Anjuman-I-Islam’s

**M.H.Saboo Siddik Polytechnic**

8, M.H.Saboo Siddik Polytechnic Road, Mumbai 400008



FINAL YEAR DIPLOMA IN COMPUTER ENGINEERING

(2023-2024)

PROJECT REPORT ON

**3D OUTFIT CUSTOMIZER: DESIGN YOUR OWN CUSTOM OUTFITS ONLINE**

BY

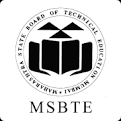
**210451 ABDURRAHMAN QURESHI**

**210455 QAZI MOHD OAISH**

**220486 SHAIKH MOHAMMED HUSSAIN**

UNDER THE GUIDANCE OF

**MS. ZAIBUNNISA MALIK**



Maharashtra State Board of Technical Education (MS-BTE)

Mumbai (Autonomous) (ISO 9001:2008) (ISO/IEC 27001:2005

Anjuman-I-Islam’s

**M.H.Saboo Siddik Polytechnic**

8, M.H.Saboo Siddik Polytechnic Road, Mumbai 400008

**Certificate**

This is to certify that Mr. **Qureshi Abdurrahman** from Computer Engineering Department of M. H. Saboo Siddik Polytechnic, Mumbai having Enrollment No. **2100020112** has completed Final Project Report having Title **3D Outfit Customizer** during the academic year 2023 - 2024 in a group consisting of **3** persons under the guidance of Faculty Guide Ms.Zaibunnisa Malik & Co Guide Mohammed Ali.

**Place: Mumbai Sign of Guide: \_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_ Sign of HOD: \_\_\_\_\_\_\_\_\_\_\_\_\_**

Anjuman-I-Islam’s

**M.H.Saboo Siddik Polytechnic**

8, M.H.Saboo Siddik Polytechnic Road, Mumbai 400008

**Certificate**

This is to certify that Mr. **Qazi Mohd Oaish** from Computer Engineering Department of M. H. Saboo Siddik Polytechnic, Mumbai having Enrollment No. **2100020108** has completed Final Project Report having Title **3D Outfit Customizer** during the academic year 2023 - 2024 in a group consisting of **3** persons under the guidance of Faculty Guide Ms.Zaibunnisa Malik & Co Guide Mohammed Ali.

**Place: Mumbai Sign of Guide: \_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_ Sign of HOD: \_\_\_\_\_\_\_\_\_\_\_\_\_**

Anjuman-I-Islam’s

**M.H.Saboo Siddik Polytechnic**

8, M.H.Saboo Siddik Polytechnic Road, Mumbai 400008

**Certificate**

This is to certify that Mr. **Shaikh Mohammed Hussain** from Computer Engineering Department of M. H. Saboo Siddik Polytechnic, Mumbai having Enrollment No. **2200020625** has completed Final Project Report having Title **3D Outfit Customizer** during the academic year 2023 - 2024 in a group consisting of **3** persons under the guidance of Faculty Guide Ms.Zaibunnisa Malik & Co Guide Mohammed Ali.

**Place: Mumbai Sign of Guide: \_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_ Sign of HOD: \_\_\_\_\_\_\_\_\_\_\_\_\_**

**INDEX**

| **Sr.No.** | **Title** | **Marks** | **Obtained Marks** | **Faculty Sign with Date** |
| --- | --- | --- | --- | --- |
| **1.** | **Problem Identification** | **02** |  |  |
| **2.** | **Industrial Survey & Literature Review** | **02** |  |  |
| **3.** | **Project Proposal** | **03** |  |  |
| **4.** | **Execution of Plan** | **02** |  |  |
| **5.** | **Final Project Report** | **06** |  |  |
| **6.** | **Project Log Book** | **02** |  |  |
| **7.** | **Project Portfolio** | **04** |  |  |
| **8.** | **Presentation & Defence** | **04** |  |  |
| **Total** | | **25** |  |  |

**Project**

**Report**

**Acknowledgement**

It is our esteemed pleasure to present the project report on

“3D Outfit Customizer: Design your own Custom Outfits Online”

We would firstly like to thank our Principal (I/c), Head of the Department & Guide Ms. Zaibunnisa Malik for encouraging and motivating us with her guidance and total support for our work. We shall also like to thank Ms. Mohammed Ali for working as our sub guide and making our path integrity much simpler.

We also thank all the teachers who constantly motivated us and provided us their precious knowledge about the procedures carried out for making a project along with technical knowledge they have availed.

We would also like to thank our principal Dr. A.K Kureshi for providing us this

Opportunity of integrating our own project and constantly supporting us throughout the process.

It would also be pleasure thanking all the staff, be it teaching or non-teaching

who always understood by us and never made any problem tread our way.

**Abstract**

Our project, the "3D Outfit Customizer: Design your own Custom Outfits Online," is all about transforming the way we shop for fashion online. Instead of the usual online shopping routine, we're introducing a game-changing 3D virtual platform that lets users become their own fashion designers. In a world flooded with typical online shopping experiences, our venture stands out by combining creativity and convenience seamlessly. With our virtual fashion design studio, users aren't just shoppers – they're designers, able to express their unique style and fashion preferences to the fullest. This approach creates a personalized and immersive shopping experience that goes beyond what existing platforms offer, revolutionizing how people engage with the fashion industry.

By giving users the tools to design and customize their outfits in a 3D environment, our project breaks the boundaries of online shopping. It opens up a world where users can unleash their creativity, explore various styles, and play around with fabrics, all while seeing their choices come to life in stunning visualizations. In this virtual fashion paradise, users don't just watch; they actively shape their fashion journey, making the experience incredibly personal and engaging. The "3D Outfit Customizer" represents the future of fashion retail, providing users with an authentic and tailor-made shopping adventure in the digital age.

**Table of Content**

| **Sr. No.** | **Chapter** | **Page No.** |
| --- | --- | --- |
| **1.** | **Introduction and Background**  1.1.Introduction  1.2.Background  1.3.Motivation  1.4.Problem Statement  1.5.Objective and Scope  1.6.Advantages  1.7.Disadvantages  1.8.Limitations  1.9.Conclusion |  |
| **2.** | **Literature Survey**  2.1.Introduction  2.2.Research Papers  2.3.References  2.4.Conclusion |  |
| **3.** | **Proposed Methodology**  3.1.System Design  3.1.1.Introduction  3.1.2.Block Diagram  3.1.3.System architecture diagram  3.1.4.Data Flow Diagram  3.1.5.Software Design Approach  3.2.Time Line Chart  3.3 Gantt Chart  3.4.Conclusion |  |

**Chapter 1: Introduction and Background**

**Content:**

* 1. Introduction

1.2. Background

* 1. Motivation
  2. Problem Statement
  3. Objective and Scope
  4. Advantages
  5. Disadvantages
  6. Limitations
  7. Conclusion
  8. **Introduction**

This section delves into the background, motivation, problem statement, objectives, scope, advantages, disadvantages, and limitations of the 3D Outfit Customizer project. It highlights the need for a more immersive and personalized fashion shopping experience that empowers users to express their individuality through 3D customization. The section outlines the project's objectives, including curating a vast collection of clothing items, enabling 3D design and personalization, providing an immersive platform, facilitating sharing and collaboration, offering a user-friendly interface, and making online fashion shopping enjoyable and personalized. It also identifies the project's advantages, such as enabling users to create unique outfits, providing realistic 3D previews, streamlining the shopping process, and enhancing the overall online shopping experience. The section acknowledges the technical challenges, limitations in fabric texture representation, and website performance complexity that may arise during development. It also mentions the limited availability of fabric textures and patterns, potential compatibility issues, and privacy concerns that may need to be addressed.

* 1. **Background**

Traditional offline outfit shopping methods do not align with modern preferences, and even conventional online shopping falls short in providing a comprehensive solution for users to fully express their style. The fashion industry lacks a platform that allows diverse preferences to flourish through 3D customization.

* 1. **Motivation**

The motivation behind the "3D Outfit Customizer" project is to bridge the gap between traditional online fashion shopping and the desires of modern consumers. The project seeks to leverage 3D technology and A to provide users with an immersive, interactive, and personalized shopping experience that empowers them to design their own outfits, thereby fostering a sense of creativity and individuality in the fashion industry.

* 1. **Problem Statement**

Many online shopping platforms lack the depth and versatility required to cater to the diverse and ever-evolving fashion preferences of today's consumers. While they may offer a wide range of products, the ability to tailor and customize these items according to one's unique taste is often limited. Users are typically constrained to selecting from pre-designed options, which restricts their creative expression and can result in a generic shopping experience. This limitation hinders the full realization of personal style and makes it challenging for individuals to find and create outfits that truly resonate with their fashion sensibilities.

Furthermore, the absence of a comprehensive 3D customization solution within the fashion industry exacerbates this problem. The conventional 2D representation of clothing on online platforms fails to capture the subtleties of fit, style, and individual preferences, leaving a gap in the market for a more immersive and interactive solution. By introducing a 3D outfit customizer, this project aims to bridge this gap and empower users to explore and materialize their unique fashion visions, ultimately revolutionizing the way fashion is both experienced and consumed in the digital age.

