Collaborative Web Application for Travellers

TravelMate

Author:
Ali Kiyan

Assessor:
Sean Hill

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Introduction

TravelMate is a scalable collaborative web application providing an interface for its user to share information about different locations, send messages in realtime, check the next day weather and call to emergency services.

The main object of *travelMate* is to provide a light platform that can be accessible in remote areas and devices with lower specification. *TravelMate* targets users in the harsh environment such as low light and inclement weather and provides them with swift, effortless and fast experience due to its simple and light design — *TravelMate* first target is mobile devices with lower specifications.

TravelMate's interface is minimal, consisting of colours with high contrast and sometimes luminous colours in some parts for make these parts easier to notice in situations with lower light.

Discussion

In this section I will go through main building blocks of *TravelMate* web applicaiton.

1. Web application design :

   - *TravelMate* is exploiting state of the art design choices and paradigms such as using MVC architecture, dependency manager, and UX design

2. User Management :

   - Secure register
   - Secure authentication
   - Login
   - Updating user profile

3. Location Management :

   - Created locations
   - Reading locations
   - Update locations
   - Deleting locations
   - Disqus Commenting system

4. Real-time interaction :

- An interface for authenticated user to interact in a light manner

5. Weather forecast :

- Using Open Weather API for the next day forecast

6. Emergency numbers :

- Provides easy access to call UK emergency services number through website

Web application design

MVC

I have used wildly embraced MVC[1] architecture over other web development methods due to its ability to support communication amongst designer and programmers (modularity), ability to use singletons, more efficient way of accessing resources. The level of complexity and line of codes are often higher than other prior web-development approaches. However, after learning how to configure a program in MVC architecture, development, especially in larger projects, is much faster and efficient in terms of time and effort because the application will be more loosely coupled, higher cohesion and minimal intra and inter-crosscutting.

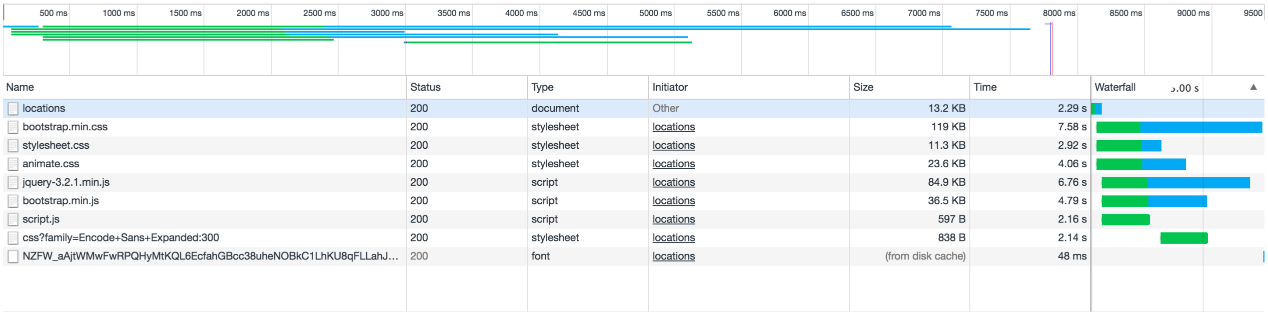
Dependency Management

I have used composer for dependency management in *TravelMate.* PHP libraries frameworks, components are all dependencies. Composer JSON file, will automatically download my dependencies and will setup my autoloading as well.

Google Chrome Development tools

I have used Google Chrome development tools to check my web application in different network speed.

[1] **M**odel **V**iew **C**ontroller



Name	Status	Type	Initiator	Size	Time	Waterfall ɔ.00 s
locations	200	document	Other	13.2 KB	2.29 s	
bootstrap.min.css	200	stylesheet	locations	119 KB	7.58 s	
stylesheet.css	200	stylesheet	locations	11.3 KB	2.92 s	
animate.css	200	stylesheet	locations	23.6 KB	4.06 s	
jquery-3.2.1.min.js	200	script	locations	84.9 KB	6.76 s	
bootstrap.min.js	200	script	locations	36.5 KB	4.79 s	
script.js	200	script	locations	597 B	2.16 s	
css?family=Encode+Sans+Expanded:300	200	stylesheet	locations	838 B	2.14 s	
NZFW_aAjtWMwFwRPQHyMtKQL6EcfahGBcc38uheNOBkC1LhKU8qFLLahJ…	200	font	locations	(from disk cache)	48 ms	

Figure 1 Locations page loading time in low 3G connection

As it can be seen in Figure 1 it takes significant amount of time to load different assets.
I have used different methods of optimising to reach best performance. Firstly, except for login and register page I did not store image in the web application. (I resized that image to an optimal size as well). Secondly, I minified all of my assets such as CSS and JS files to decrease loading time.

