



TEKNOFEST

AEROSPACE AND TECHNOLOGY FESTİVAL

TOURISM TECHNOLOGIES COMPETITION

PROJECT DETAIL REPORT

TEKNOFEST
HAVACILIK, UZAY VE TEKNOLOJİ FESTİVALİ

Contents

1. Project Team / Project Summary (Project Description)

Just like our team's name "TechXperts" suggests, we possess skill and will-power to solve problems of people with the help of digital facilities. We, namely Maryam Masood (Captain and Graphic Designer), Erum Naushad (Web Developer), and Kisa Abbas (Mini Game Designer), along with our consultant Shaista Mehmood, have worked extensively to solve the problems of tourists through software technologies, also keeping the current pandemic situation in mind.

" During this difficult time where much of the world is seriously affected by the pandemic, the tourism sector has suffered in particular. We planned to target and work on these issues so that people can have a comfortable and memorable experience when abroad." (2021, Tourism Technologies, TechXperts Team)



Maryam Khan
Graphic Designer



Erum Naushad
Web Developer



Kisa Abbas
MiniGame Designer

Our project solves tourists' problems and makes their trip easier through numerous features. Our website will provide information of hotels, restaurants, transport, prayer areas, and more. It will be able to plan out the best trip for tourists according to their budget, and will provide ease in translation of a foreign language through text and voice translators. We also plan on adding a MiniGames feature through which tourists will gain points that they can store in their virtual accounts, and these can be redeemed at places associated with our site. Finally, since our site mainly targets Turkey, it's tourism sector will greatly benefit from it, especially after facing such a downfall due to COVID-19.

A number of algorithms and flowcharts were designed which enabled us to work on the site and plan it out efficiently in an organized way. Then, detailed research was started to determine which technologies would serve our purpose. Among the many software technologies that we got to know of, we filtered out the best and most accurate.

We have used HTML, CSS, Bootstrap, JavaScript, along with several libraries associated with them like Semantic CSS, Bootstrap, Vue.js, JQuery etc. We also needed other dependencies like Python and Node JS along with Git Bash. Google, ArcGIS, Watson, and Microsoft APIs were also used.

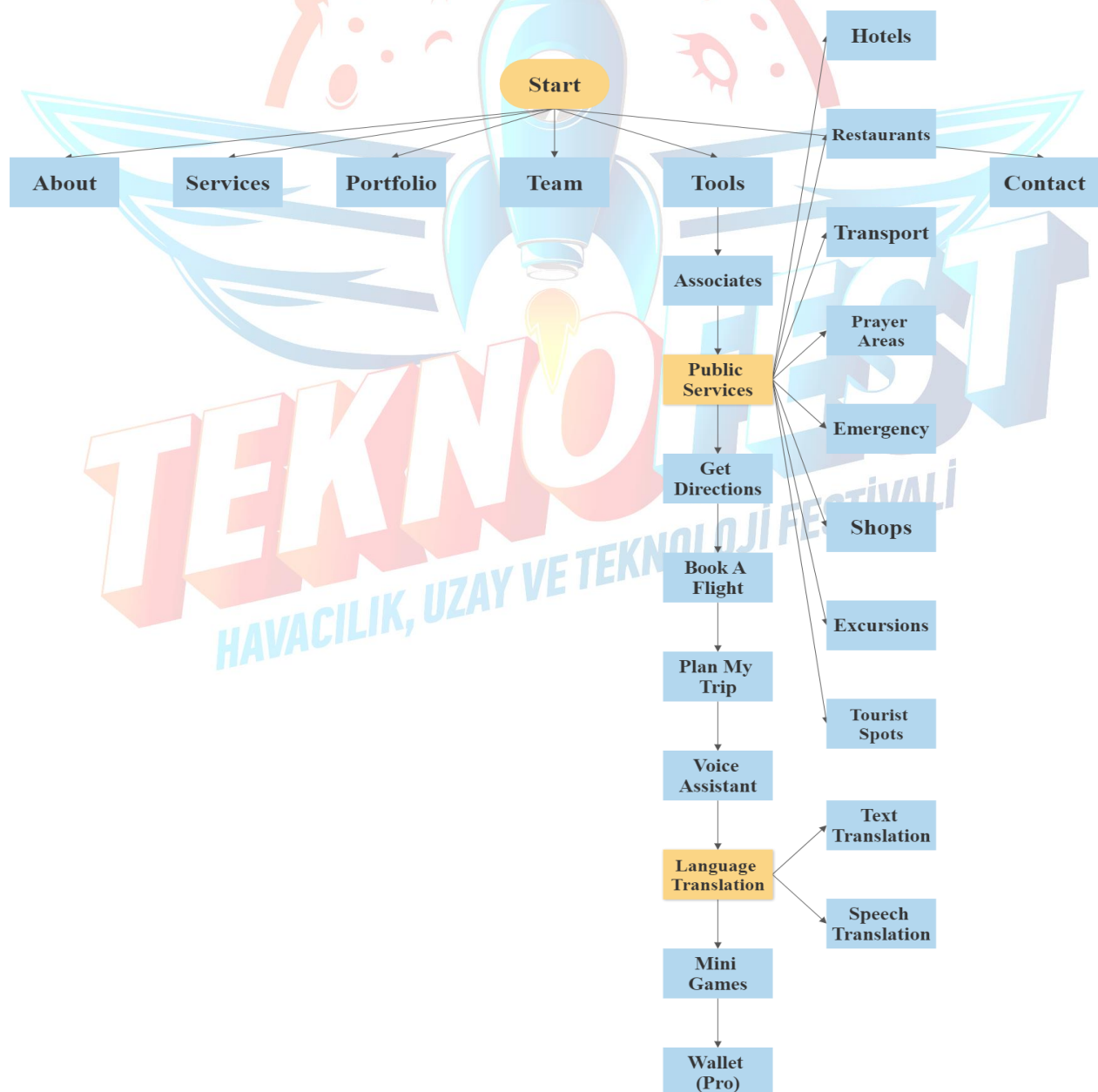
After all applications were created, set up, and brought into running, we ran them on local servers and embedded them all into our site with local server links. Some others didn't require this, and were therefore, embedded directly.

