Group Work

Group Members:

Sajid Rasool-1825539 (Group Leader)

Andre Casaco-1833856

Amadeus-Robert Golea-2087983

Martin Kirilov- 1966398

Task 3- Pedal Hire

Our Aim

Climate change becoming a global crisis which threatens our life and security on planet earth. It is argued that there are 51 billion greenhouse gas emissions which pollutes the air (Gates, (2021)). Carbon footprints it is known as a system of measurement for greenhouse gases that includes Carbon dioxide (CO_2) emissions which fuel the climate change (Pandey, (2011)). One of the biggest challenges that humans have encountered so far is to find sustainable approaches of how to reduce carbon emissions.

A way to tackle carbon emissions is to reduce the carbon footprints caused by website navigation. Specifically, create a bike rental directory web app using AI recommendation engines that holds many bicycle rental businesses. Like so the individuals who are looking to rent bikes could do this in a convenient time saving way via the platform and more important in a safe manner by helping to reduce carbon footprints.

Overview of the Project

The idea is to build a web app for bikes rentals recommendation. The customer will create the account on our website and will give us the details like bike size, body material, brand, tyres size, etc. Our website will display all the available bikes based on the user preference using AI recommendation engine which will crawl the data from different websites to match the user will the perfect bike. Many big rental companies like Santander bikes, Deliveroo, and Fatllama have public API access for the third-party apps. We will use that to fetch data on our website. For instance, if a user wants to rent a bike, they will come to our website create the profile with all the details and our web app will display the user all the bikes available from different companies with pricing and all other required details. This will save time for the customer and our business can monetize the website by affiliate rentals.

Costs/Resource Requirement

For this AI based website we will look how long and what will be the overall costs of building such website.

For the costs of the website the best option is to hire a web designer that will have cost of £4,000 to £10,000 and will include setup, design and building, content creation, training to use it, maintenance and extra features.

A Domain name will have an £8 to £50 cost per year, prices for web hosting start from £3 month and security could run anywhere from £0 and £200.

As for schedule the website will take a minimum of 14 weeks to be completed divided into the planning phase, design phase, development phase, modification period and launch.

Conclusion

Renting bikes is a very prospective idea, given the current situation regarding environmental issues and it can be used to solve many of today's environmental problems. We will not invest a substantial amount of

money as the bikes are already provided by different rental companies, which would have been the largest amount of sum required to execute such idea. The affiliate system will help expand our userbase within a few weeks and there will be no need for mass advertisement.

Team Roles

Our team is composed of four passionate members. Our members are highly qualified and experienced in their nesh area. Our team includes Amadeus-Robert Golea, Andre Casaco, Martin Kirlov, and Sajid Rasool. The team is led by Sajid Rasool which will also perform the duties of a project manager.

Sajid will be responsible for the project handling, development, and design. Robert is responsible for the testing and design. Martin will make his contribution in the requirement definition and project analysis phase. While Andre will work on the implementation and analysis phase.

References

Pandey, D. (2011). Carbon footprint: current methods of estimation. [online] Springer. Available at: https://link.springer.com/article/10.1007/s10661-010-1678-y#citeas [Accessed 28 Feb. 2021].

Bill Gates (2021) How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need, 1st edn.,

Task – 4 Presentation

Pedal Hire

A smart web solution to save time for customers and protect environment

Agenda

Agenda of this proposal

1. **1.MEET THE TEAM**
   Teams introduction
2. **2. Problem**
   Time Consuming & Browsing Carbon Footprint
3. **3. Product**
   Perfect Bike for You Web App
4. **4. Our Solution**
   Integration of AI based engine
5. **5. Market Size & Competition**
   Our Competition and Market Size
6. **6. Financials & Implementations**
   Project Cost & Funds for the Project
7. **7. Q&A**
   Any questions

1- Introduction

Meet our team

Sajid Rasool
Project Leader

Andre Casaco
Design & Testing

Robert Golea
Project Analysis & Development

Martin Kirilov
Implementation & Analysis

2- Problem

Time Consuming & Browsing Carbon Footprint

- The internet's energy and CO2 footprint are estimated to exceed air travel.
- Every time we use a search engine, there's an output of Green House Gases because every unique search require multiple servers.
- Considering the Covid – 19 pandemic, Londoners are avoiding public transport and prefer cycling to commute.
- Demand of cycle is going up everyday, more & more people are searching for bike rentals services.
- Customers spend a lot of time browsing different website to compare bikes which is contributing to CO2 footprint.

