

Higher Nationals

Internal verification of assessment decisions – BTEC (RQF)

INTERNAL VERIFICATION – ASSESSMENT DECISIONS			
Programme title	Higher National diploma in Computing		
Assessor	Mr. Isura Kilathilaka	Internal Verifier	Mr.Lakindu Premachandra
Unit(s)	Unit 28 :Prototyping		
Assignment title	Developing and Testing a prototype for Kuoni		
Student's name	Ranudi Gayathmie Kariyapperuma		
List which assessment criteria the Assessor has awarded.	Pass	Merit	Distinction
INTERNAL VERIFIER CHECKLIST			
Do the assessment criteria awarded match those shown in the assignment brief?	Y/N		
Is the Pass/Merit/Distinction grade awarded justified by the assessor's comments on the student work?	Y/N		
Has the work been assessed accurately?	Y/N		
Is the feedback to the student: Give details: • Constructive? • Linked to relevant assessment criteria? • Identifying opportunities for improved performance? • Agreeing actions?	Y/N Y/N Y/N Y/N		
Does the assessment decision need amending?	Y/N		
Assessor signature			Date
Internal Verifier signature			Date
Programme Leader signature (if required)			Date

Confirm action completed			
Remedial action taken Give details:			
Assessor signature			Date
Internal Verifier signature			Date
Programme Leader signature (if required)			Date

Higher Nationals - Summative Assignment Feedback Form

Student Name/ID	Ranudi Gayathmie Kariyapperuma KIR/X -00104243		
Unit Title	Unit 28 : Prototyping		
Assignment Number	1	Assessor	
Submission Date	30.10.2023	Date Received 1st submission	
Re-submission Date		Date Received 2nd submission	

Assessor Feedback:

LO1 Explore forms of prototypes appropriate for various functionality and end user testing requirements.

Pass, Merit & Distinction P1 P2 M1
 Descripts

LO2. Plan a prototype for specific target end users and planned tests.

Pass, Merit & Distinction P3 P4 M2 M3 D1
 Descripts

LO3. Develop multiple iterations of the prototype using appropriate tools.

Pass, Merit & Distinction P5 P6 M4 M5 D2
 Descripts

LO4. Evaluate user feedback and test results from multiple iterations of the prototype and end user testing.

Pass, Merit & Distinction P7 M6 D3
 Descripts

Grade:	Assessor Signature:	Date:
Resubmission Feedback:		
Grade:	Assessor Signature:	Date:
Internal Verifier's Comments:		
Signature & Date:		

* Please note that grade decisions are provisional. They are only confirmed once internal and external moderation has taken place and grades decisions have been agreed at the assessment board.

Assignment Feedback

Formative Feedback: Assessor to Student

Action Plan

Summative feedback

Feedback: Student to Assessor

Assessor signature		Date	
Student signature		Date	

General Guidelines

1. A Cover page or title page – You should always attach a title page to your assignment. Use previous page as your cover sheet and make sure all the details are accurately filled.
2. Attach this brief as the first section of your assignment.
3. All the assignments should be prepared using a word processing software.
4. All the assignments should be printed on A4 sized papers. Use single side printing.
5. Allow 1" for top, bottom , right margins and 1.25" for the left margin of each page.

Word Processing Rules

1. The font size should be **12** point, and should be in the style of **Time New Roman**.
2. **Use 1.5 line spacing.** Left justify all paragraphs.
3. Ensure that all the headings are consistent in terms of the font size and font style.
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3. Ensure that you give yourself enough time to complete the assignment by the due date.
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6. If you are unable to hand in your assignment on time and have valid reasons such as illness, you may apply (in writing) for an extension.
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10. If you are proven to be guilty of plagiarism or any academic misconduct, your grade could be reduced to A REFERRAL or at worst you could be expelled from the course

Higher National Diploma in Business

Assignment Brief

Student Name /ID Number	Ranudi Gayathmie Kariyapperuma KIR/X -00104243
Unit Number and Title	Unit 28: :Prototyping
Academic Year	2021/22
Unit Tutor	Mr. Isura Kilathilaka
Assignment Title	
Issue Date	18.09.2023
Submission Date	30.10.2023
IV Name & Date	

Submission format

The submission should be in the form of an individual written report. This should be written in a concise, formal business style using single spacing and font size 12. You are required to make use of headings, paragraphs and subsections as appropriate, and all work must be supported with research. You must provide in-text citations and the reference list using Harvard referencing system.

The recommended word count is 4,000–4,500 words excluding annexures. Note that word counts are indicative only and you would not be penalised for exceeding the word count.

Unit Learning Outcomes:

LO1. Explore forms of prototypes appropriate for various functionality and end

	<p>user testing requirements.</p> <p>LO2. Plan a prototype for specific target end users and planned tests.</p> <p>LO3. Develop multiple iterations of the prototype using appropriate tools.</p> <p>LO4. Evaluate user feedback and test results from multiple iterations of the prototype and end user testing.</p>
	Assignment Brief and Guidance:

Scenario

Kuoni has been a global leader in the travel industry for the past 110 years. They are not the typical travel agency people have in mind. In order for Kuoni to create tailor-made trips, travel experts listen to what the customers want and then create a vacation that's right for them and their budget. So far they have been doing everything offline, only recording basic things online for the customer to view. The management of the trip is very basic however, customers today are demanding more digital experiences and more control over their purchases. In order to facilitate this requirement, the management has decided to create a web-based application to enquire and manage the travel requirements of the customer.

The generic requirements of Kuoni have not been clearly defined, where the team is tentative towards a creative and a complete web application that would suffice their business needs. The essential requirement are as follows.

- Customer Should be able to make an inquiry without login, and he/she should be able to track his enquiry with an enquiry ID.
- First, the customer should select whether he/she is a local or a foreign customer, and then must provide the intended number of days that he/she shall stay, as well as how many adults and children will be travelling.
- Then the customer must select the destinations he/she prefer, the customer should only be allowed to choose the number of destinations based on the number of days staying with the organisation.
- Then based on the requirement, the customer should be able to choose the hotel chain, and the types of rooms required. The selection and the pricing should be generated based on his/her duration and the package. You are free to assume the flow order of the website as per your preference
- Customer should also be able to choose traveling type, with various agencies to select. The Management expects you to make your own assumptions and selection here as well.
- After the enquiry, enquiry form should collect the basic information of the client, and upon completion of enquiry form, the enquiry ID should also be generated.
- If the Customer choose to register with the website, he/she should be able to manage his/her enquiries and bookings trough his personal dashboard.

- The administrator can login and manage enquiries, agencies, hotel chains etc. (Should be able to perform CRUD applications on selected entities.)
- The customer query generation should be optimal, where the result should be based on customer's travel type, destinations, and his/her expected budget. (adding separate plans ie: luxury and economy will make this easier)
- Management expects an attractive design with UI and UX
- Alpha and Beta Versions must be released and should identify/modify appearance and/or functions, based on the user review.

The management of Kuoni Leisure is looking forward to see how these requirements would be met and what would be the feedback of the users and the clients. They expect an open dynamic design while their initial requirements are met. The management insists on creating an alpha and beta version of the product, and test in on functionality and user experience.

As the Project Manager, you are required to provide complete web-based management system with design mock-ups and reports which you will generate along the process.

Task 01

- 1.1. Recognize specific forms of prototyping use in the software products development and review how these specific prototypes can be used to test the functionalities and end user testing requirements. Your answer should include a review to the advantages and disadvantages of identified prototyping formats and appropriateness of them to meet different testing outcomes.
- 1.2. Evaluate the standard tools that can be used for prototyping and how they can be used in identifying and testing user requirements effectively in the context of Kuoni Leisure.

Task 2

- 2.1. Review different end user categorization, classification, and behaviour modelling techniques available in prototyping and by applying them select the most appropriate prototyping methodology for above given scenario.

2.2. Explore a specific end user from the user population and suggest a suitable prototyping methodology that can be used to test the requirements of the selected end user. Provide justification to the selection of the prototyping methodology and suggest a plan to test the end user requirement of the selected end user effectively.

Task 3

3.1. Explore and employ appropriate prototyping tools and Develop a prototype to test the user requirements for the selected end user.

3.2. Perform an experiment with the end user and based on the most important feedback, modify the prototype. Create multiple iterations of your prototype by considering the enhancements required in each iteration based on end user feedback until you are satisfied with the final outcome.

Task 4

Analyse the end user feedback gathered from the multiple iterations of the prototype and critically review the overall successful the final prototype you developed when comparing with the original plan developed to test user requirements. Evaluate the impact of prototyping methodology to effectively meet the objectives of software development life cycle by taking examples from the prototyping methodology you followed for Kuoni Leisure.

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ACKNOWLEDGEMENT

At last author would like to share the experience while doing the project. Author learns many new things about the projects. The best thing which author can share is that author developed more interest in this subject. This Module gave an interest to the author to find more information about it. .

A very special thanks to Mr.Isuru Kulathilaka who teach us this subject and Author thanks for who helped author to do this kind of project. Thank you!

Regards,

The author,

Ranudi Kariyapperuma.

Table of Contents

Introduction of Prototyping.....	19
Advantages of Prototyping.....	19
Disadvantages of Prototyping	20
Introduction about SDLC(Software Development Life Cycles).....	22
Steps of SDLC(Software Development Life Cycles)	22
Introduction to Prototyping Model	24
Advantages of Prototyping Model	24
Disadvantages of Prototyping Model.....	25
Different Types of Prototyping Models	27
Vertical Prototype	37
Advantages of Vertical Prototypes	38
Disadvantages of Vertical Prototypes	39
Horizontal Prototype	40
Advantages of Horizontal Prototypes	40
Disadvantages of Horizontal Prototypes.....	41
Evaluating standard tools available for use in prototyping.....	42
Wireframing and Mockup Tools.....	42
Balsamiq.....	43
Axure RP	45
Adobe XD	47
Sketch.....	49
Figma	51
Prototyping Tools for Interaction Design	53
InVision.....	53
Proto.io	55
Framer	57

Code-Based Prototyping Tools	59
HTML/CSS/JS	59
React/Angular/Vue.js	60
UI Design and Prototyping Tools	61
Adobe Creative Suite (Photoshop, Illustrator)	61
Figma/Adobe XD	62
Collaborative Prototyping Tools	63
Miro/Mural	63
Slack/Teams	64
Reviewing and Exploring Different End-user Categorizations, Classifications and Behaviour Modelling Techniques	65
Types of End-User Categorisations and Classifications	65
End-user Requirement Gathering Methods and Techniques	66
Initial Prototyping	68
Types of Initial prototyping	68
Paperboard Prototypes	68
Contextual Prototyping	69
Digital Prototyping.....	71
Native Prototyping	72
Applying end-user classification and behaviour modelling to Web Based Application of Kuoni Leisure Travel Agency.....	73
Suggesting a plan to use appropriate prototyping methodology and tools to conduct end user testing.....	74
The impact of common prototyping methodology within the software development lifecycle	75
Appropriate tools to develop multiple prototypes.....	76
Hypermedia Management Tools	76
Interface Builder Tools	76

4th Generation Systems	77
Object-Oriented Application Frameworks	77
Web Application prototype	77
Gaining access to the prototype of the Kuoni Leisure web-based system and justifying the prototype methodology used.....	78
The Interface and the Functions.....	79
Alpha Version I of Kuoni Leisure Web Based Application Prototype.....	83
End user feedback analysis for Alpha Version I prototype	92
Analyzed reports on the feedback given by the end users on the Alpha Version I prototype of the Kuoni Leisure web based application	94
Justifications from Author	97
Alpha Version II of Kuoni Leisure Web Based Application Prototype	98
End user feedback analysis for Alpha Version II prototype	107
Analyzed reports on the feedback given by the end users on the Alpha Version II prototype of the Kuoni Leisure web based application	117
Home page	117
User Menu and User Dashboard	119
Sign in and Sign up	122
Contact us and About us	124
Travel Packages	126
Justification from Author	128
Beta Version of Kuoni Leisure Web Based Application Prototype.....	129
End user feedback analysis for Beta Version prototype	138
Analyzed reports on the feedback given by the end users on the Beta Version prototype of the Kuoni Leisure web based application	140
Justification from Author	142
Analysis of whether the final prototype met the initial requirements	143
References	144

Table of Figures

Figure 1 : Throwaway Prototyping	29
Figure 2 : Balsamiq	43
Figure 3 : Axure RP	45
Figure 4 : Adobe XD.....	47
Figure 5 : Sketch	49
Figure 6 : Figma.....	51
Figure 7: Invision	53
Figure 8: Proto.io	55
Figure 9 : Framer.....	57
Figure 10 : HTML/CSS/JAVASCRIPT	59
Figure 11: React/Angular/Vue.js	60
Figure 12 : Adobe Creative Suite (Photoshop, Illustrator)	61
Figure 13 : Miro/Mural	63
Figure 14 : Slack/Teams	64
Figure 15 :Alpha version I (Home Page Interface) Developed by Author	83
Figure 16 : Alpha version I (User Menu Page Interface) Developed by Author	83
Figure 17: Alpha version I (User Dashboard Page Interface) Developed by Author	84
Figure 18: Alpha version I (Sign In Page Interface) Developed by Author	84
Figure 19: Alpha version I (Sign Up Page Interface) Developed by Author.....	85
Figure 20: Alpha version I (Contact Us Page Interface) Developed by Author	85
Figure 21: Alpha version I (About Us Page Interface) Developed by Author	86
Figure 22 : Alpha version I (Inquiry Page Interface) Developed by Author	86
Figure 23: Alpha version I (Guest Inquiry Page Interface) Developed by Author.....	87
Figure 24: Alpha version I (Inquiry Tracking Page Interface) Developed by Author.....	87
Figure 25: Alpha version I (Travel packages world Page Interface) Developed by Author ...	88
Figure 26: Alpha version I (Travel packages Sri Lanka Page Interface) Developed by Author	88
Figure 27: Alpha version I (Admin Menu Page Interface) Developed by Author	89
Figure 28: Alpha version I (Inquiry Management Page Interface) Developed by Author	89
Figure 29: Alpha version I (Guest inquiry Management Page Interface) Developed by Author	90
Figure 30: Alpha version I (Travel Packages Management Page Interface) Developed by Author	90

Figure 31 : Alpha version I (Management portal panel Page Interface) Developed by Author	91
Figure 32 : Alpha version I (Question Form Part 1) Developed by Author	92
Figure 33 : Alpha version I (Question Form Part 2) Developed by Author	93
Figure 34: Alpha version I (Feedback Analysis) Developed by Author.....	94
Figure 35: Alpha version I (Feedback Analysis) Developed by Author.....	94
Figure 36: Alpha version I (Feedback Analysis) Developed by Author.....	95
Figure 37: Alpha version I (Feedback Analysis) Developed by Author.....	95
Figure 38: Alpha version I (Feedback Analysis) Developed by Author.....	96
Figure 39: Alpha version I (Feedback Analysis) Developed by Author Error! Bookmark not defined.	
Figure 40 : Alpha version II (Home Page Interface) Developed by Author	98
Figure 41 : Alpha version II (User Menu Page Interface) Developed by Author.....	98
Figure 42 : Alpha version II (User Dashboard Page Interface) Developed by Author.....	99
Figure 43: Alpha version II (Sign In Page Interface) Developed by Author	99
Figure 44: Alpha version II (Sign up Page Interface) Developed by Author	100
Figure 45: Alpha version II (Contact Us Page Interface) Developed by Author.....	100
Figure 46: Alpha version II (About us Page Interface) Developed by Author	101
Figure 47: Alpha version II (Inquiry Page Interface) Developed by Author.....	101
Figure 48: Alpha version II (Guest Inquiry Page Interface) Developed by Author.....	102
Figure 49: Alpha version II (Inquiry Tracking Page Interface) Developed by Author	102
Figure 50: Alpha version II (Travel Packages world Page Interface) Developed by Author	103
Figure 51: Alpha version II (Travel Packages Sri Lanka Page Interface) Developed by Author	103
Figure 52: Alpha version II (Admin Menu Page Interface) Developed by Author	104
Figure 53: Alpha version II (Inquiry Management Page Interface) Developed by Author ...	104
Figure 54: Alpha version II (Inquiry Guest ManagementPage Interface) Developed by Author	105
Figure 55: Alpha version II (Travel packages Management Page Interface) Developed by Author	105
Figure 56: Alpha version II (Management Portal Panel Page Interface) Developed by Author	106
Figure 57: Alpha version II (Question Form Part 1) Developed by Author	107
Figure 58 : Alpha version II (Question Form Part 2) Developed by Author	108

Figure 59 : Alpha version II (Question Form Part 3) Developed by Author	109
Figure 60 : Alpha version II (Question Form Part 4) Developed by Author	110
Figure 61 : Alpha version II (Question Form Part 5) Developed by Author	111
Figure 62 :Alpha version II (Question Form Part 6) Developed by Author	112
Figure 63: Alpha version II (Question Form Part 7) Developed by Author	113
Figure 64: Alpha version II (Question Form Part 8) Developed by Author	114
Figure 65: Alpha version II (Question Form Part 9) Developed by Author	115
Figure 66: Alpha version II (Question Form Part 10) Developed by Author	116
Figure 67: Alpha version II (Feedback Analysis) Developed by Author	117
Figure 68: Alpha version II (Feedback Analysis) Developed by Author	118
Figure 69: Alpha version II (Feedback Analysis) Developed by Author	118
Figure 70: Alpha version II (Feedback Analysis) Developed by Author	119
Figure 71: Alpha version II (Feedback Analysis) Developed by Author	119
Figure 72: Alpha version II (Feedback Analysis) Developed by Author	120
Figure 73: Alpha version II (Feedback Analysis) Developed by Author	120
Figure 74: Alpha version II (Feedback Analysis) Developed by Author	121
Figure 75: Alpha version II (Feedback Analysis) Developed by Author	122
Figure 76: Alpha version II (Feedback Analysis) Developed by Author	122
Figure 77: Alpha version II (Feedback Analysis) Developed by Author	123
Figure 78: Alpha version II (Feedback Analysis) Developed by Author	123
Figure 79: Alpha version II (Feedback Analysis) Developed by Author	124
Figure 80: Alpha version II (Feedback Analysis) Developed by Author	124
Figure 81: Alpha version II (Feedback Analysis) Developed by Author	125
Figure 82: Alpha version II (Feedback Analysis) Developed by Author	125
Figure 83: Alpha version II (Feedback Analysis) Developed by Author	126
Figure 84: Alpha version II (Feedback Analysis) Developed by Author	126
Figure 85: Alpha version II (Feedback Analysis) Developed by Author	127
Figure 86: Alpha version II (Feedback Analysis) Developed by Author	127
Figure 87: Alpha version II (Feedback Analysis) Developed by Author	128
Figure 88: Beta version (Home Page Interface) Developed by Author	129
Figure 89: Beta version (User Menu Page Interface) Developed by Author	129
Figure 90: Beta version (User Dashboard Page Interface) Developed by Author.....	130
Figure 91: Beta version (Sign In Page Interface) Developed by Author	130
Figure 92: Beta version (Sign Up Page Interface) Developed by Author	131

Figure 93: Beta version (About Us Page Interface) Developed by Author	131
Figure 94: Beta version (Contact Us Page Interface) Developed by Author	132
Figure 95: Beta version (Inquiry Page Interface) Developed by Author	132
Figure 96: Beta version (Travel packages world Page Interface) Developed by Author	133
Figure 97: Beta version (Travel packages Sri Lanka Page Interface) Developed by Author	133
Figure 98: Beta version (Inquiry Tracking Page Interface) Developed by Author	134
Figure 99: Beta version (Guest Inquiry Page Interface) Developed by Author.....	134
Figure 100: Beta version (Admin Menu Page Interface) Developed by Author	135
Figure 101: Beta version (Inquiry Management Page Interface) Developed by Author	135
Figure 102: Beta version (Travel packages Management Page Interface) Developed by Author	136
Figure 103: Beta version (Inquiry Guest Management Page Interface) Developed by Author	136
Figure 104: Beta version (Management Portal Panel Page Interface) Developed by Author	137
Figure 105 : Beta version (Question Form Part 1) Developed by Author	138
Figure 106: Beta version (Question Form Part 2) Developed by Author	139
Figure 107: Beta version (Feedback Analysis) Developed by Author	140
Figure 108: Beta version (Feedback Analysis) Developed by Author	140
Figure 109: Beta version (Feedback Analysis) Developed by Author	141
Figure 110: Beta version (Feedback Analysis) Developed by Author	141
Figure 111: Beta version (Feedback Analysis) Developed by Author	142
Figure 112 : Analyze requirements Full fillment of the web based application Developed by Author	Error! Bookmark not defined.

