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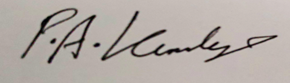
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# Introduction

This section of the report will be an introduction and will provide a brief insight as to what the Lifestyle Scanner is, its uses, purposes and will include a discussion about which retailers and companies are currently using the technology present within the web application and the benefits the application will present to its users and target audience. I will be going over the background of the project, what lead me to beginning this project, an overview and outline of the project and answering various questions such as the reasoning behind building the application as a responsive web app rather than a mobile application.

## The Problem

So, the problem occurred to me when I was making food for some friends when I realised, I had a problem, one of them is vegan, now this sent me down a spiral when I was shopping for food and had me questioning everything, is this vegan? To this day I still wonder if whatever I’m buying or making is vegan. Now some manufacturers add specific logos to food to identify the requirements quicker which is good, but these logos are not always present. This is when I decided there must be a faster way than reading all these ingredients, I would be there for hours, Then I thought that there will be a good application to help me with this, so I searched around and looked for an application to do this to which I found a challenge. Then the developer in my brain started thinking why not make one.

So, from talking to people from multiple lifestyles or now stakeholders I have identified that the problem is having a way to quickly, reliably and simply find out if the product is suitable to their lifestyle or needs.

The solution is developing a responsive lifefstyle scanner web application to help stakeholders of most lifestyles and allergen groups when shopping for their groceries to identify ingredients that may be prohibited or that they may be allergic to potentially improving their health outcomes.

## Project Background

The project that I am going to be making throughout this report is a lifestyle Scanner, this scanner will be a responsive web application that will let a user search for a product and see whether the dietary requirements of the product are vegan, gluten free, vegetarian, pescetarian etc.

As previously mentioned, I have close friends that are vegan and some that have certain dietary requirements/allergies which lead me to the question of what could make living these lifestyles easier? My first thought was a mobile application but then it would have been limited to mobile and it would have been a lot of work to scale the project to more users as there’s more than one major mobile platform android and apple. So, after a discussion about scaling this application, I came to an agreement that it would become a responsive web application that could be used across all devices whether that be mobile, pc, tablet you name it. The more I thought about it the more I became interested in making this project, why stop at vegans why not cater to all the lifestyles.

Barcode scanners have come a long way from their early days in supermarkets to the mobile phone applications we use today. The first supermarket scanner was introduced in 1974(Basker, 2012) and used a laser beam to read barcodes on products. This innovation dramatically changed the retail industry by speeding up checkout times and reducing the risk of human error whilst calculating the price.

As technology continued to advance, scanners became smaller and more portable, eventually making their way into mobile devices. Today, many mobile devices come equipped with a camera that can be used to scan product barcodes and access information about the product such as prices, nutritional information, and now, with the development of the lifestyle scanner web application, whether a product contains animal products or specific ingredients that are prohibited to specific lifestyle choices and to assist stakeholders that might have severe allergies (Mackarness, 1976).

In addition to their use in supermarkets, shops and food industries, scanners are also used in healthcare and other industries. They have become an essential tool for accessing information and improving efficiency in various fields this is where the lifestyle scanner will shine, I want the scanner to improve efficiency whilst shopping for groceries.

It will be beneficial to the project that I investigate other similar web applications on the market to compare aspects and accessibility to further my knowledge and discover anything I can implement into the scanner application to make it as user friendly and as functional as possible with the hope of covering most bases in terms of different lifestyles, diets and allergens.

With some of these lifestyle choices becoming more popular (Gheihman,2021), some of them due to help with health concerns (Mueller, 2020) there is plenty evidence to back up the importance of the development of the lifefstyle scanner application. With regards to allergens the scanner will be able to help people allergic to specific ingredients quickly and efficiently find out if the product might land them in hospital or not depending on how severe the reaction would be which the importance of cannot be stressed enough as read in Eating Dangerously: The Hazards of Allergies (Mackarness, 1976). Not only will the scanner be saving the stakeholders time it could also potentially be saving lives, hopefully due to the increasing food labelling regulations (Packaging and labelling, 2022) that are coming into play in the UK and the European union consumers will have to start displaying specifics such as allergens and ingredients that in the past didn’t have to be listed, with a scanner that can quickly interpret and read these ingredients the Lifestyle scanner in turn benefit the public when shopping for their groceries and help stakeholders life their life a little easier with the additional peace of mind.

