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*I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.*

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# 1. Introduction

Rapid growth of technology is a lot flexible in changing the consumer behaviour and the operational working area of the food services industry through online food and drink web applications. These platforms have done miraculously well and studies show the online food delivery market revenue skyrocketed from $90 billion in 2018 to $294 billion in 2021, all due to the ease and speed involved. The impact of this change in the ordering of food has left incumbent restaurants no choice but to adopt these online ordering integrations for their businesses and, where possible, seek to establish virtual restaurants (aka ghost kitchens), to fully capitalize on the uptick in demand in food ordered via the internet. However, the digital shift also presents some hurdles — especially around user interface design, delivery logistics and ensuring food remains healthy throughout take-out stages. It will be critical for the customer experience and long-term viability of the online food and drink service as to how these issues are tackled. (Charlene Li, 2020).

## 1.1.1 Problems:

Major Problems were identified as :

* **Limited Customization Options for Customers**

Due to the inability of customers to customize their food and drink orders according to their preferences, customers tend to get dissatisfied.

* **Inefficient Order Management for Restaurant**

This can lead to delays, errors, and lack of streamlined operations if orders are still being managed manually or through outdated systems.

* **Absence of an Integrated Platform**

Restaurants are using different platforms for menus, orders, and customers.

* **Lack of Real-time Updates**

Real-time tracking is impossible for customers, causing confusion and a loss of confidence in the service.

## 1.1.2 Solutions

The web app will enable users to:

Customizable Drink Options:

Offer a feature that lets customers create their own drinks with chosen ingredients and proportions. You will also have a quick way to order defaults.

Centralized Order Management System:

Integrate inventory, order tracking and reporting into one order management dashboard for restaurant staff.

Unified Web Application:

Streamlining operational overhead by creating a single platform to manage menus, accept orders, track delivery, and engage with customers.

Real-time Order Tracking:

Implement real-time tracking for customers to track their items from preparation to delivery, increasing transparency and customer satisfaction.

Personalized User Accounts:

Provide accounts that allow users to save preferences, see past orders, and get recommendations based on their previous activity.

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# 2. Aims and Objectives

## 2.1 Aim

This project aims to digitize the food and beverage industry in Nepal through a dynamic web app that gives power to both local restaurants and consumers. It streamlines digitization of small businesses, improves customer experience by allowing them to personalize their own drinks, and helps local food restaurants compete with some bigger chains. This project emphasises towards enhancing convenience in urban semi urban areas by catering to individual cultural preferences of Nepal through efficient order and Inventory management & is determined to build the growth & innovative edge of the private food segment to bring on a blur between home food & restaurant.

## 2.2 Objectives

* Implement a web-based food and drinks ordering system for customers to access or the restaurant itself to manage.
* Offer a familiar experience for customers to customize their beverages for individual preferences.
* In case of custom orders, it ensures timely order processing along with info on meal/ drinks preparation and delivery time.
* Getting Started with Creating a Strong Backend in Node js and Express to manage availability of customization in real-time and handle custom order processing.
* Develop a React-based frontend that should be user-friendly by facilitating the selection of ingredients for each drink and easily navigating through the menu.
* MongoDB will be used to store the availability of ingredients, user preferences, and order histories in a scalable database structure.

# 3. Expected Outcomes and Deliverables

* + **Expected Outcomes:**
  + **Effortless Food Ordering Process:**
  + **Script for a tool available to customers to search through the items on a menu**
  + **Add customisation option for drinks**
  + **Particular function that allows users to customize to their taste (for their drinks).**
  + **Efficient management of restaurant:**
  + **Tools in the backend for restaurant helpers to update menus, keep track of orders, and dine customer feedback, etc.**
  + **Improved User Engagement:**
  + **Enables customer feedback by integrating customer reviews and rating modules.**
  + **Localized Payment Options:**
  + **Get integrated with Nepal-specific payment gateways like eSewa and Khalti in a secure way.**
  + **Scalability And Accessibility**
  + **This is a responsive website that loads the optimal user experience for the users on desktop, tablet and mobile devices.**
  + **Improved Customer Satisfaction:**
  + **To help improve customer retention and satisfaction through a gated and responsive system.**

**Deliverables:**

**Functional Web Application:**

**A full working MERN-stack web application that includes food-ordering, drink customization and managing customer accounts.**

**Admin Dashboard:**

**An order management system, menu item configuration and sales performance dashboard.**

**Payment Integration:**

**Complete payment gateway systems to facilitate smooth transactions.**

**Documentation:**

**The user guide consists of step by step guide for the customers and the restaurant staff to use the features available on the platform.**