List of Tables

Table 1 : Advantages and Disadvantages of Balsmiq.....	44
Table 2 : Advantages and Disadvantages of Axure RP	46
Table 3 : Advantages and Disadvantages of Adobe XD.....	48
Table 4 : Advantages and Disadvantages of Sketch	50
Table 5 : Advantages and Disadvantages of Figma.....	52
Table 6 : Advantages and Disadvantages of InVision	54
Table 7 : Advantages and Disadvantages of Proto.io	56
Table 8 : Advantages and Disadvantages of Framer.....	58
Table 9 Advantages and Disadvantages of Paperboard prototypes	69
Table 10 : Advantages and Disadvantages of Contextual Prototyping.....	70
Table 11 : Advantages and Disadvantages of Digital Prototyping	71
Table 12 : Advantages and Disadvantages of Native Prototyping.....	72
Table 13 : Analyze requirements Full fillment of the web based application Developed by Author	143

Introduction of Prototyping

In software development, prototyping is an essential process that provides a concrete view of the final product prior to its full-scale deployment. It entails developing functionally reduced copies of the software so that interested parties can see and engage with the suggested system. This iterative process encourages cooperation and provides early feedback, idea validation, and improvement.

Prototypes can be anything from simple drawings to interactive simulations, and they have a variety of uses. More so than abstract concepts, they work as a bridge for communication between designers, developers, and stakeholders, successfully communicating ideas and functionality. Prototypes also help reduce risk by spotting possible problems or needs early in the development process. They serve as a roadmap for the design and development process, assisting teams in making defensible choices and revisions prior to the deployment of substantial resources. The process of prototyping encourages adaptation and flexibility, which fosters a culture that values user-centered design and ongoing development. Prototypes change throughout time in response to user feedback and iterations, making the final product more closely aligned with end-user needs and expectations.

Prototyping is essentially an iterative, collaborative, and user-focused process that greatly increases the success rate of software development by ensuring that the end result is in line with company goals and user requirements.

Advantages of Prototyping

- **Early Issue Detection:** Prototypes facilitate early visualization and interaction, making it possible to spot problems with the user experience, functional gaps, and design early on. This makes correction easier before large sums of money are spent.
- **Enhanced User Involvement:** Prototypes include end users by showcasing tangible models, which encourages feedback and active participation. By being involved, the final result is guaranteed to better suit the needs and preferences of the consumer.

- Faster Feedback Loop: Prototypes allow for quick iterations and adjustments in response to user input. Decision-making is accelerated by this iterative approach, which also improves stakeholder communication.
- Risk mitigation: By spotting and fixing problems early on in the process, you lower the chance of having to pay for expensive rework later on. This method reduces the possibility of misinterpreting specifications or forgetting important features.
- Better Communication: Compared to abstract concepts, prototypes are a more effective means of communicating ideas and functionalities. They help stakeholders, clients, and team members communicate more clearly.
- Cost-Efficiency: It is less expensive to identify mistakes and make changes early in the prototype stage than to fix problems later on in the finished product. In later phases of development, it lowers the cost of revisions and rework.
- Validation of Requirements: By giving stakeholders a visual representation they can interact with, prototyping aids in the validation and improvement of requirements. It guarantees that the finished product closely complies with the stated goals.
- Promotes Experimentation and creativity: Teams can investigate many design possibilities and functionality without committing to the final implementation thanks to prototyping, which promotes experimentation and creativity.
- Iterative Improvement: Prototyping's iterative nature fosters ongoing improvement by enabling modifications and adjustments in response to changing user requirements, industry trends, or technical breakthroughs.

Disadvantages of Prototyping

- Increased Time and Effort: Creating prototypes, particularly intricate or interactive ones, can take a lot of time and work. The early phases of the development process might take longer as a result of this higher cost.

- Possibility of Scope Creep: During prototyping, many adjustments and revisions could result in scope creep. Constant modifications could cause the project's scope to go beyond its original parameters, which would have an impact on resources and schedules.
- Misinterpretation of Prototype: It is possible for stakeholders to mistakenly view prototypes as the finished product, which could result in inflated expectations or misconceptions regarding the capabilities, features, or constraints of the real deal.
- Increased Costs: Extensive prototyping might result in higher development costs because it requires more time and resources throughout iterations, even though it may save money in the long run.
- Potential Ignorance of fundamental Functionality: If too much effort is put into perfecting the prototype's features or appearance, important fundamental functionalities that are essential to the success of the finished product may be overlooked.
- Resistance to Change: After devoting time and energy to the current prototype, stakeholders or team members may be resistant to major alterations or updates that are discovered during the prototyping phase.
- Handling Complexity: Too much complexity in prototypes can make them hard to maintain and manage. This intricacy might make things more confusing and difficult, which would hinder the development process as a whole.
- Miscommunication or misalignment: Prototypes are a communication tool, but if they are not correctly explained or understood, they could cause miscommunication among stakeholders and misplaced expectations.
- Potential Lack of Realism: Prototypes occasionally may not be realistic enough to faithfully replicate the behavior or performance of the finished product, which could mislead users.

Introduction about SDLC(Software Development Life Cycles)

A organized framework known as the Software Development Life Cycle (SDLC) outlines the procedures needed to create, develop, implement, and manage high-quality software. It acts as a road map for the whole software development process, from the very beginning to the release of the finished product and continuing support. The sequential and iterative processes outlined by SDLC approaches guarantee that software development is methodical, well-organized, and in line with user needs and company objectives.

Software development life cycle (SDLC) approaches offer an organized technique for developing software by segmenting the process into discrete stages, each with its own set of tasks and outputs. Planning, analysis, design, implementation, testing, deployment, and maintenance are frequently included in these stages. The objectives of each phase are to gather requirements, translate them into a workable system, confirm its accuracy, and preserve its integrity over the course of its existence.

Producing high-quality software that satisfies or beyond user expectations, complies with criteria, and is delivered within the allotted budget and timeframe is the main objective of the SDLC. In addition, it fosters cooperation between stakeholders, end users, and cross-functional teams, guaranteeing that the finished product complies with technical requirements and corporate goals.

Different techniques, including Waterfall, Agile, Spiral, and iterative models, are offered by SDLC methodologies, each with their own advantages and applications. The complexity of the project, the required degree of flexibility and adaptation, and project-specific requirements all influence the approach chosen.

Steps of SDLC(Software Development Life Cycles)

1. Planning Phase

This stage entails determining the objectives, schedule, scope, and resources needed for the project. It entails establishing project objectives, carrying out feasibility studies, and obtaining preliminary requirements. Determining deliverables, creating project schedules, and identifying stakeholders are important activities.

2. Analysis Phase

Requirements are compiled, recorded, and thoroughly examined throughout this stage. Understanding end-user needs, system functionalities, and constraints are all part of this phase. It involves drafting use cases, system requirements, and requirements refinement through workshops or interviews.

3. Design Phase

Using the requirements acquired, system architecture and design specifications are developed during this phase. It entails developing intricate functional and technical designs, such as those for system architecture, UI/UX, database structures, and algorithms. During this stage, requirements are translated into a system blueprint.

4. Implementation Phase

Using the specified designs as a guide, the system is actually coded and developed during this phase. To make sure each component functions as intended, developers build code, integrate various modules, and carry out unit tests. Converting design documentation into a working system is the aim.

5. Testing Phase

Testing makes sure the system works as planned and satisfies the requirements. It encompasses a range of testing methodologies, including system, user acceptability, integration, and unit testing (UAT). In this stage, defects are found, recorded, and fixed.

6. Deployment Phase

This stage entails putting the designed technology into use in a real-world setting. Final testing in a real environment is included, along with installation and configuration. Depending on the deployment, there may be a full system release or a phased rollout strategy.

7. Maintenance Phase

Post-deployment tasks are part of the maintenance phase. It covers bug patches, system updates, enhancements, and responding to customer input in addition to continuing maintenance. The best possible performance and functioning of the system are guaranteed by constant monitoring.

Introduction to Prototyping Model

In software development, the prototyping model is an iterative, user-centered process that creates early iterations of systems in order to get input, improve requirements, and create better end products. This methodology stresses the early production of simplified representations or models of the proposed system, in contrast to typical linear models.

According to this strategy, early prototypes are created using the requirements that have been acquired. These prototypes are usually simple iterations that highlight particular features or characteristics of the system's architecture. They act as concrete models that stakeholders—users, developers, and designers—can engage with and comment on. Iterative cycles of prototype development, user assessment, and refining are part of the process. User and stakeholder feedback is collected and integrated into iterations that follow, resulting in ongoing modifications and improvements in ensuing prototypes. Based on user feedback, the system's features, UI, and functionality are improved with each iteration. Flexibility is encouraged by the prototyping model, which enables rapid additions, alterations, or modifications in response to shifting requirements and changing user needs. Encouraging active participation from stakeholders throughout the development process, it creates a collaborative environment. When requirements are not totally apparent or when stakeholders need a visual depiction to help them better understand and clarify their demands, this approach might be helpful. It facilitates early concept validation, quick problem detection, and final product alignment with user expectations.

Advantages of Prototyping Model

- Enhanced User Involvement: Users can offer comments and receive an early look at the system, ensuring that their demands are met in the finished product.
- Early Issue Identification: Reducing risks and minimizing rework efforts are achieved by identifying and fixing issues early in the development process.
- Clarity in Requirements: By providing concrete examples, prototypes help to define and improve requirements.

- Flexibility and Adaptability: The iterative process facilitates rapid modifications to meet evolving needs.
- Better Communication: By promoting shared awareness of system functionalities, prototypes help stakeholders communicate more effectively.
- Risk Mitigation: By identifying faults early on, the likelihood of misinterpretations of requirements or design problems is decreased.
- Faster Development Cycles: By tackling problems early in the process, development time can be decreased overall, even with possible longer timescales for prototyping.
- User Satisfaction: When users participate in the process, they feel more valued since they can see that their suggestions are taken into account and put into practice.
- Concept Validation: Prototyping saves time and money by assisting in the validation of design concepts prior to full implementation.
- Adaptable to Change: The system is more closely aligned with changing user needs and market expectations when modifications may be incorporated early in the process.

Disadvantages of Prototyping Model

- Scope creep : the possibility of project scope expansion through ongoing iterations, which could have an impact on budgets and schedules.
- Increased Time and Effort: Creating prototypes and overseeing iterative cycles might cause a project's schedule to get longer and require more resources.
- Misinterpretation of Prototypes: Expectations may become unreasonably high if stakeholders mistake prototypes for finished goods.
- Complexity management: Iterative modifications may result in unduly complicated designs, which may affect the scalability and maintainability of the system.

- Possible Cost Overruns: Since extensive prototypes and iterations necessitate more time and resources, they may raise project costs.
- Limited Scalability: There may be scalability issues if prototypes don't always translate well into the finished product.
- Danger of Over-Engineering: Iterative modifications may result in an overly complicated solution, which could affect the simplicity of the system.
- Dependency on User Involvement: Prototyping is highly dependent on ongoing user involvement. User disengagement may make the task more difficult.
- Prioritize Features over Core Functionality: If features are prioritized over other aspects of the system, important core functionality may be overlooked.
- Possible Confusion: If prototype iterations result in divergent interpretations or expectations, stakeholders may experience confusion or misalignment.

Different Types of Prototyping Models

Throwaway Prototyping

Also known as rapid or exploratory prototyping, throwaway prototyping is centered on quickly building a simple model to test ideas or obtain early user input. The main objective is to rapidly prototype and test particular features or design concepts. This prototype isn't intended for the finished product, even though it offers insightful information early in the development cycle. Rather, it serves as a point of reference for locating design errors, honing concepts, and getting insightful input. Its early fault identification and quick feedback acquisition are its main advantages. But given that it is disposable, it might not scale well for the creation of a full system.

Advantages of Throwaway Prototyping

- Quick Prototyping Enables Immediate Feedback from Users and Stakeholders: Prototyping quickly enables early requirement clarity and design flaw discovery.
- Improved Requirement Understanding: Prototypes offer a better understanding among stakeholders and lessen misinterpretation by helping to visualize and clarify user requirements.
- Risk Reduction: By identifying problems and misunderstandings early on, the likelihood of expensive mistakes in later phases of development is decreased.
- Better Communication: Prototypes facilitate more fruitful discussions and decision-making by providing developers, stakeholders, and users with a physical medium for communication.
- Cost and Time Efficiency: By identifying issues early in the development process, disposable prototypes, albeit disposable, can ultimately save time and money.

- Enhanced User Involvement: Early in the development process, prototypes allow stakeholders and end users to participate actively. This engagement guarantees that the finished product accurately reflects the tastes and demands of the user.
- Early Issue Identification: By creating prototypes fast, possible problems, ambiguities, and conflicting requirements are found early on, reducing risks and improving the quality of the finished system.
- Adaptive and Flexible Approach: Throwaway prototyping's iterative nature permits flexibility in adding modifications and adjustments depending on ongoing user feedback and changing requirements.
- Better Decision Making: By providing stakeholders with a tangible picture of the proposed system, prototypes serve as tangible representations that support better decision-making processes.
- Improved Communication: By acting as a mediator between many stakeholders, prototypes help to clarify conversations and lessen misunderstandings about the capabilities of the system.

Disadvantages of Throwaway Prototyping

- Limited Scalability: Because disposable prototypes aren't meant to be the finished product, they might not grow or develop into the ideal answer, which might mean starting over and reworking the entire thing.
- Inadequate Documentation: Because disposable prototypes are made of paper, there may be gaps in the knowledge and comprehension that will be needed for further development.
- Misinterpretation of Prototypes: Those involved in the project may misunderstand prototypes as finished goods, leading to inflated expectations and an ignorance of their transient character.

- Potential Ignorance of Important Features: Concentrating on expeditious validation may cause one to ignore functionality or features that are crucial for the finished product.
- Resource Intensiveness: Although throwaway prototypes should be developed quickly, they may need a large amount of resources, particularly if several revisions are needed.
- Potential for Scope Creep: Regular modifications brought about by user feedback may result in ongoing additions and modifications, which could push the project's boundaries beyond what was initially intended.
- Resource Intensiveness: Creating several prototypes may take a lot of time and resources, particularly if several revisions are needed for each version.
- Documentation Challenges: Prototypes are temporary, so documentation may not be complete, which could result in understanding gaps for later stages of development.
- Misinterpretation of Prototypes: If a prototype is not adopted into the final product, stakeholders may have unrealistic expectations and become dissatisfied. Prototypes may be mistaken for completed solutions.
- Difficulty in Scaling: Prototypes may not translate smoothly into the finished product, necessitating rework or development in order to meet scalability requirements.

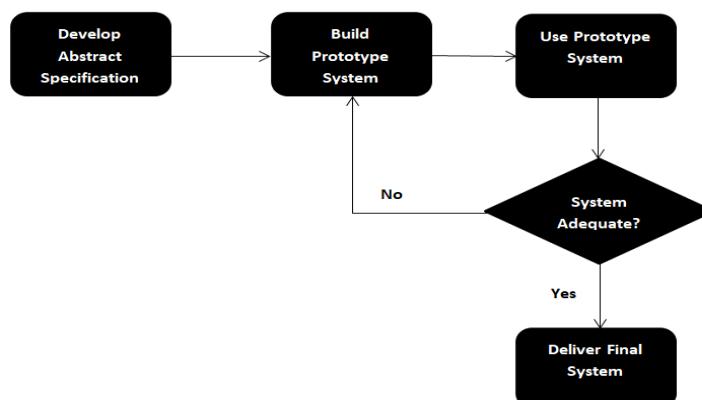


Figure 1 : Throwaway Prototyping

Evolutionary Prototyping

In this method, a basic functioning model is first created, and it is then progressively improved upon through subsequent iterations. Based on customer input, further features or functionalities are added in each iteration, ultimately transforming the prototype into the finished product. Throughout the development cycle, this method guarantees continued user participation and promotes continuous improvements. It encourages adaptability and flexibility, enabling user-driven modifications, but as the prototype develops, it may result in possible complications. Careful planning is necessary to handle these challenges and guarantee a seamless transition from prototype to finished product.

Advantages of Evolutionary Prototyping

- Increased User Involvement: Ongoing iterations promote continued user input and participation, guaranteeing that the finished product accurately reflects user needs.
- Progressive Refinement: As a result of the system's steady evolution in response to user feedback, it is possible to continuously develop and refine it over time.
- Risk Reduction: By delivering functioning prototypes ahead of schedule, developers may better identify and manage risks, which lowers uncertainty in the finished product.
- Adaptive and Flexible: Because iterative processes are designed to be flexible, they can accommodate changes and adjust to changing requirements as they arise.
- Better Communication: By promoting a shared knowledge of system needs, prototypes help stakeholders, developers, and users communicate more effectively.
- Early Concept Validation: To make sure the finished product achieves the intended goals, early prototypes verify the viability of concepts and capabilities.
- Incremental Development: As the system expands, features and modules can be added in small, manageable chunks, making integration and testing simpler.

- Early Detection of Problems: Testing and iterative improvements facilitate the early detection and correction of problems.
- Decreased Development Time: As features are delivered piecemeal, the process of developing new features moves more quickly, opening the door to timely upgrades and releases.
- Evolutionary prototyping fosters creativity and adaptability across the development lifecycle by encouraging a culture of continual improvement.