Overall, these factors demonstrate that there is a clear need for a scanner application that can help people identify ingredients in food products. Such an application can benefit the public by improving their ability to make informed choices about the food they consume and massively assist stakeholders that may have severe allergies.

## Project Overview

Within this project overview I will be showing the project outlines, aims and objectives. This will include what I want to achieve within our literature review and the specific questions we will be trying to answer. I will also be going through the hypothesis of the project to explain how I will be testing the Lifestyle scanner.

### Project Outline

With lifestyles forever changing and more diets being introduced it is becoming harder and harder to shop for products that meet the dietary requirements of these lifestyles on top of the dietary needs allergens are also crucial to this project, soon enough manufacturers are going to run out of new logos to put on the back of their products, vegan, vegetarian, dairy free, gluten free etc. Using today’s technology, I want to make this an easy, reliable and somewhat enjoyable process for the stakeholders, Alongside the increasing popularity within said lifestyles there is a big boom to be healthy at the moment so with all the factors presented to me I am deciding to make the Lifestyle scanner responsive web application to be more available as it will be able to be used across all devices including computers. This will assist them in their shopping and lifestyle needs.

With respect to the project outline and gaining insight from stakeholders our research question will be:

**Can a Lifestyle scanner benefit the public when shopping for their groceries whilst being reliable?**

## Project Aims and Objectives

The main goal of this project is to develop a responsive web application that can be used across all devices, the purpose of the web application will be to scan or search a product in a shop and find out whether the product fits the lifestyle habits you are shopping for such as vegan, vegetarian etc. I am hoping that this will be very useful to the public and including the technologies in your day-to-day life should make it a fun and quick experience, the main purpose is to eliminate the need for reading through all the ingredients of a product to see if it fits a specific lifestyle.

It’s known that some brands and manufacturers use labels on their products to easily show if a product matches a lifestyle but unfortunately this is not present in all products, the only reason I can imagine not adding these is to cover their product as to not end up in legal trouble if somehow the product doesn’t match the label.

Some of the objectives shown below are what I hope will be found out after the completion of the literature review:

|  |
| --- |
| Development options explored.  Researching into the development options for the lifestyle scanner application, the full technological stack including the front end, back end, database, version control and API handling. |
| Investigate into different lifestyles and popular dietary requirements.  Researching different dietary requirements and lifestyles to find out the differences between them such as what is a vegan, vegetarian etc. This is important as they each have their own unique dietary requirements and restrictions. By understanding these requirements, I can gain insights into the benefits and challenges associated with each lifestyle and figure out what feature needs what. |
| Investigating available scanner applications  Researching into what different scanner applications are available and seeing what they do well and what they don’t do well in, how can I make my scanner better, more accessible, cooler, more fun to use and provide a better user experience than other available scanner applications. |
| Investigate what is involved in developing these scanners.  Looking into what is involved in the creation of similar scanner applications, how does it work, what stack does it use, is there a benefit developing scanner applications with a specific language. |
| How do similar applications handle the product data, where does it get the data from? API etc.  At this current moment during the project, I’m not fully sure how the scanner is going to retrieve the data and what information is actually obtainable from a barcode thankfully this idea is not new so I’m hoping to stand on the shoulders of giants and investigate how developers have done this in the past with similar scanning applications. As there are multiple scanners including big supermarkets that are widely available, I’m hoping there might be some research that is also widely available |
| What steps will need to be taken to help accessibility?  Research into accessibility is a must as I want to scale this web application to as far as possible, I need it to be accessible and usable by all end users not just some whether this be size, colour etc. Anything. |

## Hypothesis

Users who use the Lifestyle scanner application while shopping for groceries will be more likely to purchase products that align with their dietary requirements and lifestyle choices compared to those who do not use the application.

This hypothesis can be tested by comparing the purchasing behaviour of individuals who use the application to those who do not. The results of the research can either support or reject the hypothesis.

To make sure that the Lifestyle scanner web application is robust and fit for purpose a version of the application will be handed out to 3 individuals with different lifestyles and dietary requirements with the hopes of gathering as much information across the usability and functionality of the application as possible. With the information gathered from the individuals and tests I will have the answer to my hypothesis. There will also be another 3 individuals (control group) not using the applications that we will be gathering data from to compare the purchasing behaviour.