* 1. **Objective & Scope**
* **Objective**
* To study the 3D Outfit Customizer Systems
* To curate a vast collection of clothing items, fabrics, styles, patterns, and accessories for users to choose from and customize.
* To enable users to design and personalize outfits in a 3D virtual environment, fostering a sense of creativity and individuality in their fashion choices.
* To provide users with an immersive and interactive platform that enhances their shopping experience by allowing them to express their unique style.
* To offer a user-friendly interface accessible on various devices, making the customization process intuitive and accessible.
* **Scope**
* A vast collection of clothing items, fabrics, styles, patterns, and accessories for users to choose from and customize.
* A 3D virtual design studio for outfit creation and customization.
* A vast collection of clothing items, fabrics, styles, patterns, and accessories to choose from.
* Interactive elements to adjust outfit details such as sleeves, collars, and hemlines.
* Realistic 3D previews to visualize designs.
* A user-friendly interface accessible on various devices.
  1. **Advantages**
* Empowering users to create outfits that reflect their unique style.
* Providing realistic 3D models for accurate design visualization.
* Streamlining the shopping process by enabling the creation and purchase of custom outfits in one place.
* Offering an enjoyable and interactive online shopping experience.
  1. **Disadvantages**
* Technical challenges related to achieving realistic 3D rendering.
* Limitations in accurately representing fabric textures in the 3D model.
* Complexity in maintaining website performance.
  1. **Limitations**
* Limited availability of fabric textures and patterns.
* Compatibility issues with certain devices or browsers.
* Potential privacy and security concerns related to user data.
  1. **Conclusion**

In conclusion, the "3D Outfit Customizer" project aims to transform the online fashion shopping experience by providing a 3D virtual platform for users to design and customize their outfits. By addressing the limitations of traditional online shopping, this project has the potential to revolutionize the fashion industry and empower users to express their unique style while enjoying an immersive and interactive shopping experience. Despite potential challenges and limitations, the project's advantages in personalization and creativity make it a promising endeavor for modern fashion enthusiasts.

**Chapter 2: Literature Survey**

**Content:**

2.1. Introduction

2.2. Research Papers

2.3. References

2.4. Conclusion

**2.1. Introduction**

The literature survey will delve into the history and evolution of online fashion shopping, emphasizing the limitations of traditional approaches in enabling users to fully express their unique style. We will examine existing 3D virtual design studios and fashion platforms to gain insights into the techniques and technologies that have been employed in similar contexts. In this survey, we will read a number of IEEE, IJERT, Springer Research Papers. This survey will provide a foundation for identifying best practices, potential challenges, and opportunities for innovation in the "3D Outfit Customizer" project, ensuring that it builds upon and surpasses the current state of the art in the field. This survey will help define the problem statement.

**2.2. Research Papers**

**Paper Title 1:** Dual-Mode User Interfaces for Web-Based Interactive 3D Virtual Environments Using Three.js

**Author:** Matthew Stanton, Thomas Hartley, Fernando Loizides, and Adam Worrallo

**Published in:** 2017

**Abstract:** Dual-mode user interface (2D+3D) enables faster information retrieval and higher user satisfaction than 3D websites alone. 2D interface has the best UI quality, 3D interface is the most aesthetically pleasing. 3D interface has worse text presentation than 2D and dual-mode interfaces. Dual-mode interface lacks a content search function, which could slow down data retrieval for users used to Ctrl+F. Dual-mode user interfaces have potential to enhance user interaction in 3D virtual environments. Future work should integrate 3D and 2D views more closely and expand the scope of the study.

**DOI:** <https://doi.org/10.1007/978-3-319-68059-0_47>

**Paper Title 2:** React JS – An Emerging Frontend JavaScript Library

**Author:** Pratik Sharad Maratkar and Pratibha Adkar

**Published in:** 2021

**Abstract:** React JS is an emerging and popular frontend JavaScript library known for its fully component-based architecture. It simplifies the development of rich UIs by using reusable components. Facebook, Instagram, and other organizations back React JS and use it in their web applications. React JS offers tools for easy debugging, including Chrome extensions.React primarily deals with the View part in MVC, so other tools are needed for backend development. Some developers may find JSX programming challenging during the learning phase. React's environment evolves rapidly, requiring developers to stay updated with its changes.The paper provides a comparison between React JS and Angular JS, highlighting their differences in terms of development, performance, and usage. It discusses React JS's architecture, including React Virtual DOM, one-way data flow, React components, and JSX syntax

**DOI:** <https://www.irejournals.com/paper-details/1702778>

**Paper Title 3:** Frontend Development with React**.**js

**Author:** Anjali Rananavare

**Published in:** 2022

**Abstract:** React.js is a popular choice for building UIs with a virtual DOM, one-way data flow, and component-based architecture. It is lighter weight, faster, and easier to use than other frameworks. It requires importing libraries for state and model management and moves away from class-based modules, but it simplifies frontend development and is popular in the industry.

**DOI:** https://www.irjet.net/archives/V7/i6/IRJET-V7I61149.pdf

**Paper Title 4:** React Apps with Server-Side Rendering: Next.js

**Authors:** Harish A Jartarghar, Girish Rao Salanke, Ashok Kumar A.R, Sharvani G.S, Shivakumar Dalali

**Published in:** 2022

**Abstract:** The paper discusses the use of React.js and Next.js to develop web applications with a focus on server-side rendering. It highlights the problem of client-side rendering causing slow page loading and proposes the use of Next.js, a lightweight React framework, to address this issue. Next.js leverages server-side rendering, which allows the server to process web pages, fetch user-specific data, and send it to the browser over the internet. The paper also emphasizes Next.js' benefits for Search Engine Optimization (SEO) and its automatic routing system using the "pages" directory.Next.js is a lightweight React framework that uses server-side rendering to improve page loading speed and performance. It also has benefits for Search Engine Optimization (SEO) and an automatic routing system. Next.js is a good solution for developing web applications where fast page loading and SEO are important considerations.

**DOI:** https://www.researchgate.net/publication/347242422\_Diving\_into\_Threejs

**Paper Title 5:** React JS (Open Source JavaScript Library)

**Authors:** Alok Kumar Srivastava, Vaishnavi Laxmi, Payal Singh, Km Pratima, Vibha Kirti

**Published in:** 2022

**Abstract:** The paper discusses React JS, an open-source JavaScript library for building user interfaces. React JS is used for handling the view layer in single-page applications and mobile application development. It highlights some of the key features of React JS, such as JSX, stateful components, and the Virtual Document Object Model (Virtual DOM). The paper also explains how React JS can be integrated into various types of applications, both simple and complex. The paper discusses the benefits of using React JS for front-end web application development. It emphasizes React's ability to create large and complex web applications that can update data without requiring page refreshes. React JS is a popular and powerful JavaScript library for front-end web development. It has a wide range of features and benefits, making it a good choice for developing both simple and complex web applications.

**DOI:** https://ijirt.org/master/publishedpaper/IJIRT153854\_PAPER.pdf

**Paper Title 6:** Modern Web-Development using React.js

**Authors:** Bhupati Venkat Sai Indla and Yogeshch

**Published in:** 2018

**Abstract:** ReactJS: JavaScript library for building modular UIs with virtual DOM, unidirectional data flow, and easy learning curve. Limitations: Primarily handles View entity in MVC, inline templates and JSX may be complex, failures at compile time. Overall: Modern and efficient approach to web development, especially for dynamic and interactive user interfaces. The development process, offers high performance through virtual DOM, and encourages unidirectional data flow. The paper emphasizes ReactJS's potential to impact the way web applications are developed and its ability to meet the demands of modern web development trends."

**DOI:** https://iarjset.com/wp-content/uploads/2021/03/IARJSET.2021.8229.pdf

**Paper Title 7: Review on React JS**

**Author: Dimpy Bansal**

**Published in: 2020**

**Abstract:** React JS is an open-source JavaScript library for building user interfaces. It is one of the most popular front-end development frameworks and is used by companies like Facebook, Instagram, and Airbnb. React JS has a number of key features that make it a popular choice for developers. It is declarative, meaning that developers can describe the desired state of the UI and React will efficiently update the DOM to match that state. React JS also uses a component-based architecture, which makes it easy to create reusable and maintainable code. Additionally, React JS has a virtual DOM, which improves performance by only updating the parts of the DOM that have changed. React JS can be used to build a variety of web applications, including single-page applications (SPAs), mobile apps using React Native, and e-commerce websites.

**DOI:** <https://www.ijcrt.org/papers/IJCRT2004607.pdf>

**Paper Title 8:** Role of Node.js in Modern Web Application Development

**Authors:** Ghansham Jadhav and Flavia Gonsalves

**Published in:** 2020

**Abstract:** The paper discusses the role of Node.js in modern web application development. It explains Node.js's modularity, its built-in package manager (Node Package Manager or NPM), and its working architecture. The key features of Node.js, including event-driven I/O, single-threaded, and asynchronous programming, are discussed with examples to provide insights into Node.js's working architecture. "Node.js is a JavaScript runtime environment built on Chrome's V8 JavaScript engine, designed for server-side applications. It focuses on low memory consumption and performance, making it suitable for building scalable and lightweight applications. Node.js allows developers to use JavaScript for both client and server-side scripting. It uses event-driven, non-blocking, and asynchronous approaches, enabling it to handle concurrent requests efficiently.

**DOI:** <https://www.scribd.com/document/597752129/RESEARCH-PAPER-Node-js>

**Paper Title 9:** Comprehensive Analysis of React-Redux Hybrid App Development Framework

**Authors:** Shravan G V, Prof. Anitha Sandeep

**Published in:** 2020

**Abstract:** The research paper explores the use of the React-Redux framework for developing hybrid web applications that can run on both Windows and iOS platforms. React-Redux is a framework that allows developers to create applications for multiple native platforms using a single codebase written in JavaScript ES6. The framework utilizes Redux for state management in React Native applications and incorporates various dependencies developed by other React Native developers, such as database and user interface components. The research aims to judge the user experience of web applications developed using the React-Redux framework as satisfactory. The paper suggests that creating user interfaces with React-Redux is easier compared to other platforms. React-Redux is capable of generating both simple and complex applications for cross-platform use, with a focus on high data fetching without caching.