Disadvantages of Evolutionary Prototyping

- Scope creep is the uncontrollably large extension of a project's scope as a result of ongoing additions and changes made in response to user feedback.
- Increased Complexity: Complex system designs produced by several iterations may be difficult to manage and maintain.
- Resource Intensiveness: It can take a lot of time and resources to develop and refine several iterations.
- Documentation Overhead: Because it is always changing, there may be insufficient version control or documentation, which makes it difficult to keep track of changes.
- Dependency on User Availability: If stakeholders are absent or lack the requisite experience, ongoing user involvement could create a bottleneck.
- Error in Estimation: Accurately estimating project timeframes and costs can be difficult due to ongoing changes.
- Potential Conflicts: Misunderstandings or arguments may arise from divergent stakeholder viewpoints or from needs that change with each iteration.

- Integration Difficulties: Adding new features to an evolving system may make integrating them with its current functionality more difficult.
- Possibility of Prototype Becoming Final Product: Unrealistic expectations may arise from stakeholders viewing the developing prototype as the ultimate solution.
- Management and Control: Efficient project management and coordination are necessary to manage and control the system's ongoing evolution over iterations.

Incremental Prototyping

This method breaks the system up into more manageable, smaller chunks. Every iteration concentrates on creating and evaluating particular features. These steps are gradually included into the finished product. With this approach, work can be done step-by-step and every increment may be extensively verified and validated before integration. It has benefits for controlling complexity and reducing hazards related to creating large-scale systems. Nevertheless, to guarantee the smooth integration of increments into the finished product, careful planning and integration work are required.

Advantages of Incremental Prototyping

- Early Functionality Delivery: Users can access and utilize some features of the system early in the development phase because it is supplied in increments.
- It is possible to continuously refine each module or increment through incremental development, which takes user feedback into account.
- Decreased Development Time: Compared to developing the full system at once, developing and delivering smaller increments shortens the total development time.
- Better Risk Management: By reducing risks in smaller steps, the likelihood of significant system failures is decreased.
- Progressive User Feedback: To ensure alignment with user needs, subsequent development is guided by early user feedback from each increment.
- Smaller modules make it easier to test, debug, and integrate them into the current system, which improves quality and dependability.
- Increased Flexibility: Incremental prototyping provides greater adaptability to succeeding increments, enabling the incorporation of new requirements or adjustments.

- Interim Solutions: In order to meet urgent needs, users can make use of certain functionality while waiting for the whole system.
- Early Concept Validation: Stakeholders can evaluate important system characteristics early on because each increment validates and confirms particular functionality.
- Enhanced Stakeholder Satisfaction: By allowing stakeholders to observe project progress, incremental delivery increases their level of satisfaction and confidence in the development process.

Disadvantages of Incremental Prototyping:

- Possible Integration Difficulties: There could be difficulties integrating new features with current ones, which could cause incompatibilities.
- Added Complexity: Handling several increments and their relationships could make system maintenance and design more difficult.
- The Scope Creep Possibility: An increased project scope could result from ongoing additions and modifications to each increment.
- Dependency on Initial Modules: Problems with early modules may influence later increases, affecting the stability of the system as a whole.
- Resource Allocation: Appropriate resource management and allocation are necessary while developing numerous increments at once.
- Documentation Overhead: Version control can get complicated with repeated rounds, and documentation must be updated frequently.
- Limitations of Temporary Solutions: Early iterations may not include all features, which could result in restricted use of the system.

- Dependency on Continuous User Availability: If stakeholders aren't available, it could be difficult to have ongoing user input and involvement.
- Difficulty in Estimating timetables: Because requirements change over time, it can be difficult to correctly predict timetables for each increment.
- Enhanced Management Overhead: Project management and efficient coordination are necessary to manage several increments at once.

Extreme Prototyping

Extreme prototyping stresses quick and continuous development through a number of small-scale prototypes. It is strongly associated with Agile techniques. It entails prioritizing user requirements, frequent user participation, and quick iterations. The methodology attempts to generate a sequence of working prototypes, adding additional features based on customer priorities at each iteration. Thorough prototyping guarantees tight alignment with user needs, promotes flexibility, and speeds up development. It is time- and effort-intensive because of the high levels of user interaction and collaboration that are necessary.

Extreme Prototyping Advantages

- Quick development cycles facilitate prompt feedback loops with stakeholders and end users, guaranteeing adherence to requirements.
- Enhanced User Involvement: Encouraging user feedback at every stage of development guarantees that the end product lives up to user expectations.
- Flexibility and Adaptability: Rapid integration of new requirements or modifications is made possible by Extreme Prototyping's easy adaptability to changes.
- Early Issue Identification: By reducing possible risks, rapid prototyping enables the early identification and resolution of design faults or difficulties.
- Focus on Core Functionalities: Prioritizing and quickly improving core functionalities

guarantees that important features are developed.

- Shorter Development Time: Rapid iterations and small-scale prototypes help to shorten the time to development by delivering working components more quickly.
- Better Communication: Prototypes are useful instruments for communication since they help stakeholders clarify and have debates.
- Concept Validation: Working prototypes help determine whether ideas and features are feasible and give valuable information about their viability.
- Risk Mitigation: By minimizing uncertainties in the final product, early detection of possible problems aids in risk mitigation.
- Incremental Value Delivery: By delivering valuable features in every iteration, the incremental method guarantees that users receive value right away.

Extreme Prototyping Disadvantages

- Potential Oversimplification: A concentration on speedy development may lead to solutions that are overly straightforward and weak in complexity or resilience.
- Limited Documentation: Because of how quickly things are happening, there may not be enough documentation, which makes it difficult to transmit and maintain knowledge.
- The Scope Creep Possibility: Ongoing modifications could cause the project's scope to grow beyond its original goals.
- Resource Intensiveness: Quick development and constant iterations may result in a large resource requirement, which could affect timelines and budgets.
- Quality Compromises: Intense testing and quality assurance may be compromised by speed, which could result in possible flaws in the finished product.

- Dependency on Constant User Availability: It can be difficult to maintain user engagement if stakeholders aren't available.
- Limited Scalability: Rework may be necessary to achieve scalability if prototypes do not smoothly transition into fully functional systems.
- Misunderstanding of Prototypes: Unrealistic expectations may be created when stakeholders mistakenly regard prototypes as the final solution.
- Integration Difficulties: Adding new features to an existing feature set with each iteration may make integration more difficult.

Other than that there are two more prototyping models. That are ,

1. Vertical Prototyping Model
2. Horizontal Prototyping Model

Below this explain more about these two models.

Vertical Prototype

A vertical prototype concentrates on a particular system element or capability, emphasizing depth over breadth. It displays the database, application, and presentation layers of the software stack related to that specific feature. The goal of this prototype is to give a thorough understanding of a certain capability by providing a full representation of its internal workings. It might not have as many more features as the final system, though. Early in the development phase, vertical prototypes are perfect for showing important and intricate capabilities. For example, a vertical prototype for an online banking system would concentrate heavily on fund transfer functions, showing the user interface, transaction processing logic, and database interfaces in detail. It is not a comprehensive overview of the system, but it provides a quick rundown of key features to help with early validation and feedback gathering.

Advantages of Vertical Prototypes

- Depth of Understanding: Provides a thorough understanding of particular functionalities, guaranteeing a deep comprehension.
- Early Issue Identification: Helps find and fix complex design problems or defects at an early stage.
- Concentrated growth Efforts: Enables exact focus on essential features, guaranteeing their painstaking growth.
- Better Stakeholder Communication: Increases stakeholder understanding by giving a clear picture of important aspects.
- Quick Validation: Facilitates quick validation of essential features, ensuring they meet user requirements.
- Accurate Problem-Solving: Facilitates targeted problem-solving within discrete functionalities, effectively resolving crucial difficulties.
- Decision-Making Accelerated: Facilitates speedier decision-making regarding the essential components of the system.
- Streamlined Development Path: Provides a defined route for the creation of separate modules or functionalities.
- Targeted User Feedback: Enables the collection of targeted user feedback on certain features.
- Improved Risk Management: Reduces risks related to important features at the beginning of the development process.

Disadvantages of Vertical Prototypes

- Restricted System Perspective: Ignores the wider picture of the relationships and dependencies inside the system.
- Delay in Testing Integration: Integration testing between modules may be put off until a later time.
- Difficulties in Assessing Interactions: It does not provide a complete picture of the interactions between various features.
- Possible Misinterpretation: May be interpreted incorrectly as a representation of all of the features of the system.
- Challenges in Resource Allocation: requires the deployment of particular resources to separate functionalities.
- Iteration complexity refers to the difficulties of changing particular functionality because of their interdependence.
- Integration Complexity: Combining various modules may result in intricate integration procedures.
- Unrealistic expectations on the functionality of the system may result from misaligned stakeholder expectations.
- Limited User Engagement: May limit user interaction to a small number of distinct features.
- Dependency on Particular Modules: Requirements on discrete functionalities may cause development to stall.

Horizontal Prototype

In contrast, a Horizontal Prototype exhibits a broad range of functionalities across several modules, but it lacks depth in each area. Its focus is on breadth rather than depth. It provides a more comprehensive overview of the system by displaying the overall UI, the navigation flow, and how different functionalities interact with one another. It may be shallow in certain areas, but it gives users and stakeholders a clear picture of the system's capabilities. Horizontal prototypes help with user testing, collecting input, and showing how the system works as a whole. For example, a horizontal prototype for a social media platform might highlight aspects like profile creation, news feed browsing, user registration, and messaging capabilities without going into great detail about any one element. Feedback on the system's more general features can be gathered while stakeholders can see the system's overall functionality and user experience through this prototype.

Advantages of Horizontal Prototypes

- System-Wide Overview: Offers a thorough overview of all the features included in the system.
- Early User involvement: Offers a variety of feedback while facilitating user involvement with various functions.
- Flexible Development Focus: Makes it possible to construct systems with a user-centric design that puts the user experience first.
- Easier Integration Testing: Facilitates early testing of how various functionalities interact with one another.
- Evaluation of the Overall System Flow: Enables the usability and flow of the system across all functionalities to be assessed.
- Fair Stakeholder Understanding: Provides stakeholders with a fair assessment of the system's scope.

- Early User Feedback Collection: Makes it possible to get extensive user input early on.
- Flexible Iteration Planning: Enables iteration planning that takes into account several functions at once. A holistic approach to decision-making is one that takes into account a variety of functions.
- User-Centric Development: Assists in giving the user interface top priority from the very beginning of the development process.

Disadvantages of Horizontal Prototypes

- Depth Sacrifice for Breadth: Some features may be too broad, leaving out important information.
- False Interpretation: It could be mistakenly understood by stakeholders as a representation of the entire system, setting up unrealistic expectations.
- Difficulties in Feedback Analysis: It might be difficult to prioritize and analyze user feedback for a variety of features.
- Resource-Intensive: A large amount of resources might be needed to develop a comprehensive prototype.
- Possible Integration Complexity: Several interconnected functionalities may cause integration complexities.
- Difficulty in Focused Development: May make concentrating development efforts on particular functionalities difficult.
- Restricted Depth of User Interaction: Users might not be able to provide thorough input by delving deeply into particular features.
- Complex User Journey Design: It might be challenging to create an effective user journey that incorporates a number of capabilities.

- Difficulties with Scope Management: If not handled carefully, this could result in an enlarged project scope.
- Misaligned Stakeholder Priorities: This could have an influence on key system components by giving width priority over essential tasks.

Evaluating standard tools available for use in prototyping

Examining common prototyping tools entails a thorough analysis of several software programs designed to produce prototypes during the software development lifecycle. This assessment procedure looks for and chooses the best tools that meet project needs, speed up the prototype phase, and improve the development process as a whole. It entails closely examining the features, functionality, scalability, usability, collaboration potential, and suitability of prototyping tools for the project. Teams may ensure the adoption of prototyping technologies that expedite the design, testing, and validation of concepts and ultimately aid in the production of functional and user-centric digital products by conducting a thorough examination and making well-informed decisions. In this there are 4 categories. That are known as,

1. Wireframing and Mockup Tools
2. Prototyping Tools for Interaction Design
3. Code-Based Prototyping Tools
4. UI Design and Prototyping Tools
5. Collaborative Prototyping Tools

Wireframing and Mockup Tools

The design process begins with wireframing and mockup tools, which enable designers to produce skeletal outlines and visual representations of websites or software interfaces. These tools do not go into the details of design; instead, they concentrate on organizing layouts, specifying functionalities, and describing content. While mockups give more thorough representations combining visual design components like colors and font, wireframes serve as a blueprint for the structural elements. They play a crucial role in coordinating project goals, encouraging stakeholder participation, and providing a clear, visual representation of the project's scope prior to its actual creation.

Balsamiq

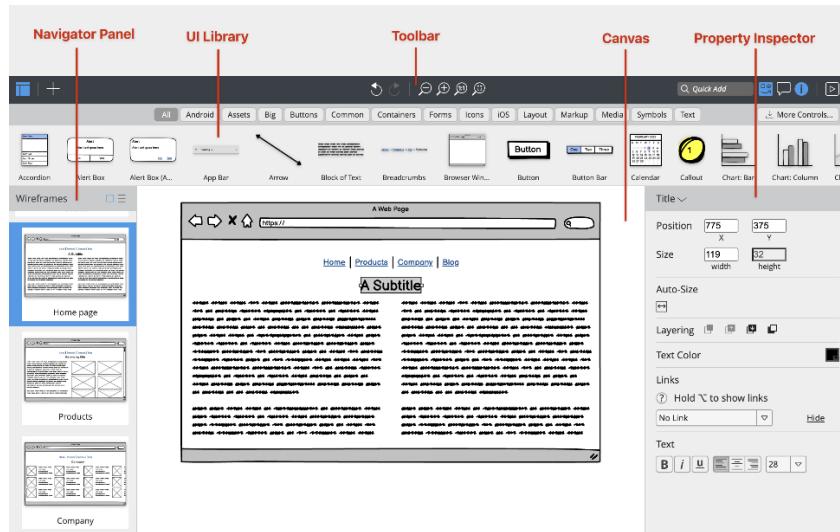


Figure 2 : Balsamiq

Balsamiq is an easy-to-use wireframing tool that has an emphasis on rapid ideation and simplicity. It's great at producing low-fidelity wireframes, which makes it perfect for quickly visualizing design concepts. Its drag-and-drop feature along with an intuitive interface make it simple to create and refine wireframes. Balsamiq is still a favored option because of its effectiveness in producing simple wireframes and enabling prompt dissemination of early-stage design concepts among stakeholders, even though it may not include high-fidelity designs or sophisticated interactions.

Limitations: Balsamiq is great for ideation, but it might not be able to handle high-fidelity designs or the intricate interactions required for sophisticated prototypes. Because of its intentional limitations on design aspects, it may make it more difficult to explore in-depth user interactions. As a result, switching to a different tool may be necessary to get from low-fidelity wireframes to high-fidelity designs, thereby disrupting the design process.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Fast Ideation: Facilitates the quick visualization of design concepts by enabling the rapid production of low-fidelity wireframes. • User-Friendly Interface: Both designers 	<ul style="list-style-type: none"> • Limited Visual Fidelity: Incapable of producing intricate visual representations or high-fidelity designs. • Limitations on Features: Some projects may not be able to incorporate intricate

<p>and non-designers may easily use it thanks to its intuitive tools and drag-and-drop capabilities.</p> <ul style="list-style-type: none"> • Effective Collaboration: Promotes efficient communication between stakeholders and aids in cooperative design procedures. • Fast Iterations: Enables quick adjustments and rework throughout the first stages of design, encouraging adaptability. • Ease of Learning: Due to its simplicity, new users don't need much training or learning curve. • Cost-Effective: It is a cost-effective option for wireframing needs because it offers reasonable price options. • Good for Conceptualization: Perfect for explaining and debating preliminary design concepts with clients or stakeholders. • Focused on Functionality: Places more attention on essential features and layout while putting functionality ahead of visual design. 	<p>design components or sophisticated interactions.</p> <ul style="list-style-type: none"> • Transition Challenges: Because of the large fidelity difference, transitioning from low-fidelity wireframes to high-fidelity design tools may be difficult. • Restricted Animation Support: Compared to other prototyping tools, this tool offers very little support for dynamic objects and animations. • Less Realistic Prototypes: The emphasis on minimalism could lead to prototypes that are less accurate depictions of the finished product. • Not for Detailed Designs: Unsuitable for tasks requiring exact pixel-perfect designs or complex visual features. • Dependency on Context: In order to effectively communicate design purpose, wireframes may require further justification or context. • Less Appeal for Clients: Presentations that lack visual appeal may not be as memorable to stakeholders or clients.
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Table 1 : Advantages and Disadvantages of Balsmiq

Axure RP

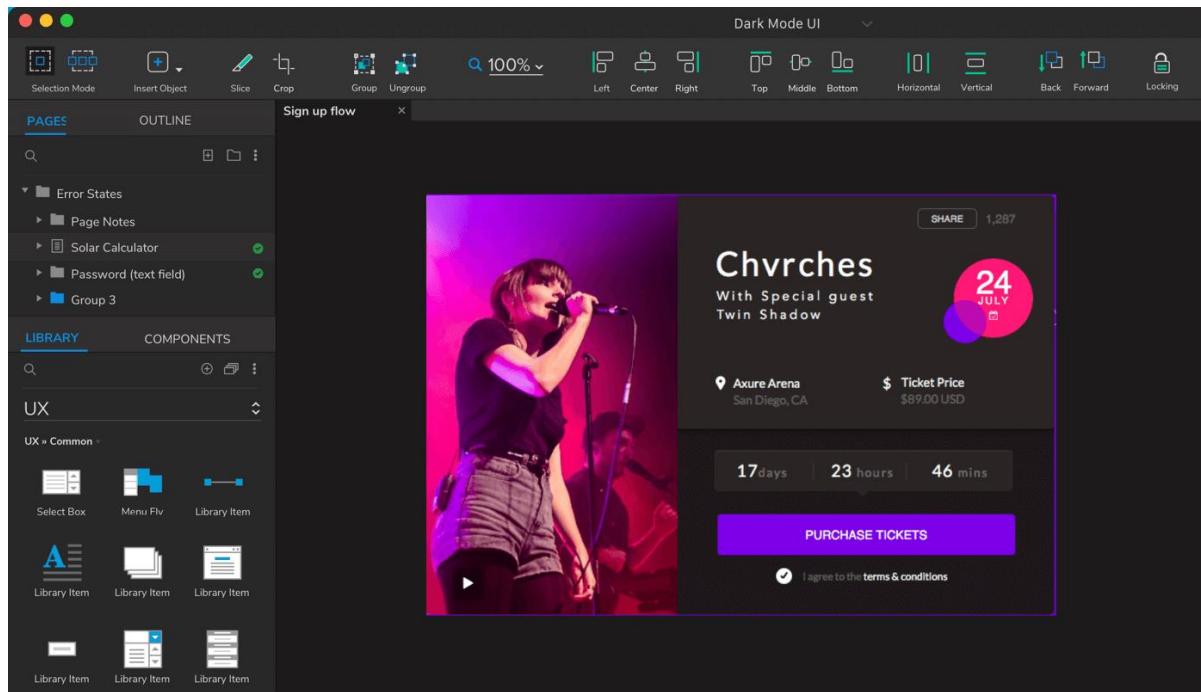


Figure 3 : Axure RP

One exceptional prototyping tool that gives designers the ability to produce intricate and highly interactive prototypes is Axure RP. Because of its capacity to include complex relationships, conditional logic, and dynamic content, it is preferred. This tool is appropriate for tasks that call for intricate prototypes and complex user experiences. Its large toolkit requires time and effort to grasp, and it has a steeper learning curve..