This hypothesis will be answered through the results of the various research methods, surveys, user testing to evaluate the impact of the application on user purchasing behaviour and if the web application helps influence the lifestyle choices or not.

# Literature Review

The literature review is going to be the back bones of the project and a very important piece of the puzzle, this section of the report will show the overview of the research followed throughout the project to make the web application happen. This will be looking at research that has been done by developers that have made scanner applications, looking into similar applications themselves and learning about the different lifestyles and dietary requirements that I would like to cater to.

All of which will be gathered and used to help me develop the application by learning more about the technology and how it is used to do what I want it to do. Which is to gather product data based on a name or a barcode and using keywords to define what category the product can go in.

The review will research the following fields.

* Different lifestyles and popular dietary requirements
* How similar applications look and work.
* What similar applications could benefit from and how I can implement?
* What steps will need to be taken to help accessibility?
* How do similar applications handle the product data, retrieving, displaying etc.
* Web application accessibility.
* Development options explored.

## Investigate into different lifestyles and popular dietary requirements*.*

In this literature review I will be looking into different lifestyles, common diets and popular allergens that I would like to implement into the scanner application. Below is a list of lifestyle subheadings (McRae, 2019) that are some of the options I want to cater to within the lifestyle application.

|  |
| --- |
| Vegan A vegan lifestyle involves avoiding all animal products, including meat, poultry, fish, dairy, eggs, and honey. Instead, vegans focus on consuming plant-based foods, such as fruits, vegetables, whole grains, nuts, and seeds, Vegans also avoid any processed foods or supplements that contain animal-derived ingredients. In addition to ethical and environmental interests.  The vegan lifestyle regarding food and consumables sounds simple but can often include particular ingredients that are often overlooked as vegan when they are in fact not such as some E numbers (not all), gelatine, vitamin D3, keratin, collagen and much more as seen in this article by Vegan food and living (Smith, 2016). |
| Vegetarian The Veggie lifestyle is somewhat simple, similarly to vegans it is a lifestyle where one avoids eating meat, poultry, and fish but may still consume other animal products such as dairy and eggs. This is obviously up to the person. |
| Pescetarian The Pescetarian diet is a type of semi-veggie diet that includes eating seafood and fish but excludes meat and poultry. This unusual diet emphasizes plant-based foods, such as fruits, vegetables, whole grains, nuts, and seeds, along with using fish and seafood as the essential source of animal protein. |
| Paleo Paleo is often referred to as the Caveman Diet (Tahreem et al., 2022), this diet includes that stresses only using whole, unprocessed foods that were available to our ancestors during the Paleolithic period. The diet includes foods such as meat, fish, poultry, fruits, vegetables, nuts, and seeds, while excluding grains, dairy and processed foods |
| Allergen Diets Allergen diets are a type of diet that is designed to eliminate specific foods or ingredients that may cause allergic reactions or specific intolerances in certain individuals. The most common allergens that are avoided in an allergen diet include milk, eggs, wheat, soy, tree nuts, peanuts, fish, and shellfish.  So as you can imagine with these diets the main goal is to steer clear of the specific foods or ingredients that can trigger these allergic reactions or intolerances in individuals. To avoid them being a patient in a hospital bed as some of these allergies are deadly. Some of which can be read about in Lisa Hungs’ article (Hung, 2018). |

## Investigate popular scanner applications.

In this literature review I will be looking into popular lifestyle scanners on the market and I will be focussing on what they do good and what they do bad from this I want to hopefully avoid replicating some problems I might find during my investigation during my own development and maybe get some inspiration and ideas on what to add and how to make this scanner the best option on the market, with this I will hopefully also get a decent insight as to what common steps are executed to maintain a good user experience and with any luck get some ideas on accessibility.

This will identify gaps in the market and I can find out the difference between successful scanners and unsuccessful scanners.

Unfortunately during my investigation I did not find one scanner that I could use through my internet browser, All the ones I happened to find were landing pages with links to download the application through apple or android app stores, the closest I got to finding one was more like a blog than a simple scanner application (veganfriendly.org.uk), too much waffle and not enough answers, I want the scanner application to be efficient so I’m looking for a yes or no and maybe at most a reason why the product might not be suitable.