**DOI:** <https://hpi.de/fileadmin/user_upload/fachgebiete/doellner/publications/2012/DHK2012/paper.pdf>

**Paper Title 10:** Survey And Analysis Of Rendering Realtime 3D Object On Cross-Browser & Cross-Platform Using WebGL

**Authors:** Yogiraj Patil, Kirti Wanjale

**Published in:** 2020

**Abstract:** The paper focuses on rendering real-time 3D objects using WebGL, a Web Graphics Library, and JavaScript. It discusses the challenges of rendering 3D objects in real-time, considering factors like varying screen sizes and processing power of different devices. It discusses the use of JavaScript frameworks for developing 3D web applications. The paper explores various rendering approaches and techniques for complex 3D objects in real-time using web browsers and WebGL. It emphasizes the importance of optimized rendering for web-based 3D applications. The paper mentions the use of glTF (GL Transmission Format) for efficient 3D model representation in WebGL.The paper acknowledges the challenges of rendering 3D objects in real-time on various devices and screen sizes. It highlights the role of JavaScript frameworks and WebGL in enabling 3D web applications. The paper mentions the importance of efficient data representation using technologies like glTF.

**DOI:** <https://www.jetir.org/papers/JETIR2105815.pdf>

**Paper Title 11:** Robust Real-Time Shadows for Dynamic 3D Scenes on the Web

**Authors:** Tim Nicolas Eicke, Yvonne Jung, and Arjan Kuijper

**Published in:** 2014

**Abstract:** The paper addresses the challenge of rendering high-quality shadows in 3D scenes on the web using the open-source JavaScript framework X3DOM, which integrates declarative 3D into HTML5. The authors examine existing shadow mapping techniques and develop a concept for enhancing shadow display in X3DOM. They implement Variance Shadow Maps and Parallel Split Shadow Maps (PSSM) to improve shadow quality and discuss the limitations of WebGL, the graphics library on which X3DOM is based, in comparison to other 3D frameworks like Three.js. The research focuses on improving the quality of real-time shadows in web-based 3D scenes.

**DOI:** <https://doi.org/10.1007/978-3-319-07857-1_101>.

**Paper Title 12:** Movie Data Visualization Based on WebGL

**Authors:** Min Li, Chunfang Li

**Published in:** 2020**1**

**Abstract:** The paper uses WebGL, a technology that allows for the rendering of interactive 3D graphics on web pages without using plugins. It utilizes the open-source framework Three.js to create complex 3D scenes. The research implements five types of 3D data visualization charts: histograms, pie charts, maps, earth representations, and force-directed graphs. These visualizations are used to display film-related data. The paper mentions that 3D data visualization charts are rarely involved in current data visualization practices, but it does not elaborate on the specific limitations or disadvantages of 3D data visualization compared to 2D visualization.

**DOI:** 10.1109/SNPDWinter52325.2021.00023.

**Paper Title 13:** Comprehensive Analysis of React-Redux Development Framework

**Authors:** Shravan G V and Prof. Anitha Sandeep

**Published in:** 2020

**Abstract:** The research paper discusses the utilization of the React-Redux framework for developing hybrid applications compatible with both Windows and iOS platforms. The framework leverages JavaScript ES6 for implementation. React-Redux is a combination of React, developed by Facebook, and Redux for state management in React Native. The paper also mentions the use of other dependencies developed by React Native developers, such as databases and user interfaces. "The research work aims to judge the user experience of web applications created using the React-Redux framework as satisfactory. It examines whether user interface creation is easier compared to other platforms. It differentiates between the generation of simple and complex applications using React-Redux.

**DOI:** <https://core.ac.uk/download/pdf/301384737.pdf>

**Paper Title 14:** Server-Based Rendering of Large 3D Scenes for Mobile Devices Using G-Buffer Cube Maps

**Authors:** Juergen Doellne, Benjamin Hagedorn

**Published in:** 2020

**Abstract:** The paper introduces a server-client approach for rendering large 3D scenes on mobile devices. Instead of streaming 3D scene data to clients, the approach splits 3D rendering into two processes: a server process for real-time rendering of virtual panoramas represented by G-buffer cube maps and a client process for reconstructing the 3D scene and enabling user interaction. The paper demonstrates that this server-based rendering approach is effective in rendering large 3D scenes on mobile devices. It decouples the complexity of the 3D scene from data transmission complexity, allows for advanced 3D rendering on the server, and provides a high degree of protection for 3D content while supporting interactive user experiences on clients. The paper does not explicitly mention any disadvantages or gaps in the research. Different types of 3D visualizations are implemented for film-related data, such as histograms, pie charts, maps, and force-directed graphs.

**DOI:** https://ijcrt.org/papers/IJCRT2205332.pdf

**Paper Title 15: The Research and Design Of 3D Web Guide System Based On WebGL**

**Authors:** Cui Peng

**Published in:** 2021

**Abstract:** The paper presents a 3D Web guide system based on WebGL and three.js. It involves the use of HTML5 and Canvas for rendering, three.js for scene creation and rendering, NodeJS for server-side implementation, Socket.IO for WebSocket communication, and A\* algorithm for shortest path search. The research paper describes the development of a 3D Web guide system that allows users to navigate unfamiliar environments using their mobile phones. It employs WebGL, three.js, and various web technologies to create interactive 3D scenes and calculate optimal paths between scenes. The system is designed for use in large amusement parks and shopping malls, serving as a form of advertising and a new type of 3D web application.

**DOI:** https://www.ijtsrd.com/papers/ijtsrd42490.pdf

**Paper Title 16: Performance Optimization using MERN stack on Web Application**

**Authors:** Sourabh Mahadev Malewade, Archana Ekbot

**Published in:** 2021

**Abstract:** The research project focuses on the development of an e-commerce web application using the MERN stack, which includes React.js, MongoDB, Node.js, and Express.js. The authors discuss the methodologies and technologies used to create and implement the web application. The use of React.js, MongoDB, Node.js, and Express.js in building the web application. The advantages of using Node.js for asynchronous, event-driven programming. The role of Express.js in simplifying back-end code and providing middleware support. The benefits of React.js in building user interfaces with components.

**DOI:** http://ijrra.net/Vol5issue1/IJRRA-05-01-27.pdf

**Paper Title 17:** Efficient visualization of 3D models by web browser

**Authors:** Bartosz Sawicki and Bartosz Chaber

**Published in:** 2013

**Abstract:** The paper presents a software module designed for efficient and convenient visualization of 3D models inside a web browser environment. It is written purely in JavaScript and takes advantage of the new HTML5 standard. The authors focus on mobile devices, emphasizing efficiency and low network usage. They propose a solution based on progressive mesh streaming and compare it with server-side rendering approaches. The findings of the paper include the successful development of a JavaScript-based web component for 3D model visualization in web browsers.

**DOI:** https://www.jetir.org/papers/JETIR2105815.pdf

**Paper Title 18:** 3D Rubik's Cube - Online 3D Modeling System Based on WebGL

**Authors:** Buyun Sheng, Feiyu Zhao, Chenglei Zhang, Xiyan Yin, Yao Shu

**Published in:** 2017

**Abstract:** The paper introduces an online 3D modeling system called "3D Rubik's Cube" based on WebGL and Three.js. It achieves online 3D modeling through web front-end technologies and the establishment of a web server using Node.js. The system enriches 3D modeling functionality and enhances rendering effects through an improved Phong reflection model, Constructive Solid Geometry (CSG) tree, and triangular patches intersection testing and division algorithms. The paper demonstrates the development of an online 3D modeling system that allows cloud-based 3D model design. It leverages WebGL for 3D rendering and provides a range of 3D modeling functions.

**DOI:** 10.1109/ITNEC.2017.8284798.

**Paper Title 19:** WEBAPP SERVICE FOR BOOKING

**Authors:** Saundariya K, Prabakaran D

**Published in:** 2021

**Abstract:** The paper describes the development of a web application for booking handyman services. The system is built using the MERN stack, which includes MongoDB for the database, Express JS for the server, React JS for the front-end, and Node JS for the back-end. The system uses technologies like Axios for HTTP requests, JWT for data security and authentication, React-Redux for global state management, and Node-Mailer for sending notifications through email. The research presents a user-friendly website that allows users to easily book handyman services online. It offers various services like cleaning, COVID-sanitization, furniture maintenance, electrical works, appliance repair, house painting, and plumbing. Users can select services, view available professionals based on location and cost, and book them. Handyman professionals can showcase their skills and accept or decline tasks.

**DOI:** https://books.google.com/books?hl=en&lr=&id=Xja9BwAAQBAJ&oi=fnd&pg=PP1&dq=three.js&ots=Rs3arD1d3b&sig=docKcu1uqZPFerJwohOOfpd-BZE

**Paper Title 20:** HANDYMAN USING MONGO DB, EXPRESS JS, REACT JS, NODE JS

**Authors:** Abirami M, Srimathi B, Senthil Kumaran R, Nagarajan G (IEEE Member)

**Published in:** 2021

**Abstract:** The paper describes the development of a web application for booking handyman services. The system is built using the MERN stack, which includes MongoDB for the database, Express JS for the server, React JS for the front-end, and Node JS for the back-end. The system uses technologies like Axios for HTTP requests, JWT for data security and authentication, React-Redux for global state management, and Node-Mailer for sending notifications through email. The research presents a user-friendly website that allows users to easily book handyman services online. It offers various services like cleaning, COVID-sanitization, furniture maintenance, electrical works, appliance repair, house painting, and plumbing. Users can select services, view available professionals based on location and cost, and book them. Handyman professionals can showcase their skills and accept or decline tasks. The system aims to provide a convenient and cost-effective solution for connecting users with professional workers.

**DOI:** https://link.springer.com/chapter/10.1007/978-1-4302-3997-0\_7

**Paper Title 21:** Immersive 3D Modeling with Blender and Off-the-Shelf Hardware

**Authors:** Matthew Stanton, Thomas Hartley, Fernando Loizides, and Adam Worrallo

**Published in:** 2021

**Abstract:** The 3D modeling application was implemented in a short time frame using readily available hardware and software. The hardware used included a standard desktop computer, a 3D display (Panasonic TV), PlayStation Move controllers for user input, and a head-mounted PS Move controller for head tracking. The application combined 3D modeling tools with logical mappings to controller buttons, making it more intuitive for users.