2. Algorithm and Design

2.1. Algorithm #1: General Website Flow:

1. Visit Home Page.
2. Navigate to About, Services, Team, or Contact sections to receive information about the website or developers.
3. Visit Tools to carry out an action.
4. In Tools you'll be able to access our associates, public services, get directions to your destination, be able to book a flight, plan out your trip, seek help of voice assistant, translate language, play games, or access your virtual account (pro).
5. Under Public services under Tools, you can find hotels, restaurants, transports, prayer areas, emergency spots, shops, excursion spots, and tourist attractions which are nearby you along with their location on map as well as address.
6. Under Language Translation under Tools, you will able to translate languages according to your need, whether it be text or speech.

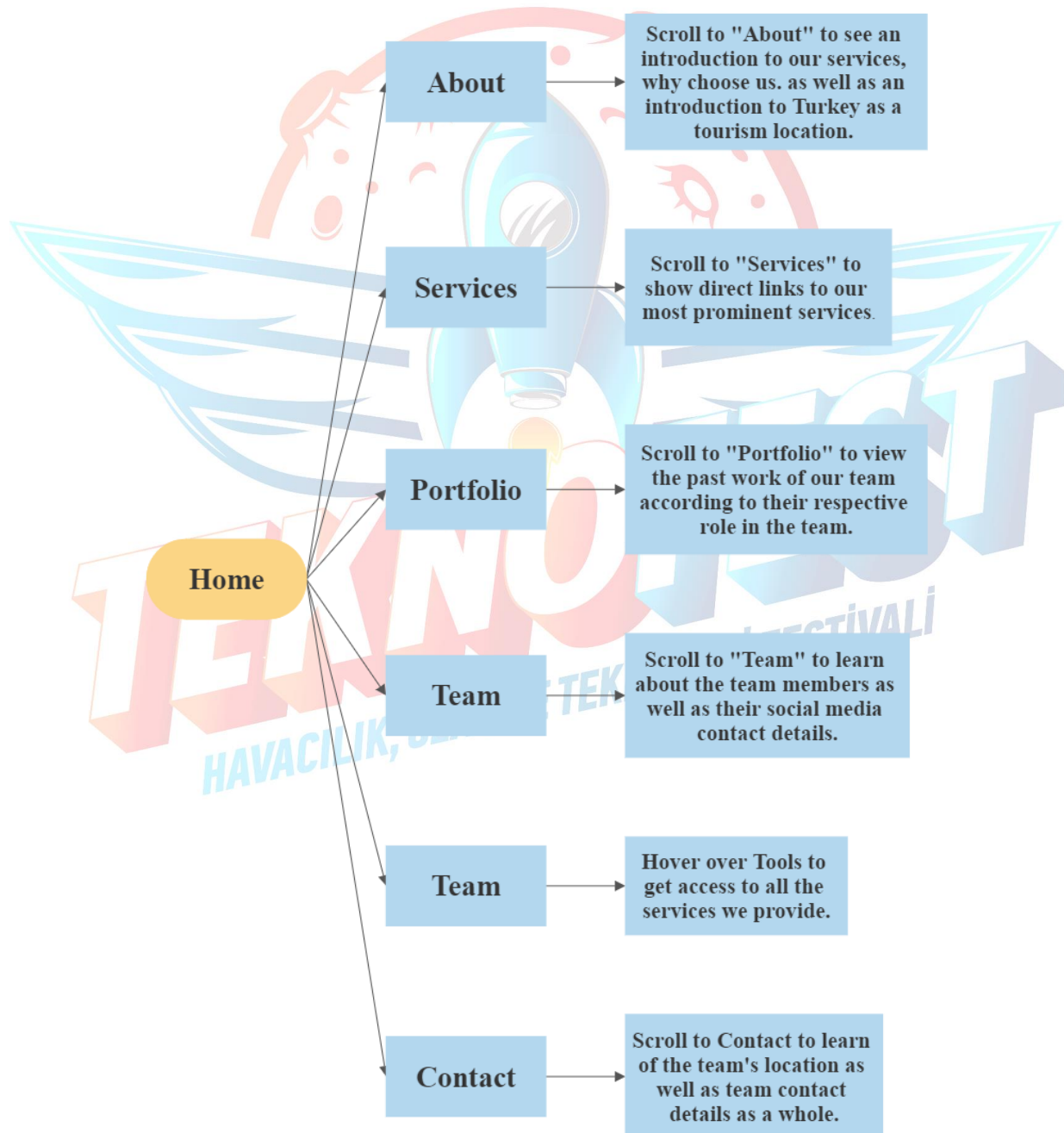
2.2. Flowchart#1: General Website Flow:



2.3. Algorithm #2: Home Page Sections:

1. Visit Home
2. Click “About” in the Navbar for brief introduction of our services, Turkey as a tourism spot, and why choose us.
3. Click “Services” in the Navbar for direct links to our most prominent services.
4. Click “Portfolio” in the Navbar to view the past work of our team, which demonstrate their respective skills.
5. Click “Team” in the Navbar to learn more about the developers involved in developing the site, along with their social media contact details.
6. Click “Tools” in the Navbar to access the collection of different services we have to provide.
7. Click “Contact” in the Navbar for location and contact details of the team as a whole.

2.4. Flowchart#2: Home Page Sections:



2.5. Algorithm #3: Tools:

1. Hover over “Tools” in the Home Navbar.
2. Click on “Associates”. Default tab selected is “All”, which shows all our associates. Click on Hotels, Restaurants, Excursions, or Shops tab according to your need, and book or fill out feedback/requirement form.
3. Click on “Public Services” to find nearby locations of different types.
4. Click on “Get Directions” to receive directions from your location to your destination.
5. Click on ”Book A Flight” to be redirected to Turkish Airlines site.
6. Click on ”Plan My Trip” to plan our trip according to budget and location for a week.
7. Click on ”Voice Tourism Assistant” to seek help if confused in any way about where to find what.
8. Click on ”Language Translation” to translate speech and/or text.
9. Click on ”MiniGames” to play our mini gmaes and learn about Turkey.
10. Click on ”Virtual Wallet (Pro)” after logging in as pro user and use our paymnet gateway to pay as well as to receive discounts from us according to your interaction with mini games.