## Investigate the data, where does it get the data from? API etc.

In my opinion this is the most important part of the literature review as in this section I will be investigating where I am going to get the data and how I am going to use the data for both functions, search and scanning.

The accuracy and reliability of data are critical factors within this project as it would be unethical for someone to scan a product and be told it is suitable when it is not. This can affect the success of a scanner application. To obtain the required data for the application, several sources will be explored.

### Crowdsourced data collection

Crowdsourced data collection is a method in which data gathering is done by a group of people, often through an the application using the data such as MyFitnessPal “by enabling MyFitnessPal’s users to input and check data.” (Macmanus, 2015). The process involves individuals providing information, which is then collected and investigated for patterns. This method could be used but in this case the reliability of the data is critical to the project’s success so this will not be the direction for the development.

### Food Databases

One of the options for getting the data is food databases (Maringer et al. 2019), some of these are the most reliable sources of data for a scanner application. Some food databases contain thorough information on the ingredients used in various food products. These databases can be integrated into the scanner web application to provide accurate and up-to-date information on the suitability of a product.

### Application Programming Interface (API)

APIs are another source of data for the scanner application. Some food and ingredient databases offer APIs such as USDA FoodData Central or Open Food Facts (Medved, 2022), Using these the data can be integrated into the application to provide real-time up to date information on the ingredients of a product. The use of APIs can drastically improve the accuracy and consistency of the data obtained for the scanner application. Unfortunately even though there are multiple APIs that we can use a lot of them require a subscription or fee per parsed ingredient so our options for these will be limited.

## Investigate what is involved in developing these barcode scanners.

In this literature review I will be looking into what is involved in developing these scanners and how the Barcode or Universal Product Code (UPC) (Maringer et al. 2019) gets the data from the code itself.

### What is a UPC?

UPC stands for Universal Product Code (Vlosky, 1994). It is a regulated barcode system used to identify products in the marketing industry, UPC codes consist of a 12 digit code, this code is numerical and each individual digit represents a unique piece of information.

### UPC Guidelines

Universal Product Codes must follow an agreed set of guidelines that are specified by GS1 (international standards organization for barcodes) (D. Savir, G. J. Laurer 1975).

Some of the main guidelines for UPC barcodes are:

|  |
| --- |
| The barcode should be used to encode the unique identification number for each trade item, which should correspond to a specific product in a company's catalogue or inventory system. |
| The barcode should be printed in a specific format, with bars and spaces that follow a specific pattern and should be of a certain size and place on the package. |
| The barcode should be scannable with a range of scanning devices, including handheld scanners, fixed scanners, and mobile phone cameras. |
| The UPC number should be registered with GS1 to guarantee uniqueness and accuracy. The associated product information should be updated regularly in the organisations database. |
| The barcode should be tested for usability, accuracy and readability before getting approval to go to market. |

Sticking to the guidelines ensures that UPC barcodes are accurate, reliable and scannable across variety of devices.

### How does it get the data?

Traditionally a scanner uses a laser or LED to scan the barcode and convert the bars and spaces into an electrical signal then the electrical signal is then sent to the scanner's decoder, which in turn translates the information and sends it back to the connected device, such as a computer or mobile.

This works the same for traditional barcodes and one we see a lot of today, QR codes as they both conform to GS1 specifications.

Below is a diagram showing the specification of a UPC-A barcode (Swartz et al., 2012).

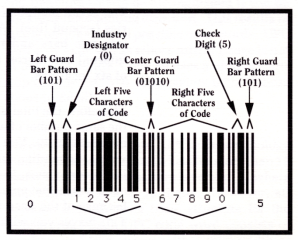


Figure "Illustration of the specifications of the UPC-A symbol." (Swartz et al., 2012).

## Common web application accessibility features.

I will be investigating accessibility features and options within web applications. The reason behind doing so is simple, scalability. Accessibility options are critical in a web application because they ensure that the application can be used by as many people as possible, including those with disabilities or impairments (Fernandes, Costa et al. 2012).

Incorporating accessibility features is a fundamental aspect of inclusive design. This is a design approach that mainly focuses on creating products and services that can be used by everyone, regardless of their abilities. This could possibly assist those with visual or hearing disabilities, motor impairments, and cognitive or learning disabilities.

