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**VADA**

Demo web-application for rental car

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Anuj Thapa  
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## ABSTRACT

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Vada is a web-platform for all those individual drivers in Nepal who are working in a rental business. Nepal is a developing country and it has a lot of emerging business opportunities, Vada can be one of them. Vada is an idea to make a rental car business in Nepal easier, more effective and cheaper. It can be a gamechanger in the rental business of Nepal. This thesis is my own idea and I have tried to implement my ideas in this thesis.

This is all about the rental car business in Nepal. The rental car is way more expensive on account to average income of public in Nepal. It is beyond the reach of general people. The idea in this thesis will help to overcome this gap this is for those individuals who want to work on their own.

To complete this project, I used many sources to learn about new technology and framework. To know about the problem in Nepal I talked to lawyer Mr. Kumar Karki for the legal issues. I had an interview with Miss. Indira Khadka who has worked in advertisement business for past 5 years to know about the Nepali market. During the thesis, I also used different data and source from the Internet

At the end of the thesis, I want to complete a prototype of my application using modern web-technology and as a BIT student, I also wanted to learn some about the business idea, how to implement the business idea and research method.

In the end, I learnt a lot about the web-technology. I know many new frameworks such as Bootstrap and Laravel. I also know about the business scenario of Nepal. During the process, I spent most of the time on research and development.

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# 1 INTRODUCTION

IT industry has been so developed that all the businesses are going to a new era using Information Technology and the Internet. Before some time, all the businesses were using the traditional approach. They worked from a workstation using a phone and letters for communication. They used the traditional way to reach the market and customers. As of now in a very short time-span, we can see the boost in Information Technology has changed the whole idea of market and business.

Today market is more visible to the world, and every business is taking benefit of Information Technology. Companies use the Internet for “Communication”, “Marketing”, “Research” and more, which helps the company to reach its target customers. Before the use of the Internet, we needed to advertise in some paper medium or telecast in some TV channels where it was not possible to know whether or not our customer knows about it.

Like other companies, Car rental companies also use IT to boost it’s business. Today most of the companies use their applications and websites to run the business. In the developing country it’s very easy to rent a car but on the another side, there is also a country like Nepal where the Information Technology is growing but the companies are not taking much advantages from it.

To overcome such problems, Vada can help a lot. Vada is a web-platform for the car owners where they can make their car online. On the other hand, customers can search for a car and book. There will be two booking options. The customer can book a car with or without the driver. The car owner has total right about their car whether the owner wants to work or not. Once a car is booked there will be the direct connection between the owner and the user.

## 1.1 Startup culture in Nepal

“Federal Democratic Republic of Nepal” is the full name of Nepal. The area of Nepal is 147.181 sq. km with the population of 31 million. In the border of Nepal, there are two giant economic countries i.e. China and India with the import of \$3.8billion and \$137 million respectively. Export of Nepal is

not even comparable with import. Its total market is depending on import goods. There isn't any start-up culture. There are many problems to start a new business with a new idea.

From the research, there is a very slim chance to get local investment in your idea. There is almost no chance to get the investor for your idea. No business house or investment company will invest in others idea. There are few investors who will prefer to invest in bigger playgrounds rather than new idea. As already mentioned that the economy of Nepal is not huge, so you cannot expect a bigger output from the business. So, if you have a big idea you will never get an output in comparison to the value of your idea. Another problem will be the payment methods. Nepal does not have so advanced banking technology and payment gateway. So, it will be always a challenge to accept payment from the customer if your business is Internet focused. Another problem of Nepal is the brain drain. Most of the masterminds are already either engaged in a big company with good salary or abroad. It will be challenging to get some good minds for your startup because they do not want to come and join in startup.

Besides all these challenges, there is still adequate scope for a good idea. "PICOVICO" can be a good inspiration which is working from Nepal and have clients from all around the globe.

## 2 RESEARCH

As we know, "Vada" is a new idea to be developed for Nepal to validate this idea. Research have been done on existing competitors, legal issue and platform which I need to use to develop the application.

### 2.1 Competitors

Vada is a new idea in the rental car business, so there is not any clear competitors but some of the existing business can be the reference. The biggest company working in the rental field is a German company "SIXT". Besides "SIXT" there are some local rental companies.

As Vada and SIXT are both car rental companies, it is good to compare and find the differences and target group. From research, idea of business is totally different because the basic concept about "VADA" is to provide a platform to all the entrepreneurs who have their car and working in rental business, but other rental companies that have their own cars. Some of the key differences are listed below.

SN	VADA	OTHER RENTAL COMPANY
1	Vada provides a driver for their ride	They do not have this kind of service
2	Vada provides emergency vehicle replace service	Most of the other companies do not provide this service
3	Clear competitive price	Company like "SIXT" is expensive in comparison to GDP of Nepal
4	24-hour call center for help	No other companies have this service
5	Because we have local driver, it will be easier to know about the place	Need to hire third person as guide

FIGURE 1 Comparing a price difference between a basic car in "SIXT" and "VADA".

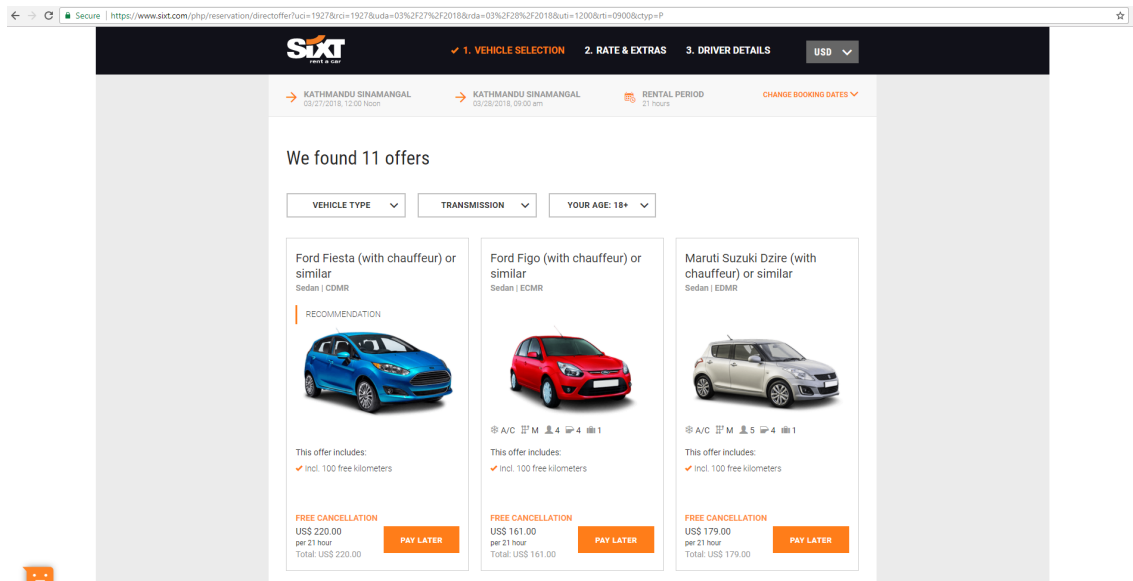


FIGURE 2 Price of a rental car per day in SIXT.

In figure 2 the price for Ford Fiesta (or similar car) is US \$ 220. Which is  $\$220 \times \text{NRS } 104.28 = \text{NRS } 22,941.6$  ( Nepal Rashtriya bank 2018, 2018/04/03). The per capita income as per 2018 in Nepal is US \$ 882.93 which is NRS 92,070.89. Let's compare the price per day and per capita income of Nepal, the result is the price of the car is high. A common people in Nepal can just rent the car in this kind of company for just 4 days by expending his or her whole income.

On the other hand, "VADA" is a platform for the local and from the local so "VADA" can provide lower price than any other company. Some of the car owners who are working in the car rental business said that the same kind of Ford car will cost around 45-55 Euros per day which means in the same price US \$220, customers can hire for 4 days with a driver.

## 2.2 Legal issue

Before starting a business, it will be always a good idea to study the rules and laws of the country. As operating area of Vada is Nepal researcher researched some of the related rules from Nepal. An interview was done with an advocate lawyer.

From interview with advocate MR. KUMAR KARKI, there is no specific law for a business like "VADA". It can be registered under company register and tax office. As per rule of Nepal government also called "Value Added Tax Rules, 2053 (1996)" company which have business more

than 100,000 per year are applicable for VAT. The capital of the company can be any amount you want to invest. There is no bound to invest any amount in your idea. 1.5 percent of the capital should be paid to the government for registration of a company. Capital can be increased at any time the investor wants. As per the law of Nepal, there is no such rule for insurance that a company should provide to its customer or partners. It can be mutually agreed upon at the time of the agreement. But for the vehicle, there must be third party insurance which covers all the expenses except for your car when you meet the accident. Mr. Kumar Karki also said that there is not any special rule or law for rental car business. It is all about how you want to run a business. Policies and agreements can be drafted according to needs that help to run your business smoothly. One thing that must be followed is that there must be a physical working space to register your company. He said that if there is any kind of help from local authorities to start a new idea. He also said that only airlines will get 5 years free tax, but no other business has such priorities.