Limitations Axure RP has a significant learning curve despite its strong features. Its large toolkit may require a significant time and effort investment to master, discouraging those looking for rapid mastery. Additionally, those who need only simple or basic prototypes may find its feature-rich environment daunting..

Advantages	Disadvantages
<ul style="list-style-type: none"> Advanced Interactivity: Facilitates the development of extremely sophisticated and interactive prototypes featuring intricate conditional logic and interactions. 	<ul style="list-style-type: none"> Steep Learning Curve: Because of its large toolkit and complexity, this requires a significant amount of time and effort to master, making it less accessible for beginners.

<ul style="list-style-type: none"> • Dynamic Content: Enables data-driven interactions, adaptable designs, and dynamic content to be incorporated into prototypes that are more realistic. • Robust Prototyping: Suitable for difficult projects, this approach provides an extensive range of tools for prototyping complex user journeys, workflows, and scenarios. • Reusable Components: Promote uniformity and efficiency in prototyping by enabling the creation and reuse of components and libraries. • Collaboration features: Enables multiple people to work on prototypes at once by supporting team collaboration with shared projects. • Extensive Feature Set: Offers a wide range of features, such as mobile prototyping capabilities, responsive design options, and adaptive views. • Simulations and Animations: Improves prototype realism by simulating animations, transitions, and micro-interactions. 	<ul style="list-style-type: none"> • Resource-intensive: May use more system resources, which could slow down or cause performance problems for PCs with lower processing capability. • Initial competency: Longer learning curves may result from users encountering difficulties in reaching competency at first. • Expensive Licensing: Individual licenses or smaller teams may have more expensive licensing, which could prevent some users from using them. • Restricted to Easy Projects: Overkill for straightforward projects or prototypes that don't need a lot of intricacy or interaction. • Dependency on Prototyping abilities: This depends on the user's ability to employ prototyping abilities, which calls for a specific degree of experience. • Prototype Load Times: Prototypes that have a lot of content or intricate interactions may take longer to load.
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Table 2 : Advantages and Disadvantages of Axure RP

Adobe XD

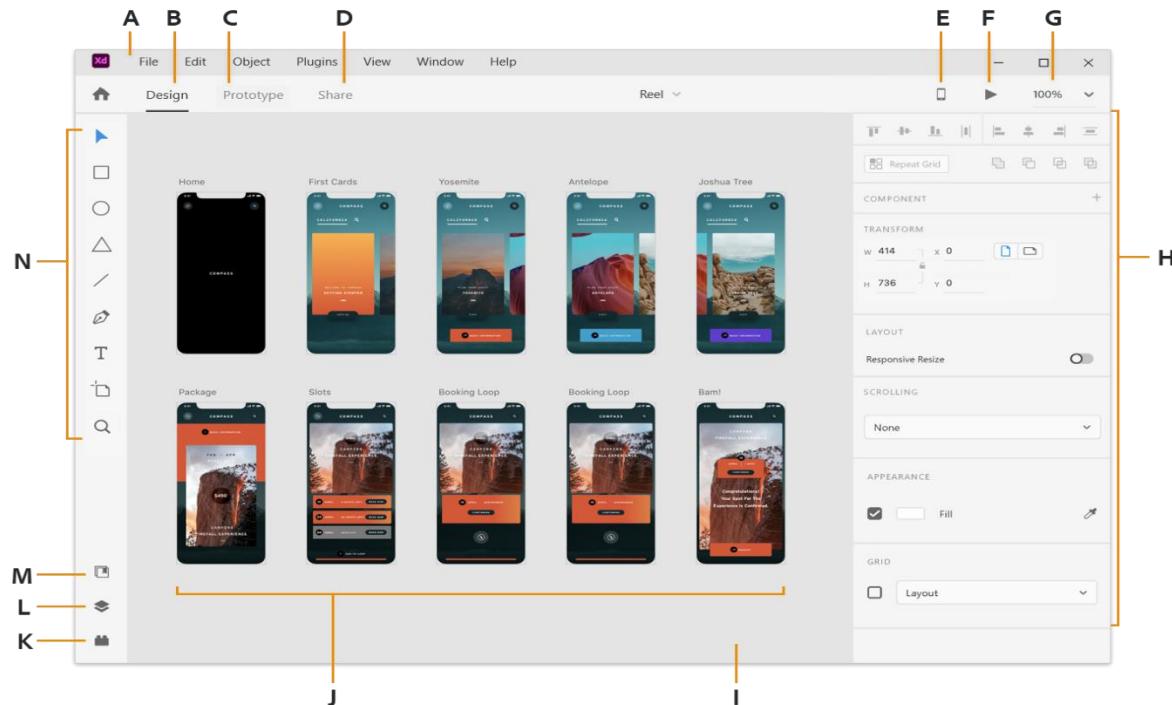


Figure 4 : Adobe XD

With a full platform for wireframing, prototyping, and design development, Adobe XD is an all-in-one solution for design and prototyping. Its smooth connection with other Adobe products helps designers work more efficiently together. Because of Adobe XD's adaptability, designers with varying levels of experience can work together effectively, iterate quickly, and create interactive prototypes..

Limitations Despite Adobe XD's extensive feature set, there may occasionally be performance problems, particularly when working on larger projects or complexly interacting prototypes. These performance constraints could make the tool less scalable and affect productivity when developing larger or more complex projects

Advantages	Disadvantages
<ul style="list-style-type: none"> Integrated Workflow: Quickens the design-to-prototype process by integrating with other Adobe Creative Cloud tools seamlessly. 	<ul style="list-style-type: none"> Limited Compatibility: When sharing designs with users who do not have Adobe XD installed, compatibility problems may occur.

<ul style="list-style-type: none"> • The Auto-Animate feature makes it simple to create animations and transitions, which improves the interaction of prototypes. • Prototyping Capabilities: Facilitates a seamless workflow by offering design and prototyping elements on a single platform. • Supports responsive resizing for designs on a range of screens and devices thanks to responsive design. • Real-Time Collaboration: Facilitates team members' sharing of design files and real-time collaboration. • The Repeat Grid Feature facilitates the creation of repeating elements and encourages uniformity in designs. • Adobe Ecosystem: Enhanced design ecosystem made possible by seamless connection with other Adobe products. 	<ul style="list-style-type: none"> • Advanced Animations: In comparison to certain other prototype tools, this one's animation capabilities aren't as sophisticated. • Feature Parity: May be inferior to more well-known tools on the market in terms of some sophisticated capabilities. • Learning Curve: Users adjusting to XD's UI after switching from another design program may encounter a learning curve. • Limited Collaboration: Compared to some other collaborative design tools, the collaboration features may not be as comprehensive. • Offline Mode: In offline settings, access may be restricted due to reliance on internet connectivity. • Stability: A few users have reported sporadic glitches or stability problems that impair the user experience.
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Table 3 : Advantages and Disadvantages of Adobe XD

Sketch

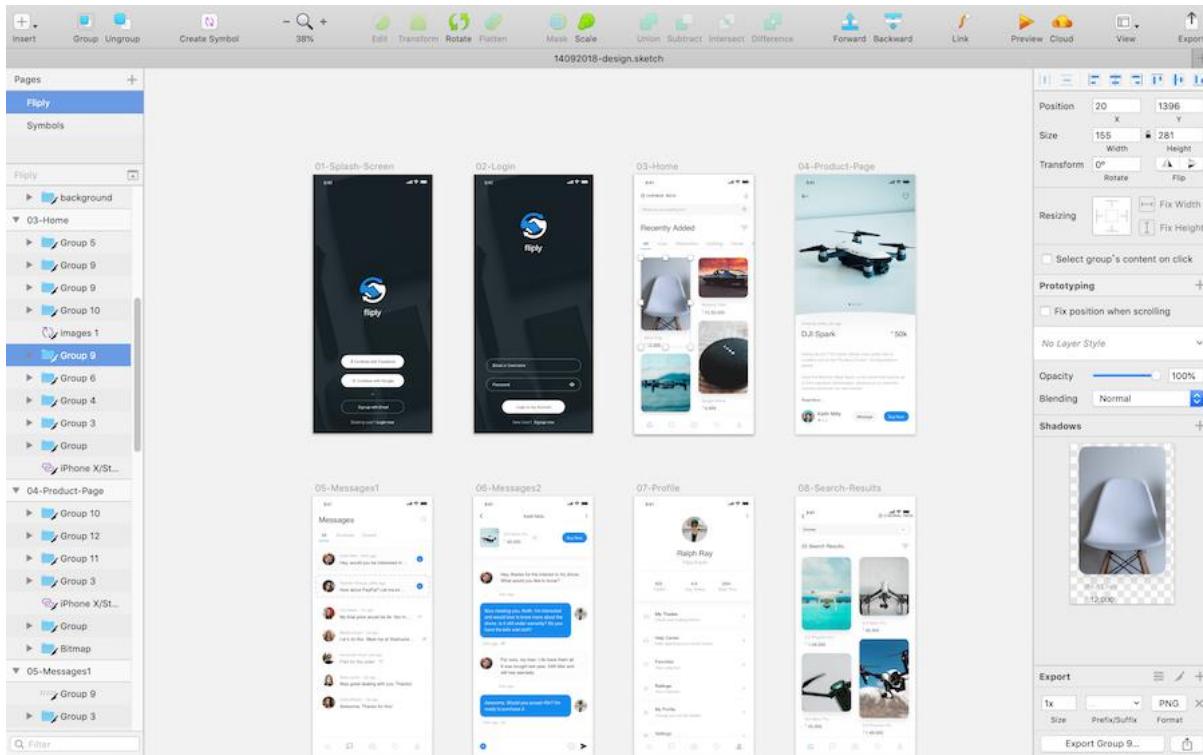


Figure 5 : Sketch

For simple interactive prototyping and user interface design, Sketch is a well-liked option among Mac users. It has an easy-to-use interface that is designed to make digital experiences and user interfaces. The advantage of Sketch's vector-based design methodology is that it can be scaled and adjusted to different screen sizes and resolutions. It may need third-party plugins for sophisticated prototype features, even though its UI design is excellent.

Limitations: Sketch frequently depends on third-party plugins in order to access sophisticated prototyping capabilities like animations or sophisticated interactions. This dependency could be inconvenient and confusing, especially for consumers looking for a one-stop shop in a single tool.

Advantages	Disadvantages
<ul style="list-style-type: none"> Vector-Based Revisioning: offers scalability and precision in designs because of its vector-based methodology. 	<ul style="list-style-type: none"> Restricted Platform Compatibility: Only compatible with Mac OS natively, preventing Windows and Linux users from using it.

<ul style="list-style-type: none"> • Plugin Ecosystem: A robust network of add-on features and functionalities offered by plugins. • Symbol Libraries: Promote consistency between designs by enabling the production of reusable design elements. • Mac-Centric: Designed with a responsive and fluid interface specifically for Mac users. • Collaborative Tools: Provides cloud-based services or third-party integrations to facilitate collaboration. • Simpler learning curve and intuitive interface make this design tool easier to use than some others. • Artboard-Based Design: This method simplifies the management of numerous design screens by organizing designs into artboards. 	<ul style="list-style-type: none"> • lacked advanced prototyping features at first, but these have been becoming better. • Performance: Larger or more complicated files may experience lags or problems with performance. • Stability: From time to time, users report bugs and stability problems with specific functionality. • Limited functionality when offline or not connected to the internet in "offline mode." • Interoperability: Problems with compatibility that arise when collaborating with groups or users who utilize various design tools. • Advanced Features: In comparison to other powerful design tools, it might not have all of the advanced features.
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Table 4 : Advantages and Disadvantages of Sketch

Figma

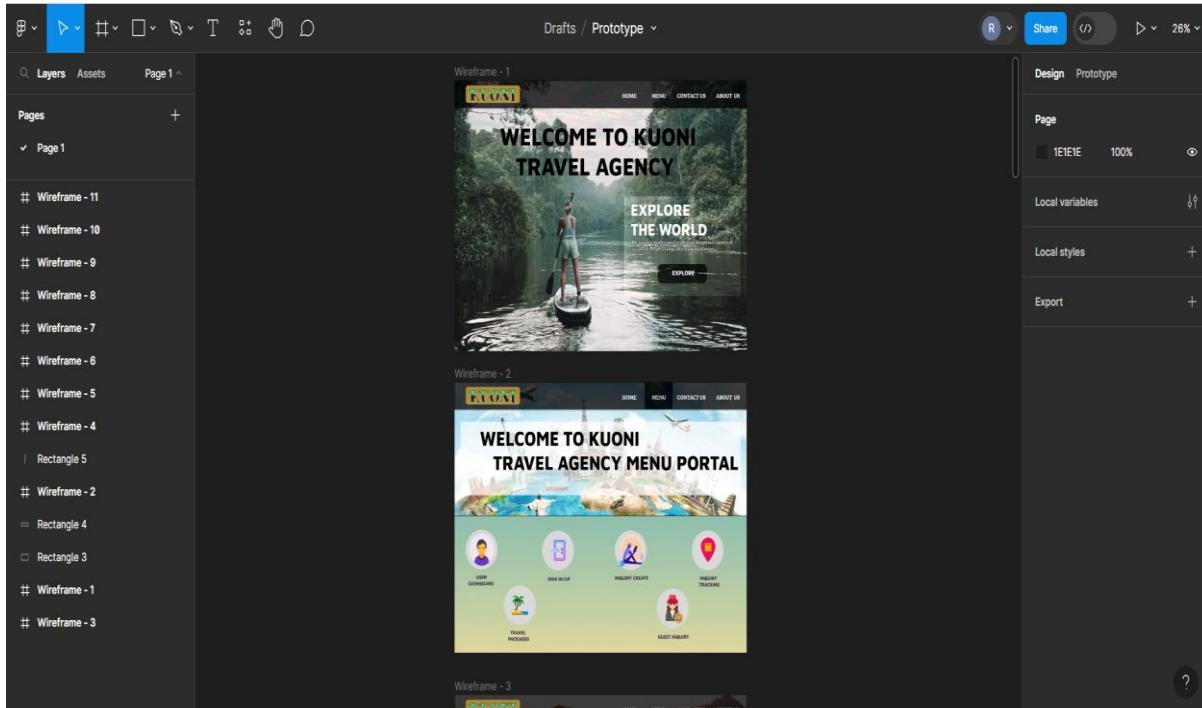


Figure 6 : Figma

One cloud-based design and prototype program that's well-known for its real-time collaborative features is called Figma. Several users can work on the same project at once thanks to its facilitation of fluid teamwork. Its ability to function as a platform for both design and prototyping, which makes the design-to-prototype process easier, is its greatest asset. Larger or more complicated projects, however, may cause performance problems for Figma.

Limitations Figma may have performance problems despite its collaborative strengths, particularly when working on more complex or large-scale projects. It might be difficult to manage scalability while preserving performance efficiency, especially for designs or prototypes that require a lot of resources.

Advantages	Disadvantages
<ul style="list-style-type: none"> Real-time collaboration and simultaneous editing among team members are made possible by cloud-based collaboration. 	<ul style="list-style-type: none"> Performance: With bigger or more complicated projects, there may be lags or slower performance.

<ul style="list-style-type: none"> • Cross-Platform: Functionality preserved while using several operating systems. • Version History: Provides history tracking and version control, enabling users to go back to earlier versions. • Design and Prototyping in One: combines functionality for both design and prototyping onto a single platform. • Plugins and Integrations: A vast ecosystem of plugins that improve workflow and functionality. • The Auto Layout feature makes responsive design easier by adapting layouts to various screen sizes automatically. • Vector Network: Offers scalability and versatility when using vector networks for design elements. 	<ul style="list-style-type: none"> • Learning Curve: Although user-friendly, individuals used to other design tools may find it to have a learning curve. • Offline Mode: When working without internet connectivity or with limited functionalities, there may be difficulties. • Limitations of Prototyping: More complex animations or interactions might not be as reliable as those of other tools. • Stability: Occasionally, users experience problems or malfunctions related to stability. • Compatibility: When sharing or exporting files with other design programs, there may be some compatibility problems. • Features for Exporting: Fewer export choices than with some other design programs.
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Table 5 : Advantages and Disadvantages of Figma

Prototyping Tools for Interaction Design

The creation of dynamic, interactive prototypes that mimic user experiences requires the usage of prototyping tools for interaction design. With the aid of these tools, designers can produce working prototypes that display complex user flows, animations, and interactions. By bridging the gap between interactive user experiences and static design elements, they enable stakeholders to test and visualize the functionality of the product prior to its deployment. They make it easier to comprehend user interactions in a more realistic way, which helps to improve design concepts and guarantee user-centricity.

InVision

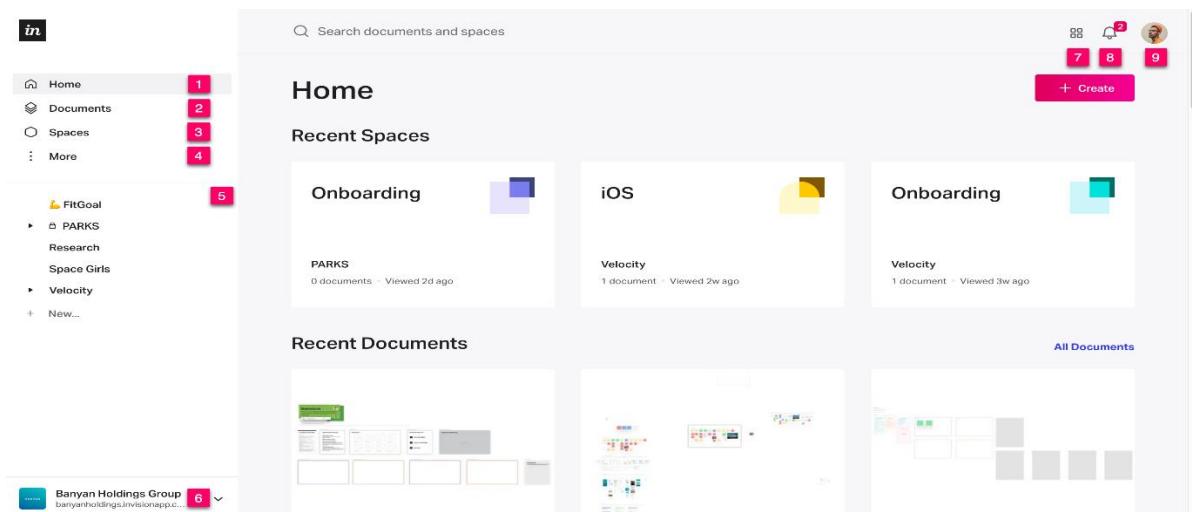


Figure 7: Invision

Prototyping software like InVision is popular because of its easy-to-use interface and ability to create interactive prototypes quickly. It is particularly good at helping designers quickly convert static designs into clickable and interactive prototypes. Easy screen and element connecting is made possible by InVision, enabling the development of simple to fairly complex prototypes. Although it might not be the best option for complex animations, it is nevertheless a useful tool for designers looking for rapid and fast prototyping..