By implementing accessibility options in a web application, I can improve the user experience for all users, not just those with disabilities. For example, keyboard accessibility can benefit users who prefer to use the keyboard to navigate the application, while clear labelling of forms can benefit all users, irrespective of their abilities.

Upon my investigation I came across a set of guidelines that I had never heard of before called the Web Content Accessibility Guidelines (WCAG) (Cooper et al., 2016) whilst looking through the guidelines I managed to find over 200 different guidelines with all sorts of techniques to assist whilst programming ranging from HTML, CSS techniques to PDF and Flash techniques, There is also a full list of common failures (Cooper et al., 2016) whilst implementing techniques and instructions and suggestions on how to fix them.

## Development options explored.

Investigations into the development options for this project would be endless so I have narrowed it down based on knowledge I already possess in terms of specifics within the development stack, As I have already got a little experience using a MERN stack I will be going with that as my chosen development stack, despite already choosing my stack I did do research to make sure it would not be a mistake doing so.

The MERN stack consists of using Mongo DB for database, Express is a minimal and flexible web application framework that will be used to create APIs and handle server-side logic. React is a JavaScript library that is used for building user interfaces, while Node.js is a server-side JavaScript runtime that enables the running of JavaScript code outside of the web browser.

MongoDB will be used within this project to store the users basket which will be accessed in the project to view specifics, the database might also be used for users later in the projects development if a decision might be made to go in that direction making the application a little more personal with the endless possibility of new features.

The MERN stack is a brilliant option for the development of this web application for several reasons. First, it offers a fast and efficient way to develop scalable and high-performance web applications. Second, the MERN stack is an open-source technology stack that has a large and active developer community, which means that there are plenty of resources, tools, and libraries available to support the development process which is crucial as there will be a learning curve. Third, using the same language for both the client and server-side makes it easier to develop and maintain the application. Finally, the MERN stack provides built-in support for modern web development features such as real-time updates, modular code, and responsive design.

For version control within our development stack, I will be using Github, my reasons behind choosing github are because I’m very familiar with the system and its capabilities of which according to statistics “The most popular version control system is Git, used by over 70% of teams.” (Abdalslam, 2023) would say that it’s the best option for what it’s for and best of all its opensource which is something common across the MERN stack (Islam, 2022).

## Literature Review Conclusion

The research method's objectives were met by the literature review. The project is supported by the cited references, which indicate that the lifestyle scanner web application will indeed provide users ingredients swiftly and efficiently in products, users will be more likely to find products that suit the lifestyle or diet they represent.

# Methods

The methods section of this report provides a detailed description of the procedures and techniques used to conduct the study. This section is necessary as it allows readers to understand the steps taken to gather and analyse the data, and to assess the validity and reliability of the results. The methods section provides a clear account of the research design, the sample selection, data collection methods, and data analysis techniques used. By providing a comprehensive overview of the methods used, this section serves as a roadmap for the study, enabling readers to follow the logic and reasoning behind each step of the investigation. This section could also be a valuable resource for future researchers who may wish to replicate or build upon the work described in this report.

## Research Method

The main purpose of the project is to see if using a Vegan Scanning responsive web application will be useful to the public when going shopping for their groceries etc. Whilst doing so the hope is that the application will assist the shopper figure out if products suit their lifestyle or diet habits and saving them time in the process. To find out the answers to this I will be using somewhat mixed research methods, I will be starting a develop and test approach using an Agile software development life cycle, then later down the line after development to assist my research I might use some kind of user testing and survey or participant observations (University Libraries, 2019) qualitative research (Villegas, 2021).

To complete this project, I will be using the information and technologies gathered within my literature review to design, develop and test the responsive web application, hopefully with the succession of the development of the application I can help people of various lifestyles all over the world on almost any device as the web application will be responsive (Gardner, 2011).

## Develop the Lifestyle scanner responsive web application.

Using the knowledge from my findings within the literature review I will be continuing with the same idea of developing the lifestyle scanner as a responsive web application as this will have the most user coverage and will be able to be used across all platforms from mobile devices to tablets and computers. This will be developed using a MERN (MongoDB Express React NodeJS) stack using github to handle version control which will present a learning curve as I will need to learn how to do multiple things technically to help me with the development and API handling. Having the web application responsive is also why I want to have multiple releases due to the search function for PC and the scanner for mobile/portable use. The multiple releases is one of the main reasons behind using an agile methodology lifecycle as I want the a functional release of the application asap so that I can gather feedback to start testing on the application straight away.