It is always a problem with a payment in Nepal, so researcher asked whether a company can open a bank account in any foreign country so that it would be easy for payment. He replied that company registered in Nepal cannot open an account in other countries but if the company is registered in other countries, it can have multiple accounts in the various countries. Because "VADA" has an insurance for the customer and its partners, researcher needs to know if it is possible to buy insurance policies from the big international insurance company. He said a company registered in Nepal can only buy policies from Nepali insurance company.

## **2.3 language analysis**

In this thesis, demo web application will be developed. For the whole process, it is important to know to find a right platform and language. There are many platforms and languages to develop the application. There are different options of native language and cross-platform to develop this application. There are different languages such as PHP, JavaScript, Java and C# to develop a web application.

### **2.3.1 Programming language**

"A programming language is a computer language engineered to create a standard form of commands. These commands can be interpreted into a code understood by a machine.

Programming is created through programming language to control the behavior and output of a machine through accurate algorithms, similar to the human communication process.” (techopedia.com 2018, cited 22/07/2018)

Some examples of programming languages that can be used for web development are described below

- PHP It is a general-purpose scripting language for server-side web development. It helps to make a page dynamic by communicating with the database. Most of the Content Management System such as WordPress, Drupal are based on PHP.
- ASP ASP means Active Server Pages which provides dynamic scripting functionality into HTML documents.
- JAVA Java is an object-oriented language used for desktop and web development, but it requires a browser plugin. It is not so popular nowadays.

Out of these languages, PHP was considered as a suitable language as it is most suited to a small web application and also to host.

### 3 TOOLS FOR DEMO WEB DEVELOPMENT

#### 3.1 HTML5

HTML, which means Hypertext Markup language is a computer language which is used to create a website. It is written in format of HTML containing tags bracket in angle brackets '<html>'. For

Example 1

```
<!DOCTYPE html>
<head>
<title>Page Tittle</title>
</head>
<body>
<h1>This is heading</h1>
<p>This is a paragraph</p>
</body>
<footer>
<p>Footer of page</p>
</footer>
</html>
```

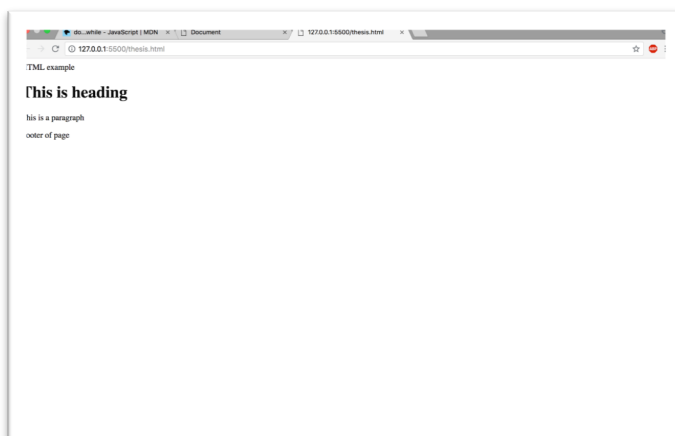


FIGURE 3 Output of example 1.

In the above example <!DOCTYPE html> is the opening tag of HTML file and </html> is closing tag of the file. Every tag starts with "<>" bracket and closes with </>. Some of the common tags are<h1>

which means heading 1 which is the biggest heading. There are six types of heading tags. <p> means for paragraph. <b> means bold. There are different new tags used in HTML5 such as <article> used for article document. <details> means the detail file in HTML. In details tag, it shows the remaining document in a file. <nav>, <section> and <footer> are some of the different tags used in HTML5.

## 3.2 CSS

CSS is an acronym for cascading style sheet. CSS is used to describe the style of the HTML element. CSS aligns the HTML elements and describes how the HTML content should be described. There are three different ways to write CSS for HTML file.

**Inline CSS** Inline CSS means that the style written on the same line. If any style should be given for a paragraph the style should be written on the same line inside the tag. For example

```
<!DOCTYPE html>
<head>
<title>Page Tittle</title>
</head>
<body>
<h1>This is heading</h1>
<p style "color red">This is a paragraph</p>
</body>
<footer>
<p>Footer of page</p>
</footer>
</html>
```



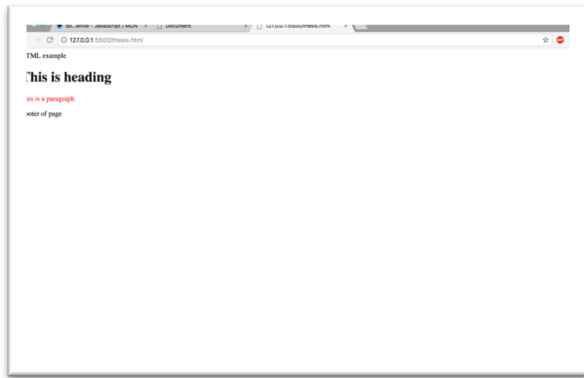


FIGURE 4 Output of inline CSS.

In the above example, CSS is written inline. Inside p tag there is style “color red”, which means that the color of the paragraph which is inside the same line must be red in color.

**Internal CSS** Internal CSS means that the style written on same page but not on the same line. Internal CSS is basically written on same page inside the <head> element. For example

```
<!DOCTYPE html>
<head>
<title>Page Tittle</title>
<style>
p {
    Color red;
}
</style>
</head>
<body>
<h1>This is heading 1</h1>
<p>This is a paragraph one</p>
<h2>This is heading 2</h2>
<p>This is a paragraph two</p>
</body>
<footer>
<p>Footer of page</p>
</footer>
</html>
```

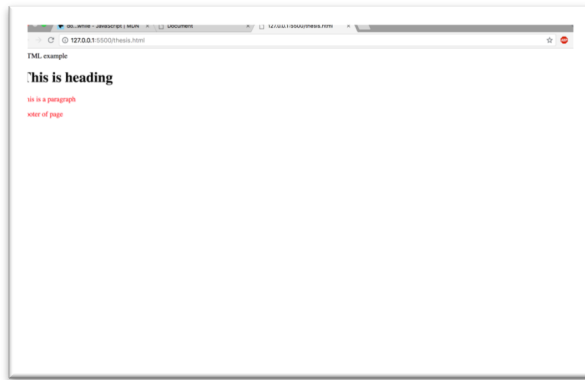


FIGURE 5 Output of Internal CSS.

In the above example style is written on the same page but not on the same line. In this kind CSS once the <p> tag is given a color all the paragraph in HTML element will be red.

**External CSS** External CSS means that the style is written on a different file, but it will be connected to the HTML page with a link. The external CSS has commonly practiced the type of CSS. For example

```
style.css
p {
    Color red;
}

<!DOCTYPE html>
<tittle>Page Tittle</tittle>
<link href :” style.css” rel” stylesheet”>
</head>
<body>
<h1>This is heading 1</h1>
<p>This is a paragraph one</p>
<h2>This is heading 2</h2>
<p>This is a paragraph two</p>
</body>
<footer>
<p>Footer of page</p>
```

</footer>

</html>

---

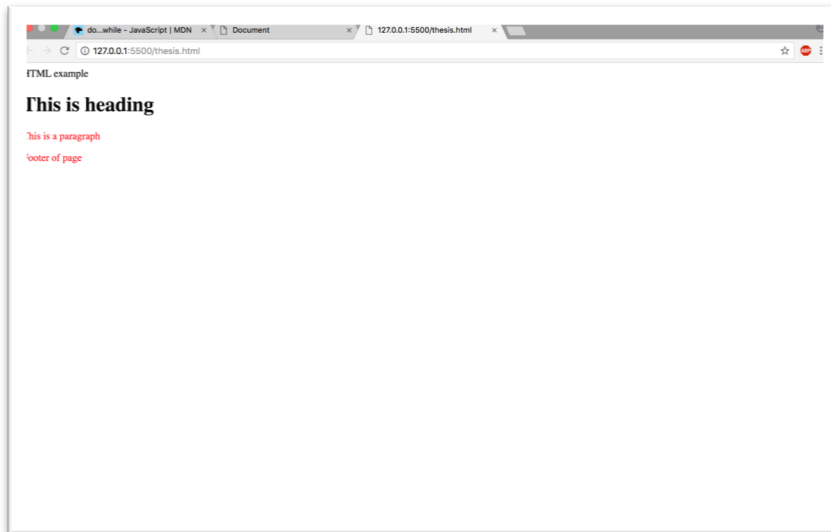


FIGURE 6 Output of External CSS.