Limitations: Although InVision is very user-friendly, it may not be suitable for complex interactions or highly animated scenes. It mostly supports simple interactions, and users may find it difficult to implement more intricate or complicated transitions and animations inside the tool's structure.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Interactive Prototyping: Focuses on easily producing clickable and interactive prototypes. • Input and Collaboration: Facilitates smooth stakeholder input gathering and collaboration. • Workflow Integration: Promotes a seamless design-to-prototype workflow by integrating effectively with other design tools. • Easy to Use: With an intuitive UI, designers of all ability levels can use it. • Real-Time Updates: Enables synchronization and real-time updates for team members who are working concurrently. • Version Control: Enables iterative design processes by providing version control and history tracking. • Presentation Mode: Offers a special presentation mode for showing stakeholders prototypes. 	<ul style="list-style-type: none"> • Limited Design Tools: Mostly prototyping-oriented, they don't have all the capabilities that design-centric tools have. • Complex Interactions: Compared to certain tools, you could run into issues with elaborate interactions or complex animations. • Integration constraints include restricted possibilities for integration or difficulties using specific third-party products. • Stability: Occasionally, customers have reported experiencing performance lags or stability difficulties. • Learning Curve: Although quite user-friendly, some sophisticated capabilities could take some time to get the hang of. • Export possibilities: Compared to other programs, designs and prototypes have fewer exporting possibilities. • Working offline has limitations on cooperation and functionality.

Table 6 : Advantages and Disadvantages of InVision

Proto.io

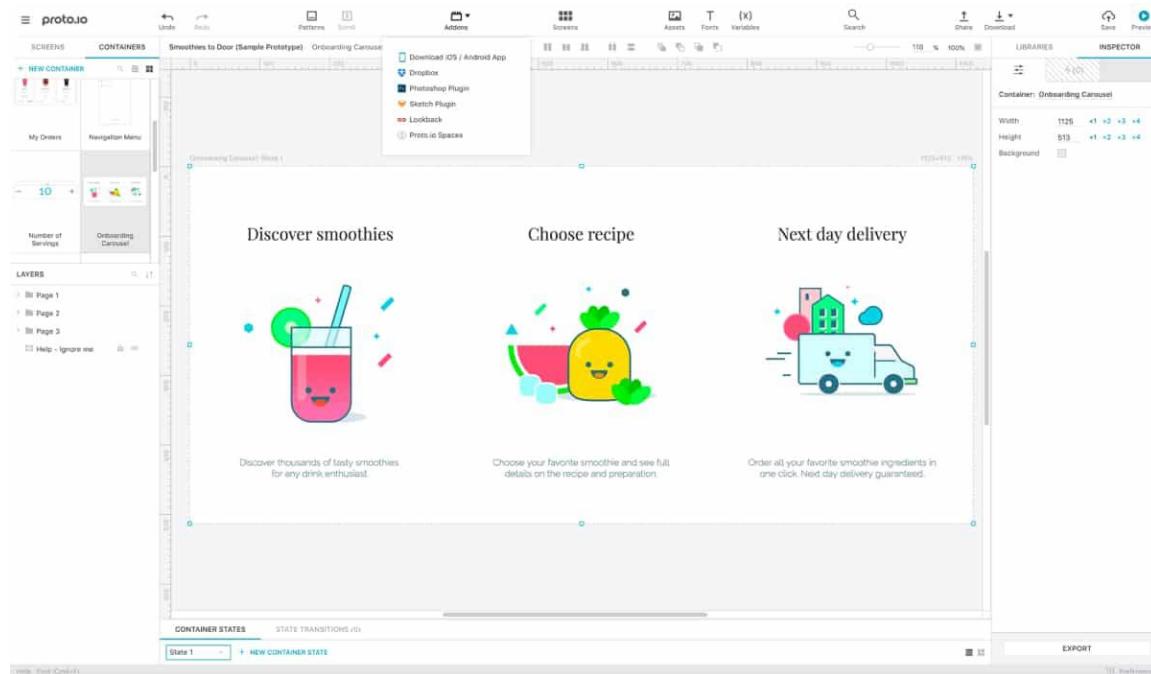


Figure 8: Proto.io

Proto.io is an expert in producing high-fidelity prototypes for mobile applications, emphasizing intricate animations and interactions. It is preferred because of its vast collection of animations and components, which enable designers to create intricate and lifelike mobile app prototypes. Its feature-rich environment, however, could be too much for novices or inexperienced designers to handle at first, taking some time to get used to..

Limitations Despite its strength, Proto.io may have a high learning curve, particularly for new users or designers who are not familiar with its feature set. Its many features could be too much for novice users to handle, and learning the program will take a lot of effort.

Advantages	Disadvantages
<ul style="list-style-type: none"> Elevated Reliability Prototypes: Focuses on producing realistic and high-fidelity interactive prototypes for mobile applications. Custom Interactions: Provides a great deal of flexibility in terms of 	<ul style="list-style-type: none"> Learning Curve: Novices or individuals who are not familiar with prototyping may find complexity challenging. Performance: Issues with larger or more intricate projects may arise.

<p>animations, transitions, and interactions.</p> <ul style="list-style-type: none"> • Device Preview: Enhances prototype realism by enabling real-time previews on genuine devices. • Rich Library: Offers an animation and UI component library to expedite the prototype process. • Interactive States: Facilitates the creation of several interactive states for components, hence improving the exploring experience for users. • Collaboration: Makes it simple to share information and get input from stakeholders. • Cross-Platform Accessibility: The ability for designers to access content on many operating systems. 	<ul style="list-style-type: none"> • Integration restrictions: restricted integrations or difficulties integrating with specific additional technologies. • Cost: In comparison to some other prototyping tools, this one may have comparatively costlier pricing plans. • Export Options: Restrictions on the formats or export options available for prototypes. • Stability: From time to time, users report bugs or stability problems. • Working offline can provide certain difficulties or limited functionality.
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Table 7 : Advantages and Disadvantages of Proto.io

Framer

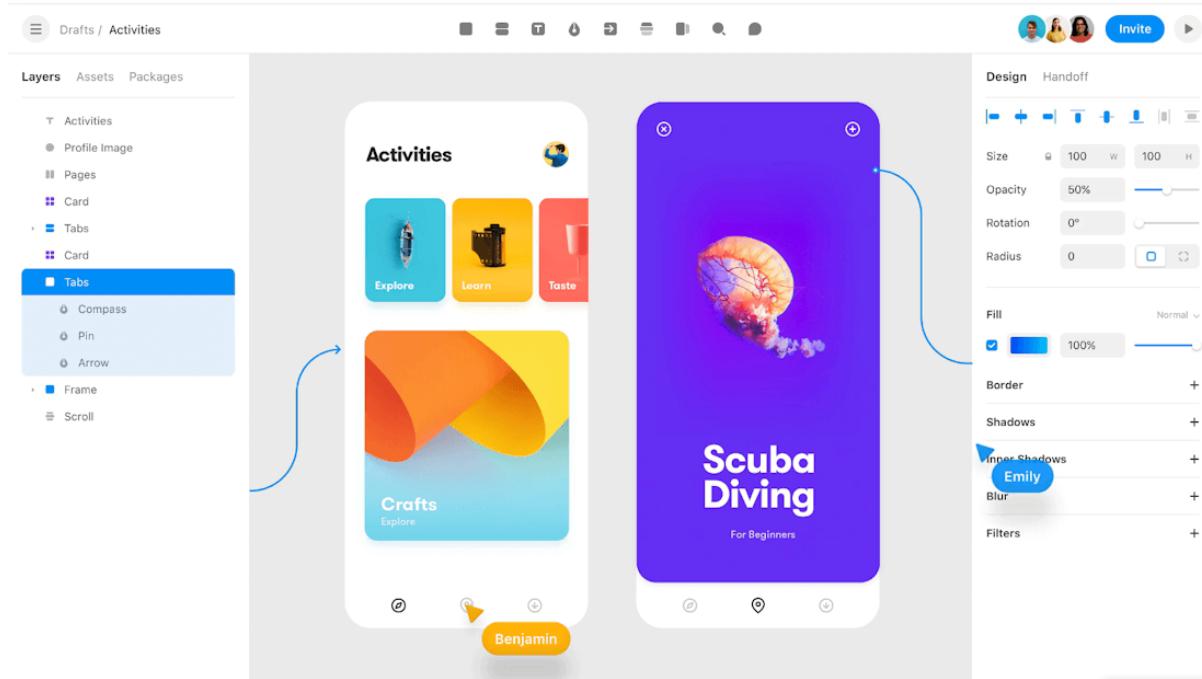


Figure 9 : Framer

Framer sets itself apart as a code-based prototype tool that gives designers the flexibility to produce complex interactions and animations. For experienced users looking to create dynamic, extremely detailed prototypes, it's perfect. The focus that Framer places on coding expertise enables exact customization and control over animation. Its dependence on coding, however, may turn off non-technical users or those with less programming experience, making it less user-friendly than more graphically-focused prototype tools..

Limitations Non-technical users or those with limited programming language skill may be discouraged by Framer's dependence on coding expertise. Comparing it to more visually-oriented prototype tools, its learning curve can be difficult for designers who are not experienced with coding.

Advantages	Disadvantages
<ul style="list-style-type: none"> A code-based method for producing highly interactive prototypes with sophisticated animations is provided by code-based prototyping. 	<ul style="list-style-type: none"> Learning Curve: For optimal usage, requires knowledge of JavaScript or coding.

<ul style="list-style-type: none">• Custom Interactions: Enables complex design expressions by offering a great deal of control over interactions and animations.• React Integration: Makes use of the React framework to facilitate easy integration with web apps that are React-based.• Real-Time Preview: Enables designers to view changes rapidly by supporting live previews.• Encourages team members to work together and share information.• Advanced Animations: Enables the creation of intricate and lifelike prototype animations.• Plugin Ecosystem: Extends its features with a developing ecosystem of plugins.	<ul style="list-style-type: none">• Complexity: Designers searching for more straightforward prototype tools may be put off by complexity.• Performance: Larger projects may encounter hiccups or problems with performance.• Integration Difficulties: When using specific design tools, one may run into integration difficulties or limits.• Stability: Occasionally, users run into glitches or stability problems.• Limited Platform Support: Its applicability for other platforms is restricted to web-based prototypes.• Export Options: Not as many as with other programs for prototyping.
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Table 8 : Advantages and Disadvantages of Framer

Code-Based Prototyping Tools

Developers can use programming languages like HTML, CSS, JavaScript, or specialized frameworks like React or Angular to generate prototypes with the help of code-based prototyping tools. They offer complete creative freedom while creating prototypes, enabling complex and personalized designs. These tools support developers who know how to write code and make it possible to create interactive, fully adjustable prototypes. They might, however, take longer to construct and necessitate coding knowledge.

HTML/CSS/JS



Figure 10 : HTML/CSS/JAVASCRIPT

The three main languages used in web development are JavaScript, HTML (HyperText Markup Language), and CSS (Cascading Style Sheets). While CSS affects the appearance and layout, JavaScript provides functionality and interactivity to the content structure provided by HTML. When combined, they give developers total freedom when building prototypes from the ground up. They give developers complete control over behavior and design, making them perfect for highly personalized and interactive prototypes. However, prototype using these languages can take a while, especially if you're prototyping quickly, and it requires a good grasp of coding fundamentals.

Advantages: When it comes to prototyping, HTML, CSS, and JavaScript offer unmatched versatility. With total control over functionality and design, developers may create highly personalized, interactive prototypes. These technologies are fundamental to web development, so developers who know how to code and want a high degree of customization in their prototypes can use them.

Limitations: Despite their adaptability, HTML/CSS/JS may be too time-consuming for quick

prototyping, particularly for detailed designs or more complicated interactions. These languages require coding knowledge to create working prototypes from scratch, which may be difficult for designers who are not as proficient with computers.

React/Angular/Vue.js



Figure 11: React/Angular/Vue.js

Popular JavaScript frameworks for creating scalable and dynamic online applications include React, Angular, and Vue.js. Their hierarchical architectures and reusable components make it easier for developers to produce prototypes quickly. These frameworks encourage a modular approach to development by offering pre-built components and libraries, which expedites the prototype process. Vue.js offers simplicity and flexibility, Angular delivers a strong framework, while React concentrates on component-based development. But they could have a harder learning curve, especially for people who are unfamiliar with the framework, and it would take longer to become proficient in their syntax and customs.

Advantages: Frameworks that give developers reusable components, like as React, Angular, and Vue.js, encourage a modular approach to prototyping. By providing pre-built structures and components, these frameworks expedite the development process and help developers produce prototypes more quickly. They also guarantee maintainability and scalability by promoting well-organized and structured codebases.

Limitations: Although these frameworks are scalable, they have a high learning curve, especially for users who are not familiar with the particular framework. To fully utilize the framework, one must become proficient in its syntax, conventions, and ecology. This learning curve could be difficult, particularly if quick, rapid prototyping is needed.

UI Design and Prototyping Tools

prototype and design capabilities are combined into one platform by UI design and prototype technologies like Adobe Creative Suite, Figma, or Adobe XD. The design process is streamlined by these technologies, which enable smooth transitions from interactive prototype to design conceptualization. They guarantee a smooth design-to-prototype process by enabling designers to produce aesthetically pleasing interfaces while also directly prototyping interactions.

Adobe Creative Suite (Photoshop, Illustrator)



Figure 12 : Adobe Creative Suite (Photoshop, Illustrator)

Industry-standard programs like Photoshop and Illustrator are included in the Adobe Creative Suite, which meets a variety of design requirements. Photoshop is an image editing tool that lets designers work with and generate raster graphics. It's perfect for intricate visual design work, digital painting, and fine photo editing. Conversely, Illustrator is a vector-based program that can be used to create accurate and scalable logos, images, and illustrations. Although Photoshop and Illustrator are capable design programs, they are not specifically designed for prototyping. They are frequently used by designers to produce graphics and elements that can be used to interactive mockup prototype tools.

Advantages: Adobe's Creative Suite, which includes Illustrator and Photoshop, provides flexible tools for developing complex user interfaces. Designers are skilled at precisely creating intricate images, icons, and layouts. Although not specifically designed for prototyping, these

technologies provide a strong basis for producing design elements that may be imported or utilized with prototyping software in the future.

Limitations: While Photoshop and Illustrator are capable of creating designs, they do not have specific features for prototyping. Using these technologies to get from static designs to interactive prototypes might be difficult. The process of prototyping is made more difficult by the need for additional software or plugins to achieve interactive features or animations.

Figma/Adobe XD

Contemporary all-in-one design and prototype platforms include Adobe XD and Figma. Known for its collaborative features, Figma is a cloud-based tool that allows team members to work together in real-time on design and prototyping projects. It facilitates a smooth design-to-prototype process by offering a complete environment for both designing and prototyping. Similar to other Adobe products, Adobe XD provides a unified platform for design and prototype along with smooth integration. By enabling designers to produce interactive prototypes right within the program, it expedites the design process. Both Adobe XD and Figma are easy to use, suitable for novice and expert designers alike, and they help design teams collaborate effectively.

Advantages: All-in-one solutions that support both design creation and prototype are Figma and Adobe XD. They enable a smooth workflow from design to prototype on a single platform. The entire design process can be streamlined by designers because they can directly prototype interactions while creating designs. The collaboration aspects of these applications are excellent, enabling several team members to collaborate on the same file at once.

Limitations: Although Figma and Adobe XD are feature-rich programs, they may not have all of the sophisticated functions seen in more specialist design suites like Adobe Creative Suite. When using Figma or XD, designers who are used to complex features or specialized tools like Photoshop or Illustrator may find these lacking, necessitating concessions or workarounds in their design process.

Collaborative Prototyping Tools

During the prototyping stages, collaborative prototyping solutions like as Teams, Slack, Mural, and Miro prioritize teamwork and communication. They give groups of people a place to work together to develop prototypes, enable remote cooperation, and promote in-the-moment communication. Although these technologies may not provide comprehensive prototype features, they are invaluable in promoting cooperation and coordination across geographically dispersed teams during the prototyping phase.

Miro/Mural

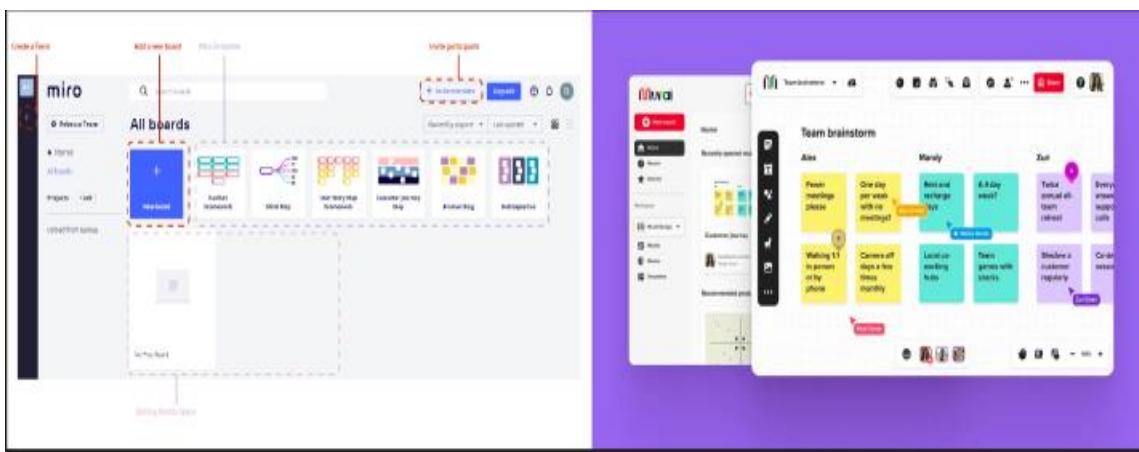


Figure 13 : Miro/Mural

Online whiteboard collaboration tools like Mural and Miro are made to help distant teams collaborate visually and work together as a team. With the help of these technologies, team members may brainstorm, sketch, and work together in real time on a virtual canvas. They include tools for collaborative brainstorming sessions, idea exchange, and visualization, including sticky notes, diagrams, and drawing tools. Because of their exceptional ability to support online collaboration, Miro and Mural are the perfect tools for distant teams looking to collaborate on projects, build prototypes, and collectively visualize ideas.

Advantages: Teams can collaborate to design prototypes by using platforms like Mural and Miro. They are excellent at facilitating remote collaboration, which enables team members to collaborate on prototypes from different geographical locations. With features like sketching tools, sticky notes, and virtual whiteboards, these products promote group idea development and brainstorming sessions.

Limitations: Although excellent for teamwork, Miro and Mural may not have all of the comprehensive prototype features of more specialist prototyping programs. Their main goal is to make collaborative brainstorming and visualization easier, which may restrict the level of intricacy and sophistication that can be achieved in the prototypes made on these platforms.