## Project Development Lifecycle

As stated in the research method my chosen software development lifecycle methodology will be using an Agile approach as I plan on delivering the application multiple times using iterative delivery throughout the sprints, this way my milestones will be reflected as functional releases with different features/advancements (Kumar, Bhatia, 2012).

The main benefits of using Agile (Shultis, 2019) over other methodologies within this project mainly lie within the goal, I want the scanner to have multiple releases one with search function then I want to add the barcode scanning function in the next release. Throughout this process I will be using some scrum elements such as delivering in increments, I will also be sizing work into stories and working in sprints to set targets for myself. The reason I will be using elements rather than just scrum itself is because the main part of scrum is to be working in a team and I am working solo on this project (Gant, 2019).



Figure - Agile Model (Software Engineering) - javatpoint

## Test*s, Survey* and *Participant Observations*

This stage will be creating the actual tests of the application and creating a survey for the stakeholders of the project i.e. the users. I will also be gathering some participants to trial the application to help evaluate its functionality and user experience.

## Obtain participants for evaluation.

For the observations I will be finding a total of 6 participants to test the application, three will be given a version of the application in its alpha state to use and test with the hopes of gathering data and opinions on their user experience and if it actually assists them whilst shopping or is a hindrance. The other three will be a control group shopping without the scanner at hand.

The six participants chosen will all be of different lifestyles to get a good span of data across the board.

## Carry out the evaluation.

The three users will be given the same version of the lifestyle scanner web application and as they all have different lifestyles or dietary requirements I’m hoping for varying experiences as no data will be considered bad data and shall assist me in developing the app further.

The three in the control group will be shopping without the scanner.

The users will be given the application to use for 3 days and upon completion will be asked to take a survey through surveymonkey on their experience.

## Gather *findings* and analyse test *results!*

After the trials I will be comparing the purchasing behaviour of individuals who use the application to those who do not. The results of the research can either support or reject the hypothesis. Then I will check all the surveys and analyse the test results with the intention of developing a greater understanding of the user experience within the scanner application and deciding what changes to make to the application to make it more fit for purpose, accessible, usable etc.

From the evaluation research methods ideally, I will have all the information to find out if my solution addresses the issue at hand being, Will the lifestyle scanner benefit the general public and help assist them in their shopping needs, quick, fast and reliably.

# References

Basker, E., 2012. Raising the barcode scanner: Technology and productivity in the retail sector. *American Economic Journal: Applied Economics*, *4*(3), pp.1-27.

Mackarness, R., 1976. *Eating Dangerously: The Hazards of Allergies*. Houghton Mifflin Harcourt P (Accessed: February 17, 2023).

Gheihman, N., 2021. Veganism as a lifestyle movement. *Sociology compass*, *15*(5), p.e12877. (Accessed: February 17, 2023).

Packaging and labelling (2022) Food Standards Agency. Food Standards Agency. Available at: https://www.food.gov.uk/business-guidance/packaging-and-labelling (Accessed: February 19, 2023).

Mueller, M., Ganesh, R. and Bonnes, S., 2020. Gut health= mental health? The impact of diet and dietary supplements on mood disorders. *Current Nutrition Reports*, *9*, pp.361-368. Available: https://link.springer.com/article/10.1007/s13668-020-00340-2 (Accessed: February 17, 2023).

McRae, L. (2019) Vegan, vegetarian, pescatarian, Flexitarian and macrobiotic diets – what's the difference?, NorthShore. Available at: https://www.northshore.org/healthy-you/vegan-flexitarian-vegetarian-pescatarian-and-macrobiotic-diets--whats-the-difference/ (Accessed: February 17, 2023).

Smith, R. (2016) *34 non-vegan ingredients to avoid on a vegan diet*, *Vegan Food & Living*. Available at: https://www.veganfoodandliving.com/features/food-ingredients-avoid-vegan-diet/ (Accessed: February 17, 2023).