In the above example, there are two different filenames style.css and index.html. In the head element, there is a connection for the style which is on a different page. <link href "style.css" rel "stylesheet"> will connect style in the index.

### 3.3 BOOTSTRAP

Bootstrap is a widely used front end development framework for responsive and mobile-friendly websites. It is free and open source framework to develop front end on websites and web applications. It contains HTML, CSS and JavaScript-based design for different buttons, tables and forms. It makes so easy to design frontend. It will make the website and web application responsive and device friendly in only a few lines of code.

Bootstrap is so easy to use. There are two main ways to implement Bootstrap. The first way is to add the link of CDN in your HTML page inside the head tag. The second way and the mostly used way is to download the Bootstrap and give the same path as CSS using a link. Bootstrap is so popular framework because it is a powerful and simple tool to make device friendly web-application. It is completely free to use. The figure below shows the use of Bootstrap



FIGURE 7 Bootstrap example

In the figure above, Bootstrap is used by BOOTSTRAP CDN link. `<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/4.1.3/css/bootstrap.min.css">` is the CDN link to connect Bootstrap in HTML page. If you see the `<div class="jumbotron text-center">`, jumbotron is a division in Bootstrap which has a defined height and width. 'Text-center' class is used to align the content in the center. If we need to do this thing using CSS we may write more than 10 lines of code.

In another division, there is a div class container which takes 100% width of the page which is pre-defined in Bootstrap. The class 'row' means the alignment and division of screen width on a row. Screen width is divided into 12 small parts in Bootstrap. `<col-sm-4>` means if the screen width is the small screen that class will take 4/12 part of the screen. There are 4 different types of screen size in Bootstrap.

- Extra small col-xs- is used to define this screen size. This covers all the screen size below 768px.
- Small col-sm- is used for this screen size which covers more than 768px and below 992px.
- Medium col-md- covers for the medium size screen with the minimum of 992px and less than 1200px.
- Large col-lg- means all the screen sizes more than 1200px.

### 3.4 JAVASCRIPT

JavaScript is a programming language for the web. It is used to make the website and web-Application interactive. It is an object-oriented programming language to create interactive effects with the web. `<script>` tag is used to define the JavaScript. JavaScript is used for DOM manipulation, form validation and dynamic change of content.

JavaScript is widely popular because this is a client-side scripting language in which the program is processed in the web browser rather than in server which makes the website faster and loads in the server are less. JS program validates itself without communicating with a server validation was used in the form and user input in the application. If there is an error in the validation it shows the error message with details. An example of JavaScript is shown below.

```
<script>  
function sub(num1,num2){  
return num1-num2;  
}  
var answer = sub (7,5);  
alert(answer);  
</script>
```

In the above example, `</script>` tag is used to open the JavaScript program. There is one function named `sub` which will take two inputs from the user. Then that function returns the value after subtracting the user input number. When you see after the function, there is a variable named `answer` which will take two inputs `num1` and `num2` and places it to a 'sub' function. After all the calculation, there is an `alert` function which is pre-defined. `Alert` function is used to display any message on the screen. This `alert(answer)` will display the final answer in the browser.

### 3.5 Laravel

Laravel is a clean and well-structured web framework for PHP development. According to its author, Laravel is "The PHP framework for Web artisans" (laravel.com 2018, cited 25.06.2018).

For a long time, PHP has become popular as well as gained a bad reputation because of many websites which are badly written. PHP is easy to learn and PHP is designed for mainly small websites and web applications which have few users. “PHP” originally comes from the term “personal home page” (php.net 2018, cited 25.06.2018). In the last few years PHP has brought many new features such as namespace, traits, and composer.

“Laravel decided to hop on the shoulder of giants and embrace these pre-existing mature components.” (Martin Bean, Laravel 5 Essentials, page 3). Basically, Laravel is a fully MVC-compliant framework (Laravel.net 2018, cited 21.04.2015). It covers all the necessary component of the MVC framework. Laravel comes with Eloquent, ORM and blade templating language which helps developers to build a website and web-application within short time and with less effort.

### **3.5.1 Structure of Laravel**

Laravel default application structure is intended to provide a good starting point for small and large-scale web-application and websites.

- App directory contains the core of your application.
- Bootstrap directory contains the Bootstrap framework in Laravel. As mentioned earlier, Bootstrap makes easy for frontend development. Bootstrap in Laravel has made it much easier to develop frontend.
- Config directory contains all the configuration file of the application
- Database directory contains all the data migration and seeds.
- Public directory contains the frontend items like images, JavaScript and CSS.
- Resource directory contain views files and raw assets like LESS, SASS and other local file.
- Storage directory compiled blade templates, session on file based, caches file and other generated files by framework.
- Tests directory contains the automated tests.
- Vendor directory contains composer dependencies.

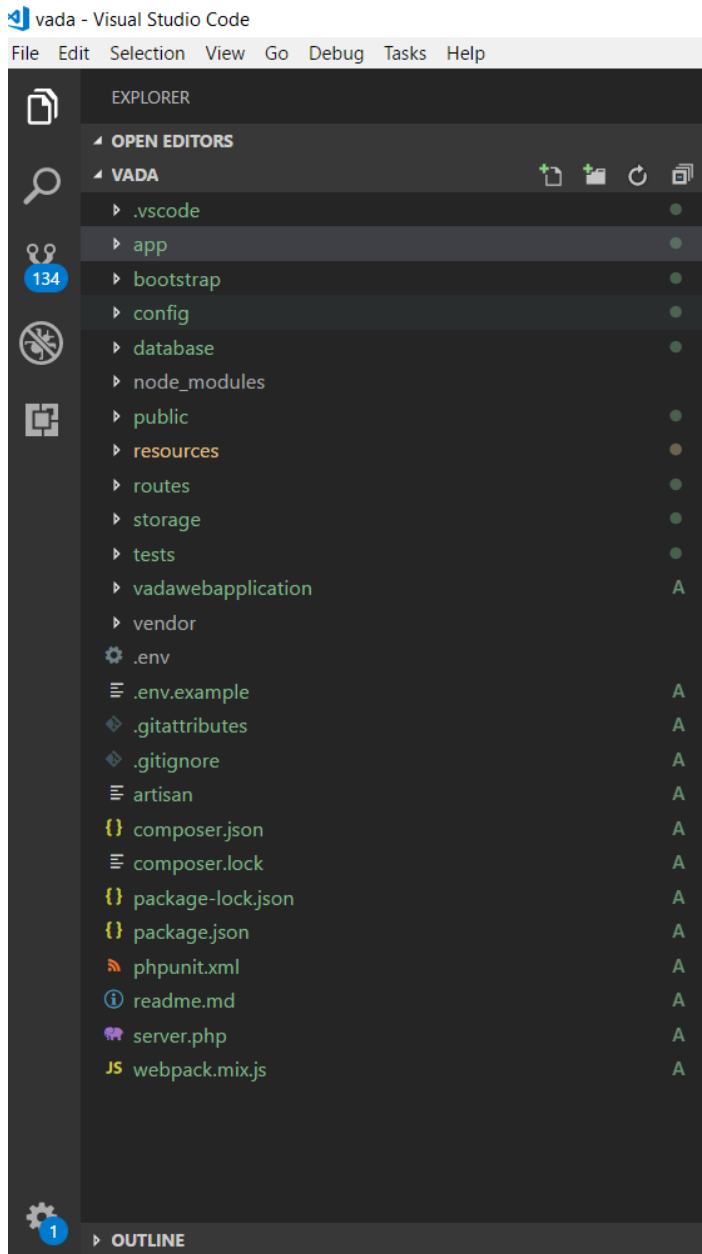


FIGURE 8 Structure of Laravel framework.

### 3.5.2 MVC (modal-view-controller)

Model-view-controller is one of the most popular design patterns for a web application.

The concept was originally invented by Trygve Reenskaug in the 1970s as part of a Smalltalk system being developed at Xerox PARC before the born of World Wide Web and the era of a personal computer (c2.com 2018, cited 26.06.2018). It is worth noting that that Laravel is a fully MVC compliant framework (Maks Surguy, History of Laravel PHP framework, Eloquence emerging,

cited 26.06.2018). Laravel developers should understand the MVC pattern because Laravel uses the MVC pattern.