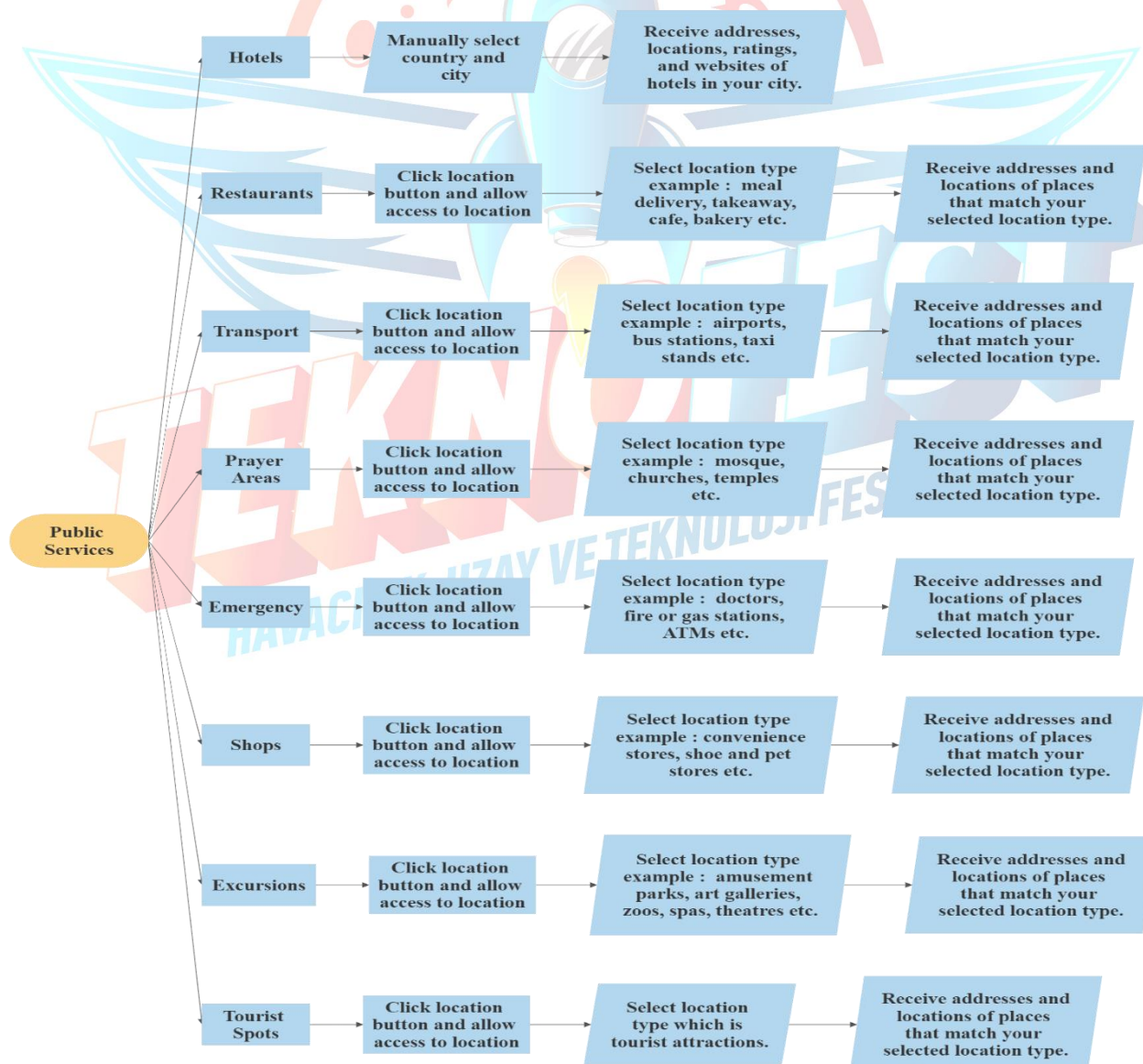
2.6. Flowchart#3: Tools:



2.7. Algorithm #4: Public Services:

1. Hover over “Public Services” under Tools.
2. Click on “Hotels” to enter your country and city and find all hotels in that place along with location on map, address, website, and ratings.
3. Click on “Restaurants” to find restaurants, meal delivery, takeaway, etc near you according to your location.
4. Click on “Transport” to find airports, bus and taxi station etc near you according to your location.
5. Click on “Prayer Areas” to find mosques, churches, etc near you according to your location.
6. Click on “Emergency” to police and fire stations, doctors, ATMs, etc near you according to your location.
7. Click on “Shops” to find convenience, pet, shoe stores, etc near you according to your location.
8. Click on “Excursions” to find amusement parks, art galleries, zoos, etc near you according to your location.
9. Click on “Tourist Spots” to find tourist attractions near you according to your location.