3- Pedal Hire

Our solution

Customer
We will take the user preference for bike details like type, size body etc.

Website
Our website will use AI ba rch engine to find bike which matches t preferences.

Product Finding
All the bikes which matches the user preference will display on our website with the details of bike and pricing.

Booking
When the user is happy with the selection, they will click book now which will take them to the business booking page of the product.

4- Our solution

Underlying Magic of the website

- The customer will create the account on our website and will give us the details like bike size, body material, brand,tires size, etc.
- Our website will use AI based search engine which will run in the backend to fetch the data from different website based on the user preferences.
- This will save the customer's time and will help the environment by reducing the Carbon footprint.
- People are realizing that renting bikes is so much more convenient than travelling with their own, and they get to try out a different kind of bike.

5- Market Size & Competition

Our Competition and Market Size

- According to Statista this industry worth around £5 billion and in 2026 it's predicted grow over £13 billion.
- At the moment there is other solution which offering the same service as our solution but in the future, we are expected to compete with City Mapper.
- Many websites have the same functionality for cars and vans, but no one has yet moved towards the bike at the moment.
- We believe this is the best time to enter the market as we are unique and have no competition.

6 – Financials & Implementation

Project Cost & Funds for the Project

This AI based website will have the following expenses.

- Resources – Best option is to hire a web designer that will have cost of £4,000 to £10,000 and will include
  - Setup
  - Design and Building
  - Content creation
  - Maintenance
- Domain & Hosting – A Domain name will have an £8 to £50 cost per year, prices for web hosting start from £3 month and security could run anywhere from £0 and £200.
- We are asking for £20k investment for 40% share in our business. We will spend the investment for hiring resources and other one-time cost.
- Our team will work full time on this project to make it successful.

6.1 Project Road Map Diagram

Methodology for this project

6.2 Final Product

Pedal Hire NewWebsite

- Our solution is to implement a system that will allow customers to save time.
- Our solution will work as a centralised search engine for bike hiring in London.
- Our solution will allow customers entering all the details directly on the website to improve the quality of AI based search engine.
- We have implemented a data security plan, including encryption, access control.

References

- Sarah Griffiths (2020) Why your internet habits are not as clean as you think, : BBC.
- ClimateCare (7th May 2018) The Carbon Footprint of the Internet, Available at: https://www.climatecare.org/resources/news/infographic -carbon-footprint-internet/ (Accessed: 15th March 2020).
- Statista (7th May 2020) Global bike -sharing service market size between 2020 and 2026, Available at: https://www.statista.com/statistics/868126/global -bikesharing-market-size/ (Accessed: 15th March 2020).