**Technical Documentation : Insights on system architecture, data flow and deploying the system.**

**Testing Reports:**

**User application documentation: Test scenarios, results, and resolutions demonstrating application functionality, usability, and performance.**

**Deployment:**

**The demo is a locally hosted version with pointers on future deployment to a production server.**

# 4. Project Risks, Threats, and Contingency Plans

## 4.1 Project Risks

**Tech Stack Compatibility:**

**As for the MERN stack components, potential integration difficulties are possible due to compatibility concerns, especially with MongoDB's query strategies for multi-recipe food combinations.**

**Lack of Skilled Resources:**

**Since I have only just started learning the MERN stack, it might take some time to implement advanced features, which may slow down the process.**

**Local Machine Setup Issues:**

**Local development environment related problems like installation issues with necessary dependencies (Node. js, MongoDB), packages conflicts, or lack of hardware to run the application smoothly etc. can slow down the process.**

**Technical Failures:**

**If the system crashes or the application is down, the user will not be able to customize or order their drink.**

**Ingredient Availability:**

**Hardware may not always be readily available for all components.**

**User Confusion:**

**If the customization process is not done in an intuitive way, or if the user receives no guidance on how to use such features, this might make it complicated for the users.**

**Payment Gateway Issues:**

**Inability to integrate with or maintain Nepal-specific payment gateways (such as eSewa or Khalti) may lead to obstacles in smooth payment processing.**

**Scalability and Performance:**

**The increased load during peak hours could slow the response time or lead to server overload and reduce user satisfaction.**

## 4.2 Contingency Plans

**Tech Stack Validation and Prototyping**

**Focus on early days tech stack (MERN) setup and mongo and react integration test. Create prototypes for complex features to ensure they will play nice.**

**Training and Development of Competencies:**

**First spend some time learning the fundamental in tools of MERN stack like online courses and resources, and in the initial stage of the development phase, try to go in a phased manner to adapt to the associated dev complexity.**

**Local Machine Setup:**

**Check the specifications of your local machine and verify you can run local development tools (Node. js, MongoDB). Test your dev environment with a sample project ahead of time to avoid any issues with package installations or system dependencies so ya'll are ready when Oct 2023 rolls around.**

**Strong Backup and Recovery Systems:**

**Scheduling regular data backups and implementing recovery solutions will ensure minimal downtime in the face of technical failures.**

**Options for Substituting Ingredients:**

**Use substitutes for drink ingredients when you run out of some items to keep serving.**

**User Interface Optimization:**

**To be able to encourage the employee to use the drink customization, work on comprehensive UX testing, providing the tools needed for UI components along, with tooltips to help, instructions in steps.**