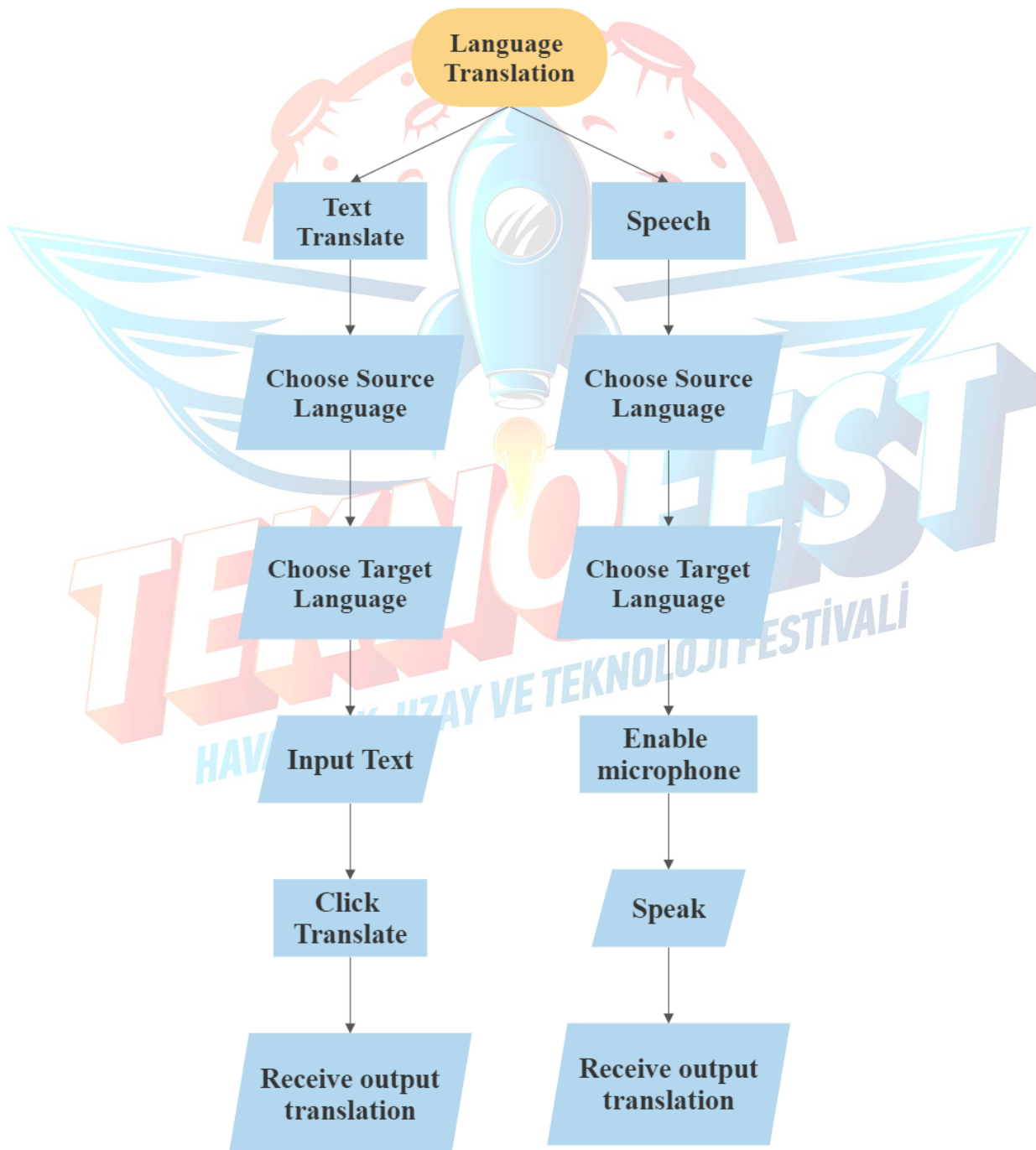
2.8. Flowchart#4: Public Services:



2.9. Algorithm #5: Language Translators:

1. Hover over “Language Translation” under Tools.
2. Click on “Text Translate” to translate text.
3. Select source and target language.
4. Input text to be translated.
5. Click on Translate and receive output.
6. If user wants to translate speech, click on “Speech Translate”.
7. Select source and target language.
8. Enable microphone and speak into the mic.
9. Receive the translation in your target language.

2.10. Flowchart#5: Language Translators:



2.11. Visuals:

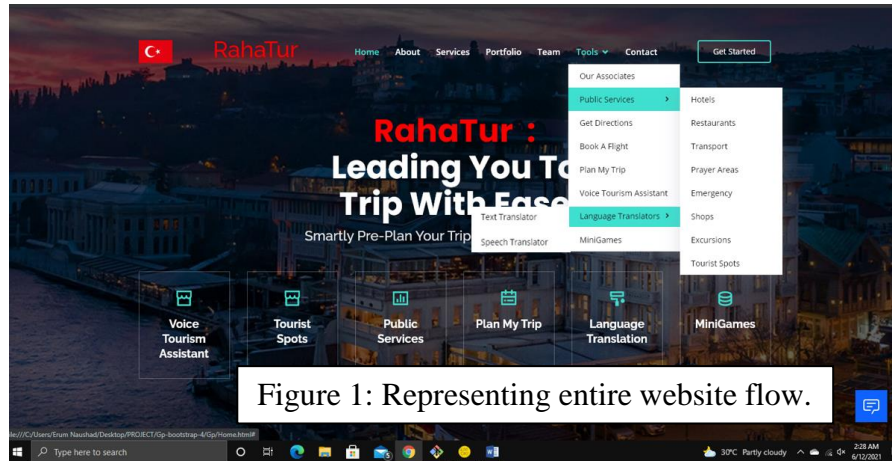


Figure 1: Representing entire website flow.



Figure 2: Speech Translation.

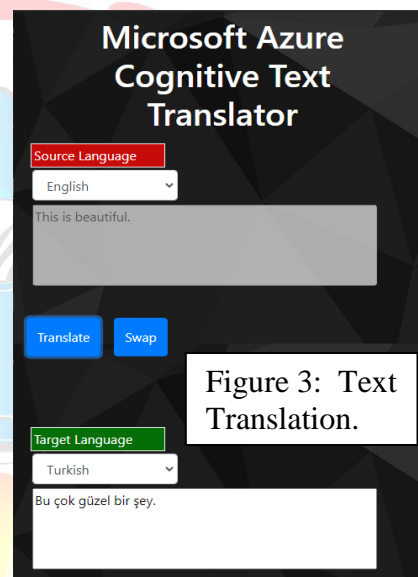


Figure 3: Text Translation.

3. System Architecture

A number of software applications were used in successful implementation of our project. For instance, Visual Studio Code is the hub of all our activities, used for coding and defining the structure of our site. Additionally dependencies like Node JS, Axios, Python (with Pip), Unity, and Vue.js must be installed on our system. Other libraries associated with CSS or JavaScript should either be installed locally, or embedded through a CDN.

3.1. The Home Page:

The professional, classified, responsive, and functional design of our website is based on a Bootstrap Made template which was then modified in many ways to suit our needs. It's design is based on HTML, CSS, and JavaScript, along with utilization of many other libraries which include IcoFont, Boxicon, venobox, remixicon, and AOS, Font Awesome (CSS libraries), as well as JQuery along with its library counterup (JavaScript library), and of course, Bootstrap. Some libraries were imported by default in the template while others were imported by us. The Home Page is neatly divided into sections, enabling users to scroll to any section with just a click.

Our Home Page is assisted with a Virtual Assistant, built with IBM Cloud service known as Watson Assistant API. We created it's database from scratch and then Watson services enabled us to embed it.

3.2. Tools:

This tab includes all features that our site provides for users.