**DOI:** 10.1109/3dui.2013.6550243

**Paper Title 22:** A Framework for Browser-based Multiplayer Online Games using WebGL and WebSocket

**Authors:** Bijin Chen, Zhiqi Xu

**Published in: 2**011

**Abstract:** The paper introduces a framework for creating browser-based multiplayer online games using HTML5, WebGL, and WebSocket technologies. It discusses the background of these technologies, such as HTML5's support for multimedia and graphics, WebGL for 3D graphics, and WebSocket for real-time communication. The authors implement a framework for a multiplayer online game (MOG) using Three.js for 3D rendering and jWebSocket for communication. The architecture of the framework involves clients, web servers, and game servers, with web workers optimizing communication between servers and clients.

**DOI:** [10.1109/ICMT.2011.6001673](https://doi.org/10.1109/ICMT.2011.6001673).

**Paper Title 23:** Investigating Web3D topics on StackOverflow: a preliminary study of WebGL and Three.js

**Authors:** Farag Almansou ry, Sègla Kpodjedo, and Ghizlane El Boussaidi

**Published in:** 2020

**Abstract:** The paper investigates the attention and support received by WebGL and Three.js, two important Web3D technologies, on Stack Overflow. The authors focused on questions tagged with either WebGL or Three.js and extracted information from these questions, including the number of questions, cumulative views, and average views for each tag. They also analyzed the community support by looking at the failure rate (percentage of questions without accepted answers) and the median wait time for satisfactory answers.

**DOI:** [0.1145/3424616.3424726](https://doi.org/10.1145/3424616.3424726).

**Paper Title 24:** Web 2.0 and Virtual World Technologies: A Growing Impact on IS Education

**Authors:** Albert L. Harris and Alan Rea

**Published in:** 2009

**Abstract:** The paper discusses the use of Web 2.0 technologies and virtual world technologies in information systems (IS) education. It explores various Web 2.0 technologies, including wikis, blogs, podcasts, social networks, and virtual worlds. The authors examine how these technologies are being incorporated into IS education and discuss their potential advantages and disadvantages.

**DOI:** https://link.springer.com/chapter/10.1007/978-1-4302-3997-0\_7

**Paper Title 25:** Research and Application of Web3D Exhibition Based on WebGL and Html5

**Authors:** M.J. Bian, J. Gao, H.H. Gao, J.P. Xu

**Published in:** 2015

**Abstract:** The paper presents a solution for creating Web3D exhibitions by combining WebGL and HTML5. It introduces the Web3D Exhibition Building System (Web3D-EBS), which is designed to build Web3D exhibitions in web applications. This system aims to improve compatibility and efficiency in Web3D exhibition applications, eliminating the need for plugins and relying on GPU rendering.

**DOI:** <https://link.springer.com/content/pdf/10.1007/s00607-012-0275>

**Paper Title 26:** REACT JS – AN FRONTEND JAVASCRIPT LIBRARY

**Authors:** Avinash Mishra Arshita Gupta

**Published in:** International Research Journal of Modernization in Engineering Technology and Science, Volume 04/Issue 11, November 2022

**Abstract:** The choice of the correct frontend framework or library is fundamental for software and application development. React.js plays a crucial role in frontend development, providing developers with opportunities to build new applications. This paper explores how React.js is instrumental in building applications, its merits, and key features. With over 80,000 sites and more than 1500 developers using React.js for web and mobile frontend development, it has become a key player in the industry. Companies like Amazon and PayPal utilize React.js for a significant portion of their application's frontend development. The paper analyzes the features of this library and its advantages over other frameworks. React.js, as an open-source frontend JavaScript library, simplifies the development of user interface components

**DOI:** https://www.irjmets.com/uploadedfiles/paper//issue\_11\_november\_2022/31217/final/fin\_irjmets1668401774.pdf

**Paper Title 27:** The usage of Vue JS framework for web application creation

**Authors:** Peter Pšenák, Matúš Tibensky

**Published in:** 2020

**Abstract:** The paper concentrates on the positive sides of front-end frameworks. It creates a small webpage that shows some of the basic capabilities of a JavaScript front-end framework called Vue JS and the easiness of its implementation. It explains the need for frameworks in development and how companies can benefit from them. Vue JS is considered user-friendly, making it a suitable tool for teaching web development, and it allows for incrementally adoptable web development. The paper provides a practical example of creating an interactive web app using Vue JS, demonstrating its simplicity and conciseness.

**DOI:** 10.35406/MI.2020.2.61

**Paper Title 28:** Review Paper on Web Frameworks, Databases, and Web Stacks

**Authors:** Jyoti Shetty, Deepika Dash, Akshaya Kumar Joish, Guruprasad C

**Published in:** 2020

**Abstract:** In today's world, online applications have become an essential component of various industries. The development of web applications involves identifying product requirements, design, coding, and testing using frameworks and technologies. Front-end and back-end frameworks, along with databases, play crucial roles in web development. This paper discusses the importance of choosing the right combination of these components, highlighting a few key frameworks, languages, databases, and web stacks.

**DOI:** https://www.irjet.net/archives/V7/i4/IRJET-V7I41078.pdf

**Paper Title 29:** React Apps with Server-Side Rendering: Next.js

**Authors:** Harish A Jartarghar, Girish Rao Salanke, Ashok Kumar A.R, Sharvani G.S, Shivakumar Dalali

**Published in:** 2022

**Abstract:** Web applications are developed using a variety of different web frameworks, and developers can pick from a wide range of web frameworks when developing a web application. React.js library provides flexibility for building reusable User Interface (UI) Components. It uses the approach of client-side rendering, which loads the HTML content using Javascript. The client-side rendering causes the page to load slowly and the client communicates with the server for run-time data only. Next.js Framework solves this problem by using server-side rendering. When the browser requests a web page, the server processes the web page by fetching the user’s specific data and sending it back to the browser over the internet. Next.js helps the Search engines to crawl the site for better Search Engine Optimization (SEO).

**DOI:** https://jtec.utem.edu.my/jtec/article/view/6192/4083

**Paper Title 30:** Modern Front End Web Architectures with React.Js and Next.Js

**Authors:** Mochammad Fariz Syah Lazuardy and Dyah Anggraini

**Published in:** 2022

**Abstract:** This paper discusses the advantages and disadvantages of React.js and Next.js in the development of the State Civil Apparatus Information System (SIASN) web application. React.js is a JavaScript library for building user interfaces, while Next.js is a framework that enables server-side rendering with React concepts. The study highlights the steps involved in building the SIASN application's front-end and provides insights into the strengths and weaknesses of these technologies. React.js offers reusable components and supports both class and functional paradigms, making it versatile for front-end development. Additionally, it allows for client-side rendering and integrates with Redux for state management. On the other hand, Next.js facilitates server-side rendering, static site generation, and incremental static regeneration, enhancing SEO and application performance. By comparing these two technologies, the paper offers valuable insights for developers working on modern front-end web architectures.

**DOI:** https://irjaes.com/wp-content/uploads/2022/02/IRJAES-V7N1P162Y22.pdf

**2.3. References**

1. Dual-Mode User Interfaces for Web- Based Interactive 3D Virtual Environments Using Three.js - Matthew Stanton, Thomas Hartley, Fernando Loizides, and Adam Worrallo – 201
2. React JS – An Emerging Frontend Javascript Library - Pratik Sharad Maratkar and Pratibha Adkar – 2021
3. Frontend Development with React.js - Anjali Rananavare – 2022
4. React Apps with Server- Side Rendering: Next.js - Harish AJartarghar, Girish Rao Salanke, Ashok Kumar A.R, Sharvani G.S, Shivakumar Dalali - 2022
5. React JS (Open Source JavaScript Library) - Alok Kumar Srivastava,Vaishnavi Laxmi, Payal Singh, Km Pratima, Vibha Kirti - 2022
6. Modern Web- Development using React.js - Bhupati Venkat Sai Indla and Yogeshch - 201
7. Review on React JS - Dimpy Bansal - 2020
8. Role of Node.js in Modern Web Application Development - Ghansham Jadhav1, Flavia Gonsalves 2 - 2020
9. Comprehensive Analysis of React-Redux Hybrid App Development Framework - Shravan G V, Prof. Anitha Sandeep – 2020
10. Survey And Analysis Of Rendering Realtime 3D Object On Cross- Browser & Cross- Platform Using WebGL - Yogiraj Patil, Kirti Wanjale – 2020
11. Robust Real-Time Shadows for Dynamic 3D Scenes on the Web - Tim Nicolas Eicke, Yvonne Jung, and Arjan Kuijper - 2014
12. Movie Data Visualization Based on WebGL - Min Li, Chunfang Li – 2021
13. Comprehensive Analysis of React-Redux Development Framework - Shravan G V and Prof. Anitha Sandeep – 2020
14. Server- Based Rendering of Large 3D Scenes for Mobile Devices Using G- Buffer Cube - Mapsn Juergen Doellne, Benjamin Hagedorn – 2020
15. The Research and Design Of 3D Web Guide System Based On WebGL - Cui Peng – 2021
16. Performance Optimization using MERN stack on Web Application - Sourabh Mahadev Malewade, Archana Ekbot – 2021
17. Efficient visualization of 3D models by web browser - Bartosz Sawicki and Bartosz Chaber – 2013
18. 3D Rubik's Cube - Online 3D Modeling System Based on WebGL - Buyun Sheng, Feiyu Zhao, Chenglei Zhang, Xiyan Yin, Yao Shu - 2017
19. WEBAPP SERVICE FOR BOOKING - Saundariya K, Prabakaran D, - 2021
20. HANDYM AN USING MONGO DB, EXPRESS JS, REACT JS, NODE JS - Abirami M,
21. Srimathi B, Senthil Kumaran R, Nagarajan G (IEEE Member) - 2021
22. Research and Application of Web3D Exhibition Based on WebGL and Html5 - M.J. Bian, J. Gao, H.H. Gao, J.P. Xu - 2015
23. Web 2.0 and Virtual World Technologies: A Growing Impact on IS Education - Albert L. Harris and Alan Rea - 2009
24. Investigating Web3D topics on StackOverflow: a preliminary study of WebGL and Three.js - Farag Almansou ry, Sègla Kpodjedo, and Ghizlane El Boussaidi – 2020
25. Immersive 3D Modeling with Blender and Off-the-Shelf Hardware Matthew Stanton, Thomas Hartley, Fernando Loizides, and Adam Worrallo - 2020
26. Prasetyo, F. A. (2019). Badan Kepegawaian Negara (BKN). tribunnewswiki. https://www.tribunnewswiki.com/2019/10/24/badankepegawaian-negara-bkn (accessed Nov. 02, 2021).
27. Yogyakarta, K. R. I. B. (2021). Wakil Kepala Bkn: Siasn Solusi Benahi Kualitas Data Kepegawaian. Yogyakarta.Bkn.Go.Id. https://yogyakarta.bkn.go.id/berita/2021/10/wakil-kepala-bkn-siasnsolusi-benahi-kualitas-data-kepegawaian (accessed Nov. 02, 2021).
28. Falih, F. (2018). A Review Study of Information Systems. International JournaLof Computer Applications, 179(18), 15–19. doi: 10.5120/ijca2018916307.
29. Venkat, B., Indla, S., Puranik, Y., Student, P. G., & College, P. E. S. M. (2021). Review on React JS. Journal Title, 5(4), 1137–1139.
30. Bhalla, A., Garg, S., & Singh, P. (2020). Present Day Web-Development Using ReactJS. International Research Journal of Engineering and Technology, 7(5), 1154–1157.