Animation and User Engagement

I decided to used smooth and natural transitions with animate CSS library in development of *TravelMate.* Although it may cause and overhead to be loaded in each page, it can have many impacts on user engagement and user experience. It can guid the attention of user to the most important object at an specific time (Head, 2016).

In a study by Merz et al. (2016) three animation principles applied to common animated transitions in mobile applications. Different users took part in the online pilot study with their personal smartphone and used these applications. The results showed that animated transitions could affect the perception of UX.

According to Head (2016), even small motion can enhance users understanding of the interface and saves user’s time.

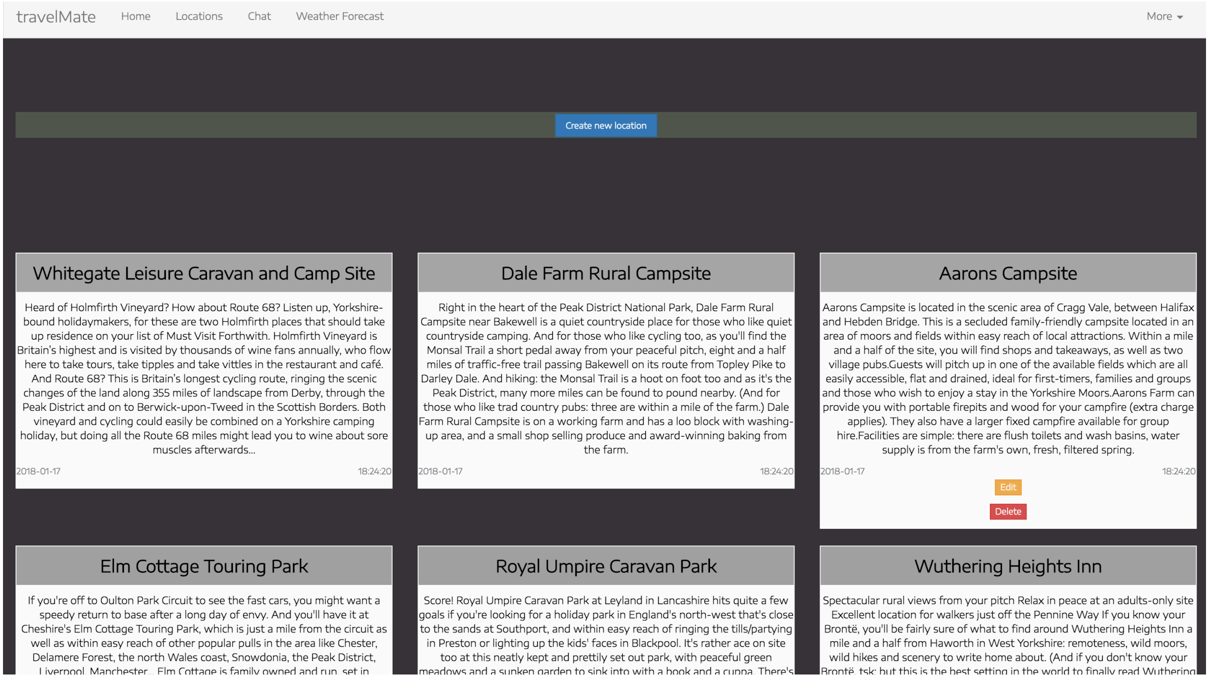
I believe advantages of using animations on users experience and engagement outweigh its negative impact on page load, therefore, I used animation in development of *TravelMate.*

Another factor for user engagement is readability. In fact readability can be viewed important from a different perspective as well. The content of the web should be readable in harsh environment.
A research by ATW-LAB, Design Guidelines for Web Readability, showed there exist guidelines accounting for a substantial improvement in webpage readability. I have chosen the ones that were relevant to my project and applied them to increase the readability of my web application.

- Limit the amount of content on a page to avoid scrolling
- Use short, simple sentences in a direct style
- Consider using short paragraphs
- Avoid formatting texts in large-width columns
- Use an off-white colour for your background, like light grey

Another research by Richard Hall and Patrick Hanna (2003), showed users rate subtle colours as more pleasing and simulating and most readable. They also found traditional black on white background to be the most professional colour combination.
Also it is worth mentioning that both of the researches point out the importance of colour contrast in readability.