3.2.1. Associates:

It uses exactly the same software architecture and libraries as the Home Page. It shows a model of how our associates will be shown. In this case, we included tabs of Hotels, Restaurants, Shops, and Excursions. Along with that, we made a Google Form for each tab so that users can fill it out for feedback, and state what they need so that it can be brought to them. We used Google Forms so that responses can easily be received, acknowledged, and stored securely. In the Hotel tab exclusively, link to Hotel sites will be embedded so that booking can be done in a click.

The image displays four Google Forms side-by-side, each for a different category: Hotels, Restaurants, Shops, and Excursions. Each form is titled 'Hotel Form', 'Restaurant Form', 'Shops Form', and 'Excursions Form' respectively, with a subtitle 'Rate for Associate Form'. They all contain a rating scale from 'Excellent' to 'Poor' and a text area for comments. Below the forms, the category names 'Hotels', 'Restaurants', 'Shops', and 'Excursions' are listed with corresponding colored lines underneath them.

3.2.2. Public Services:

For this, the main services that were used were Vue.js, and two Google APIs known as Maps JavaScript API and Google Places API. One must create a Google Developer Console account and enable required APIs to use Google APIs. An API key will then be provided which must be entered in the code in order for it to function. A CSS library called Semantic CSS was also used.

The Hotels service does not use Vue.js, and used Autocomplete service of Google rather than detection of user location. It does though, use JavaScript Maps API. After users manually enter their country and city, it uses Google database and shows all hotels of the city with their location on map, address, rating, location, and website.

The Restaurants, Transport, Prayer Areas, Emergency, Shops, Excursions, and Tourist Spots services all use Vue.js, Axios, Smenatic CSS, and Maps JavaScript and Google Places API. The template was first designed in Vue.js and the presentable look was provided with Semantic CSS. Then, functionality was added with JavaScript with complex coding and functions which utilize Google services to draw and display data according to information received from user.

3.2.3. Get Directions:

This feature uses the ArcGIS API. This enables us to create a detailed and explicit Directions service in only a few lines of code, but, in order to utilize this API, one must sign up for an ArcGIS services account and use the API key and other specifications provided.

3.2.4. Book A Flight:

This simply redirects the user to the Turkish Airlines website. It's just a feature we added to make our site a complete package, as well as to direct more traffic to the Turkish Airlines website. No significant software has been used for this except a single line of HTML code.

3.2.5. Plan My Trip:

This model was made possible using HTML, CSS, and JavaScript, particularly JQuery. It was made to demonstrate how we want this feature to work. Data was fed into HTML code, then JQuery filtered it, and showed or hid data according to location and budget chosen. It only currently supports two locations (Ankara, Istanbul), and two budget ranges (5,500 TL and 11,000 TL), and

plans the trip for a week. More locations, budgets, and durations can be supported by creating and using a large MySQL database.

3.2.6. Voice Tourism Assistant:

This is where Watson Services come in again. It utilizes three Watson APIs, namely Speech to Text, Watson Assistant, and Text to Speech API. For each, a separate key, URL should be provided, additionally along with ID for Assistant API. We created a database for this too, then used the official Watson GitHub library to create and run the software. It's a python app for which Python should be installed, along with dependencies like Pip. After configuring everything and setting it up, we had to run it in the Node JS terminal. After that, it worked. User can then enable their mic and state what they want to do, and the assistant will then tell them where to navigate in the site to carry out the task.

Even though, the text Virtual Assistant in the Home Page does the same thing, we kept that too just in case the user does not happen to have a device with a mic, or for any reason, cannot speak. A major help that this feature provides is that if a user particularly targets a specific location like a super market, then instead of uselessly navigating through tabs to look for where he can find a supermarket, he can simply ask the assistant regarding in which tab he can find one.

3.2.7. Language Translators:

This feature requires us to create a Microsoft Azure account. Only then can we use its Text and Speech services.

For Text Translation, we used an open source GitHub library for a Node JS app that serves our purpose. We installed its dependencies, and to use it in the browser, we have to run it in the Node Js terminal first.

For Speech Translation, Microsoft has provided many Software Development Kits. We had to choose the one that supported our purpose, and then had to enter our API key and make it support Turkish language. We also made a few basic modifications in its display.

3.2.8. MiniGames:

First, we made a quiz minigame related to Turkish culture/history and embedded it in an iframe in our site. This game was made through an online quiz maker.

Then, we made an interactive game with Unity, exported it, and then embedded it in our site. We tried to make the landmarks in the game resemble Ankara's historical site Anitkabir. An extension called Web Server must be installed in the browser to run the game.

3.2.9. Virtual Wallet (Pro):

In this section, a PayPal gateway has been added so that users can also pay with our site, and as a future plan, we plan on adding a feature that can track user activity with our games, and then provide them discounts based on it in their virtual accounts. They will only be able to redeem them with our associates.

3.3. Visuals:

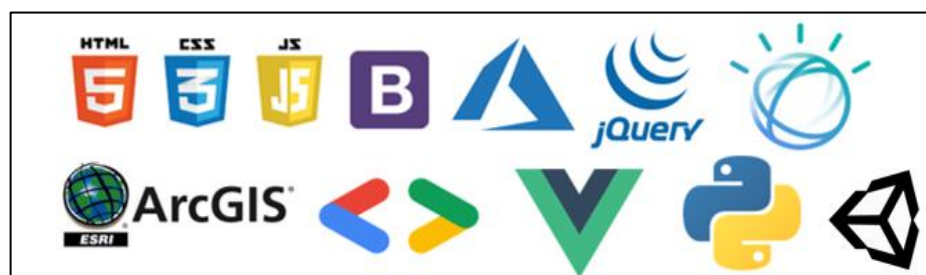


Figure 4: Main software technologies used by us.



Figure 5: Flowchart of Watson Voice Bot.

4. Feasibility / Practicability

Let's now look at real life situations where the solutions we provide will come in handy for a tourist, as well as proofs through experimentations that our features are functional:

4.1. Associates:

Suppose a hotel is associated with our site. All they need is a functional device and a professional Google Account to receive responses of our users, and act upon them. The succession rate of this was assured as the Google forms would reach the consultants. We tested this feature by entering some information in the forms and then sending it to the domain. It works successfully and we received the forms.