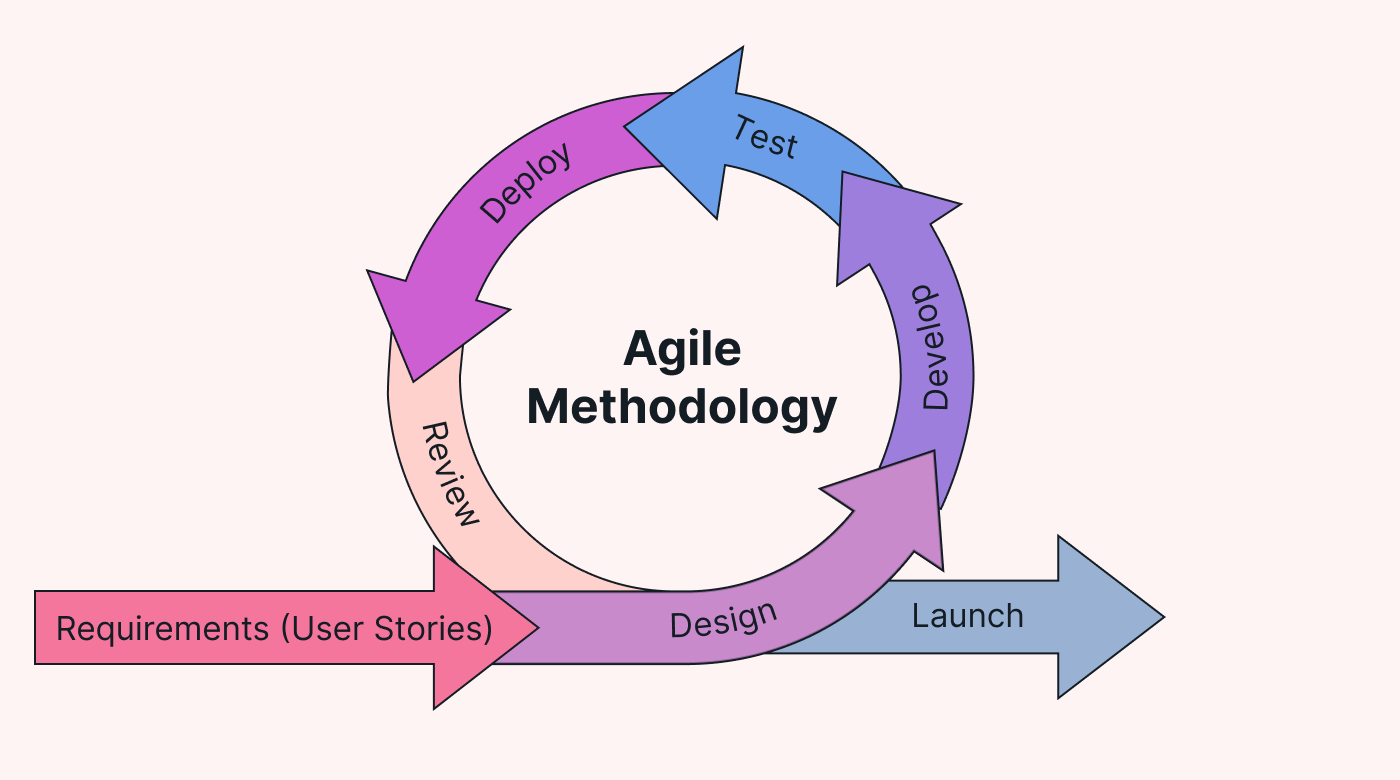
**Payment Gateway Alternatives:**

**In order to avoid risks with eSewa or Khalti, it is advisable to have multiple payment methods like cash-on-delivery or integration with some other reliable sites/ Gateways.**

**Performance Optimization:**

**Use cloud services to dynamically adjust server capacity and optimize database queries to maintain responsiveness during high traffic periods.**

# 5 Methodology

The Food Web Application is going to be developed and implemented using the Agile methodology, under the premise of the Scrum framework. Adopting this approach ensures responsiveness to changes as requirements evolve, incremental progress, and frequent deliverables containing functional units. So this project is naturally perfect for Scrum, because it is an iterative development process and very complex and user-centered to be in constant feedback to improve open to key users and interested.

**Key Elements**

1. **Roles:**
2. **Product Owner: Feature prioritization (drink customization, order management, payment integration, etc.**
3. **Scrum Master — Facilitates and helps the team to prevent roadblocks and work together in the framework.**
4. **Development Team: Responsible for developing the web application through design and testing.**
5. **Artifacts:**
6. **Product Backlog: Customize your drink, generate dynamic menu, real time order tracking sand local payment system integration (khalti, esewa)**
7. **Sprint Backlog: A list of features and tasks committed to be worked between the two sprints.**
8. **Increment: The running application with new functionality added that has been developed during each sprint.**
9. **Ceremonies:**
10. **Sprint Planning: Identify sprint objectives, prioritize IB features, task assignment to the development team.**
11. **Standups: 15-minutes long meetings to give updates.**
12. **Sprint Review: Show the finished increment to stakeholders, receive feedback, and assess user satisfaction.**
13. **Sprint Retrospective: Analyze the results of the sprint and discuss shortcomings, suggesting improvements for the next sprint.**

**Benefits of Using Scrum for This Project**

**Advantages of Implementing Scrum For This Project**

**Flexibility & Adjustment to Client Needs:**

**The food web application can be improved incrementally with the help of scrum's iterative process at the end of each sprint. This is crucial for adjusting to any changes in client needs or feedback as development of features such as drink customization, user interface optimization, and payment gateway integration progresses. Stakeholders can see progress and provide feedback at regular sprint reviews to ensure the final product meets client needs and expectations.**

**Faster Delivery of Features:**

**The Scrum framework divides more significant features (for example, drink customization or payment processing) into smaller tasks or user stories, that are easier to accomplish within a short period. This allows features to be released incrementally: clients can start using and providing feedback on the already implemented features while other parts are still being polished. So if we want to make a drink customization feature, we can build and ship just the prototype in the first sprint, and then we can iterate on the features of the drink in subsequent sprints.**

**Clarity and Investment in Stakeholder Relationships:**

**Scrum also enables communication across the project thanks to daily standups and sprint reviews that make sure problems are tackled head on while ensuring the broader project is on-track and aligned with what the stakeholder expects. Stakeholders are able to directly see and experience working features at the end of each sprint, so they have a chance to ask for changes or improvements early in the process.**

**Effective Risk Management:**

**Scrum is oriented towards early risk detection. Because the development cycles are so short, it compels teams to mitigate risks associated with technology or problems with project requirements early on in the process. Challenges with technologies such as the MERN stack for example can be learned and applied iteratively on a sprint by sprint basis. Additionally, decreasing risks such as ingredient availability, payment gateway integration, and any other technical problems with regular backlog grooming and sprint planning.**