After reading these different researches and guideline I decided to use only black and white for texts in the majority of my project and in some part I used different colours for emphasising on an specific task. I used flat design to have simple and easy to read layout.



Whitegate Leisure Caravan and Camp Site

Heard of Holmfirth Vineyard? How about Route 68? Listen up, Yorkshire-bound holidaymakers, for these are two Holmfirth places that should take up residence on your list of Must Visit Forthwith. Holmfirth Vineyard is Britain's highest and is visited by thousands of wine fans annually, who flow here to take tours, take tipples and take vittles in the restaurant and café. And Route 68? This is Britain's longest cycling route, ringing the scenic changes of the land along 355 miles of landscape from Derby, through the Peak District and on to Berwick-upon-Tweed in the Scottish Borders. Both vineyard and cycling could easily be combined on a Yorkshire camping holiday, but doing all the Route 68 miles might lead you to wine about sore muscles afterwards...

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Dale Farm Rural Campsite

Right in the heart of the Peak District National Park, Dale Farm Rural Campsite near Bakewell is a quiet countryside place for those who like quiet countryside camping. And for those who like cycling too, as you'll find the Monsal Trail a short pedal away from your peaceful pitch, eight and a half miles of traffic-free trail passing Bakewell on its route from Topley Pike to Darley Dale. And hiking: the Monsal Trail is a hoot on foot too and as it's the Peak District, many more miles can be found to pound nearby. (And for those who like trad country pubs: three are within a mile of the farm.) Dale Farm Rural Campsite is on a working farm and has a loo block with washing-up area, and a small shop selling produce and award-winning baking from the farm.

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Aarons Campsite

Aarons Campsite is located in the scenic area of Cragg Vale, between Halifax and Hebden Bridge. This is a secluded family-friendly campsite located in an area of moors and fields within easy reach of local attractions. Within a mile and a half of the site, you will find shops and takeaways, as well as two village pubs.Guests will pitch up in one of the available fields which are all easily accessible, flat and drained, ideal for first-timers, families and groups and those who wish to enjoy a stay in the Yorkshire Moors.Aarons Farm can provide you with portable firepits and wood for your campfire (extra charge applies). They also have a larger fixed campfire available for group hire.Facilities are simple: there are flush toilets and wash basins, water supply is from the farm's own, fresh, filtered spring.

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Elm Cottage Touring Park

If you're off to Oulton Park Circuit to see the fast cars, you might want a speedy return to base after a long day of envy. And you'll have it at Cheshire's Elm Cottage Touring Park, which is just a mile from the circuit as well as within easy reach of other popular pulls in the area like Chester, Delamere Forest, the north Wales coast, Snowdonia, the Peak District, Liverpool, Manchester... Elm Cottage is family owned and run, set in