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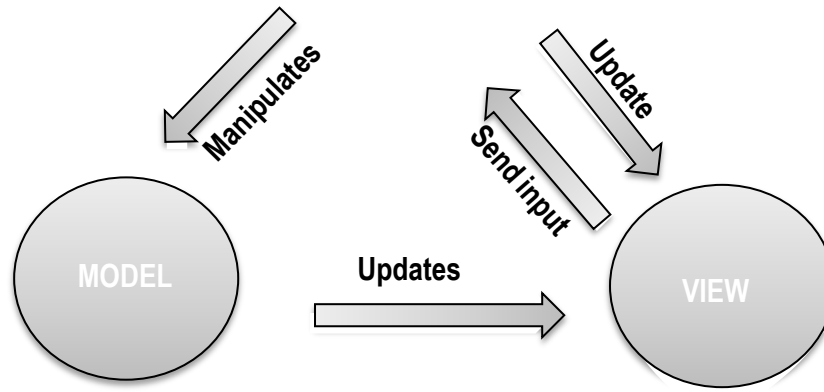


FIGURE 9 MVC pattern design

- Model A model is basically an abstraction layer. It contains all the databases of the application. If any data changes in the application, model notifies the view so that the UI gets changed. The model needs to communicate to view with the help of the controller.
- Controller A controller contains all the logic layer of an application. A controller basically communicates between the views and the model.
- Views Views is the presentation layer of the application. All the front end elements are written in views. The thing which the user sees is on views. When an user does any activity in views then controller gets notified to the model and changes in the database. Once the database is changed then the changed data will be shown in UI.

### 3.5.3 ARTISAN AND MIGRATION

During the development process, we need to do the same task several times. All those common tasks can be constructed automatically. For this purpose, there is artisan. It is a collection of useful command utilities to help the developer quickly create the skeleton code or doing some administration tasks. (Laravel official website, Artisan Console, cited 27.06.2018)



Artisan is a great feature for a developer. It helps to build and manipulate the database schema via migration files. Using Artisan, it is easy to create Controller, Model. With some basic command, it is easy to create the database in Laravel. Following example shows how the database was created for this application

Firstly, a database named Vada was created on a local server xampp.

After that, the database needs to be connected to Laravel project.

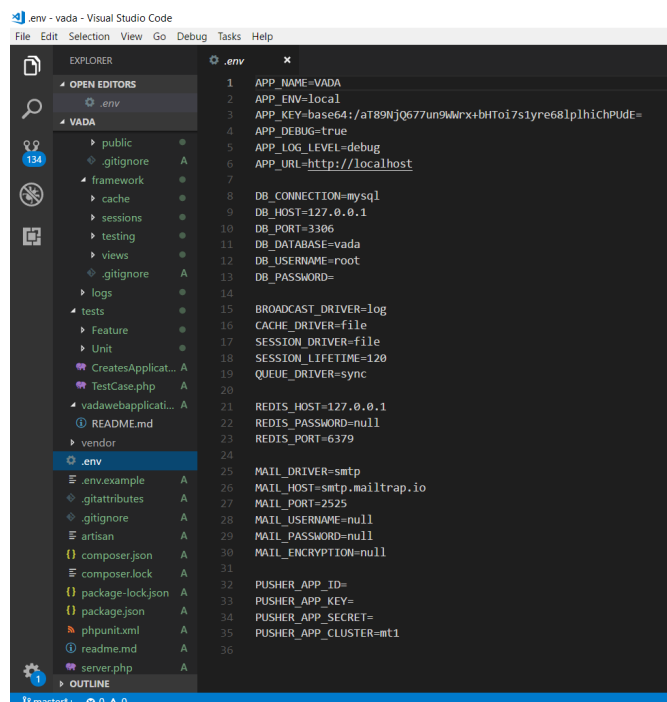


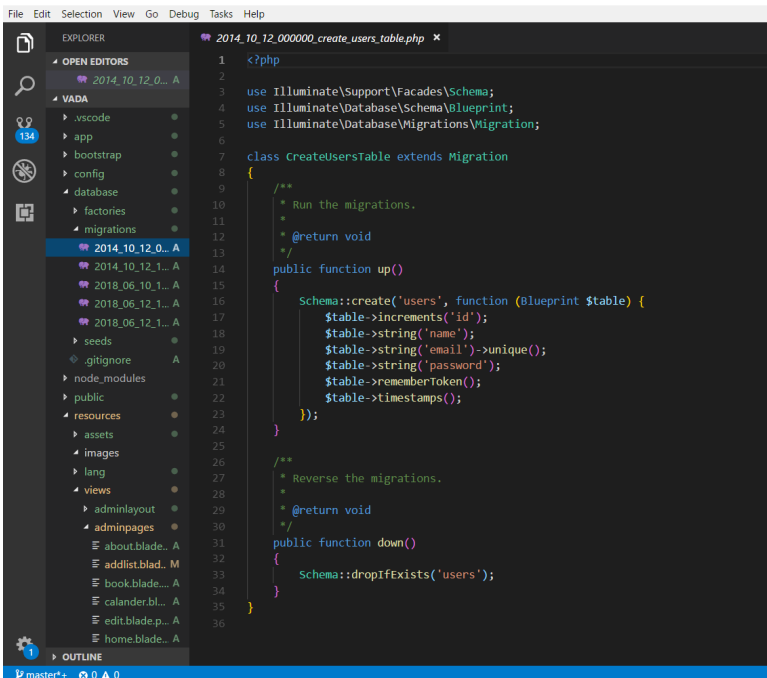
FIGURE 10 Database connection with Laravel project.

In the above example, there is DB-CONNECTION which name is MySQL because MySQL is used as the database. After that there is DB\_DATABASE = Vada. Vada is the name of the database. DB\_USERNAME is root as default. Database username can be changed. Once database username is changed, the same username must be written in DB\_USERNAME. In DB\_PASSWORD section, there is no password so it is empty. Password can also be changed and same password must be written in DB\_PASSWORD.

After this process migration needs to be created. For example

PHP Artisan make migration create\_user\_table

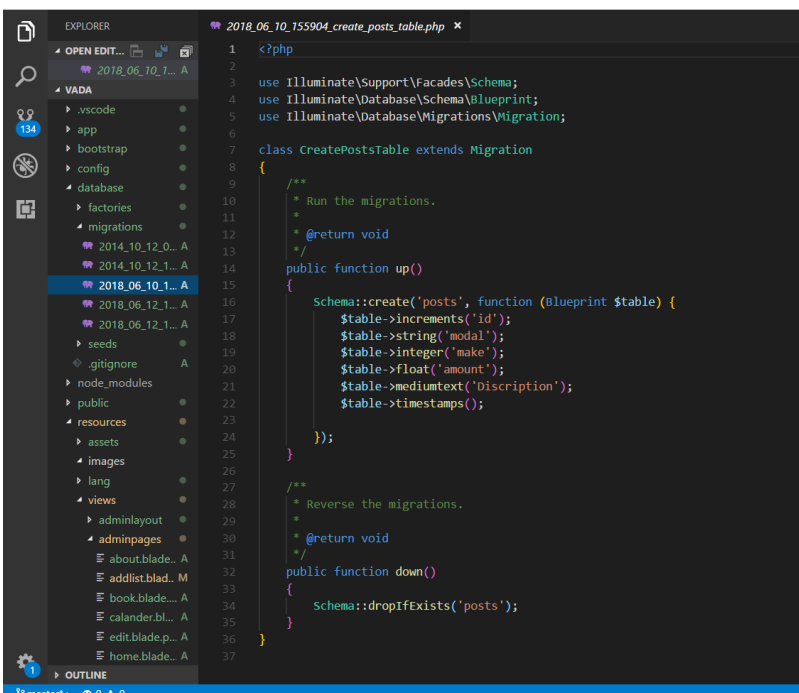
Then in the database in the migration folder, a file will be created which creates a user table with some of the pre-defined attributes.



```
1 <?php
2
3 use Illuminate\Support\Facades\Schema;
4 use Illuminate\Database\Schema\Blueprint;
5 use Illuminate\Database\Migrations\Migration;
6
7 class CreateUsersTable extends Migration
8 {
9     /**
10      * Run the migrations.
11      *
12      * @return void
13      */
14     public function up()
15     {
16         Schema::create('users', function (Blueprint $table) {
17             $table->increments('id');
18             $table->string('name');
19             $table->string('email')->unique();
20             $table->string('password');
21             $table->rememberToken();
22             $table->timestamps();
23         });
24     }
25
26     /**
27      * Reverse the migrations.
28      *
29      * @return void
30      */
31     public function down()
32     {
33         Schema::dropIfExists('users');
34     }
35 }
36
```

FIGURE 11 user table after migration command.