7 – Q&A

Any Questions

Task 5: IT Innovation Report

SCHOOL OF ARCHITECTURE, COMPUTING AND ENGINEERING

Department of Engineering and Computing

Pedal Hire

Sajid Rasool: u1825539

André Casaco: u1833856

Amadeus Golea: u2087983

Martin Kirilov: u1966398

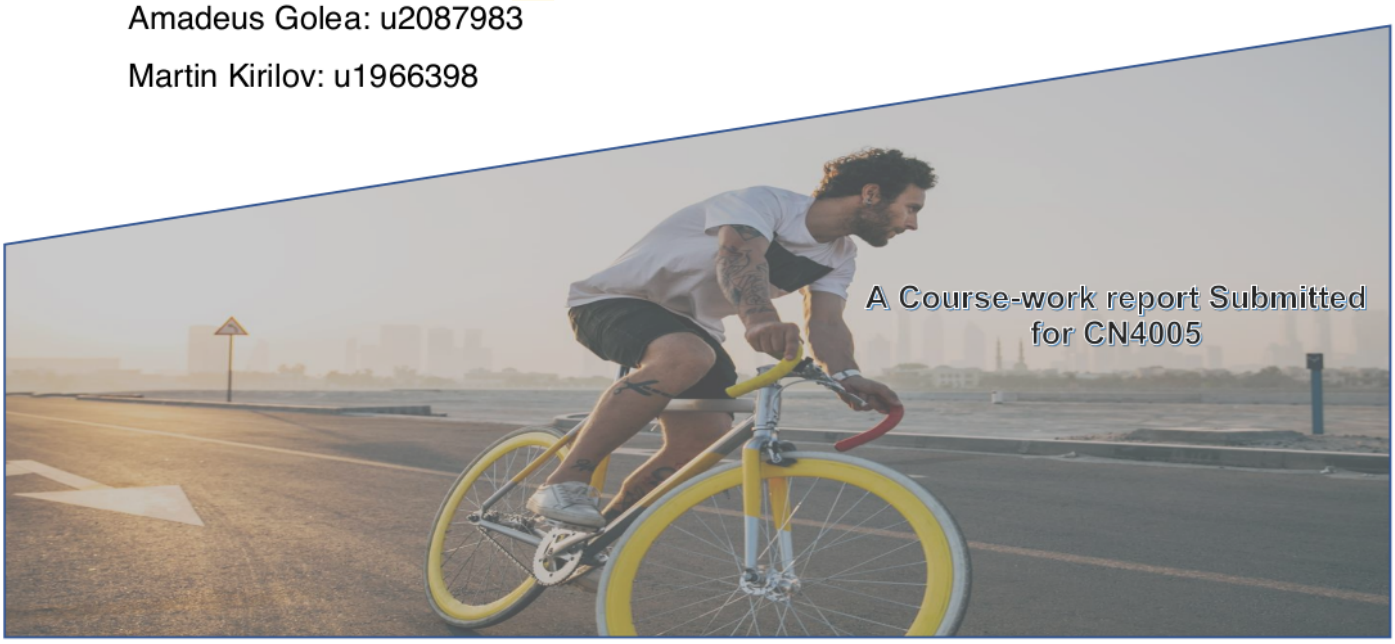

Table of Contents

Introduction

Current Problem

Climate change is evolving into a global emergency that challenges our survival and stability on the globe. According to (Gates, 2021), there are 51 billion greenhouse gas emissions that pollute the air. Carbon footprints are a means of calculating greenhouse gases such as carbon dioxide (CO_2) emissions, which lead to climate change (Pandey, et al., 2011). One of the most difficult obstacles that humans have faced so far is determining sustainable methods of reducing carbon emissions.

Reducing the carbon footprints caused by website navigation is one way to minimize carbon emissions by developing a product with a bike rental directory that uses AI recommendation engines and contains a large number of bicycle rental businesses. Individuals looking to rent bikes, for example, may do so in a simple and time-saving fashion across the app, as well as in a sustainable manner by helping to minimize carbon footprints.

Literature Review

Main Argument

Every time we use a search engine, there is an output of Green House Gases because every unique search requires multiple servers. Users spend a lot of time browsing different website to compare bikes which is contributing to CO_2 footprint. According to (Vaughan, 2015) datacentres used by giant companies which people use every day like Google & Facebook are responsible for the same Greenhouse gas emissions same as air travel.

Figure 1 Inside one of the biggest Google data servers in Oklahoma. Photograph: Google/Rex

London is one the biggest cities in the world with a population of approximately 9 million. According to (Transport for London) there are around 2.6 Million cars in London. Nowadays, especially in London, it is very difficult to commute locally on the main roads and commuting on main road has the following drawbacks. On the market there is a place for solution which will advise the user how to avoid main roads and traffic which will save time for the user and it is safer for cyclist as well. Following are some major hazards cyclist face every day on London roads.

Importance

At the moment there is no proper solution to tackle both problems mentioned above. Having the solution which can help user rent a bike and plan a route is highly needed in the London's market. This type of solutions will open new horizons of opportunities for people who are looking to rent a bike. This solution is going to have big impact in the customer experience as it is going to provide the following to the user.

- Reduce Green House Gases – When the user will find the products, they are looking for on a single website will reduced the CO2 emission.
- Save Time – As the user will find everything, they are looking for under the one hood it will save the time of the user as they do not have to search multiples website to the to get the product they are looking for.
- Explore New Routes – The user will be able to find the local routes are which are generally very quiet and safe as compared to the main roads.

Solution

Our plan – Perfect Bikes for You

Our plan is to develop a platform from where the user can hire a custom build bicycle based on personal preferences. The platform will provide all the tools necessary to design the ideal bicycle and it will be made accessible to any user from any backgrounds and will not require high-level skills from the customer side.