**2.4. Conclusion**

In conclusion, the "3D Outfit Customizer" project aims to transform the online fashion shopping experience by providing a 3D virtual platform for users to design and customize their outfits. By addressing the limitations of traditional online shopping, this project has the potential to revolutionize the fashion industry and empower users to express their unique style while enjoying an immersive and interactive shopping experience. Despite potential challenges and limitations, the project's advantages in personalization and creativity make it a promising endeavor for modern fashion enthusiasts.

**Chapter 3**: **Proposed Methodology**

**Content:**

3.1. System Design

3.1.1. Introduction

3.1.2. Block Diagram

3.1.3. System architecture diagram

3.1.4. Data Flow Diagram

3.1.5. Software Design Approach

3.2. Time Line Chart

3.3. Gantt Chart

3.4. Conclusion

**3.1. System Design**

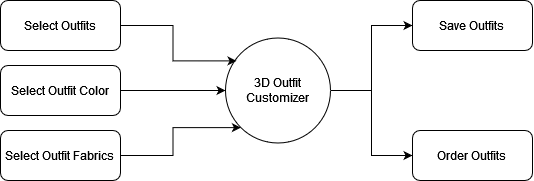
**3.1.1. Introduction**

Systems design is a methodical approach to crafting a system. This can be carried out in a top-down or bottom-up manner, but in both cases, the process is systematic and considers all the interconnected aspects of the system being created. This includes everything from the system's structure, the necessary hardware and software, right down to the management and transformation of data as it traverses the system.

Systems design is closely intertwined with systems analysis, systems engineering, and systems architecture. The origins of the systems design approach can be traced back to the period just before World War II when engineers were grappling with intricate problems related to control and communication. They recognized the need to formalize their work into a structured discipline with established methods, especially given the emergence of new fields like information theory, operations research, and computer science.

System design is the process of defining the various elements of a system, encompassing its architecture, modules, components, the interfaces between these components, and the flow of data within the system. Its primary aim is to meet the specific needs and requirements of a business or organization by engineering a coherent and efficiently functioning system.

**3.1.2. Block Diagram**

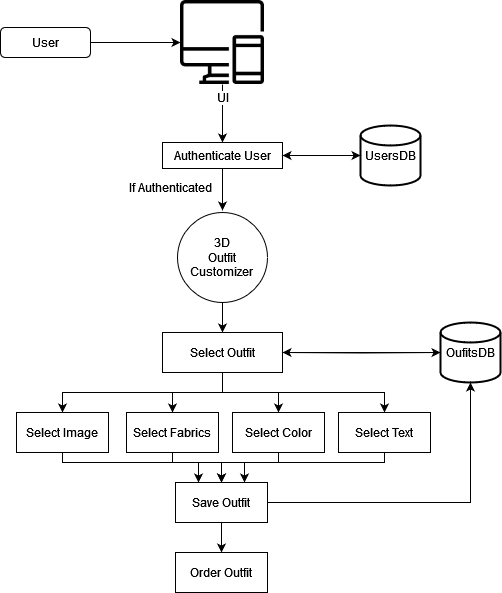


*Figure 3.1.2(a) Block Diagram for 3D Outfit Customizer*

A block diagram is a visual tool that simplifies complex systems or concepts by using labeled blocks to represent individual or multiple elements, entities, or ideas. These blocks are connected by lines to illustrate connections or associations among them. An entity relationship diagram (ERD), which is a specific type of block diagram, depicts an information system by showcasing the relationships between people, objects, places, concepts, or events within that system.

Block diagrams find extensive application in engineering, where they are essential for creating diagrams in fields such as electronics, hardware, software, and various processes. Typically, they offer a high-level, less detailed perspective on concepts and systems. These diagrams are particularly valuable for diagnosing and resolving technical problems.

**3.1.3. System architecture diagram**



*Figure 3.1.3(a) System Architecture Diagram for 3D Outfit Customizer*

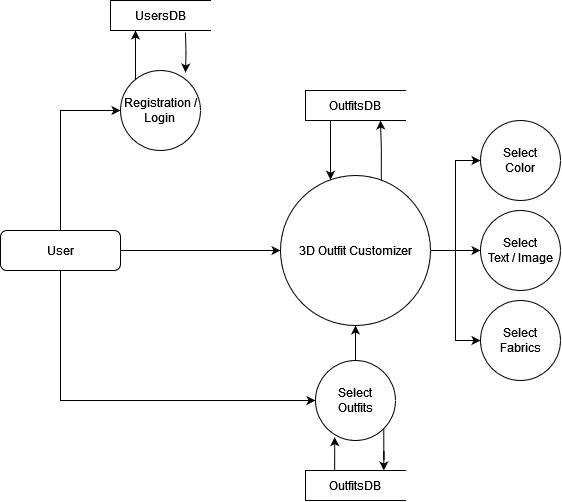
A system architecture diagram serves as a visual representation of how different components interact within a system. Typically, these diagrams are designed for systems that encompass both hardware and software elements, depicting their relationships. However, they can also be tailored for web applications. In the context of a web application, the system architecture design would encompass components like the database, application server, web server, internet, browser, and potentially other relevant elements. The level of detail in these diagrams can vary, offering a higher-level, less intricate overview. These visual representations play a crucial role in troubleshooting technical issues.

**3.1.4. Data Flow Diagram**

Data Flow Diagrams, commonly referred to as DFDs, serve as visual representations of data flow within a business information system. They depict the processes responsible for transferring data from input sources to file storage and report generation. DFDs can be categorized into two types: logical and physical. The logical data flow diagram illustrates the path of data within a system to execute specific business functions, while the physical data flow diagram outlines how the logical data flow is put into practice.



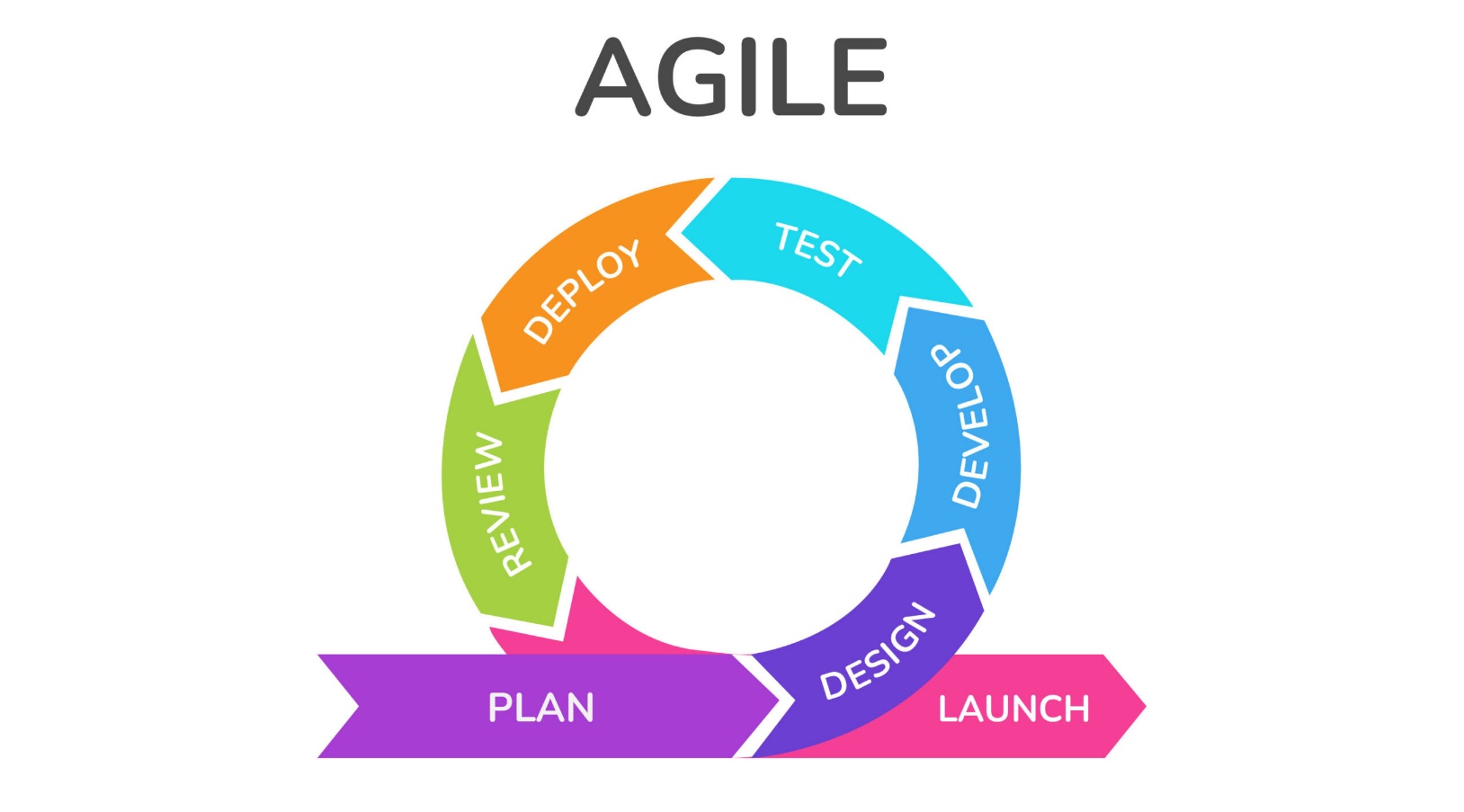
*Figure 3.1.4(a) DFD Level 0 for 3D Outfit Customizer*



*Figure 3.1.4(b) DFD Level 1 for 3D Outfit Customizer*

**3.1.5. Software Design Approach**

An Agile process model is a software development methodology that emphasizes flexibility, collaboration, and iterative development. It is characterized by breaking the project into small, manageable increments, allowing for regular reassessment and adaptation based on feedback. Agile methodologies prioritize customer satisfaction, rapid delivery, and the ability to respond to changing requirements.