Some other migration that was used in this projects are below



```
1 <?php
2
3 use Illuminate\Support\Facades\Schema;
4 use Illuminate\Database\Schema\Blueprint;
5 use Illuminate\Database\Migrations\Migration;
6
7 class CreatePostsTable extends Migration
8 {
9     /**
10      * Run the migrations.
11      *
12      * @return void
13      */
14     public function up()
15     {
16         Schema::create('posts', function (Blueprint $table) {
17             $table->increments('id');
18             $table->string('modal');
19             $table->integer('make');
20             $table->float('amount');
21             $table->mediumtext('Discription');
22             $table->timestamps();
23         });
24     }
25
26     /**
27      * Reverse the migrations.
28      *
29      * @return void
30      */
31     public function down()
32     {
33         Schema::dropIfExists('posts');
34     }
35 }
36
37
```

FIGURE 12 migration to post the car

In figure 12 a table post is created in the database. Post table have id which is unique id for every car. Modal is the modal of car. Make is for the year modal of car. Amount is for the pirce of car for a day. Discription is for the detail of car. Timestamp generates the exam time and date of car posted in system.

```

1 <?php
2
3 use Illuminate\Support\Facades\Schema;
4 use Illuminate\Database\Schema\Blueprint;
5 use Illuminate\Database\Migrations\Migration;
6
7 class CreatePasswordResetsTable extends Migration
8 {
9     /**
10      * Run the migrations.
11      *
12      * @return void
13      */
14     public function up()
15     {
16         Schema::create('password_resets', function (Blueprint $table) {
17             $table->string('email')->index();
18             $table->string('token');
19             $table->timestamp('created_at')->nullable();
20         });
21     }
22
23     /**
24      * Reverse the migrations.
25      *
26      * @return void
27      */
28     public function down()
29     {
30         Schema::dropIfExists('password_resets');
31     }
32 }

```

FIGURE 13 migration to reset password.

In figure 13 there is a table for password reset. To reset password user need to give email and reset link will be send to the user email id.

```

1 <?php
2
3 use Illuminate\Support\Facades\Schema;
4 use Illuminate\Database\Schema\Blueprint;
5 use Illuminate\Database\Migrations\Migration;
6
7 class AddCoverImageToPosts extends Migration
8 {
9     /**
10      * Run the migrations.
11      *
12      * @return void
13      */
14     public function up()
15     {
16         Schema::table('posts', function($table){
17             $table->string('cover_image');
18         });
19     }
20
21     /**
22      * Reverse the migrations.
23      *
24      * @return void
25      */
26     public function down()
27     {
28         Schema::table('posts', function($table){
29             $table->dropColumn('cover_image');
30         });
31     }
32 }

```

FIGURE 14 migration to post cover image.

## 4 DESIGN

Different types of designs are needed to make a complete application. A logo design, a flowchart, and website template design are also needed. When designing, a suitable and comfortable brand color for the application will be selected.

### 4.1 Logo design

The logo is basic of a company. It represents the company image. The logo must represent business. So business nature and business area must be cleared before designing logo. A company logo must be used in different medium, so it must be scalable and suitable for all platforms. While designing a logo different idea were implemented and tested. After a lot of brainstorming and research, simple and meaningful logo is finalized.

Figure 15 is the final logo for Vada.

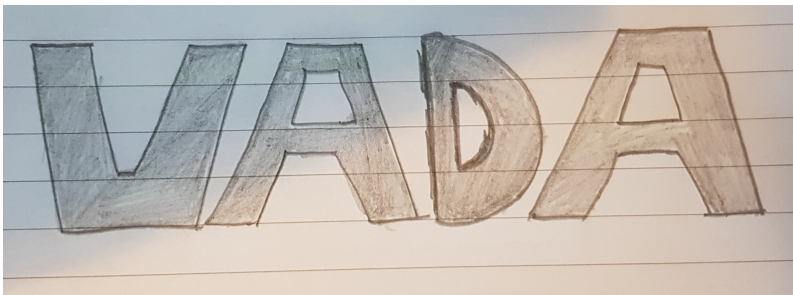


FIGURE 15 logo design of the application

### 4.2 Web application design

Designing was done according to idea. Many design were designed to cover all idea, but that design could not meet the standard. Lot of design were designed using pen and paper. After a few trials and practice, a design was finalized. While learning to design in Photoshop, one of the index page was made in photoshop and remaining in a paper prototype.

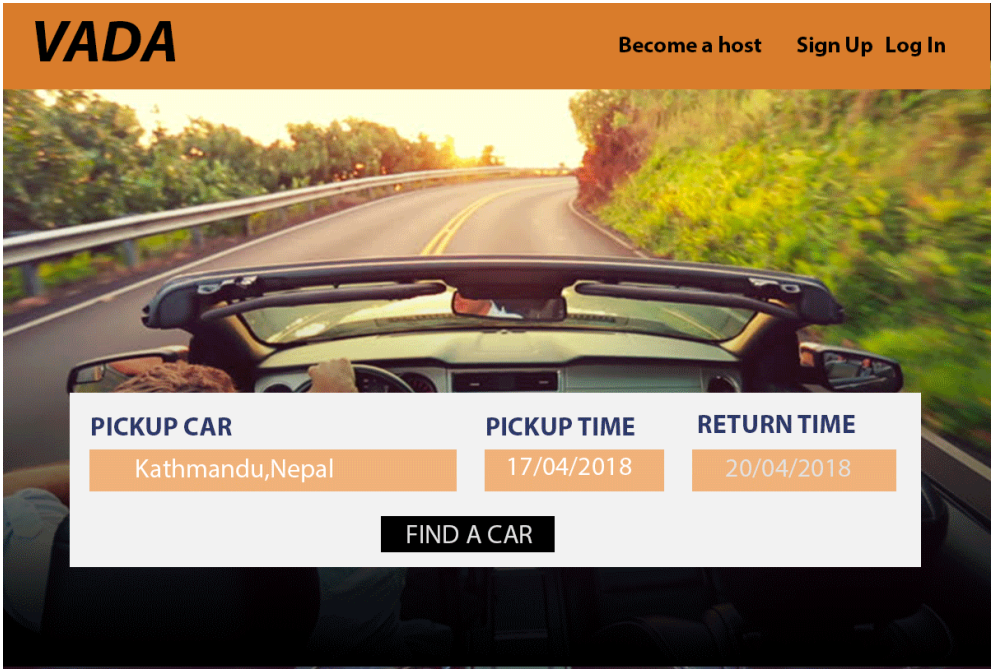


FIGURE 16 index design of application.

Figure 16 is the design made to develop the prototype. It was made first by pen and pencil later done by photoshop. The header section and the footer section are the same in color and have most of the information about the company. The body holds the information for the customer. Their choice and different offer that can help to make their trip smooth.



