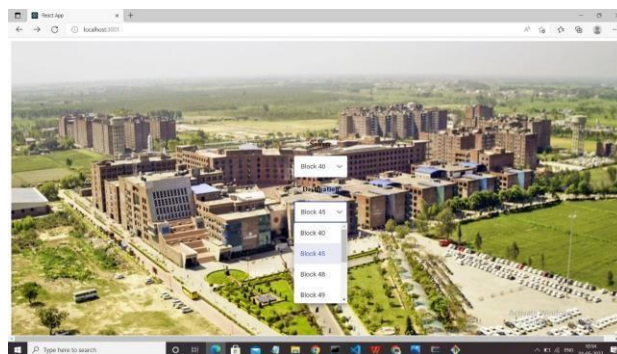
Step 3 : After Clicking on submit button you will be redirected to the new page which will basically show a video guiding the user that how to approach the destination the user has entered.
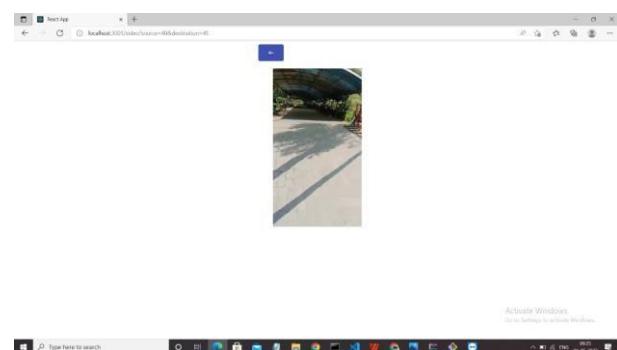
References

[1].   HTML5 W3C Recommendation 28 October 2014 (@ http://www.w3.org/TR/htm l5).

[2].   WHATWG (Web HyperText Application Working Group) HTML(5) Specification (@ https://html.spec.whatwg.org/m ultipa ge/index.html).

[3].   HTML 4.01 Specification W3C Recommendation 24 December 1999 (@ http://www.w3.org/TR/html40 1).

[4].   1.0 Specification W3C Recommendated Revised 1 August 2002 (@ http://www.w3.org/TR/xhtml1

[5].   CSS 2.1 Specification W3C Recommendation Revised 17 December 2014 (@ http://www.w3.org/TR/CSS21/ http://www.w3.org/TR/CSS21/)). .

[6].   CSS3 Selectors module (@ 6. CSS3 Selectors module (@ http://www.w3.org/TR/selectorhttp://www.w3.org/TR/selectors/s/)7)

[7].   CSS3 Colors module (@ . CSS3 Colors module (@ http://www.w3.org/TR/css3http://www.w3.org/TR/css3--color/color/).).

[8].   David Sawyer McFarland, 8. David Sawyer McFarland, "JavaScript and jQuery "JavaScript and jQuery -- The The mismissing manual", 3rd ed, 2014, sing manual", 3rd ed, 2014, O'Reilly. O'Reilly.

[9].   Jonathan Chaffer and Karl 9. Jonathan Chaffer and Karl Swedbery, "Learning jQuery", 4th Swedbery, "Learning jQuery", 4th ed, 2013, Packt Publishing. ed, 2013, Packt Publishing. 10. PHP mother site @

[10]. PHP mother site @ http://php.net/http://php.net/. .

[11]. PHP Manual @ 11. PHP Manual @ http://php.net/manual/en/http://php.net/manual/en/. .

[12]. PHP   Language   Reference   @   12.   PHP   Language   Reference   @ http://php.net/manual/en/langhttp://php.net/manual/en/langref.phpref.php. . 13. ECMAScript (JavaScript)

[13]. ECMAScript (JavaScript) Specification: "Specification: "Standard ECMAStandard ECMA--262 ECMAScript Language 262 ECMAScript Language Specification 5.1Specification 5.1", (same as ", (same as "ISO/IEC 16262" 3rd eds). "ISO/IEC 16262" 3rd eds). 14. Mozilla's (MDN) JavaScript

[14]. Mozilla's (MDN) JavaScript Project @ Project @ https://developer.mozilla.org/enhttps://developer.mozilla.org/en-- US/docs/Web/JavaScriptUS/docs/Web/JavaScript. . 15. Mozilla's (MDN) "JavaScript

[15]. Mozilla's (MDN) "JavaScript Reference" @ Reference" @ https://developer.mozilla.org/enhttps://developer.mozilla.org/en-- US/docs/WUS/docs/Web/JavaScript/Refereeb/JavaScript/Referencence. . 16. "Document Object Model

[16]. "Document Object Model (DOM)" Level 1, 2, 3 (DOM)" Level 1, 2, 3 Specifications @ Specifications @ http://www.w3.org/standards/thttp://www.w3.org/standards/techs/domechs/dom. . 17. jQuery mother site @

[17]. jQuery mother site @ http://jquery.comhttp://jquery.com. .

[18]. jQuery API @ 18. jQuery API @ http://api.jquery.comhttp://api.jquery.com. . 19. QUnit JavaScript Unit

[19]. QUnit JavaScript Unit Testing Framework @ Testing Framework @ https://qunitjs.comhttps://qunitjs.com. .