Ai based search engine

Nowadays, due to a high amount of data that can be found on the internet, it has become a real challenge for the ordinary users to receive relevant results when browsing on the Web. (Modi, et al., 2011).

According to (Joachims , 2002), when a user is searching on the Web the process comprises of three phases. Firstly, a query is sent from the user to the search engine, then a ranking is displayed by the search engine for that query and finally the links accessed by the user (Fig. 1). This process is defined by the author as clickthrough data in search engines.

Figure 2 Three phases process when browsing

Similar to our project, (Modi, et al., 2011) suggested in their research a different approach to tackle the issues encountered while browsing on the Web. Their strategy was to develop a new concept referred to as the “smart Meta search engine” which has a wider data coverage. This strategy will incorporate various search groups by using a multitude of search engines. The findings will be filtered into categories using algorithms and then displayed to the user in a more organized way.

Map the local area manually (routes that are not available on google maps)

Additionally, we will make available to our customers maps from which they can choose the most convenient route to cycle on. Our organization will hire third party companies that will develop the route planner. Subsequently, they will provide us with the tools and the data required to develop alternative safe and low-polluted routes to the user. Previous research (Steeneveld, et al., 2017) has shown that such route planners are achievable by creating a map which will reveal the best time in the day for cycling along with the safest routes. The data regarding of the weather and the air rate pollution is collected using advanced technology.

Project methodology

After looking at different methodologies and considering its pros and cons we decided that the most suitable approach for this project would be the Waterfall methodology. This approach was chosen because it as a clear and simple sequential structure, with distinctive goals at every stage (Synopsys Editorial Team, 2017). This will make it easier to manage and monitor the time taken at every phase.

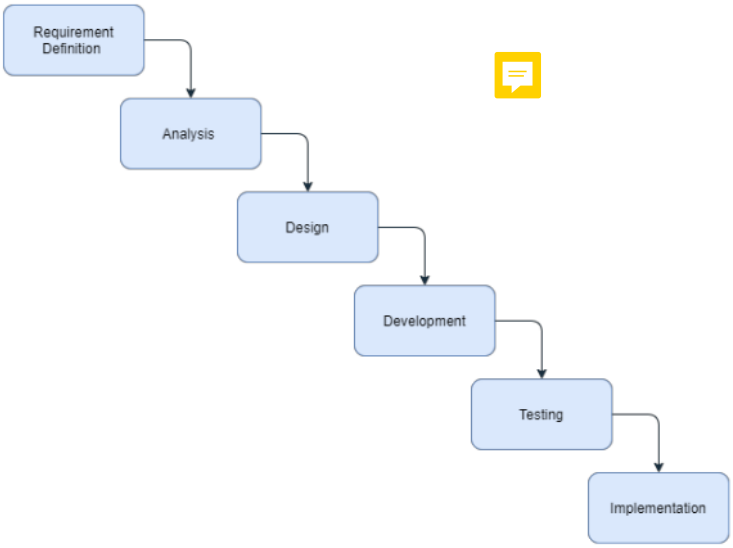

Figure 3 Waterfall Methodology

Requirement definition

Based on our research and internal team discussion we have come up with the following requirements for this project.

1. Non-functional requirements
    - Accessibility
    - Security
    - Storage
    - Performance
    - Configuration
    - Cost
    - Interoperability
    - Flexibility

2. User interface requirements
    - Easy navigation
    - Content presentation
    - Strategical use of colour and texture
    - Simple interface
    - Group based views settings
    - Consistent UI elements
    - Responsive
    - Default settings
    - Feedback mechanism
    - Provide help information
    - Purposeful layout
    - User-centric approach

3. Software metrics and measures
    - Complexity metrics
    - Size metrics
    - Process metrics
    - Resource metrics
    - Quality metrics (tutorials point, n.d.)

Analysis

After determined that the system is feasible the information gathered in the requirement definition step will be used to identify three key objectives in this phase.

1. Understand how the current system works
2. Making sure that system users and IT professionals are in agreement by producing a diagrammatic model of the current system

3. Produce a set of requirements for the new system
   This will define the features of the new system, the intended system users, system performance standards and the scope of the system. (Bocij, et al., 2018)

Design

In this step, the information gathered from the previous phases will be used to make the design that will be broken down into five steps.