**The Agile Software Development process typically consists of the following steps:**

1. **Requirements Gathering:** The customer’s requirements for the software are gathered and prioritized.
2. **Planning:** The development team creates a plan for delivering the software, including the features that will be delivered in each iteration.
3. **Development:** The development team works to build the software, using frequent and rapid iterations.
4. **Testing:** The software is thoroughly tested to ensure that it meets the customer’s requirements and is of high quality.
5. **Deployment:** The software is deployed and put into use.
6. **Maintenance:** The software is maintained to ensure that it continues to meet the customer’s needs and expectations.

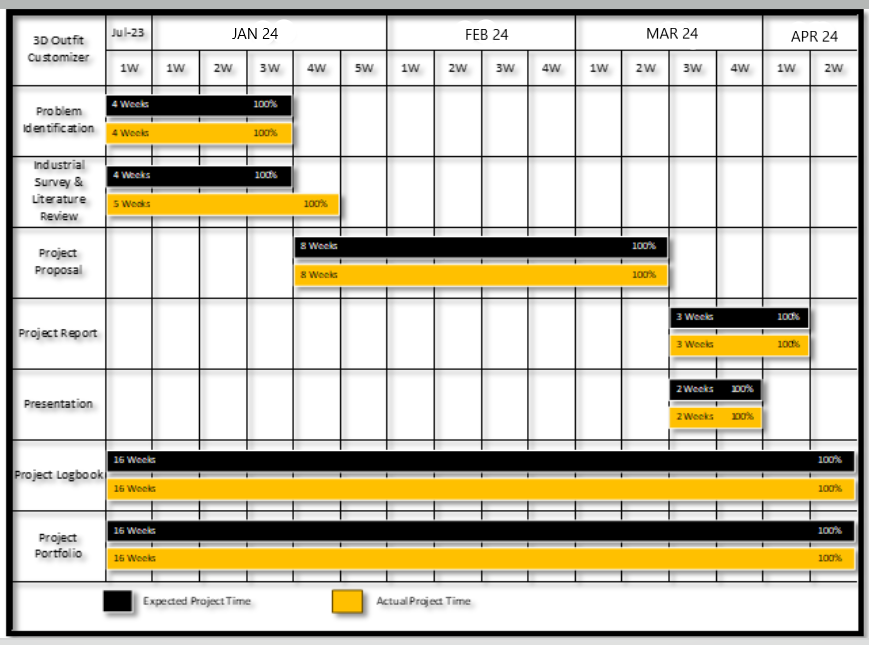
**Principles of Agile Software Development Process are:**

1. Highest priority is to satisfy the customer through early and continuous delivery of valuable software.
2. It welcomes changing requirements, even late in development.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shortest timescale.
4. Build projects around motivated individuals. Give them the environment and the support they need, and trust them to get the job done.
5. Working software is the primary measure of progress.
6. Simplicity the art of maximizing the amount of work not done is essential.
7. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

**Development in Agile:** Let’s see a brief overview of how development occurs in Agile philosophy.

* In Agile development, Design and Implementation are considered to be the central activities in the software process.
* Design and Implementation phase also incorporates other activities such as requirements elicitation and testing into it.
* In an agile approach, iteration occurs across activities. Therefore, the requirements and the design are developed together, rather than separately.
* The allocation of requirements and the design planning and development as executed in a series of increments. In contrast with the conventional model, where requirements gathering needs to be completed in order to proceed to the design and development phase, it gives Agile development an extra level of flexibility.
* An agile process focuses more on code development rather than documentation.

**3.2. Time Line Chart**

****

**3.3. Gantt Chart**

****

**3.4. Conclusion**

In conclusion, Agile methodologies are the perfect fit for the "3D Outfit Customizer" project in the fashion industry. Let's break down why Agile is the way to go: First off, Agile's customer-centric approach is spot-on for a project catering to the diverse and ever-evolving tastes of fashion enthusiasts. By involving users in the development process, the "3D Outfit Customizer" can be tailored to meet individual needs and unique styles. The fashion industry's fast-paced nature requires adaptability, and Agile delivers. Its flexibility enables the project team to swiftly respond to shifting trends and requirements, ensuring the platform's continued relevance and competitiveness. Agile's iterative development approach is another big win. It means we can get valuable features into users' hands earlier, allowing them to start creating and customizing outfits sooner, enhancing the overall experience. Open and transparent communication is at the core of Agile. This is vital for understanding and adapting to the ever-changing world of fashion, ensuring the project stays in sync with customer needs. Last but not least, Agile's emphasis on quality assurance is a big deal. It ensures the final product meets high standards, which is a critical factor for success in the fashion industry.

So, in a nutshell, Agile's customer-centric, adaptable, and collaborative approach, coupled with its focus on risk management and quality assurance, makes it the top choice for the "3D Outfit Customizer" project. Going Agile will help us tackle the unique challenges of the fashion industry and deliver a more personalized, competitive, and high-quality solution to our users.

**Project**

**Proposal**

**Project Title**

**3D Outfit Customizer: Design your own Custom Outfits Online**

**Rationale**

Navigating the fashion industry has undergone a significant shift, with online shopping becoming the go-to destination for many seeking to acquire clothing. While this shift offers convenience and a vast array of options, it fails to provide the flexibility and personalization that many desire. The "3D Outfit Customizer" project aims to bridge this gap by introducing a 3D virtual platform that empowers users to design and customize their outfits. This groundbreaking approach will revolutionize the online shopping experience, allowing users to express their unique style and preferences in a way that was previously unimaginable.

Traditionally, online shopping has limited users to selecting from pre-existing designs, often resulting in outfits that fail to capture the individuality of the wearer. The "3D Outfit Customizer" project breaks free from these constraints, providing users with a virtual canvas upon which they can bring their fashion aspirations to life. With a comprehensive range of customizable options at their fingertips, users can tailor each garment to their exact specifications, from fabric and color to patterns and accessories.

The transformative potential of the "3D Outfit Customizer" project extends beyond mere personalization. It fosters an engaging and interactive experience, transforming online shopping from a passive activity into a creative endeavor. Users can experiment with different styles, explore new trends, and visualize their creations in real-time, empowering them to express their unique fashion identity in ways that were previously impossible. This level of creative freedom not only enhances the online shopping experience but also nurtures a deeper connection between users and the fashion industry.

Moreover, the "3D Outfit Customizer" project can have a profound impact on sustainability within the fashion industry. By allowing users to create garments tailored to their exact preferences, there is a potential reduction in clothing waste, as customers are more likely to cherish and keep items that reflect their unique style.

Additionally, the virtual platform can serve as a testing ground for innovative and eco-friendly materials, promoting sustainability and responsible consumption. As the fashion industry continues to evolve, this project has the potential to redefine the way we approach clothing design, production, and consumption, ushering in a new era of personalized, sustainable, and interactive fashion experiences.

**Introduction**

In a world where the fashion industry is constantly evolving, the "3D Outfit Customizer" project stands at the forefront of a transformative shift in how we engage with clothing. As the digital age has redefined the way we shop, the limitations of conventional e-commerce have become increasingly evident. This innovative 3D virtual platform represents a leap forward, granting users the ability to assume the role of fashion designers in their own right. By breaking free from pre-existing templates and design constraints, individuals can now create garments that authentically express their unique personalities, blurring the lines between fashion and self-expression. What's more, this project introduces a profound shift in the way we experience online shopping, turning it into an interactive, creative process where users can experiment with styles, materials, and accessories in real-time. It forges a deeper connection between fashion enthusiasts and the dynamic world of style evolution.

However, the influence of the "3D Outfit Customizer" extends well beyond personalization and creativity. It has the potential to address a pressing issue in the fashion industry—sustainability. By enabling users to design clothing that perfectly aligns with their tastes, this project can potentially reduce clothing waste, as individuals are more likely to cherish and keep items that genuinely resonate with them. Additionally, the platform can serve as a breeding ground for testing eco-friendly materials and promoting responsible consumption, thereby advancing sustainability in the fashion world. In this sense, the "3D Outfit Customizer" project doesn't just redefine fashion as we know it, but it also pioneers a path towards a more conscious and eco-friendly future in the realm of clothing design, production, and consumption. It promises to be a pivotal game-changer, reshaping our approach to fashion in its entirety.