4.2. Public Services:

Locating tourist attractions and excursions is all good, but unforeseen circumstances can befall upon anyone anytime. Due to wide variety of places that our site can locate, one can find almost any time of location according to need, like a doctor in case of injury.

We tested out this tool by using it at multiple locations, and Google API was successful everytime in locating the places we specified.

4.3. Get Directions:

Not only during a tour but also during an emergency situation this service serves as one-stop solution, such as getting directions to a market or ATM that the user learnt about from Public Services tab from their location.

After testing this feature out, we were able to conclude that this is working efficiently as ArcGIS API was able to receive routes when multiple starting and ending/destination points of Turkey were entered.

4.4. Plan My Trip:

A person with no knowledge of a place would really like a tool that can reliably plan out everything for him if he is to go on a trip to that place.

After developing and testing this feature, the webpage was planning the trip according to the user's will, considering their budget and location, through simple jQuery coding.

4.5. Voice Tourism Assistant:

Everyone wants software to be as easy as possible, and the assistant plays a vital role in that. We tested out this feature by speaking up to the assistant. The voice assistant responded to the commands accordingly. So, we can conclude that the Watson assistant is fully functional and works efficiently.

4.6. Language Translation:

Suppose the user wants to talk to a market attendant to just a citizen nearby, or suppose they want to translate text on a sign or bill board. This feature will be needed at these times.

To test them out we typed in and spoke up to the translator various words and phrases which were detected by the Microsoft Azure translators and were translated perfectly.

4.7. MiniGames:

No doubt, everyone must have awareness of atleast some basic points of the culture of the place they are visiting. Our games enable the users to do so in an enjoyable way, and also becomes a source of easing the users' pockets.

In terms of the games, first of all, comes the trivia quiz. Upon running, it was working perfectly syncing the wrong and right answers. Secondly, the 3D Unity-based game was running faultlessly on the webpage after we embedded it with all its components.

4.8. Virtual Wallet:

For now, this feature can be used on our site for contact-less payment. Improvements of providing discounts will be provided in future.

4.9. Visuals:

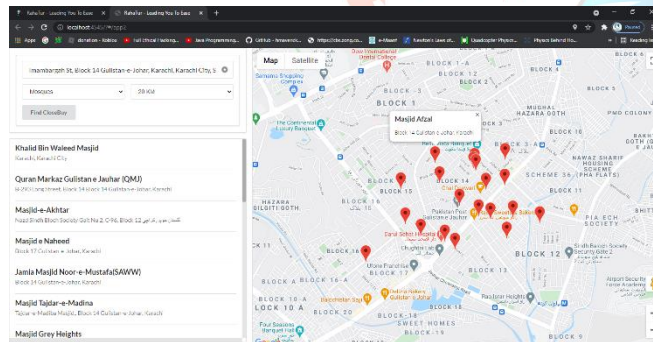


Figure 6: "Prayer Areas" tool showing nearby mosques.

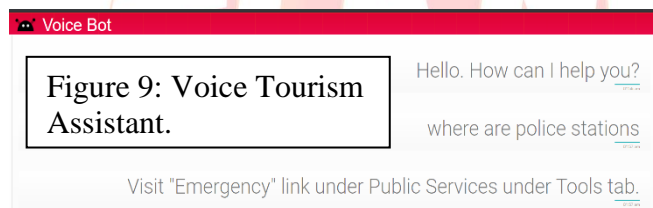


Figure 9: Voice Tourism Assistant.

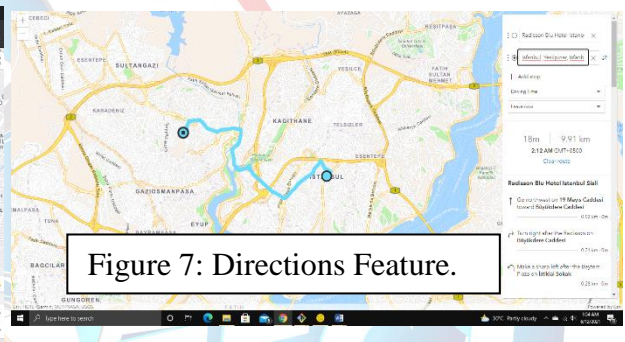


Figure 7: Directions Feature.

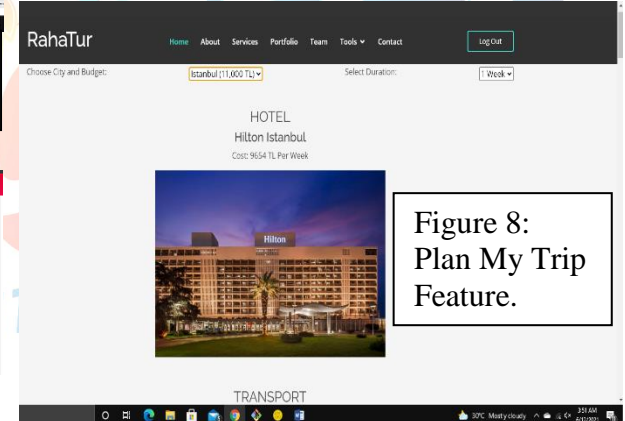


Figure 8: Plan My Trip Feature.

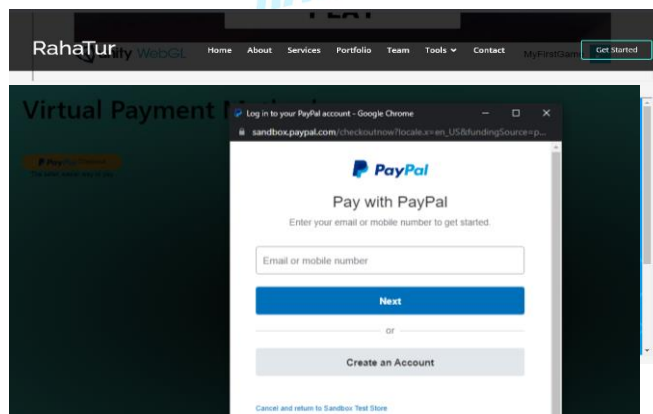


Figure 11: Payment Gateway in our site. Improvements in future are to be made.