Slack/Teams

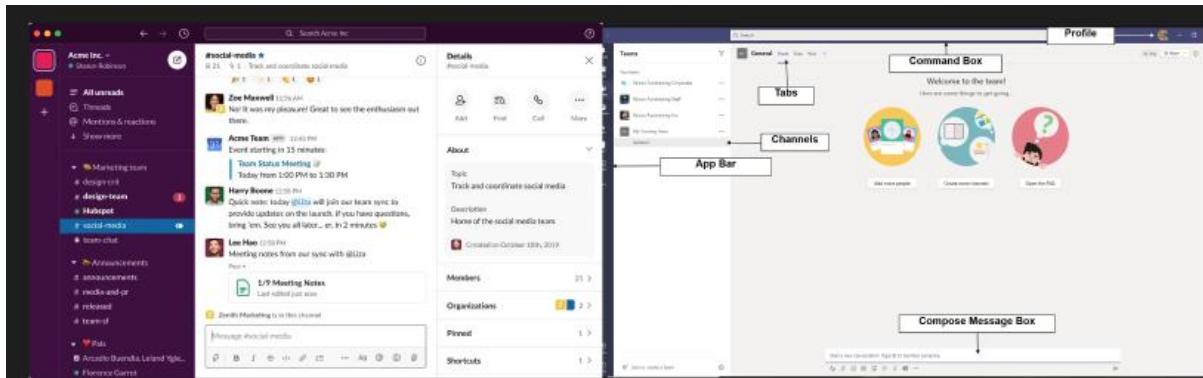


Figure 14 : Slack/Teams

The popular communication and collaboration tools Slack and Microsoft Teams facilitate team communication, file sharing, and project management. Even though they aren't specifically designed as prototype tools, they are extremely important for enabling team members to communicate in real time during prototyping. Slack facilitates effective team communication with its chat channels, file sharing, and connectors. In a similar vein, Microsoft Teams offers a central location for file sharing, conversations, and group workspaces. Throughout the prototyping phase, both platforms are vital tools for team members' collaboration, feedback sharing, and continuous communication.

Advantages: Slack and Microsoft Teams provide as venues for real-time communication, allowing team members to continue talking and interacting as the product is being prototyped. They are essential resources for discussing ideas, exchanging feedback, and organizing work. Through effective communication and teamwork, these platforms support team members during the prototyping phase.

Limitations: Slack and Teams are communication platforms rather than specific prototype tools, albeit being essential for cooperation. Although they encourage teamwork and communication, they don't specifically assist in prototyping; instead, their features are focused on file sharing, task management, and messaging.

Reviewing and Exploring Different End-user Categorizations, Classifications and Behaviour Modelling Techniques

Types of End-User Categorisations and Classifications

understanding the wide range of users that interact with software or systems requires a knowledge of end-user classifications. Developers, designers, and product teams can better identify and handle different user requirements, behaviors, and competency levels with the aid of these classes. The system's functioning and design are influenced by the unique preferences, abilities, and expectations of each user type. Here are a few well-known categories:

Casual End Users

A selected group of users known as "casual end users" utilize the system occasionally to accomplish routine chores. They interact with the system for basic functions and frequently have little technical proficiency. These users may not be familiar with complicated capabilities, thus they may need simple functionalities and intuitive interfaces. It is imperative to design the system with easily navigable and clear pathways to accommodate their sporadic interactions and guarantee a seamless user experience.

Naive or Parametric End Users

These individuals usually have little to no familiarity with comparable software or systems. They may not be experienced with more complex functionalities, therefore they may rely on common configurations or default settings. Clear instructions, tooltips, or system tutorials can help these users explore and make the most of the tools that are accessible. Their entire experience interacting with the system could be improved by simplified user interfaces with easily available alternatives.

Application Programmers

Skilled users with programming knowledge, application programmers work with the system to add or change features. To create or improve features, these users work closely with the frameworks and architecture of the system. To meet their needs, the system should offer comprehensive documentation, reliable APIs, and adaptable choices. For this user group, access to the system's underlying architecture and the capacity to add new functionalities via code are imperative.

Sophisticated End Users

End users with advanced knowledge exhibit familiarity and familiarity with comparable systems or software. They look for extensive functionality, sophisticated customization choices, and frequently make use of intricate features to make their jobs easier. By offering customizable shortcut keys, various configuration options, and a personalized user experience, you may increase users' pleasure and productivity with the system.

Standalone Users

These users utilize the system on their own, collaborating or interacting with other users seldom. They rely on the system to carry out their duties on its own. Self-sufficiency is essential for these users, and the system should provide them with all the tools, well-defined processes, and readily available resources they need to support their independent activities.

Specialized Users

These consumers have particular needs that necessitate customized features or user interfaces. They frequently have needs that differ from typical user behaviors, thus tailored solutions are required. Recognizing their specific needs and providing modifiable options or specialized modules within the system can efficiently handle their unique demands

End-user Requirement Gathering Methods and Techniques

The foundation of software development is end-user requirement gathering, which tries to identify, assess, and understand the requirements, attitudes, and actions of the people who will ultimately use the program. In this process, a variety of approaches and strategies are used to extract important insights necessary for creating user-centric solutions. These strategies cover a wide range of interactions, such as utilizing formal or informal meetings, conducting site assessments, and involving stakeholders. Software developers, designers, and project stakeholders can comprehend a variety of user viewpoints, preferences, and pain issues by combining these approaches. Teams can develop software solutions that meet end users' expectations and provide a smooth and enjoyable user experience by combining these strategies in different ways. This introduction emphasizes how important it is to apply a multimodal strategy to obtain thorough insights that inform software development that is in line with user needs.

- Stakeholder Interviews

Interviewing stakeholders is an essential way to get insightful information from people or organizations who are intimately related to the goal or development of the product. These interviews, which are done with clients, decision-makers, or representatives, focus on high-level goals, expectations, and particular needs. Through these interactions, stakeholder priorities and points of view may be directly understood, which helps to align software development with organizational objectives. However, in order to obtain thorough and correct information, they need to communicate skillfully and listen intently

- User Research

In order to gain a thorough insight of end users' wants, issues, and behaviors, user research methods include a variety of approaches such as surveys, observations, and interviews. User research yields essential insights into user preferences, pain spots, and usage habits by directly interacting with the target audience. These observations inform user-centric design choices, guaranteeing that the program fulfills actual user needs. For results that can be put into practice, this process can be time-consuming and requires in-depth analysis.

- Formal and Informal Meetings

Both types of meetings provide a forum for more open communication with users or stakeholders as well as organized conversations. Formal sessions offer a structured setting for in-depth requirement talks, while unstructured sessions encourage candid and open communication, which promotes team problem-solving and creative ideas. To make sure that all opinions are heard and that important needs are met, it is imperative to strike a balance between formality and structure.

- Site Audits

A site audit entails assessing current systems, interfaces, or processes in order to identify areas that require improvement as well as their strengths and shortcomings. These audits give a thorough understanding of the functioning and usability problems with the current system, serving as a foundation for determining what needs to be improved. They may not, however, be able to fully account for future user requirements or developing trends because they are restricted to evaluating current systems.

- Surveys and Questionnaires

These organized methods are used to get certain data from a greater number of respondents. They are effective at gathering quantitative insights about the preferences, beliefs, or experiences of users. Although they offer information from a larger user base, they could not be deep enough to understand complex user behaviours or motivations.

Initial Prototyping

The first step in the development of software or items is known as initial prototyping, and it involves building simple models or prototypes. Even though these prototypes are simple, they provide the foundation for later stages of development by helping to validate concepts, improve upon them, and get early feedback. They support understanding project requirements, analyzing functionalities, and visualizing layouts. Teams investigate several design options and functionality through early prototype, creating a cooperative atmosphere for improving and fine-tuning the final product. This stage is essential for reducing risks and guaranteeing that the finished product closely complies with user requirements and expectations.

Types of Initial prototyping

Paperboard Prototypes

Prototyping ideas on paperboard is a useful way to see and improve initial ideas. These physical models are easily adjustable, which makes it possible to make quick changes during brainstorming sessions or group discussions. Their ease of use promotes a creative approach to brainstorming, freeing teams from the burden of technical details to concentrate on key features. However, these prototypes may not accurately depict dynamic digital features or interactions due to their static nature, which limits their efficacy in communicating complicated functionalities.

Advantages	Disadvantages
<ul style="list-style-type: none">• Quickly creating low-fidelity prototypes to explain and visualize concepts is known as rapid conceptualization.	<ul style="list-style-type: none">• Limited Fidelity: Isn't realistic enough to accurately replicate intricate interactions or digital components.

<ul style="list-style-type: none"> • Cost-effective: Many iterations can be made without incurring large costs thanks to inexpensive materials. • Tangible Representation: Stakeholder participation and tangible feedback are facilitated by physical models. • Ease of Use: All team members can use it because no technical knowledge is needed. • Encourages Creativity: Facilitates a hands-on approach that inspires original thought and inventiveness. • Quick Changes: Facilitates quick prototyping cycles by being simple to adjust and alter. 	<ul style="list-style-type: none"> • Inaccurate Interpretation: Misinterpretations may result from digital features that are not adequately conveyed. • Time-Consuming for Details: Creating minute details may take a lot of time, which could reduce productivity as a whole. • Physical Restrictions: Digital experiences and screen-based interactions cannot be replicated by physical representations. • Deceptive impressions: May raise erroneous hopes regarding the digital features of the finished work. • Storage and Portability: It could be difficult to store several physical models, particularly for larger projects.
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Table 9 Advantages and Disadvantages of Paperboard prototypes

Contextual Prototyping

The idea behind contextual prototyping is to build prototypes in the actual settings in which the good or service will be used. By fully integrating designers into the context of the user, this approach offers insightful knowledge about the demands, challenges, and behavior of users. Designers can improve prototypes by studying real-world interactions and making adjustments to better meet user needs. However, conducting in-depth research is generally time-consuming and labor-intensive when using contextual prototyping, particularly when numerous settings need to be explored.

Advantages	Disadvantages
<ul style="list-style-type: none"> • User-Centric Design: Acquires knowledge about actual user wants and behaviors in their natural surroundings. • Comprehensive comprehension: Offers context-specific information that guides the creation of more user-relevant solutions. • Validating Concepts: By seeing real user interactions, design concepts are helped to be validated. • A holistic approach takes into account the limitations and surroundings that have an impact on user interactions. • Identifying Pain Points: Through firsthand observation, identify areas that require improvement and identify pain points for users. • Enhanced Usability: More usable products result from designs that are adapted to certain circumstances. 	<ul style="list-style-type: none"> • Resource-intensive: Needs a significant investment of time and money for field research and observation. • Challenges with Specificity: Results may not be generalizable and may be limited to specific user groups or situations. • Complexity in Execution: It can be difficult and time-consuming to incorporate contextual insights into prototypes. • Subjective Interpretations: There is room for personal interpretation and subjectivity in observations. • Difficulties in Data Collection: Collecting data in natural environments can be difficult and may not be exhaustive. • Informed Consent: In order to ensure ethical practices during observations, users' consent must be obtained.

Table 10 : Advantages and Disadvantages of Contextual Prototyping

Digital Prototyping

Using software tools, digital prototyping produces incredibly intricate and interactive prototypes of the finished product. Thorough user testing and feedback gathering are made possible by these prototypes, which closely resemble the real user interface and functionalities. It is helpful to communicate complex design aspects and interactions with digital prototypes. Nevertheless, creating complex digital prototypes could take some time, particularly in the early phases of the design process.

Advantages	Disadvantages
<ul style="list-style-type: none">• Realistic Simulations: Enables interactive digital products with realistic visuals.• Efficient Testing: This speeds up the development process by enabling quick testing and design iterations.• Enhanced Interactivity: Offers chances to demonstrate intricate user flows and interactions.• Cost-Effective Modifications: In comparison to actual prototypes, modifications are comparatively affordable.• Remote Collaboration: Uses digital sharing to make it easier for teams who are spread out to collaborate.	<ul style="list-style-type: none">• Complexity in Creation: It can take time and specialized knowledge to create complicated relationships.• Initial Learning Curve: It could take some time for users to get used to prototype tools and software.• Resource-intensive: Tools and software may need a large amount of hardware.• Misinterpretation of Fidelity: High fidelity may mislead stakeholders into believing that it is the finished product.• Technical Restrictions: Certain functionalities may not be able to be simulated due to limitations in tools.• Less Tangible Feedback: In user testing, physical prototypes provide a tangible element that this form of feedback lacks.

Table 11 : Advantages and Disadvantages of Digital Prototyping

Native Prototyping

Native prototyping is the process of designing prototypes with certain platforms or devices in mind, taking into account their distinct features and user interfaces. This method guarantees that the prototype closely resembles the planned platform, offering a more accurate depiction of the finished product. However, developing native prototypes for several platforms can be labor- and resource-intensive, necessitating distinct iterations for every platform or gadget.

Advantages	Disadvantages
<ul style="list-style-type: none">• insights specific to a certain platform: tells us how users will engage with the finished product on that platform.• Close connection with platform-specific features and capabilities is made possible by seamless integration.• Enhanced User Experience: Designs are customized for the platform, providing a more natural and user-friendly interface.• Realistic Representations: Provides a more accurate user experience by simulating the environment of the finished product.• Testing Efficiency: In a platform-specific setting, testing can be more thorough and targeted.	<ul style="list-style-type: none">• Platform Restrictions: Creative freedom in design may be curtailed by platform-specific restrictions.• Multiple Versions: It can take more time and effort to design prototypes for many platforms.• Platform Dependency: The prototype could be impacted by modifications to platform rules or technological advancements.• Learning Multiple Platforms: As skill requirements rise, developers must have knowledge of multiple platforms.• Maintenance Difficulties: Since updates and modifications are required, maintaining several versions might be difficult.

Table 12 : Advantages and Disadvantages of Native Prototyping

Applying end-user classification and behaviour modelling to Web Based Application of Kuoni Leisure Travel Agency

As the author used web based application as a prototyping methodology to the Kuoni Leisure Travel agency. For Kuoni's travel management system, a web-based application prototype process was selected based on various strategic factors. First and foremost, choosing a web-based strategy is in line with the changing needs of the travel business today, as clients are looking more and more for digital travel solutions. By using this approach, Kuoni guarantees a platform that is accessible on all devices, which is convenient for both employees and customers, who frequently want to manage travel arrangements while on the road.

By making this decision, Kuoni is able to enable smooth communication and cooperation between its internal employees—who are in charge of designing customized travel experiences—and the outside tourists who are looking for unique travel experiences. An online application creates an atmosphere that is helpful for effective communication and quick feedback integration, which is essential for improving user experience and satisfying consumer demands.

Additionally, running a web-based application prototype gives Kuoni the adaptability to keep improving and refining the system over time. The iterative process facilitates the gradual integration of user feedback, guaranteeing that the end result is optimally tailored to meet the varied requirements of both Standalone Users (outside visitors) and Casual Users (inside workers). In the end, this process helps Kuoni to develop a user-centered travel management system that is adaptable, simple to use, and in line with the changing tastes of modern tourists.

So as the end user classification author choose the casual users and standalones users Because the application would be used by Customers of Kuoni as well as the staff of Kuoni travel agency. If it explains this is how its done as first user categorey casual users in Kuoni, Casual Users stand in for internal staff members who use the system sometimes. For example, in order to handle questions or manage bookings, customer support professionals may want access to a simplified dashboard. These users need a solution that simplifies their irregular interactions and helps them with their simple administrative duties.

As the second end- user classification standalone users these are Kuoni's outside clients who

make heavy use of the web application to arrange and reserve travel. They use the platform thoroughly, looking up locations, evaluating their selections, and making bookings. This user group need a system that is both comprehensive and easy to use in order to meet their various trip planning demands and provide an enjoyable user experience.

After that author explains about the behaviour of the modelling technique. Author choose the modelling technique as the questionnaires and surveys. Surveying customer service agents and new travellers provides insightful information. Staff surveys reveal their process, difficulties, and the particular features they need in order to effectively handle questions. In the meanwhile, surveys sent to prospective tourists reveal their preferences, areas of dissatisfaction with current travel planning techniques, features they would want to see in an online platform, and expectations for user engagement.

So this is the main idea of how author applying end user classification and behaviour modelling to the web application of Kuoni travel Agency .

Suggesting a plan to use appropriate prototyping methodology and tools to conduct end user testing

Author select Digital Prototyping in Figma, which is represented by changing to alpha 1, alpha 2 and beta versions, marks a significant turning point in the development process. A dynamic platform for producing high-fidelity prototypes with complex interactions and minute design details is provided by Figma's digital environment. Because of its collaborative character, it makes teamwork and ongoing editing easier, which expedites the design process and guarantees stakeholder alignment. Iterative design adjustments based on feedback from users are supported and the efficacy of user testing is improved by the tool's capacity to accurately mimic the final product and replicate interactions.

Throughout the project lifecycle, Figma's planned combination of Digital Prototyping seeks to capitalize on the advantages of each methodology. The early focus on Paperboard Prototyping speeds up the process of visualizing fundamental ideas and enables rapid feedback processes. The creation of more complex prototypes is made possible by later changes to Figma's Digital Prototyping approach, which facilitate thorough user testing and iterative design improvements.

This method stresses early-stage quick ideation and cost-effectiveness, but it also highlights the value of complex, interactive prototypes for thorough testing and improvement. The smooth alignment of the final product with user expectations and business objectives is ensured by the progressive shift from low-fidelity to high-fidelity prototypes.

The impact of common prototyping methodology within the software development lifecycle

Figma, as a digital prototyping tool, significantly influences the software development lifecycle (SDLC), particularly in the context of Kuoni's travel application iterations (alpha 1, alpha 2, and beta). This tool serves as a pivotal asset in modern development cycles, enabling teams to collaborate effectively, streamline design processes, and swiftly iterate through various versions. With Figma, the iterative nature of the development cycle becomes more pronounced, allowing for rapid design changes and quick adaptation to user feedback.

In the initial stages, Figma aids in conceptualizing and visualizing the travel application's interface and functionalities. It facilitates comprehensive collaboration among designers, developers, and stakeholders, fostering an environment where diverse insights and suggestions converge to shape the product's design direction. By incorporating feedback from different iterations, the tool assists in refining user experience (UX) and addressing functional requirements effectively.

Moreover, Figma's interactive features empower the team to present and test different functionalities early in the development phase. This not only accelerates the development process but also allows for the identification of potential issues or flaws before extensive coding efforts are undertaken. By providing a platform for visual representation, Figma aligns development efforts with user expectations and business goals, ensuring a more user-centric final product.

The tool's capacity to streamline communication and collaboration, facilitate rapid iterations, and empower teams to capture user-centric design inputs significantly influences the SDLC. Its utilization across multiple phases, from conceptualization to the refinement of beta versions,

underscores its pivotal role in enhancing productivity, refining user experiences, and ultimately delivering a high-quality travel application for Kuoni.