* **Purpose**

The primary purpose of the "3D Outfit Customizer" project is to reconcile the inherent limitations of traditional online shopping with the multifaceted preferences of today's fashion enthusiasts. While conventional online shopping platforms provide access to a wide range of clothing items, they often fall short in enabling users to personalize their selections fully. The "3D Outfit Customizer" addresses this gap by offering a comprehensive 3D customization solution, empowering users to create outfits that authentically reflect their personal style and preferences. This project intends to go beyond conventional shopping experiences and provide a platform where consumers can become fashion designers in their own right.

* **Scope**

The "3D Outfit Customizer" is an innovative online fashion destination that empowers users to design and customize their outfits in an immersive 3D environment. The platform will feature a virtual dressing room equipped with an extensive collection of clothing items, fabrics, styles, patterns, and accessories. Users will have the opportunity to visualize how their selections fit and drape on a 3D model, allowing them to make informed decisions. Furthermore, they can share their creations with friends and family and easily place orders for the customized outfits. The "3D Outfit Customizer" project aims to provide a highly user-friendly interface accessible on various devices, ensuring that users can engage with the platform seamlessly.

**Literature Survey**

To inform the development and design choices of the "3D Outfit Customizer," a comprehensive literature survey will be conducted. This survey will focus on current trends in the fashion industry, the state of online shopping platforms, and the utilization of 3D technology in fashion design and retail. By understanding the latest industry developments and consumer behaviors, we can make informed decisions about how to create a platform that not only meets current expectations but also anticipates and accommodates future trends in the fashion and technology sectors.

**Problem Definition**

The problem at the core of this project is the limited capability of existing online shopping platforms to facilitate a complete and personalized expression of individual style through 3D customization. The traditional online shopping experience often lacks interactivity and creativity, making it challenging for users to fully engage with the process and translate their unique fashion visions into reality. Consequently, this limitation hinders the fashion industry's ability to cater to the diverse and ever-evolving fashion preferences of consumers. The "3D Outfit Customizer" project seeks to resolve this issue by offering a dynamic and immersive solution that not only addresses these shortcomings but also sets a new standard for online fashion shopping experiences.

**Proposed Methodology**

The methodology for the "3D Outfit Customizer" project can be structured as follows:

1. **Requirements Analysis and User Research:** Begin with a detailed analysis of user expectations, fashion trends, and platform functionality. This stage involves gathering insights from potential users and industry experts to understand the unique project requirements.
2. **System Architecture Design:** Plan the technical infrastructure, database, and scalability of the platform, including the 3D environment and data security measures.
3. **Front-End and Back-End Development:** Employ web and mobile technologies for user interfaces and server-side components, ensuring an intuitive and responsive 3D design studio.
4. **Thorough Testing:** Conduct extensive testing for functionality, security, and performance, ensuring a seamless and secure user experience.
5. **Deployment and Continuous Integration:** Deploy the platform and establish continuous updates for ongoing enhancement.

* **Aim**

The aim of the project is to develop an interactive 3D virtual platform that allows users to design and customize their own outfits online while addressing the shortcomings of traditional online shopping.

* **Objective**

To study the 3D Outfit Customizer Systems

To curate a vast collection of clothing items, fabrics, styles, patterns, and accessories for users to choose from and customize.

To enable users to design and personalize outfits in a 3D virtual environment, fostering a sense of creativity and individuality in their fashion choices.

To provide users with an immersive and interactive platform that enhances their shopping experience by allowing them to express their unique style.

To offer a user-friendly interface accessible on various devices, making the customization process intuitive and accessible.

**Resources**

* **Hardware**
* Personal Computer
* Microsoft Windows 7/8/10/11 (64-bit)
* 4 GB RAM Minimum, 8 GB RAM Recommended
* Graphics Card
* **Software**
* Visual Studio Code
* WebStorm IDE
* NPM
* Node.js
* MongoDB
* Postman
* Selenium

**Action Plan**

1. Conduct a comprehensive literature survey to gather insights and trends.

2. Define the project's requirements and scope.

3. Develop the 3D virtual design studio and wardrobe.

4. Implement interactive elements and 3D previews.

5. Create sharing and collaboration features.

6. Develop personalization options.

7. Design and test the user-friendly interface.

8. Conduct thorough testing and quality assurance.

9. Launch and promote the "3D Outfit Customizer" platform.

**Industrial Survey**

**&**

**Literature Review**

**Project Title**

**3D Outfit Customizer: Design your own Custom Outfits Online**

**Abstract**

In today's fashion-forward world, the quest for the perfect outfit is paramount. Online resources have become the primary source for outfit inspiration, but these platforms often lack a comprehensive archive of 3D outfit models. In this project, we introduce a groundbreaking solution to this challenge. Creating a 3D outfit customizer web app is a complex task, particularly when it involves the fusion of React JS, WebGL, Next JS, and MongoDB.

The world of fashion, contains limitless desgin types but none of them can be as favourable as a custom one built by the customer. Our app simplifies the outfit customization process. Users can customize 3D models according to their tastes, and upload it to our databse, storing it efficiently in a key-value format within MongoDB. The keys reference image paths, while the values contain essential outfit information.

Upon visiting our web app, users input their outfit preferences. The app instantly loads 3D outfit models on the screen. Users can manipulate and customize these outfits, giving them a hands-on experience. This application is a game-changer for fashion enthusiasts, designers, and anyone in search of the perfect 3D outfit. It provides a seamless and interactive platform for outfit customization, empowering users to explore, create, and make informed fashion decisions.

**References**

[1] Dual-Mode User Interfaces for Web- Based Interactive 3D Virtual Environments Using Three.js - Matthew Stanton, Thomas Hartley, Fernando Loizides, and Adam Worrallo – 2017

[2] React JS – An Emerging Frontend Javascript Library - Pratik Sharad Maratkar and Pratibha Adkar – 2021

[3] Frontend Development with React.js - Anjali Rananavare – 2022

[4] React Apps with Server- Side Rendering: Next.js - Harish AJartarghar, Girish Rao Salanke, Ashok Kumar A.R, Sharvani G.S, Shivakumar Dalali - 2022

[5] React JS (Open Source JavaScript Library) - Alok Kumar Srivastava,Vaishnavi Laxmi, Payal Singh, Km Pratima, Vibha Kirti - 2022

[6] Modern Web- Development using React.js - Bhupati Venkat Sai Indla and Yogeshch - 2018

[7] Review on React JS - Dimpy Bansal - 2020

[8] Role of Node.js in Modern Web Application Development - Ghansham Jadhav1, Flavia Gonsalves 2 - 2020

[9] Comprehensive Analysis of React-Redux Hybrid App Development Framework - Shravan G V, Prof. Anitha Sandeep – 2020

[10] Survey And Analysis Of Rendering Realtime 3D Object On Cross- Browser & Cross- Platform Using WebGL - Yogiraj Patil, Kirti Wanjale – 2020

[11] Robust Real-Time Shadows for Dynamic 3D Scenes on the Web - Tim Nicolas Eicke, Yvonne Jung, and Arjan Kuijper - 2014

[12] Movie Data Visualization Based on WebGL - Min Li, Chunfang Li – 2021

[13] Comprehensive Analysis of React-Redux Development Framework - Shravan G V and Prof. Anitha Sandeep – 2020

[14] Server- Based Rendering of Large 3D Scenes for Mobile Devices Using G- Buffer Cube - Mapsn Juergen Doellne, Benjamin Hagedorn – 2020

[15] The Research and Design Of 3D Web Guide System Based On WebGL - Cui Peng – 2021

[16] Performance Optimization using MERN stack on Web Application - Sourabh Mahadev Malewade, Archana Ekbot – 2021

[17] Efficient visualization of 3D models by web browser - Bartosz Sawicki and Bartosz Chaber – 2013

[18] 3D Rubik's Cube - Online 3D Modeling System Based on WebGL - Buyun Sheng, Feiyu Zhao, Chenglei Zhang, Xiyan Yin, Yao Shu - 2017

[19] WEBAPP SERVICE FOR BOOKING - Saundariya K, Prabakaran D, - 2021

[20] HANDYM AN USING MONGO DB, EXPRESS JS, REACT JS, NODE JS - Abirami M,Srimathi B, Senthil Kumaran R, Nagarajan G (IEEE Member) - 2021

[21] Research and Application of Web3D Exhibition Based on WebGL and Html5 - M.J. Bian, J. Gao, H.H. Gao, J.P. Xu - 2015

[22] Web 2.0 and Virtual World Technologies: A Growing Impact on IS Education - Albert L. Harris and Alan Rea - 2009

[23] Investigating Web3D topics on StackOverflow: a preliminary study of WebGL and Three.js - Farag Almansou ry, Sègla Kpodjedo, and Ghizlane El Boussaidi – 2020

[24] A Framework for Browser-based Multiplayer Online Games using WebGL and WebSocket - Bijin Chen, Zhiqi Xu - 2011

[25] Immersive 3D Modeling with Blender and Off-the-Shelf Hardware Matthew Stanton, Thomas Hartley, Fernando Loizides, and Adam Worrallo - 2020

[26] Prasetyo, F. A. (2019). Badan Kepegawaian Negara (BKN). tribunnewswiki. https://www.tribunnewswiki.com/2019/10/24/badankepegawaian-negara-bkn (accessed Nov. 02, 2021).

[27] Yogyakarta, K. R. I. B. (2021). Wakil Kepala Bkn: Siasn Solusi Benahi Kualitas Data Kepegawaian. Yogyakarta.Bkn.Go.Id. https://yogyakarta.bkn.go.id/berita/2021/10/wakil-kepala-bkn-siasnsolusi-benahi-kualitas-data-kepegawaian (accessed Nov. 02, 2021).

[28] Falih, F. (2018). A Review Study of Information Systems. International JournaLof Computer Applications, 179(18), 15–19. doi: 10.5120/ijca2018916307.

[29] Venkat, B., Indla, S., Puranik, Y., Student, P. G., & College, P. E. S. M. (2021). Review on React JS. Journal Title, 5(4), 1137–1139.