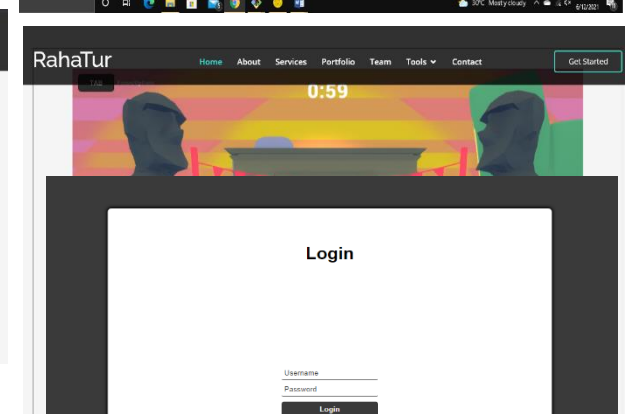


Figure 10: Users have to Login as Pro users first to access virtual accounts.

5. Innovativeness / Originality

There are many existing tourism sites. The unique features of our site which will provide tourists ease and comfort at their best level are:

5.1. What's different:

Our site can be tourists' go-to guide which has all the features that they need for traveling, at one place, we also have some new features which nobody else has introduced yet but for the existing ones, the advantage is that users won't have to download different applications or access different sites, because our site will provide them all at one place.

5.2. "Plan My Trip":

This is the most important and innovative feature of our site which you won't find anywhere else, this will save the tourists from all the headache of organizing a budget for their trip. All you have to do is enter your budget and city name, and it'll plan your trip according to that.

5.3. Smart solutions:

To make our users' tour safe, the "Our Associates" tab on our site includes restaurants, shops and excursion spots that are associated with our site. Our users can give and check ratings of the respective places and also if they need anything, they can click on the "contact" button and they will be redirected to a google form, where they will fill out their order which will be securely stored in the hotel or shop's server, this is for making their service contactless.

5.4. Culture Games:

Our site also has a minigames feature. The points that users' will collect by playing minigames will be added to their virtual account which they can later redeem to get amazing discounts for places associated with our site. These games are based on Turkish culture. One is set in Anitkabir, and the other is a quiz of questions related to Turkey.

5.5. Voice Assistant:

On the top right corner of our landing page, we have our voice assistant who will guide you everything you need to know about the site. Voice assistant will save our users from the trouble of manually scrolling, whatever they want to search for they can simply just speak and voice assistant will direct them to that particular page.

5.6. Restaurants & Hotels:

All restaurants and hotels on our sites are rated and open to rating as well, so you know you are going to good and hygienic place. It's innovative in the sense that you can contact them through our site, or even place an order in a restaurant, or request room service in a hotel.

5.7. Emergency Spots:

With this feature, our tourists will feel safe and secure in a new country/city because they will have easy access to nearby hospitals, police stations, fire stations, ATMs, pharmacy etc. We feel like this should be a part of all tourism software platforms, so we included it.

5.8. Prayer Areas:

A praying area is not a part of tourism but often tourists have this complaint that they can't find their respective prayer area at a place, and for those who don't want to miss prayers; it's a huge problem. We have this new feature which will tell you all the prayer areas near you.

5.9. Directing You:

The "Giving Directions" feature provides direction between two locations, your current location and your destination. Google maps provides this feature as well, what's different in our site is that our feature is much more detailed.

5.10. Translator:

Language is a big barrier between the locals and the tourists. Our Speech & Text translator solves this problem of theirs by just simply typing out the text that they want to translate or by saying in the microphone. It will translate it into any language that the user input. We used microsoft cognitive services to design it. Tourism sites usually don't include this.

SOLUTION CATEGORIES COMPARISON		
	 RahaTur	
1) Info about Tourism spots and Restaurants	✓	✓
2) Info about emergency spots, shops, prayer areas, transport feature of getting directions	✓	✗
3) Virtual Assistants	✓	✗
4) Language Translators	✓	✗
5) MiniGames	✓	✗
6) Trip planning	✓	✗

Comparison of our site with the existing technology of goturkiye.com

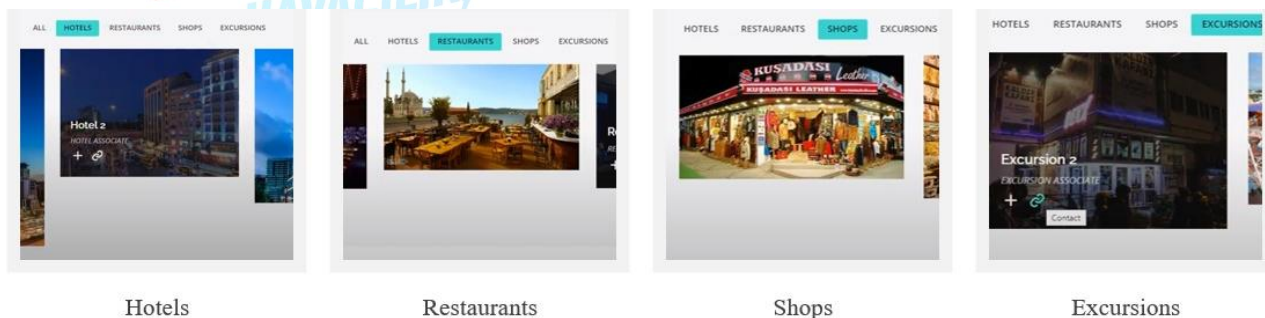
6. Solution to a Problem / Need

Mostly when going for a tour, its all about the hassle of finding a place to stay, finding places to eat etc. We also miss out on some ideal tourist spots we don't know about. Our site is your tour guide, and with the danger of COVID-19 spreading, its safer to have a virtual tour guide with you.

Here are the features of our site which solves most of tourists' problems:

6.1. Our Associates:

Includes all the hotels, restaurants, shops and excursion spots that are associated with our site. It includes a booking option and a contact option for contactless feedback.



6.2. Public Services:

It consists of loads of futures that will make your trip astounding with everything just one-click away. The tabs in public services are:

6.2.1. Hotels:

When you enter the particular city's name, it opens up a map, spotting all the hotels and by clicking on any of them, you will get the address of the hotel, their rating and contact details. This will enable tourists to quickly and easily find an accommodation.