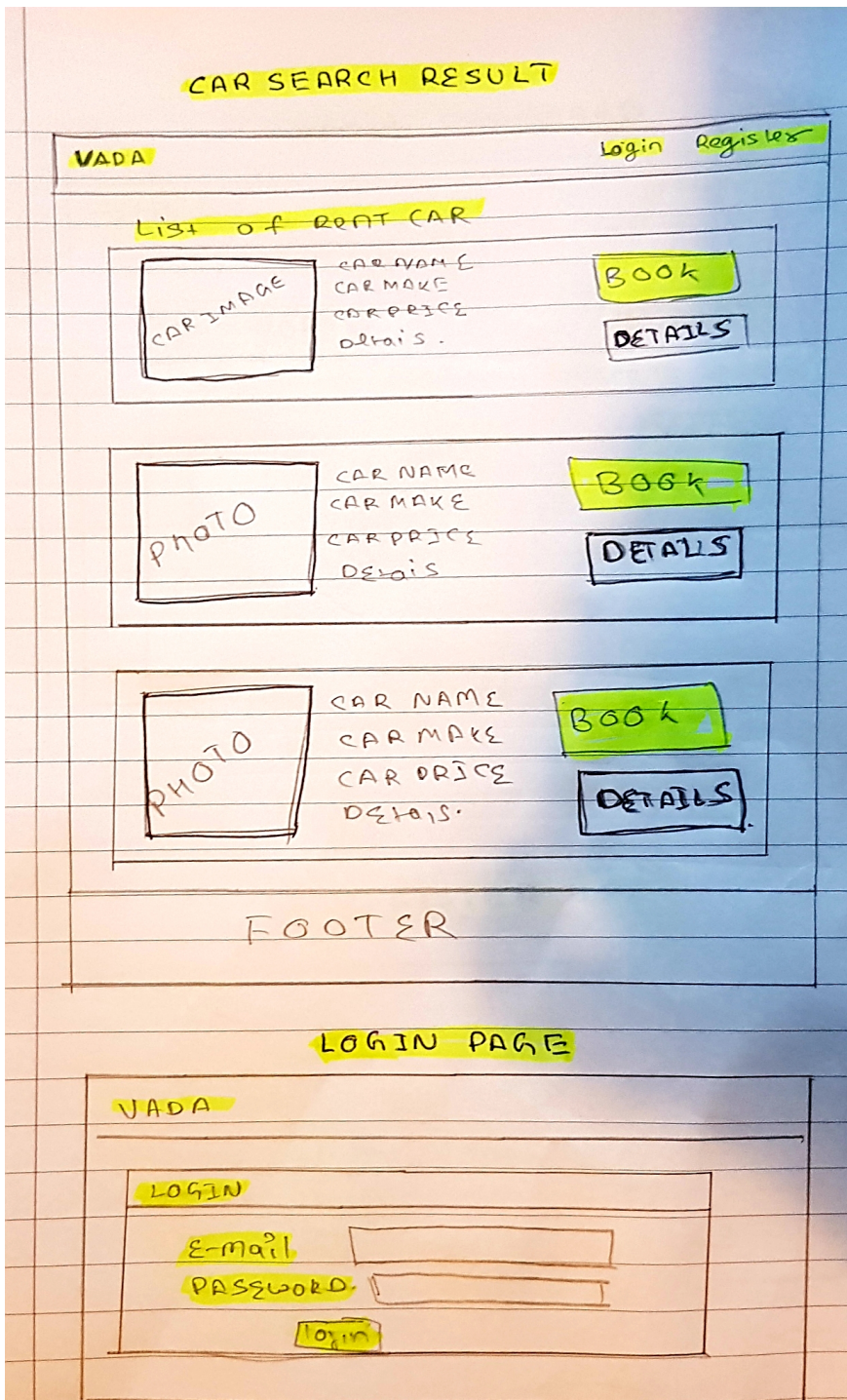


FIGURE 17 paper design of Vada

Figure 17 has two different paper prototypes for car search result and a login form for an owner of the car. The first figure of figure 17 shows the list of cars that are available once the user gives the required input in an index page.

The second prototype in figure 17 shows the login form where a car owner needs to login with his or her username and password. Once car owner are logged in they can add, edit and delete their cars from the list.

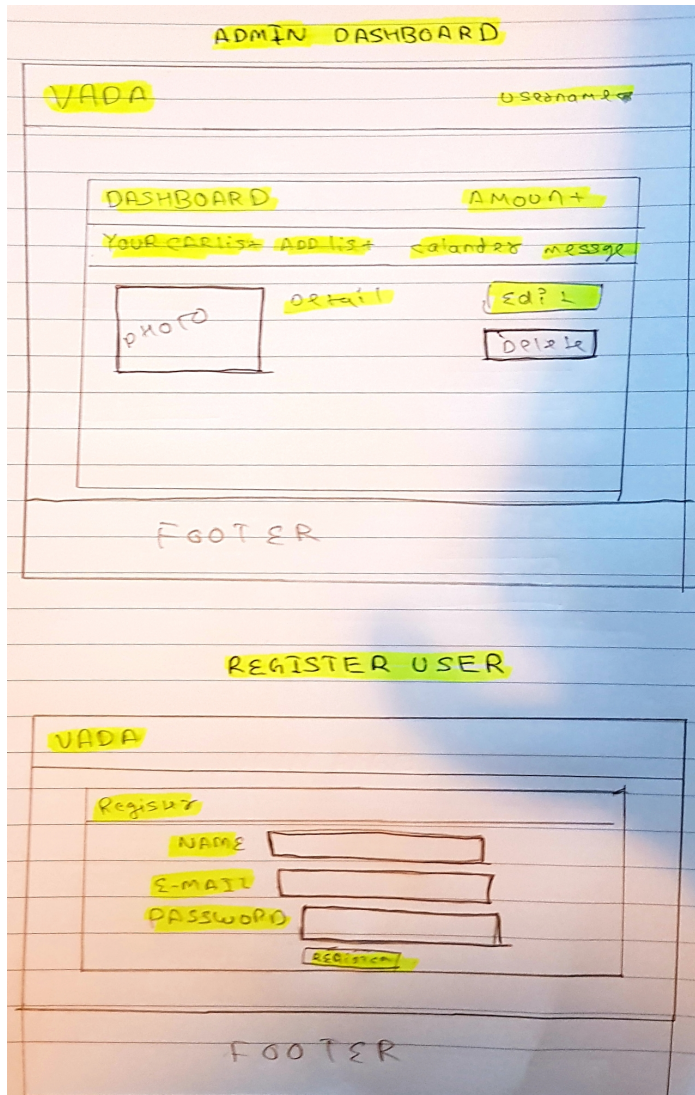


FIGURE 18 paper design of Vada-application

The first prototype of figure 18 is a view of the car owner admin page. Once the car owner logged in this is the page to control their products. All the information about the price, calendar and other important information. An owner can edit, delete and add their car from the admin page of an application.

The second prototype of figure 18 is to register the owner of a car. Once they give the information needed they will get their username and password.



## 5 DEVELOPMENT

In the end, in the development phase a prototype of this idea was built. During the development process a lot of online tutorial, documentation and expert suggestion was used. Visual studio code was used as a text editor to develop the idea. PHP Laravel framework and MySQL were used as a database. Local server XAMPP was used to run this application in the computer. To faster the process Bootstrap was used for frontend and Laravel Artisan and migration for backend data. Laravel framework was used to make code easier and professional. After all the effort, result was produced according to the plan. Many other resources from the Internet were used to make prototype work. It was a challenging work for researcher. As for the BIT student, it was challenging to implement modern day web technologies in the project. However working and interactive prototype was developed at the end.

### 5.1 User trail and interview.

As the plan, some trail of user were done about application. Many of the users have positive feedback and suggestions.

Test user 1

a) What do you think about the idea?

- "The idea sounds good, it must be one of the working ideas in Nepal, but Nepal is not a country with good Internet so that could be challenged."

b) What do you think about the application?

- "The application is cool and easy to use. It is good enough as a prototype but there are a lot of things to do."

c) Was navigating easy?

- "It is quite easy to find all the menu. Searching the car is quite easy. Search and function are like many other applications, so it looks familiar to me."

d) What do you think about color?

- "Colour looks good to see. It can also be different color later you need to work in it."

e) What do you think about the website?

- "Well I said earlier it is like another different website, so it is familiar for me and good enough to use."

f) Do you have any suggestion on an idea and web-application design?

- "Well, I like the overall application. The idea needs to work but there are a lot of challenges in the field. Do more study on basic requirement like government rules (new laws are on its way because Nepal has a new constitution. You also need to see the Internet connection and speed in the rural part of the country.

Taking about your web-application. As it is only a demo so there is a lot more to do for full application. If you made it with different language it could be good. You can see other different frameworks to develop which can be better for future, according to your idea. It seems like you will need both web and mobile application in future. Thus the suggestion is to use cross-platform to develop it in future."

Test user 2

a) What do you think about the idea?

- "The idea for me is good and impressive, it can be a good idea for Nepal and such type of country. I can see the future of this idea."

b) What do you think about the application?

- "The application looks good, you can work it to make it smart."

c) Was navigating easy?

- "For me navigating through the website is easy. I can easily find the thing all I want. But in driver page, it can be made easier."

d) What do you think about color?

- "Colour is ok but work in the design of web-application."

e) What do you think about the website?

- "It is easy to use, good to see."

f) Do you have any suggestion on an idea and web-application design?

- "Main suggestion is to work in design. Your idea is good but technically web-application must be stronger. But as you said as a demo or prototype, it can be used but for future, you need a good application using modern web technologies. Also, have some look for a similar idea if they exist in Nepal, you can work together that makes you easy."

## 5.2 Final product

As a beginner in this programming world, it was a big chance and challenge to develop this prototype. Lot of problems were faced. There were a lot of bugs in every step of development. Lot more time was spent than the usual development process to develop this product. For now, it was concluded with some of the working features and few for the component were left behind due to lack of time and resources. This application will be live for the public with a required features and design after it meets with investors and manage to gather the fund.