Appropriate tools to develop multiple prototypes

Choosing the appropriate tools to create several prototypes is essential to guaranteeing the efficacy and efficiency of the prototyping procedure. These technologies are essential for turning concepts into concrete representations, supporting iterative design, and getting input from users. Each area offers unique benefits for producing varied and useful prototypes, whether it's web application prototyping, object-oriented frameworks, 4th generation system use, interface creation, or hypermedia management. With this extensive range of tools, designers and developers can create simple wireframes or intricate, interactive prototypes, which helps them refine concepts and improve user experiences. The success of the prototypes in the end and the iterative design process can both be greatly impacted by selecting the right tools from these categories. Now author will be discussed each areas,

Hypermedia Management Tools

Programs that handle multimedia-rich content well include Adobe Animate and Tumult Hype. Animated and interactive content can be made for web-based prototypes with Adobe Animate. Tumult Hype is centered on interactive features and HTML5-based animations that enable the modeling of user experiences through dynamic visuals. These tools are excellent at adding complex animations and multimedia components to prototypes, which improves user experience and engagement.

Interface Builder Tools

Popular options for interface design and prototyping include Sketch, Figma, and Adobe XD. Also can use for web applications. Sketch facilitates collaborative design processes by providing a vast collection of UI components and user-friendly design elements. The cloud-based platform from Figma makes it easier for team members to collaborate in real-time, which streamlines the design and prototype processes. With its seamless integration with other Adobe products, Adobe XD gives designers the ability to manage their design system and produce interactive prototypes.

4th Generation Systems

These systems, which emphasize interactive prototype, include tools for prototyping such as Axure RP and Justinmind. Using conditional logic, designers can generate highly interactive and dynamic prototypes with Axure RP that are ideal for replicating intricate application behaviors. With Justinmind's all-inclusive prototyping, usability testing, and code generation suite, designers can create intricate and useful prototypes with ease.

Object-Oriented Application Frameworks

Although they are mainly used for application development, frameworks like React, Angular, and Vue.js help speed up the construction of prototypes. With its component-based architecture, React, for example, enables developers to create reusable user interface components, facilitating quick prototyping through the assembly of pre-existing pieces. Prototyping and application development tools are part of Angular's extensive ecosystem, which guarantees consistency between early iterations and finished projects. Vue.js is a simple and flexible framework that allows for rapid prototyping without sacrificing scalability.

Web Application prototype

For those primarily in need of web application prototype, Balsamiq and Proto.io are available. The simplicity of Balsamiq comes from its ability to quickly generate ideas and conduct preliminary concept exploration through low-fidelity wireframing. However, Proto.io offers a more sophisticated framework for building complex, high-fidelity prototypes that may be used to mimic web application experiences. It is perfect for interactive web-based prototypes because of its wide feature set and emphasis on responsiveness.

Gaining access to the prototype of the Kuoni Leisure web-based system and justifying the prototype methodology used

Building a prototype for the web-based application needed by the Kuoni Leisure travel business is the suggested project plan that will be delivered to the author, according with the scenario . The scenario provided by the author indicates that upon examination of the application's needs, it was observed that while the application's basic needs were clear, its wide requirements were not. Staff members and servers at Kuoni Leisure are the primary users of the web-based program that Kuoni Leisure requires, indicating that the application's end users can be divided into two groups:

Standalone users and casual end users. The author of this study covered many kinds of prototyping models, methodologies, and methods, as well as tools. In this case, the most suitable prototyping technique for developing a prototype for the web-based application that the Kuoni Leisure travel company needed was progressive prototyping. Furthermore, as Kuoni Leisure is a web-based application, it is possible to apply even severe prototyping techniques when needed. The procedures, equipment, and other items utilized in developing a prototype for the web-based application that the Kuoni Leisure travel agency requested are detailed by the author below.

As author Author created As a Digital prototype author used Figma prototyping tool. So author used 3 versions. The 3 versions are Alpha version 1 , Alpha version 2 and Beta version. So in Alpha version 1 , Alpha version 2 and Beta version was made by using Digital prototype. Figma was helpful to make success interfaces for these. The following describes how three versions of the web-based application prototype—which was demanded by the Kuoni Leisure travel agency—were developed with feedback from users. To meet the needs for the Kuoni Leisure web based application, Alpha Version was developed in keeping with the scenario . There, 17 interfaces were designed to satisfy all the requirements for the Alpha Version I prototype of the entire web-based application.

“

The Interface and the Functions

- Home Page

In home page user can see the heading of welcome to the page and after that in the bottom it shows a explore button when user click it user can go to the user menu interface. This page can view for the guest also. In home page above there is a nav bar in there are home, menu, contact us and about us are showed.

- Menu Page

In menu page the user can see there are user dashboard icon , sign in and sign up icon, Inquiry create icon ,inquiry tracking icon ,travel packages icon and guest inquiry. Basically if a user is a guest then should go to the guest inquiry to book a tour . If user need to get more services from this web application user need to sign up/sign in.After that user can also maintain a user dashboard. In inquiry create user can book a tour but only for registered users.

- User Dashboard

In user dashboard there are 4 categories that are recent activities , Travel packages , Ongoing inquiry ,Inquiry tracking. The user dashboard can use only registered users in this site. In recent activities tab user can upload users recent went tours and photos. In travel packages there are packages for user to travel . Ongoing inquiry means the user can see the booked trips and finally user can see tracking of inquiry.

- Sign In portal

In sign in portal user should add email address and password to enter the web site and also should choose the if it is a customer or a staff member. Because this website is use for both staff and customers.

- Sign Up Portal

In sign up portal user should enter a email address , Enter a username and a strong password .Also user should choose male or female then choose if the user is a customer or staff after that user can click the sign up button.

- About Us

In about us user can see the mission and visions of Kuoni Leisure Travel Agency. The web site of Kuoni explain everything about the company in About Us page.

- Inquiry Page

In inquiry page user can book a tour that user wants. In this page user should enter the Customer name ,Email, Category of customer Local or Foreign because this web pages are used by locals and Foreign. After that Select gender male or Female, enter person count, enter adults count and Childrens count , enter the start date of the tout , enter the end of the date of tour ,Day count that staying , enter the night count that staying ,enter the token No of Hotel , enter the room category ,room count that user like Wise. So in here user get automatically the inquiry ID and The tracking ID after that user get click the create an Inquiry. Basically this interface can use only the registered users at Kuoni Travel Agency.

- Guest Inquiry Page

This page made for the Guests that means not a registered at Kuoni Travel Agency. In this page user should enter the Customer name ,Email, Category of customer Local or Foreign because this web pages are used by locals and Foreign. After that Select gender male or Female, enter person count, enter adults count and Childrens count , enter the start date of the tout , enter the end of the date of tour ,Day count that staying , enter the night count that staying ,enter the token No of Hotel , enter the room category ,room count that user like Wise. So in here user get automatically the inquiry ID and The tracking ID after that user get click the create an Inquiry.

- Inquiry Tracking Portal

In this page user can look the tracking of the tour that user made. User need to enter the Inquiry ID and click the Search button also if don't user can click the delete button. There is a space also in grey color in there will see when user search the Inquiry will appear.

- Travel packages pages

In travel package there are 2 interfaces one interface shows the Explore the world and other interface shows the Explore the Sri Lanka. In explore world interface there is a bar that can

enter location, type, date and guest number after that it appears the packages with the location and the days that can stays and the price of the package.

- Admin Menu Page

This will be for the staff members. In there shows travel package management , Inquiry management , Inquiry tracking Management and Guest Inquiry Management.

- Inquiry Management Portal

These inquiries are from the registered customers at the Kuoni Travel Agency. In this page it can use only by the staff members. In this page Admin can see the entered Customer name ,Email, Category of customer Local or Foreign because this web pages are used by locals and Foreign. After that admin can see the Selected gender male or Female, entered person count, entered adults count and Childrens count , entered the start date of the tout , entered the end of the date of tour ,Day count that staying , entered the night count that staying ,entered the token No of Hotel , entered the room category ,room count that user like Wise. So in here admin also can see the inquiry ID and The tracking ID after that user get click the create an Inquiry Also admin can create the inquiries, update the inquiries ,Delete the inquiries and search the inquiries that want as the customers. In here admin can manage all the inquiries.

- Inquiry Guest Management

These inquiries are from the guests of Kuoni Travel Agency. In this page it can use only by the staff members. In this page Admin can see the entered Customer name ,Email, Category of customer Local or Foreign because this web pages are used by locals and Foreign. After that admin can see the Selected gender male or Female, entered person count, entered adults count and Childrens count , entered the start date of the tout , entered the end of the date of tour ,Day count that staying , entered the night count that staying ,entered the token No of Hotel , entered the room category ,room count that user like Wise. So in here admin also can see the inquiry ID and The tracking ID after that user get click the create an Inquiry Also admin can create the inquiries, update the inquiries ,Delete the inquiries and search the inquiries that want as the customers. In here admin can manage all the inquiries

- Travel Package Management

This page is that when user select a package then the admin can see it. In here admin can see the inquiry ID, Package name, package type ,package price ,Duration of the tour, Distance ,Location ,Person count, Hotel No and the image of package. So the Admin can insert, update, delete, search as the customer says.

- Management Portal Panel

In this page admin can search the packages, customers and Inquiries IDs and can get the updates of it. In here all are managed by the admin.