6.2.2. Restaurants:

Being at a completely new place, finding a good place to eat can be a huge hassle at times. This feature finds location of all restaurants near you, additionally, if an order is to be placed or a takeaway is to be done, this is the tool for that too.

6.2.3. Tourist Spots:

This tab consists a list of all tourist points that you should definitely not miss out on. It will help tourist to easily find good tourist attractions that are a must to visit, and those that are near them.

6.2.4. Emergency Spots:

We have a list of all emergency spots nearby as well like Hospitals, ATMs, Pharmacy, Firestations, Police stations, Gas stations and Supermarkets. So, even at an unknown place, you can feel safe and secured.

6.2.5. Prayer Areas:

Many people have this complaint that they can't find their respective prayer area when they are at a new place. Our site gives a solution to this problem by including locations of all nearby prayer areas (mosques, churches, temples) etc.

6.2.6. Transport:

At different times, a different kind of transport is needed. So whether you need to cover a small distance through a taxi, or travel for miles in a plane, this feature is made to suit all circumstances.

6.2.7. Shops:

It has a list of locations of convenience stores, clothing stores, department stores, book stores, electronic stores, furniture stores, hardware stores, home goods stores, jewelry stores, pet stores, shoe stores and shopping malls.

6.2.8. Excursion spots:

The excursion tab has a list and locations of amusement parks, aquariums, art galleries, beauty salons, bowling alleys, movie theatres, museums, parks, spa, hair care, libraries and zoos, so that tourists don't miss places where they can enjoy.

6.3. **Book A Flight:**

By clicking on this tab, you will be redirected to Turkish airlines website where you can easily book your flight.

6.4. **Minigames:**

We have two minigames on our site for now; one is a Turkey related questions-based quiz and the other is a collecting checkpoints game which is set in Anitkabir. In future our website users can redeem the points that they collect by these games through virtual accounts.

6.5. **Voice Assistant:**

Voice assistant is your whole voice guide to our site, it will help you navigate and fully discover all the features. Voice assistant is present on the top right corner of the landing page.

6.6. **Speech & Text translators:**

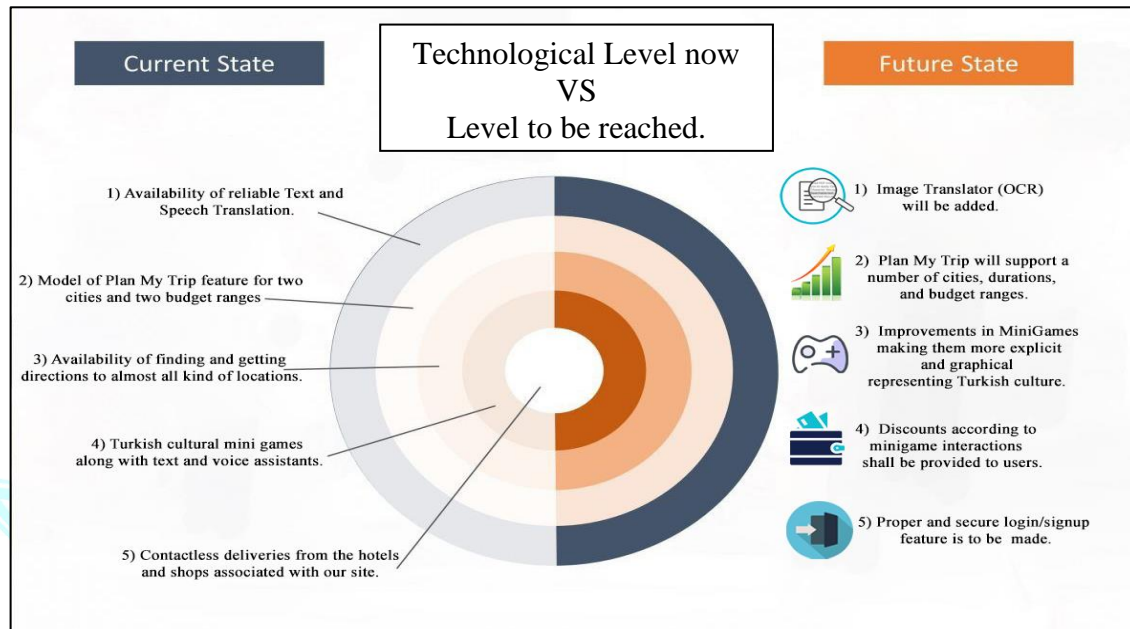
When you are in a new place, surrounded by strangers who don't speak your language or the common language, then language can be a huge issue. So to provide ease to our users in this aspect, we have this translator feature which would translate any language.

6.7. Get Directions:

This feature of our site will provide directions. Enter your current location and your destination. You will be provided with directions with every detail, with a route on a map.

6.8. Virtual Wallet:

At present this feature ensures payment without contact, thus serving as a protection feature as well as source of ease during this time.



7. SWOT Analysis

S Strengths	W Weaknesses (also our future goals)	O Opportunities	T Threats
<ul style="list-style-type: none"> • All-in-one package, and one stop solution for tourists in Turkey. • Reliable and functional. • Easy to use (user-friendly) and interactive. • Wide variety of features. 	<ul style="list-style-type: none"> • Virtual assistants of the site can be made better by making them able to carry out tasks rather than just responding with a dialogue. • Image translators should be made part of this tool too. • Feature of transferring redeemable discounts should be made functional. • MiniGames should be designed even better with even more Turkish cultural details. 	<ul style="list-style-type: none"> • Consolidation of almost all required features for a tourist guarantees a success in the market. • Ease of use will also direct more traffic to the site. • If success is achieved, costs involved will be outweighed by profit. • Users would be able to redeem their points in premium version, as well as associates would also pay to get more users through our site. 	<ul style="list-style-type: none"> • Every product launched always has a chance of not doing well in the market no matter how good it is, due to factors such as timing. • Utilization of APIs requires developers to pay for unlimited service, which may result in loss if product fails. • Improper security may result in exploitation of sensitive information. Security for user data is to be guaranteed and taken care of. • Improper exposure and lack of product marketing may also result in product failure.

Strengths, Weaknesses, Opportunities, Threats.

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6. freecodecamp.org		
7. cloud.ibm.com		
8. github.com		
9. azure.microsoft.com		
10. console.developers.google.com		
11. developers.arcgis.com		