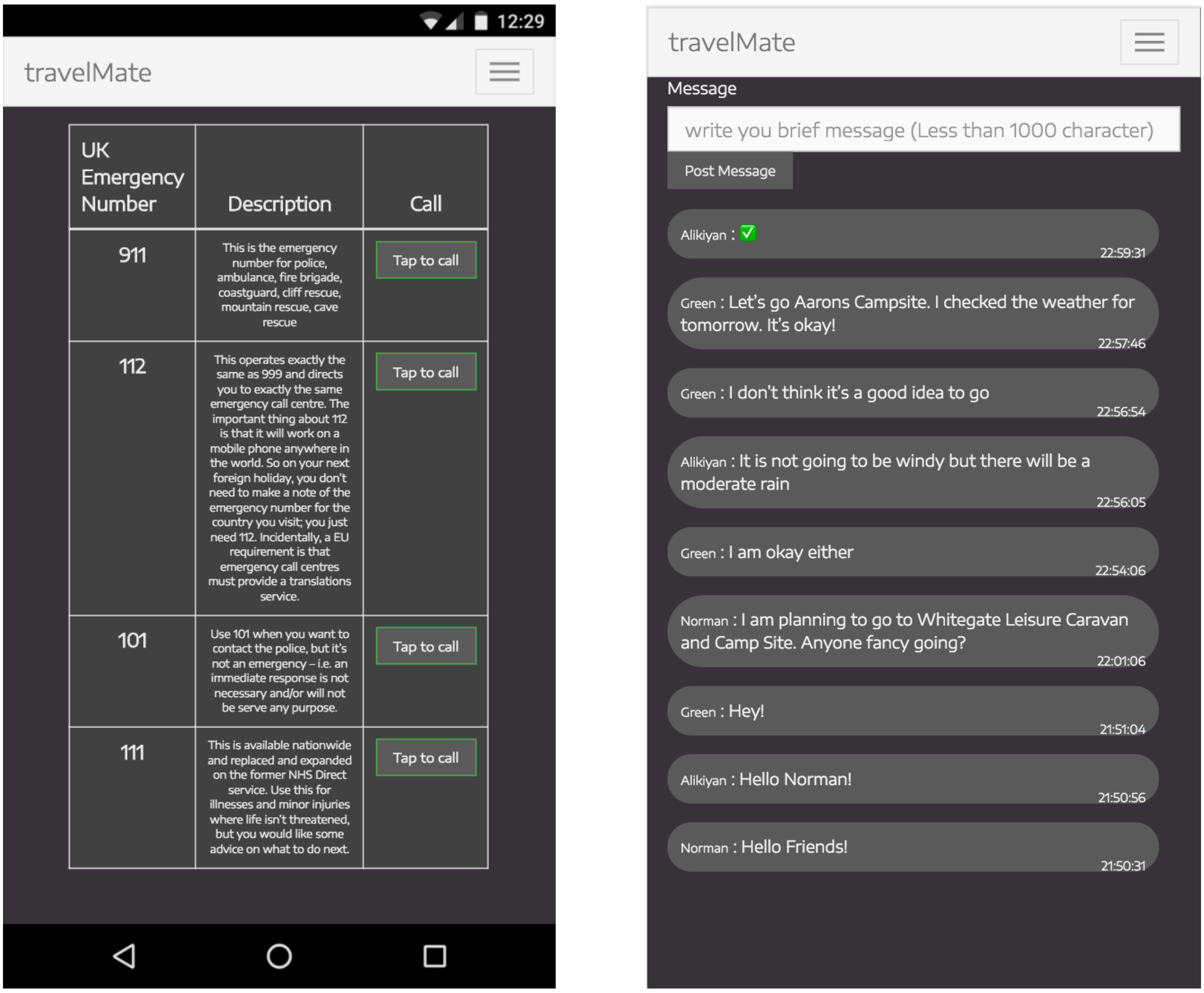
Royal Umpire Caravan Park

Score! Royal Umpire Caravan Park at Leyland in Lancashire hits quite a few goals if you're looking for a holiday park in England's north-west that's close to the sands at Southport, and within easy reach of ringing the tills/partying in Preston or lighting up the kids' faces in Blackpool. It's rather ace on site too at this neatly kept and prettily set out park, with peaceful green meadows and a sunken garden to sink into with a book and a cuppa. There's

Wuthering Heights Inn

Spectacular rural views from your pitch Relax in peace at an adults-only site Excellent location for walkers just off the Pennine Way If you know your Brontë, you'll be fairly sure of what to find around Wuthering Heights Inn a mile and a half from Haworth in West Yorkshire: remoteness, wild moors, wild hikes and scenery to write home about. (And if you don't know your Brontë, tsk; but this is the best setting in the world to finally read Wuthering

Figure 2 TravelMate locations page design



UK Emergency Number	Description	Call
911	This is the emergency number for police, ambulance, fire brigade, coastguard, cliff rescue, mountain rescue, cave rescue	Tap to call
112	This operates exactly the same as 999 and directs you to exactly the same emergency call centre. The important thing about 112 is that it will work on a mobile phone anywhere in the world. So on your next foreign holiday, you don't need to make a note of the emergency number for the country you visit; you just need 112. Incidentally, a EU requirement is that emergency call centres must provide a translations service.	Tap to call
101	Use 101 when you want to contact the police, but it's not an emergency – i.e. an immediate response is not necessary and/or will not be serve any purpose.	Tap to call
111	This is available nationwide and replaced and expanded on the former NHS Direct service. Use this for illnesses and minor injuries where life isn't threatened, but you would like some advice on what to do next.	Tap to call

Alikiyan : ✅ 22:59:31

Green : Let's go Aarons Campsite. I checked the weather for tomorrow. It's okay! 22:57:46

Green : I don't think it's a good idea to go 22:56:54

Alikiyan : It is not going to be windy but there will be a moderate rain 22:56:05

Green : I am okay either 22:54:06

Norman : I am planning to go to Whitegate Leisure Caravan and Camp Site. Anyone fancy going? 22:01:06

Green : Hey! 21:51:04

Alikiyan : Hello Norman! 21:50:56

Norman : Hello Friends! 21:50:31

Figure 3 TravelMate in Nexus (Emergency services) 5X and iPhone 7plus (Chat)

Responsive design

Since *TravelMate* is mostly going to be viewed with mobile phone, I took mobile first design approach. I used bootstrap framework and its grid system to make *TravelMate* responsive along with CSS media query.