Tahreem, A. et al. (2022) FAD diets: Facts and fiction, Frontiers. Frontiers. Available at: https://www.frontiersin.org/articles/10.3389/fnut.2022.960922/full (Accessed: February 17, 2023).

Hung, L. (2018) On The Topic of Allergies, IMMpress Magazine. Available at: https://www.immpressmagazine.com/on-the-topic-of-allergies/ (Accessed: February 17, 2023).

Macmanus, R. (2015) *How myfitnesspal became the king of diet trackers*, *ReadWrite*. Available at: https://readwrite.com/trackers-myfitnesspal-excerpt/ (Accessed: February 17, 2023).

Maringer, M., Wisse-Voorwinden, N., van’t Veer, P. and Geelen, A., 2019. Food identification by barcode scanning in the Netherlands: a quality assessment of labelled food product databases underlying popular nutrition applications. Public health nutrition, 22(7), pp.1215-1222.

Medved, E. (2022) *Food API – 18 most popular food apis [Q3, 2022]*, *Suggestic*. Available at: https://suggestic.com/blog/food-api-ultimate-list (Accessed: February 17, 2023).

Vlosky, R.P., 1994. Influences of interorganizational information system technologies on business relationships: Wood products sellers and home center buyers. The Pennsylvania State University.

D. SAVIR and G. J. LAURER, 1975. The characteristics and decodability of the Universal Product Code symbol. Available at: https://ieeexplore.ieee.org/abstract/document/5388144 (Accessed: February 17, 2023).

Jerry Swartz et al. (2012) Bar code scanning. Scholarpedia, Available at: http://www.scholarpedia.org/w/index.php?title=Bar\_code\_scanning&action=cite&rev=137139 (Accessed: February 17, 2023).

FERNANDES, N., COSTA, D., DUARTE, C. and CARRIÇO, L., 2012. Evaluating the Accessibility of Web Applications. Procedia Computer Science, 14, pp. 28-35.

Cooper, M. *et al.* (2016) *Techniques for WCAG 2.0*, *W3C*. Available at: https://www.w3.org/TR/WCAG-TECHS/ (Accessed: February 17, 2023).

Cooper, M. *et al.* (2016) *Failures for WCAG 2.0*, *W3C*. Available at: https://www.w3.org/TR/WCAG20-TECHS/failures.html (Accessed: February 17, 2023).

Research guides: Research methods guide: Research design & method (2019) Research Design & Method - Research Methods Guide - Research Guides at Virginia Tech. University Libraries. Available at: https://guides.lib.vt.edu/researchmethods/design-method (Accessed: February 15, 2023).

Islam, M.M. (2022) *MERNjs*. Available at: https://mern.js.org/ (Accessed: February 19, 2023).

Abdalslam, A. (2023) *Version control clients statistics, trends and facts 2023*, *Abdalslam*. Available at: https://abdalslam.com/version-control-clients-statistics#:~:text=The%20most%20popular%20version%20control,used%20by%20less%20than%205%25. (Accessed: February 19, 2023).

Villegas, F. (2021) Participant observation: What it is, Types &amp; Uses, QuestionPro. Available at: https://www.questionpro.com/blog/participant-observation/ (Accessed: February 15, 2023).

Gardner, B.S., 2011. Responsive web design: Enriching the user experience. Sigma Journal: Inside the Digital Ecosystem, 11(1), pp.13-19.

Kumar, G. and Bhatia, P.K., 2012. Impact of agile methodology on software development process. *International Journal of Computer Technology and Electronics Engineering (IJCTEE)*, *2*(4), pp.46-50.

Shultis, G. (2019) Agile vs. waterfall: Pros & cons, use cases, & more, Glasscubes. Available at: https://www.glasscubes.com/agile-vs-waterfall/#:~:text=Agile%20projects%20are%20typically%20cheaper,and%20take%20longer%20to%20deliver. (Accessed: February 16, 2023).

Gant, M. (2019) *Scrum and the solo dev*, *Medium*. Medium. Available at: https://medium.com/@jmgant.cleareyeconsulting/scrum-and-the-solo-dev-fb8e810ed42b (Accessed: February 15, 2023).

*Agile Model (Software Engineering) - javatpoint* (no date) *Javatpoint*. Javatpoint. Available at: https://www.javatpoint.com/software-engineering-agile-model (Accessed: February 16, 2023).