[30] Bhalla, A., Garg, S., & Singh, P. (2020). Present Day Web-Development Using ReactJS. International Research Journal of Engineering and Technology, 7(5), 1154–1157

**Problem**

**Identification**

**Project Title**

3D Outfit Customizer: Design your own Custom Outfits Online

**Problem Statement**

Many online shopping platforms lack the depth and versatility required to cater to the diverse and ever-evolving fashion preferences of today's consumers. While they may offer a wide range of products, the ability to tailor and customize these items according to one's unique taste is often limited. Users are typically constrained to selecting from pre-designed options, which restricts their creative expression and can result in a generic shopping experience. This limitation hinders the full realization of personal style and makes it challenging for individuals to find and create outfits that truly resonate with their fashion sensibilities.

Furthermore, the absence of a comprehensive 3D customization solution within the fashion industry exacerbates this problem. The conventional 2D representation of clothing on online platforms fails to capture the subtleties of fit, style, and individual preferences, leaving a gap in the market for a more immersive and interactive solution. By introducing a 3D outfit customizer, this project aims to bridge this gap and empower users to explore and materialize their unique fashion visions, ultimately revolutionizing the way fashion is both experienced and consumed in the digital age.

**Purpose**

The primary purpose of the "3D Outfit Customizer" project is to reconcile the inherent limitations of traditional online shopping with the multifaceted preferences of today's fashion enthusiasts. While conventional online shopping platforms provide access to a wide range of clothing items, they often fall short in enabling users to personalize their selections fully. The "3D Outfit Customizer" addresses this gap by offering a comprehensive 3D customization solution, empowering users to create outfits that authentically reflect their personal style and preferences. This project intends to go beyond conventional shopping experiences and provide a platform where consumers can become fashion designers in their own right.

**Scope**

The "3D Outfit Customizer" is an innovative online fashion destination that empowers users to design and customize their outfits in an immersive 3D environment. The platform will feature a virtual dressing room equipped with an extensive collection of clothing items, fabrics, styles, patterns, and accessories. Users will have the opportunity to visualize how their selections fit and drape on a 3D model, allowing them to make informed decisions. Furthermore, they can share their creations with friends and family and easily place orders for the customized outfits. The "3D Outfit Customizer" project aims to provide a highly user-friendly interface accessible on various devices, ensuring that users can engage with the platform seamlessly.

**Features**

1. **Virtual Design Studio:** A 3D virtual environment where users can create, customize, and visualize outfits.

2. **Extensive Wardrobe:** A diverse collection of clothing items, fabrics, styles, patterns, and accessories to choose from

3. **3D Preview:** See how your design looks on a 3D t-shirt.

4. **Sharing** **and** **Collaboration**: Easy sharing of created designs with friends, family, or social media, promoting community interaction.

5. **User-Friendly Interface:** Intuitive navigation and user interface accessible on various devices.

**Advantages**

* Empowering users to create outfits that reflect their unique style.
* Providing realistic 3D models for accurate design visualization.
* Streamlining the shopping process by enabling the creation and purchase of custom outfits in one place.
* Offering an enjoyable and interactive online shopping experience.

**Disadvantages**

* Technical challenges related to achieving realistic 3D rendering.
* Limitations in accurately representing fabric textures in the 3D model.
* Complexity in maintaining website performance

**Project**

**Portfolio**

**Portfolio for Self Directed Learning for Major Project Work**

**Name of Student: ........…………………………………………………………….**

**Semester: …………………………………………………………………………..**

**Programme/Branch: ………………………………………………………………**

**Roll No: …………………………………………………………………………….**

**Title of the Project:**

**……………………………………………………………………………………….**

**Name and Designation of Project Guide: ……………………...………………………………………………………………..**

**Name of Institute: ……………………………………………………………………………**

**After Finalization of Project Topic & Formation of Project Team**

**(Answer to the following questions to be included in ‘Portfolio’ as reflection related to formation of group and finalization of project topic).**

1. **How many alternatives we thought before finalizing the project topic?**

**Ans.** Before finalizing the project topic, following are the alternatives we thought:

1. Video Streaming Application

2. Car Rental Service

3. React UI Framework

1. **Did we consider all the technical fields related to branch of our diploma programme?**

**Ans.** Before finalizing our topic for the project, we searched project on different domains covering all technical fields. We covered different topics like Internet of Things, Artificial Intelligence, Machine Learning, Data Science, Data Mining, Cloud Computing and many more.

1. **Why we found present project topic as most appropriate?**

**Ans.** It is the need of the hour as there is no similar technology available.

1. **Whether all the group members agreed on the present project topic? If not? What were the reasons of their disagreement?**

**Ans.** There were some disagreements initially for other topics but for our present topic, there was none.

1. **Whether the procedure followed in assessing alternatives and finalizing the project topic was correct? If not then discuss the reasons.**

**Ans.** While assessing alternatives and finalizing the project topic our HOD played a vital role. She suggested our topic and gave us proper guidance on how to complete our project. She told us to refer various IEEE papers published on similar topics and report her back. Hence, the procedure followed in assessing alternatives and finalizing the project topic was correct.

1. **What were the limitations in other alternatives of project topic?**

**Ans.** Car Rental Service: The hardest part was to set up a real payment system with real-time maps

Video Streaming Application: The hardest part was to come up with a new feature in streaming that could rival the likes of YouTube a multi-billion dollar company

1. **How we formed our team?**

**Ans.** Since the three of us went to the same gym and the same industry during our Industry Training so we decided to learn web development and formed a team together.  
Group Members:

1. Abdurrahman Qureshi
2. Oaish Qazi
3. Shaikh Mohammed Hussain
4. **Whether we faced any problem in forming the team? If yes, then what was the problem and how was it resolved?**

**Ans.**  We initially thought that the group would comprise of 4 members and so we planned accordingly but we were disappointed to know it later that the maximum group strength is 3.

1. **Am I the leader of our project team? If yes, then why was I chosen? If not, why I could not become the project team leader?**

**Ans.** No, Abdurrahman Qureshi is our group leader. I lacking leading skills and capabilities

1. **Do I feel that present team leader is the best choice available in the group? If yes, then why? If not then why?**

**Ans.** Yes, he’s capable enough to lead the team

1. **According to me who should be the leader of the team and why?**

**Ans.**  Present group leader should be and is already the leader of the team.

1. **Can we achieve the targets set in the project work within the time and cost limits?**

**Ans.** We think we can achieve the targets that we set in the project work within the time and cost limits. We believe that earlier start can help us to complete the project much earlier and in turn will save our time and cost.

1. **What are my good/bad sharable experiences while working with my team which provoked me to think? What I learned from these experiences?**

**Ans.** Working with the present team is much easier as we understand each other very well. A good sharable experience while working with my team is that we know each other’s weaknesses and strengths which allows us to assign the task to the right person. But, when the job is quite difficult, we as a team try to solve it where each one of us put equal efforts.

1. **Any other reflection which I would like to write about formation of team and finalization of project title, if any?**

**Ans.** As mentioned earlier, we all are satisfied with team formation and project topic finalization. We just need to give our best and make this project live as soon as possible. We didn’t get to face difficulties in the above activities.

**After Finalization of Project Proposal**

**(Answer to the following questions to be included in ‘Portfolio’ as reflection on planning)**

1. **Which activities are having maximum risk and uncertainty in our project plan?**

**Ans.** As we are the first group implementing this project. The activity having higher risk is to find the correct way in implementing the project. Once we find the correct way for implementing the project our task will become much easier.

1. **What are most important activities in our project plan?**

**Ans.** The most important activity or part in our project plan is working in new environment, new languages and to implement 3D Models on the web which has the major role.

1. **Is work distribution is equal project group members? If not? What are the reasons? How we can improve work distribution?**

**Ans.** We first classified the activities, we need to complete for project development. After classifying the activities, we distributed it among us. While distributing the activities, we assigned the activity to the group member who is good in it. That’s where the disparities arise, that each member is good at something but that something may not have that much role in the project, So the work distribution is not equal but fair enough.

1. **Is it possible to complete the project in given time? If not, then what are the reasons for it? How can we ensure that project is completed within time?**

**Ans.** After classifying the activities, we assigned them the minimum time required for their completion. After summing up, the time required by all the activities we can conclude that we can complete the project in the given time.

1. **What extra care and precaution should be taken in executing the activities of high risk and uncertainty? If possible, how such risks and uncertainties can be reduced?**

**Ans.** While executing activities with higher risk, we should put up more efforts and all the group members should contribute to make the activity less effective. Activities with higher risk should be started earlier in case it requires more time.

1. **Can we reduce the total cost associated with the project? If yes, then describe the ways.**

**Ans.** Developing a website requires use of many technical tools. They may be paid software’s and working with them might be difficult and costlier. So, we need to find the best alternative which can provide us the same features and reduce the cost associated with the project.

1. **For which activities of our project plan, arrangement of resources is not easy and convenient?**

**Ans.** For implementing our project, we require software like WebStorm IDE, Blender, VS Code, etc. which only runs on high end computer systems. But we will find ways to overcome this problem.

1. **Did we make enough provisions of extra time/expenditure etc. to carry out such activities?**

**Ans.** As we have assigned the minimum time required by an activity, so we can make a prediction on how much time our project needs to get completed. Activities which require more time can be started earlier and finished without any delay in the completion of the project.

1. **Did we make enough provisions for time delays in our project activity? In which activities there are more chances of delay?**

**Ans.** As mentioned earlier, we require more time in project implementation as we are the first people implementing the project. So, we are well prepared that we start the implementation part earlier so that it doesn’t delay our project completion.

1. **In our project schedule, which are the days of more expenditure? What provisions we have made for availability and management of cash?**

**Ans.** In our project schedule, implementation activity requires more expenditure in both effort and cost as it might require paid applications and paid IEEE papers. It will require more effort and equal contribution of each group member.

1. **Any other reflection which I would like to write about project planning?**

**Ans.** In project planning, we distributed the project work and searched for the best possible way to complete our project. Some activities which require more time and effort should be started earlier with proper planning.

**Project**

**Logbook**