- Logical Design
- Physical Design this concept design will outline the data flow of the website, where the data will be stored and how the user will be protected.
- Wireframe will give a visual representation of each page making it easier to understand how the final product will look.
- Sitemap will be a navigational diagram of all pages that will help find information around the website and show how pages are connected together.
- Visual Design every element like typography, colour palette, form, textures and shapes to be used on website will be documented here.

Development

After completion of the design our team will start developing the website from scratch and made according to the client requirements. This will be the most time-consuming phase that will involve more resources, front end designers will focus on HTML, CSS and JavaScript and at the same time backend developers will work on PHP and SQL.

Testing

This will be a crucial stage of the project, a beta version will be released into the target environment and a selection of end users will perform system tests, our team will then determine if the website meets all of the requirements. Any bugs or faults will be removed to make sure everything is running smoothly before being ready to be released.

Implementation

The final phase of the project after the test phase being successfully completed our team will upload the software in the service to run in real-time.

SSH protocol will be used to make secured network communications and MySQL to store records into the database.

Analysis and Challenges

Costs

The costs for executing such project include the hiring of essential staff and infrastructure; Software Engineers, pedestrians and/or cars to map the local area, site managers and technicians. This project also has a recurring cost, apart from the usual bills that may be found in other businesses (gas/electricity bills), these recurring costs may include but not be limited to domain purchase and renewal, server maintenance and hosting, whether the server is located in the premises of the company or in the cloud. The costs will also include hardware and software costs for the development of the application, some of these will be paid once, such a license for the right to use a copyrighted font, they may require a monthly subscription, or it could be GPS hardware for the mapping of the local area.

Potential Obstacles

The obstacles that may be faced during the development phase of the project may include the development of algorithms to find the best routes at any given point of the day based on traffic and bike accessibility, as not all bike routes are accessible at all times of the day. Other obstacles that may arise are competing with other companies and software such as Citymapper, that already have a large userbase. Mapping a city and area as big as the City of London can be a very tedious process that could take months and possibly years to achieve the desired detail and precision of the map.

Conclusion

To conclude our goal is to develop a fully functional web application the help the citizens of London in reducing congestion and pollution. This will also help in solving a big issue that is arising and becoming more common amongst teenagers and young adults, and that is obesity. According to (Lifestyles Team, NHS Digital, 2020), 68% of men and 60% of women were overweight or obese in 2019. An application like this can also serve a purpose of saving time while travelling, or for recreational purposes such as exploring new areas. This application will allow us to gather more data that can be, later on, user for other purposes while also monetizing this project whether it be through in-app advertisement or a subscription-based model.

References

Bocij, P., Greasley, A. & Hickie, S., 2018. *Business Information Systems eBook ePub.* Sixth ed. s.l.:Pearson.

Gates, B., 2021. *How to avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need.* 1st Edition ed. s.l.:s.n.

Joachims , T., 2002. *Optimizing search engines using clickthrough data,* New York: Association for Computing Machinery.

Lifestyles Team, NHS Digital, 2020. *Health Survey for England 2019,* s.l.: s.n.

Modi, A., Bhandari, A., Desai, K. & Shah, N., 2011. art search engine using artificial intelligence. In Proceedings of the International Conference & Workshop on Emerging Trends in Technology. *Association for Computing Machinery,* p. 707–710.

Pandey, D., Agrawal, M. & Pandey, J., 2011. Carbon footprint: current methods of estimation. *Environ Monit Assess,* p. 135–160.

Steeneveld, G.-J., Vreugdenhil, C., van der Molen, M. & Ligtenberg, A., 2017. Towards a Healthy Urban Route Planner for cyclists and pedestrians in Amsterdam. *EMS annual meeting abstracts,* Volume 14.

Synopsys Editorial Team, 2017. *Top 4 Software development methodologies.* [Online] Available at: https://www.synopsys.com/blogs/software-security/top-4-software-development-methodologies/
[Accessed 12 04 2021].

Transport for London, 2013. *How many cars are there in London and who owns them?,* s.l.: s.n.

tutorials point, n.d. *Software Requirements.* [Online] Available at: https://www.tutorialspoint.com/software_engineering/software_requirements.htm
[Accessed 20 04 2021].

Vaughan, A., 2015. How viral cat videos are warming the planet. *The Guardian.*