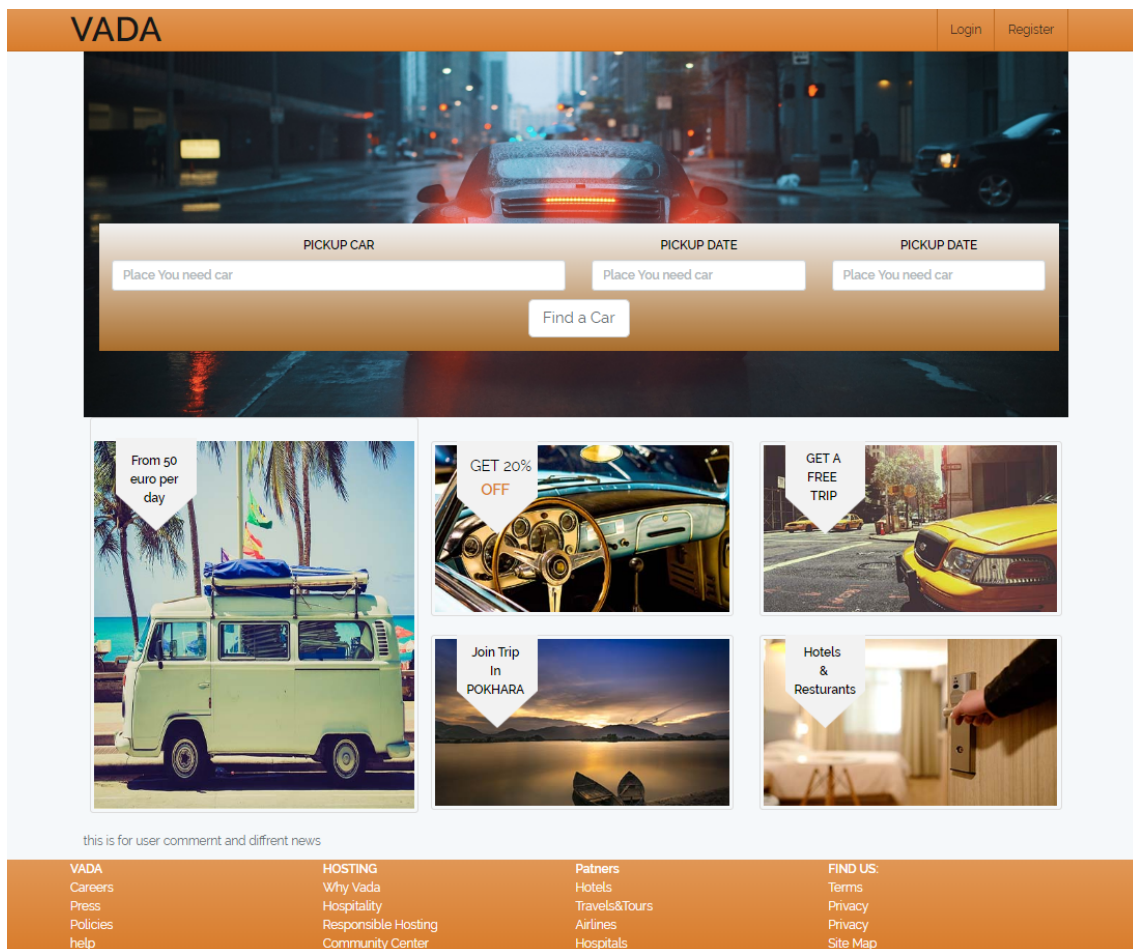


FIGURE 19 Index page of application

In the above figure, on the left top corner, you can see the logo of the application with the name of the application. On the right side of the navigation, there is the login and register button. Login is for the car owner who wants to post their car for rent. They will have their own user id and password to login the page. The register button is for the new car owner who can have their car for rent.

After the nav, you can find a section to search for a car where you need to select the place, date you need and date you will return the car. After that section, you will find the advice and information about the different promos and our partner organizations.

In the footer you can see four different headings Vada is all about us. Customers can get information about our organization such as a job opening in our company and who are we. Under HOSTING heading, the new car owners can see why they need to use this system, what are the benefits of using this application, how can they be a responsible host and a forum for the owner community.

PARTNERS heading is all about the partner organizations that relates to us. In this section, our customer will get some information about the hotel, hospital and all the things they need on their tour. Find us section is about our social media page, terms mean our policies and sitemap will help to use our website.

The screenshot shows the VADA website interface. At the top, there is an orange navigation bar with the logo 'VADA' on the left and 'Login Register' on the right. Below the navigation bar, the main content area is titled 'List of cars for rent'. This section contains four car listings, each in a white box with a light gray border. Each listing includes a car image on the left, and text on the right: 'Car Brand: [brand]', 'Car Make: 2018', 'Car Price: [price]', and a short description. To the right of each listing are two buttons: a green 'BOOK' button and a blue 'Details' button. The footer is an orange bar with four columns of links: 'VADA' (Careers, Press, Policies, help), 'HOSTING' (Why Vada, Hospitality, Responsible Hosting, Community Center), 'Partners' (Hotels, Travel/Tours, Airlines, Hospitals), and 'FIND US' (Terms, Privacy, Privacy, Site Map).

FIGURE 20 Car search result.

When the user searches for a car from the index page, he will see the result he wants in the page. The user will get a list of available cars in the search filter user input. The result will be a car that a user wants in the user data. After the result, users can either book the car or see the details. When the user presses 'book a car' button, user needs to register him/her first. After that the user needs to pay for the car. Once the user has booked a car, that car will not be shown in the available list in that time for another user.

After all the process, the user will get his/her dashboard where they can communicate with there car owner and plan their trip. For a security purpose, the actual information of the car owner will be hidden for the user. Once the car is booked all the information will be shown.

\*As it is only a prototype, book a car and details are not functioning.

The image shows a web page for VADA. At the top, there is an orange header with the VADA logo on the left and 'Login Register' on the right. The main content area is light blue and contains a white login form. The form has a title 'Login' and two input fields: 'E-Mail Address' and 'Password'. Below the password field is a checkbox labeled 'Remember Me'. At the bottom of the form is a blue 'Login' button and a link for 'Forgot Your Password?'. The footer is orange and contains four columns of links: 'VADA', 'HOSTING', 'Partners', and 'FIND US.'. Each column lists several sub-links.

FIGURE 21 User-login form

This is a user login-form. Every car owner will have a username and password. They will log in using this form. There is 'forgot your password' option which means that they can recover their password if they forget it.

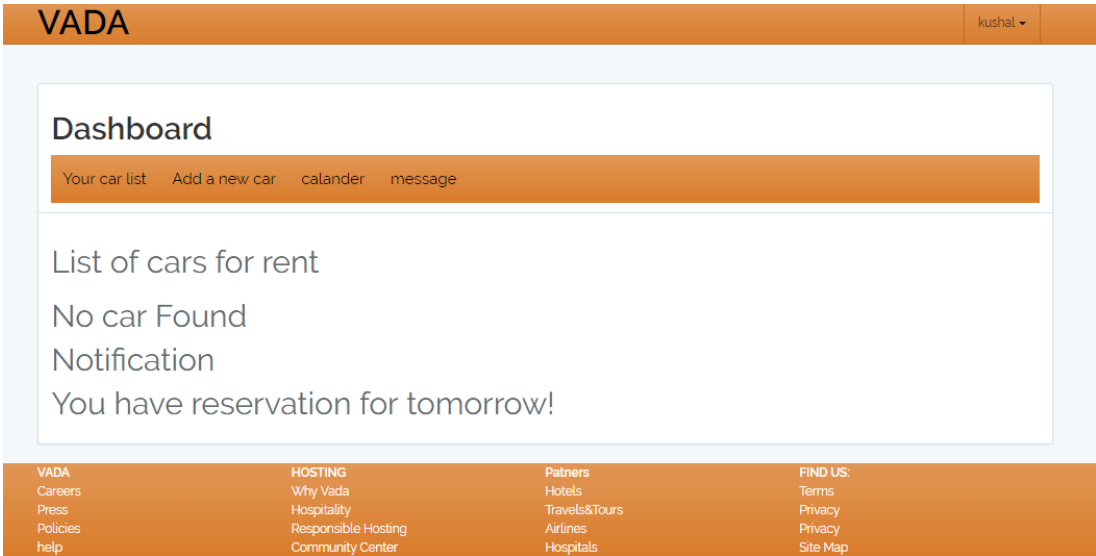


FIGURE 22 Car owner admin page

This is the main page after a car owner logs in to the page. There will be a sub-menu like add another car, your calendar where he/she can check their reserve day. In the message, they can direct a message to their customer.

If there is no car on their list, it will show no car found. In the notification section, there will be a notification if they have any reservation or any message from the customer.