It is worth mentioning that I have used normalised css to normalise default setting of browser. I check my website to have the same experience in different browsers such Google Chrome, FireFox, and Safari in desktop version and I used Google Chrome development tools to test it on iPhone and Android phones such as iPhone and Nexus.

Designing database

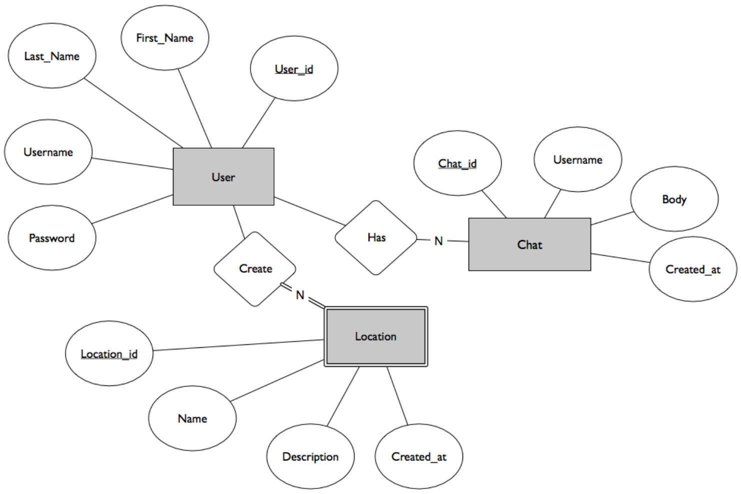


Figure 4 TravelMate Database Schema

Figure 4 demonstrates the relationships between *TravelMate* entities. I have used MySQL database to implement this schema and PDO[2] infract to enable access to it. I used PDO in my models because its templating concept, provides secure way of transferring data to mysql (preventing sql injection)

User Management

In *TravelMate,* users can built a profile with a secure hashed password. I have used php one-way hashing function and **CRYPT_BLOWFISH** algorithm to prevent attacker using different methods such as Rainbow table, dictionaries to access to users' password. Amongst, DES, 3DES, AES, RC4, and RC6, Blowfish algorithm is the lightest and its encryption speed is the fastest, therefore, I used Blowfish algorithm.

Once a user registers on *TravelMate,* He/She can login and update his/her profile.

Location Management

The index page of *TravelMate* is locations which consist all locations added by *TravelMate* users. Every user, even unauthenticated user, can benefit the information shared by the users of *TravelMate* and also post comments using Disqus commenting system. Although using

[2] **P**HP **D**ata **O**bjects

database for implementing comments would make the page load faster, I decided to use Disqus commenting system due to its simplicity for unauthorised users. Users can comment with their Disqus account they are used for commenting in many different websites through the web.

To add a new location, user should sign in and once a new location is created, it can be edited and deleted.

In other words, reading location is accessible to everyone, only logged in users can create new locations and only users who create a location can edit or delete them.

Real-time interaction

I have used AJAX[3] and MySQL database to implement chat system. This system enable *TravelMate* users to chat with each other in real-time. The objective of this project is not running text mining procedures or any kind of analysis on chat data, therefore, as time passes by, chat data become unnecessary large. To prevent this, I wrote a MySQL recurring event that delete all chat every week in this way the data in Chat table remain light and faster to access in harsh environment.

In this section I also used colours with high contrast which have better readability in harsh situations.

Weather forecast

One of the most important concern of travellers is information related to Weather, Temperature, Humidity, Wind, Pressure. This information become handy in different scenario. For example a user views a new location and thinks about going to this location. One of the first thing that He/She will do is checking Weather, Temperature, Humidity, Wind, Pressure information for that area and Weather Forecast provides a simple and fast access to all these type of weather related information for the next day. I have used Open Weather API[4] to have this information and display them to users.

Emergency numbers

Every logged in users can call emergency services in UK directly from *TravelMate.* This feature provide faster and simpler access to emergency services in harsh environment where users are in inclement weather (or wearing gloves) and need to access to emergency services quickly.

[3] **A**synchronous **J**avascript **A**nd **X**ml

[4] **A**pplication **p**rogram **I**nterface

Conclusion

To sum up, the objective of *TravelMate* is to provide a light scalable platform for travellers to share information about locations, and provide social networking real-time tools for them to interact and provide them with weather information using external services to enhance their travel experience. This web application mostly is going to be used on mobile devices with lower specifications in harsh situations, therefore, the design should be simple and responsive with high contrasting colours to improves readability of contents. All of these objectives has been met.

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