**Continuous Improvement:**

**The retrospective meetings are an opportunity for the team to reflect on what went well and what went poorly at the end of each sprint (a given period of work in Scrum). The iterative process allows the development of best practices, like improving user interface or easing of the issues raised by users. This constant feedback loop helps address scalability, feature implementation, or technical issues early on, enabling adaptability and efficiency during the project.**

**A Tight Focus on Quality and UX:**

**Scrum values and works around iterations/release cycles, enabling deployment of small and working versions of the application with adherence to QA with each sprint. For instance, the drink customization feature can be regularly and early tested as one of the UI/UX tests. It assists with discovery of user interface or user experience problems to quickly resolve them and makes sure that application is user- friendly and intuitive.**

**Improved Collaboration and Communication:**

**Scrum promotes cross-functional collaboration, even in smaller teams, via daily standups, sprint reviews and retrospectives. Using this form of communication helps the development team and stakeholders to work effectively and make sure that every part of the application is developed in coherence with others. It minimizes miscommunication among all the people involved and helps out the smooth sailing of projects.**

**Scope Changes:**

**The backlog grooming process of Scrum is very effective for scope change management. The client prefers agile methodology so any new requirements / features from the client can be prioritized in a product backlog and implemented in a subsequent sprint. New drink ingredient options, extra customization features and such can be added into the system without affecting project flow and keeping things agile.**

**Delivery predictions and milestones:**

**Scrum allows you to have a clear goal for each sprint. The first sprint could set up the frontend, the next sprint could handle backend functionality, a sprint could be dedicated to payment integration, and a final sprint could be for performance optimization. This allows you to see whether features will be delivered on time, helping manage internal timelines and better align functionality with client expectations.**

# 6. Resource Requirement

To ensure the successful development, testing, and deployment of the Food Web The following resources and tools will be used to ensure that the Food Web Application is developed, tested and deployed successfully:

Hardware Requirements

Personal Computer (Desktop/Laptop): A high-performance PC or laptop computer with at least:

CPU: Intel i5 11th gen.

RAM: 8GB (Recommended: 16GB for smooth and faster)

Storage: 512GB SSD

Operating System: Windows 11

An active high-speed internet connection to support uninterrupted communication, development and deployment processes.

Software Requirements

Frontend Development:

React. js: To create a dynamic and user-friendly interface.

Material-UI / TailwindCSS: For designing components to ensure contextual coherence.

Redux or Zustand: for state management to manage complex user interactions.

Backend Development:

Node. js with Express. js: To handle the server-side application to make it more robust and scalable.

Authentication Libraries: Packages used to authenicate and authorize users securely (e.g. JWT, bcryptjs).

API Testing Tools: For Testing backend API endpoints from postman to thunder client.

Database Management:

MongoDB: To save and manage user preferences, ingredient data, order info.

Mongoose: To create a schema and interface with MongoDB.

DevOps and Deployment:

GitHub or GitLab – For version controlling, collaboration, and storing code repositories

Docker: To containerize the application and ensure that it can run in any environment.

Hosting Platform (Like: Vercel, Heroku, or AWS) — To deploy the application.

Design and visualization tools

Wireframing and Prototyping:

[Moqups or Figma] For interactive wireframes

Flowchart Design:

Microsoft Visio or Draw. io: For visualizing system architecture, workflows and software development processes.

Project Management & Documentation

Gantt Chart Tool: (e.g., Gantt Project, MS Project, or Asana) For providing a visual project timeline.

Testing and Debugging Tools

Unit Tests: Jest or Mocha for unit testing of various components and modules.

Browser Debugger: Chrome Developer Tools / Firefox DevTools to locate frontend errors.

# 7. Work Break Down structure:

A black and white diagram

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# 8. Milestone chart

A screenshot of a calendar

Description automatically generated

# 9. Gantt chart

A screenshot of a project

Description automatically generated

# 10 Conclusion

The Grill and Bakes Family Restaurant is a project that focuses on revolutionizing the food and beverage side of things and delivering a user-friendly, feature-rich web application that addresses the specific requirements of the Nepali landscape. User can customize their drink, track their order in real-time and pay for it through the in-app payment gateways like eSewa and Khalti for an enhanced and more personalized experience for the customers. The application is built with the latest technologies React, Node. js and MongoDB and are built to scale fast, perform, and respond at excellent user experiences on any device. It provides restaurant operators with direct and scopes of menu management, order tracking and finding their customers with an easy and efficient adaptation to see the contemporary manners of eating. It aims to elevate customer satisfaction and assist local businesses on the path of digital transformation, thereby promoting innovation and growth for the food service sector in Nepal

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