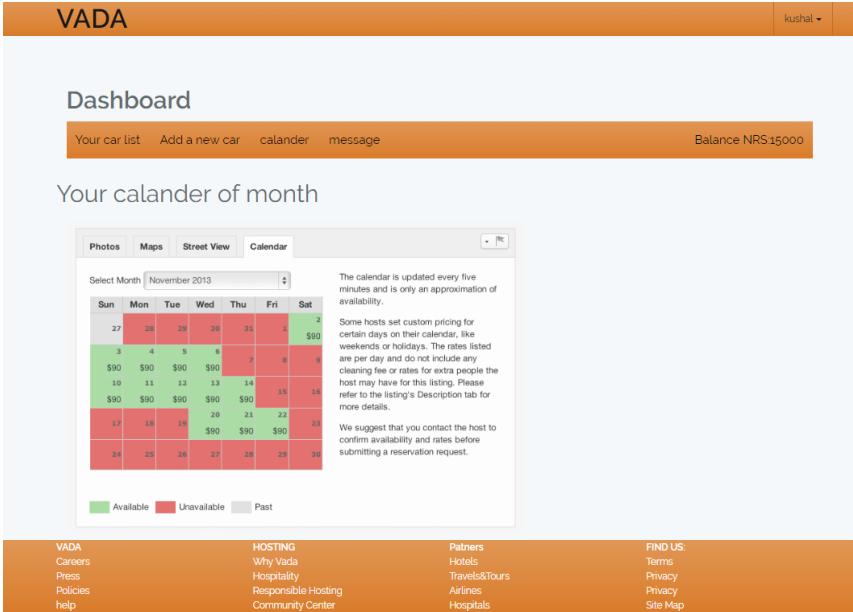
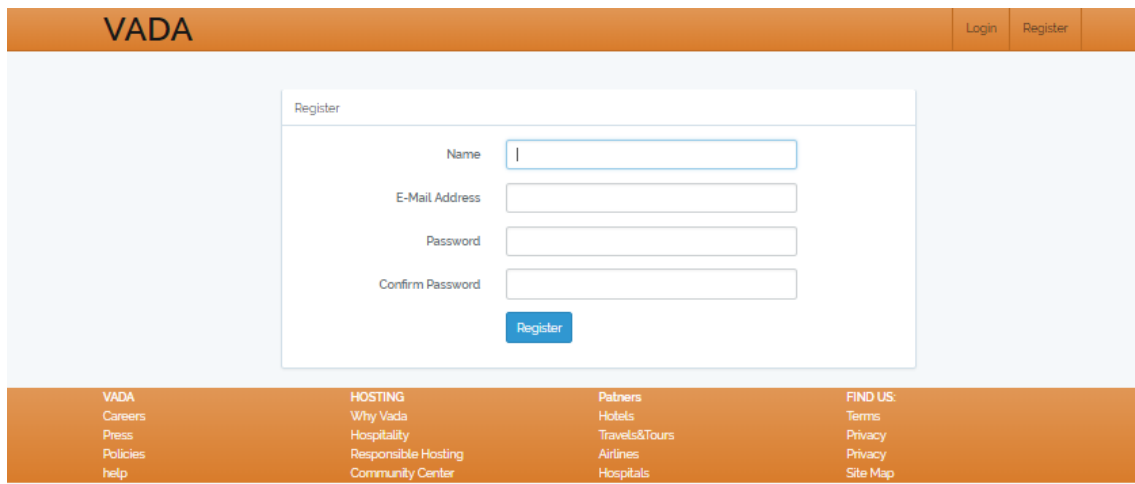


FIGURE 23 Car owner calendar

Above figure is of calendar feature for a car owner. If they have a reservation they can see red in that day and if they have free days, they will have a green color. They can customize their price from day to day as they want.

Another feature of the calendar for the host is that they can just block the date they don't want to make their car available. That day will be shown red in the calendar, but once they have booked a car they cannot block the day. They need to make their car available for the client.



The image shows a screenshot of the VADA website's registration form. The page has an orange header with the VADA logo on the left and 'Login' and 'Register' links on the right. The main content area is light blue and contains a white 'Register' form. The form has four input fields: 'Name', 'E-Mail Address', 'Password', and 'Confirm Password'. A blue 'Register' button is located below the 'Confirm Password' field. The footer is orange and contains four columns of links: 'VADA' (Careers, Press, Policies, help), 'HOSTING' (Why Vada, Hospitality, Responsible Hosting, Community Center), 'Partners' (Hotels, Travels&Tours, Airlines, Hospitals), and 'FIND US:' (Terms, Privacy, Site Map).

FIGURE 24 Car owner register form

This form is to register to be the host or a car owner. You need to enter your name and email-address, which is validated so a real email should be entered. The host must enter the password to verify it. The password must be at least six characters long.

**VADA** admin ▾

**Dashboard**

Your car list   Add a new car   calander   message Balance NRS15000

Add a new car for rent

**Modal of Car**

Title eg: BMW, TOYOTA

**Year modal**

Year Model of car eg : 2010

**Price of car per day**

Rent amount of your car per day

**Discription of your service**

Write more about your car and your service

**Choose File** No file chosen

VADA Careers Press Policies help	HOSTING Why Vada Hospitality Responsible Hosting Community Center	Partners Hotels Travels&Tours Airlines Hospitals	FIND US: Terms Privacy Privacy Site Map
--	---	--	---

FIGURE 25 : Add car list form.

To add a car, you need to go through this form. You need to give the required information and picture so that the customer car knows about your service and car. After the car is added, it will show in the availability list.

Adding a car will not be easy as it is shown in the above prototype. There would be various types of inspection of the car. The car must have an insurance, road tax must be cleared, and most importantly, car must pass the inspection by our experts.



## 6 DISCUSSION

Finally, after a long process and challenges, the result was obtained. Researcher learned and worked a lot for this process, from the basic HTML to Laravel framework. Everything was new at this moment. Great effort was put to finish the prototype. The aim of this project is completed. Now, work needs to be done for business plan and further development of an application. Throughout the process, many things were learned about the different web technologies like HTML, CSS, Bootstrap JavaScript MySQL and some basic Laravel framework. Laravel is a big and good framework of PHP. Basic Laravel framework was used to develop the prototype.

Throughout the process, researcher faced a lot of problems with the codes. Bugs are something which make the problem. All the problems were fixed in the code and now it is able to function well. Researcher learned about many business implementations, some legal issues and a lot of programming principle. By the end of the project, researcher is capable of developing frontend of a web application.

For further development of the project, some of the good developers will be needed who are familiar with new technologies. In future, this project can be developed in cross-platform which means it can be easy to develop for all the platforms i.e. web, Android and iOS. Cross-platform development can be cost effective for a start-up company. As idea of Vada is targeted to attract a huge number of customers, the server for hosting should be good. As it is a service platform it must be running smoothly all the time. The server must be the best and reliable. There could be an error all the time in the application, so a good technical team is essential to make it run all the time.

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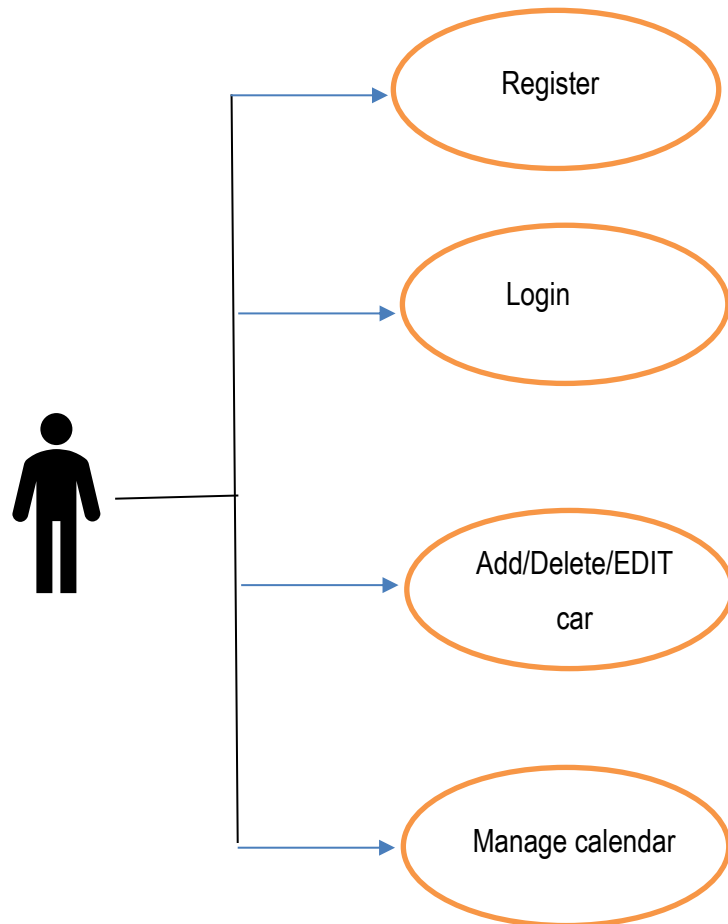
<https://www.SIXT.com/PHP/reservation/directoffer?uci=1928&rci=1928&uda=04%2F13%2F2018&rda=04%2F14%2F2018&uti=1200&rti=0900&ctyp=P>

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User case diagram

-car owner



-customer