Alpha Version I of Kuoni Leisure Web Based Application Prototype

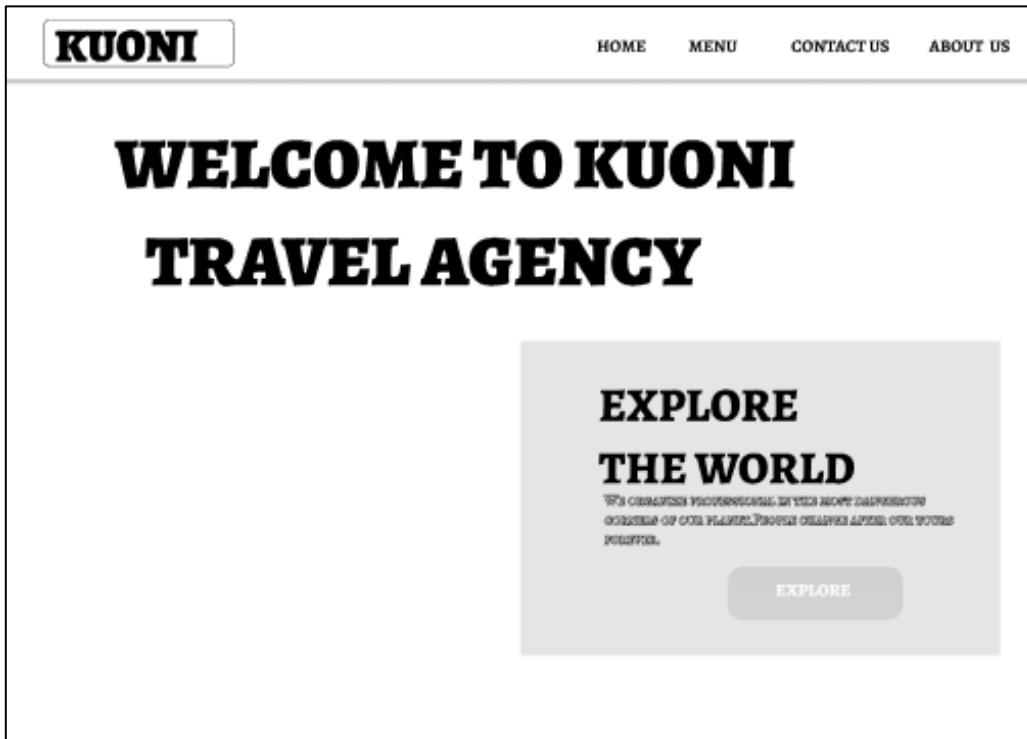


Figure 15 :Alpha version I (Home Page Interface) Developed by Author

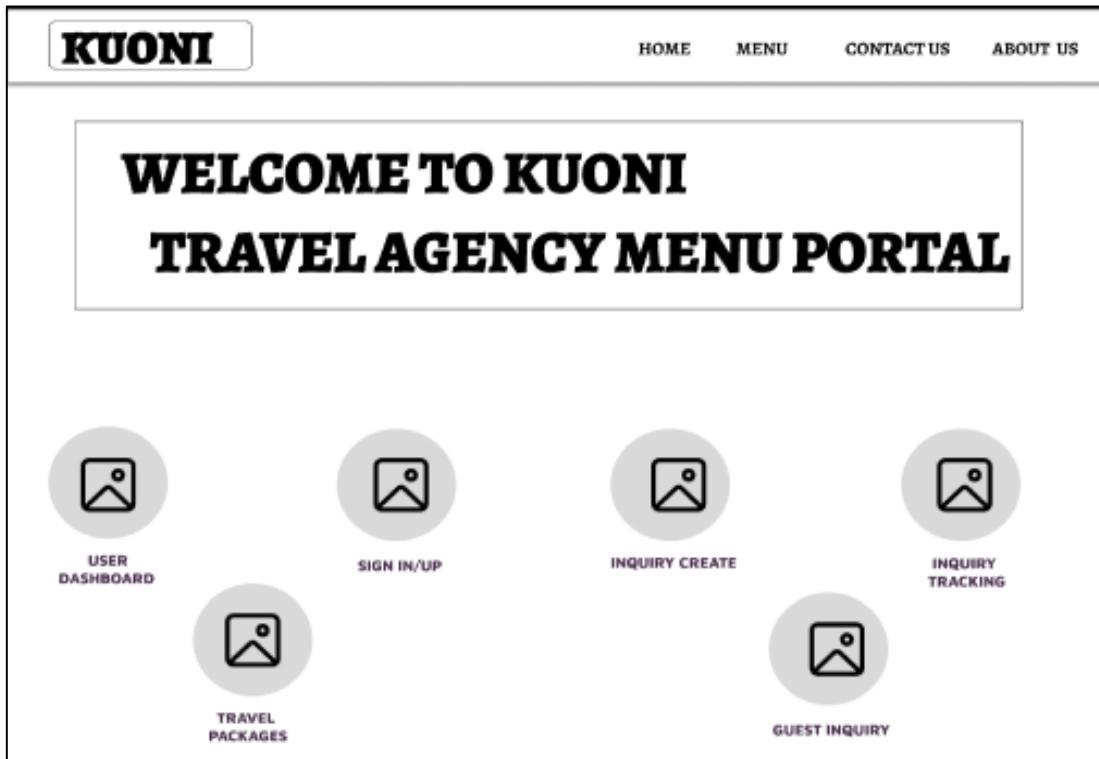


Figure 16 : Alpha version I (User Menu Page Interface) Developed by Author

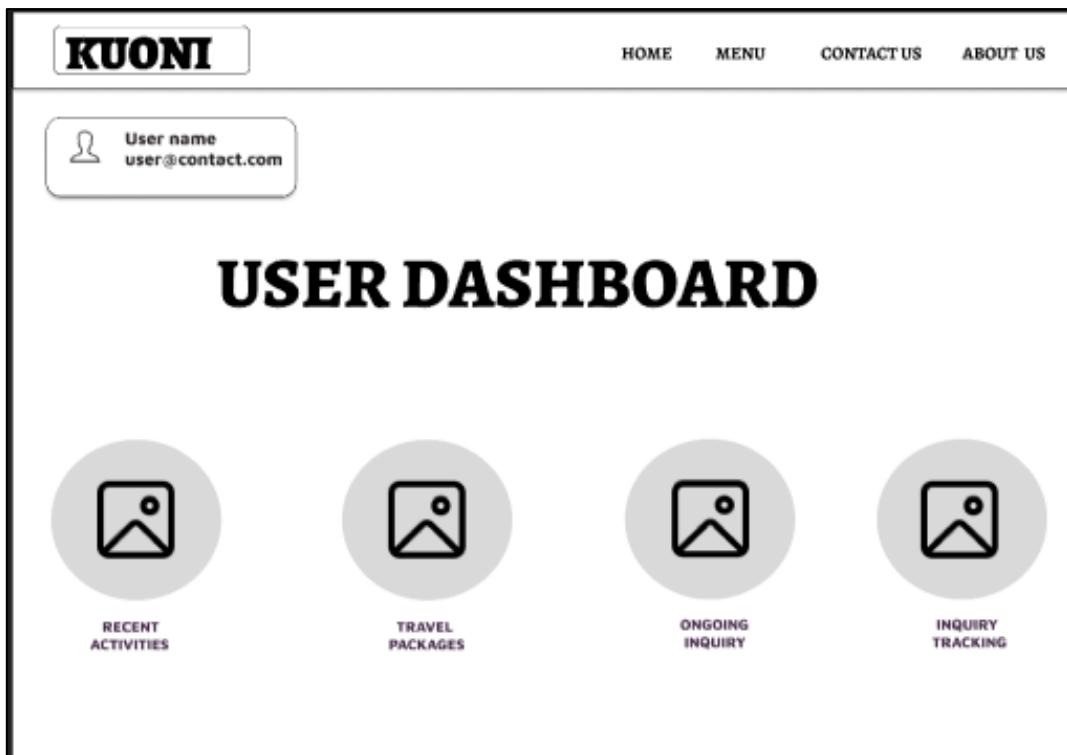


Figure 17: Alpha version I (User Dashboard Page Interface) Developed by Author

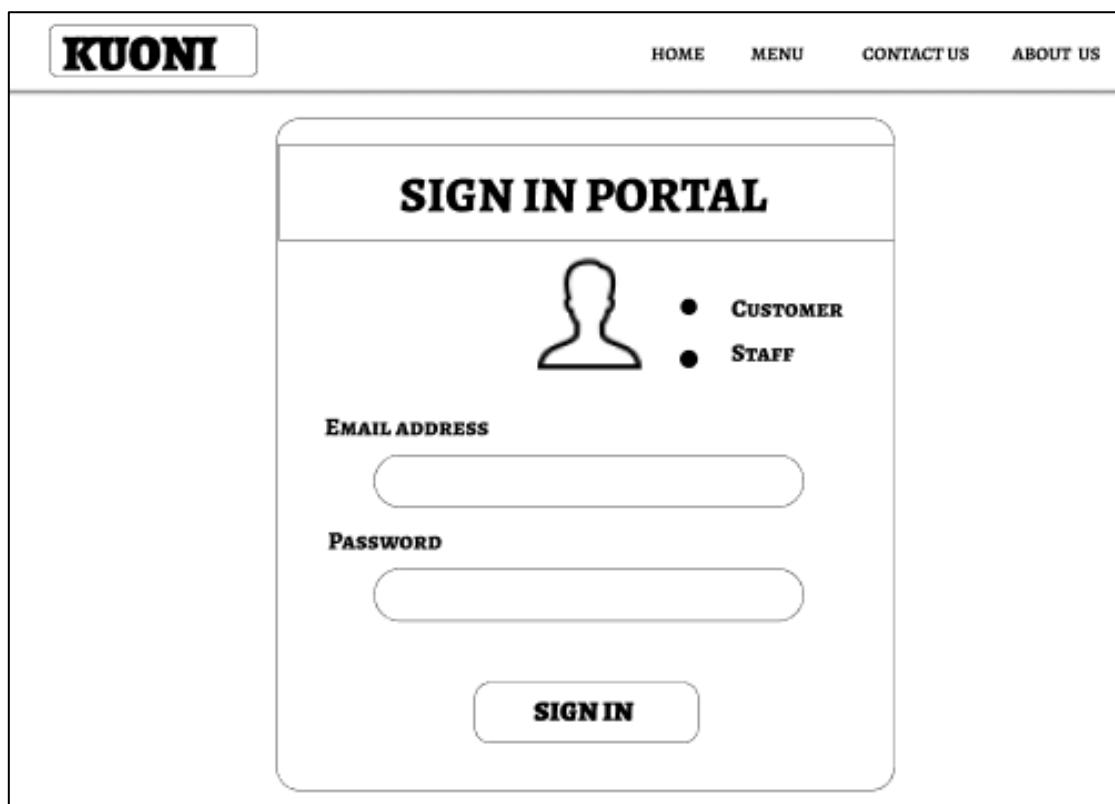


Figure 18: Alpha version I (Sign In Page Interface) Developed by Author

KUONI

HOME MENU CONTACT US ABOUT US

SIGN UP PORTAL



- CUSTOMER
- STAFF

EMAIL ADDRESS

PASSWORD

USERNAME

RE-PASSWORD

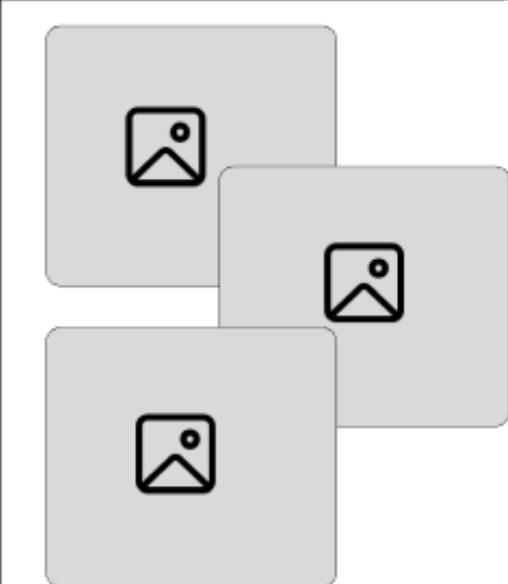
MALE FEMALE

SIGN UP

Figure 19: Alpha version I (Sign Up Page Interface) Developed by Author

KUONI

HOME MENU CONTACT US ABOUT US



CONTACT US

0112738394
kuoni@gmail.com
www.Kuoni.lk
Colombo

Figure 20: Alpha version I (Contact Us Page Interface) Developed by Author

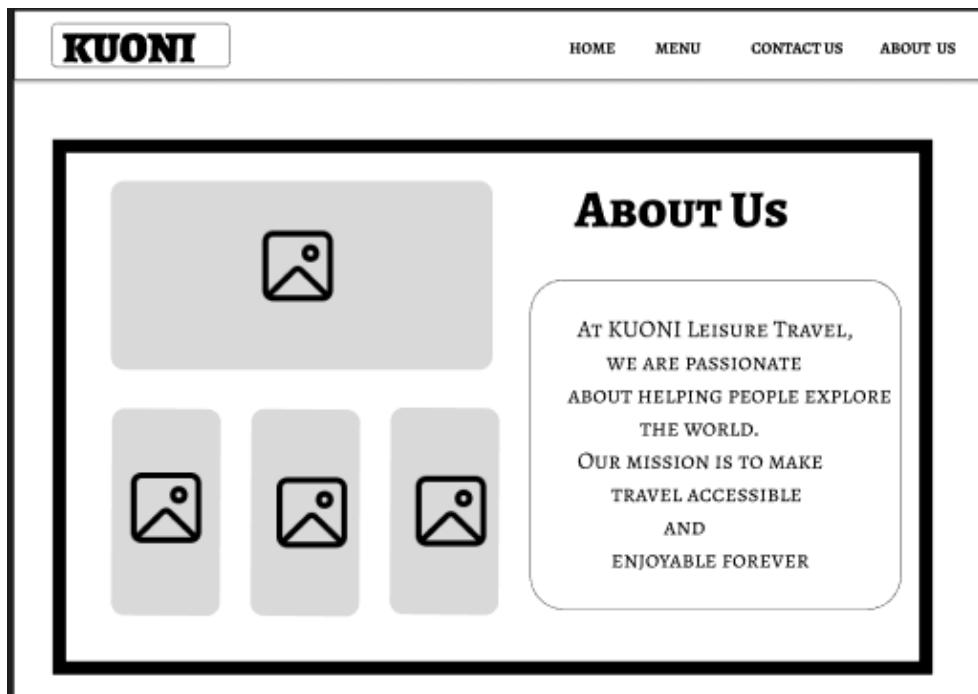


Figure 21: Alpha version I (About Us Page Interface) Developed by Author

The screenshot shows the 'MAKE A INQUIRY FOR YOUR TOUR WITH KUONI TRAVEL AND TOURISM AGENCY' page. At the top, there is a navigation bar with links for HOME, MENU, CONTACT US, and ABOUT US. Below the navigation bar, there is a large section titled 'MAKE A INQUIRY FOR YOUR TOUR WITH KUONI TRAVEL AND TOURISM AGENCY' in bold capital letters. The page contains various input fields for user information, including:

- Inquiry ID :
- Customer name :
- Email Address :
- Customer : Local Foreign
- Gender : Male Female
- Person count :
- Adult's count :
- Children's count :
- Start Date :
- End Date :
- Days count :
- Nights count :
- Hotel token No:
- Rooms Category:
- Room count :
- Hotel cost :
- Other services cost :
- Transport cost :
- Tracking ID :

On the right side of the form, there is a button labeled 'CREATE AN INQUIRY'.

Figure 22 : Alpha version I (Inquiry Page Interface) Developed by Author

KUONI

HOME MENU CONTACT US ABOUT US

**MAKE A INQUIRY FOR YOUR TOUR WITH KUONI TRAVEL AND
TOURISM AGENCY AS A GUEST**

Inquiry ID :	<input type="text"/>	Days count :	<input type="text"/>
Customer name :	<input type="text"/>	Nights count :	<input type="text"/>
Email Address :	<input type="text"/>	Hotel token No:	<input type="text"/>
Customer :	Local	Foreign	
Gender :	Male	Female	
Person count :	<input type="text"/>	Rooms Category:	<input type="text"/>
Adult's count :	<input type="text"/>	Room count :	<input type="text"/>
Children's count :	<input type="text"/>	Hotel cost :	<input type="text"/>
Start Date :	<input type="text"/>	Other services cost :	<input type="text"/>
End Date :	<input type="text"/>	Transport cost :	<input type="text"/>
		Tracking ID :	<input type="text"/>

**CREATE AN
INQUIRY**

Figure 23: Alpha version I (Guest Inquiry Page Interface) Developed by Author

KUONI

HOME MENU CONTACT US ABOUT US

INQUIRY TRACKING PORTAL

INQUIRY ID

SEARCH **DELETE**

Figure 24: Alpha version I (Inquiry Tracking Page Interface) Developed by Author

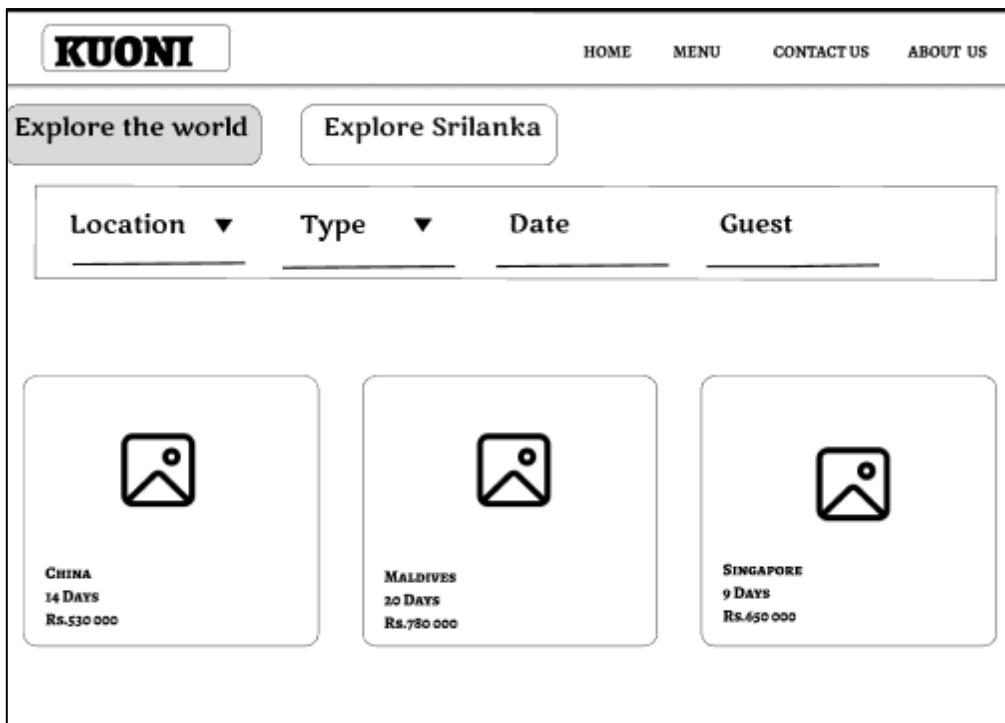


Figure 25: Alpha version I (Travel packages world Page Interface) Developed by Author

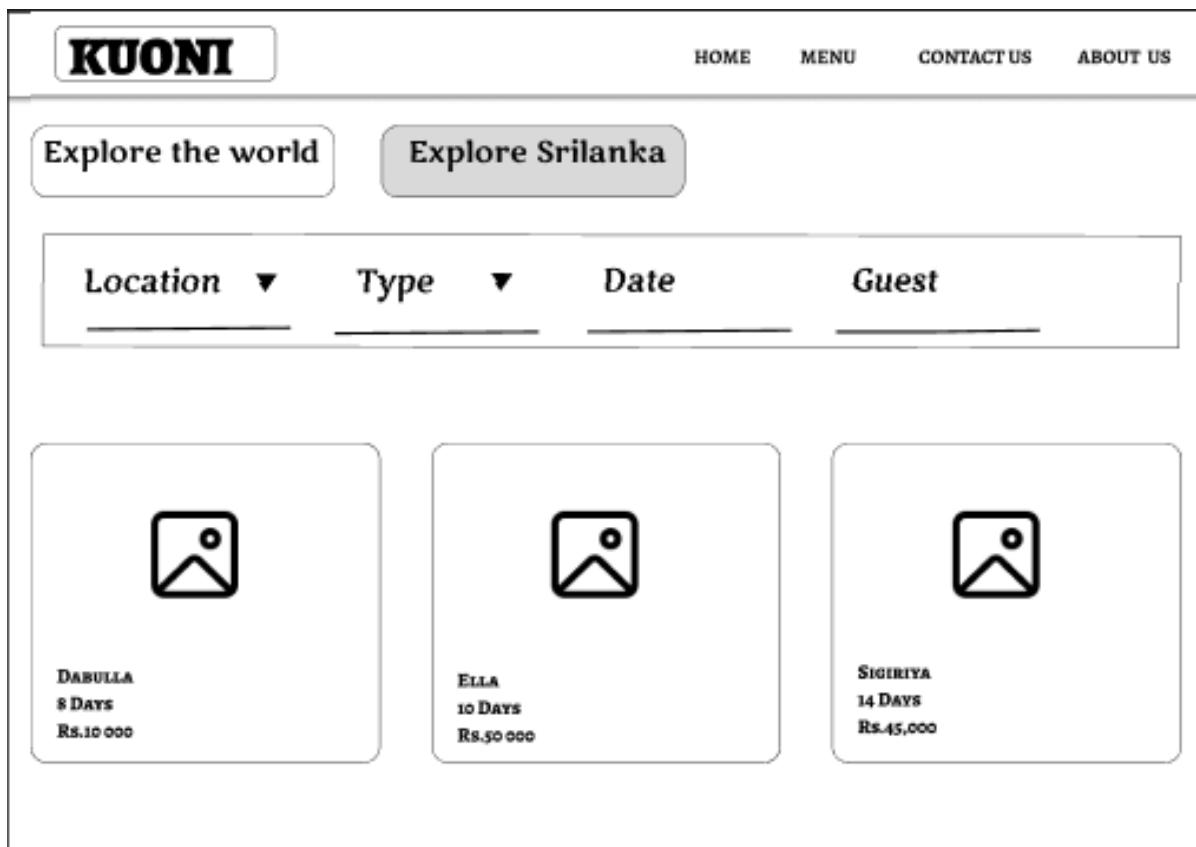


Figure 26: Alpha version I (Travel packages Sri Lanka Page Interface) Developed by Author

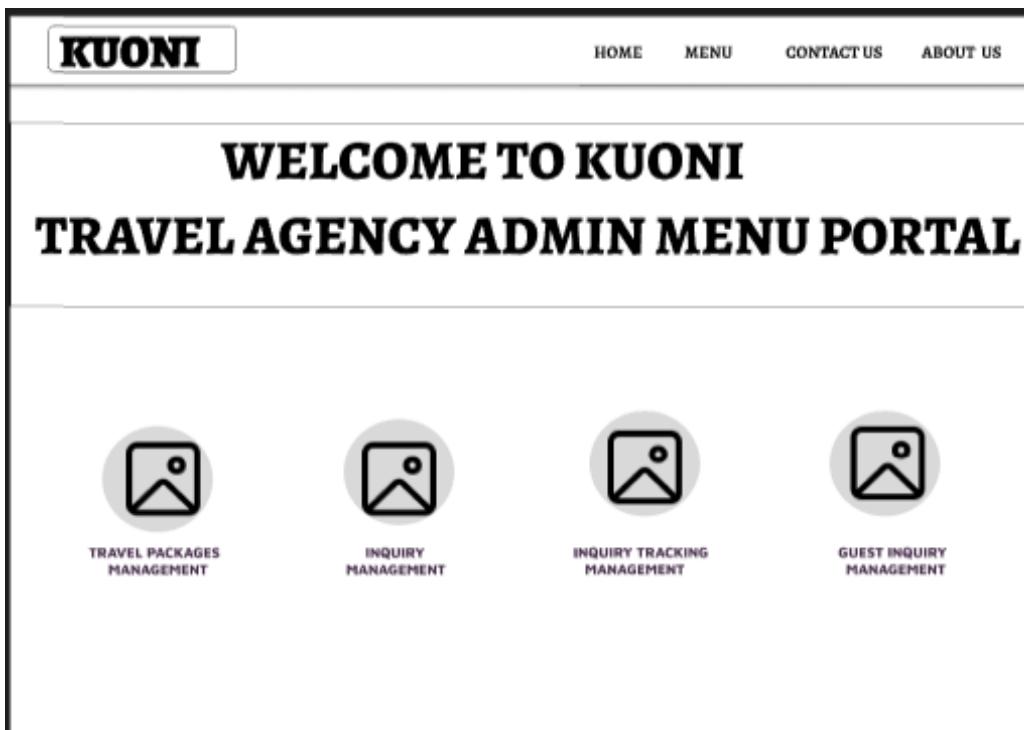


Figure 27: Alpha version I (Admin Menu Page Interface) Developed by Author

Figure 28: Alpha version I (Inquiry Management Page Interface) Developed by Author

KUONI

INQUIRY GEUST MANAGEMENT PORTAL

Inquiry ID :	Days count :	CREATE AN INQUIRY
Customer name :	Nights count :	UPDATE AN INQUIRY
Email Address :	Hotel token No:	
Customer : Local Foreign	Rooms Category:	
Gender : Male Female	Room count :	DELETE AN INQUIRY
Person count :	Hotel cost :	
Adult's count :	Other services cost :	
Children's count :	Transport cost :	SEARCH AN INQUIRY
Start Date :	Tracking ID :	
End Date :		

Figure 29: Alpha version I (Guest inquiry Management Page Interface) Developed by Author

KUONI

TRAVELING PACKAGES AND PLANS MANAGEMENT PORTAL

Inquiry ID :	Duration :	Package Image
Package ID :	Distance :	
Package Name :	Location :	
Package Type :	Pearson Count :	
Package Price :	Hotel No :	

INSEERT
UPDATE

DELETE
SEARCH

Figure 30: Alpha version I (Travel Packages Management Page Interface) Developed by Author

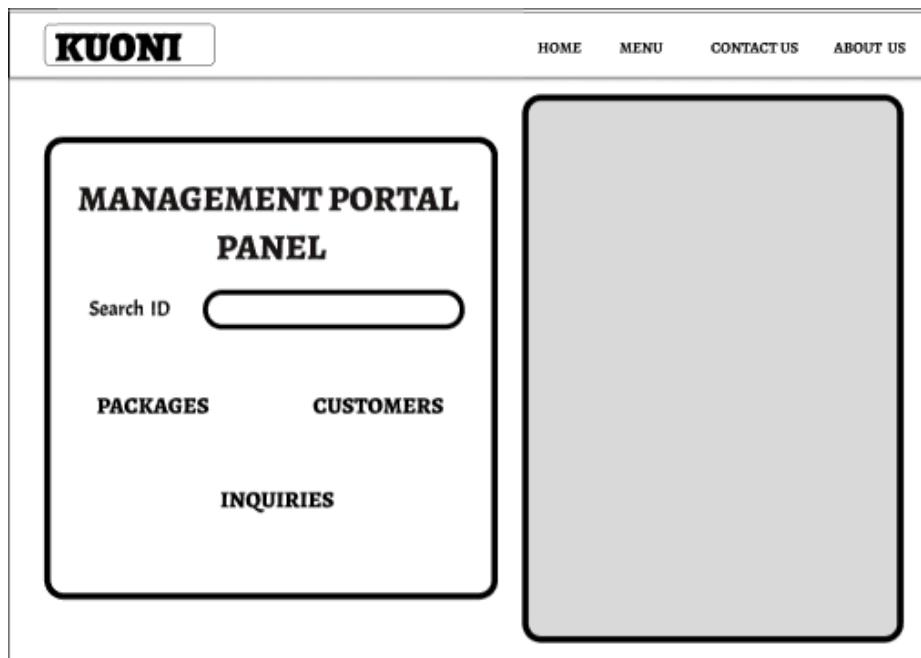


Figure 31 : Alpha version I (Management portal panel Page Interface) Developed by Author

End user feedback analysis for Alpha Version I prototype

Kuoni Leisure Web Based Application Usability Testing Questionnaire (Alpha version I)

ranudigk@gmail.com [Switch account](#) 

 Not shared

* Indicates required question

As for the viewers I will share interfaces in a link to get the feedbacks of It.
[please click this to view the interfaces](#)

Name *

Your answer

Are you Satisfied with the UI on first sight? *

Yes
 No

Does the interfaces look user-friendly? *

Yes
 No

What kind of user experience did you get from this web application? *

Excellent user experience
 Good user expereince
 Fair user expereience
 Poor user expereince

Figure 32 : Alpha version I (Question Form Part 1) Developed by Author

What are the elements that need to be re-edited in these interfaces *

- Headings
- Paragraphs
- Text Lines
- Buttons
- Radio buttons
- Labels
- Icons
- Pictures
- Whole interfaces

Rate the interfaces from 1-10 *

1 2 3 4 5 6 7 8 9 10

Needs a lot of
amendments Very satisfied

Submit [Clear form](#)

Never submit passwords through Google Forms.

Figure 33 : Alpha version I (Question Form Part 2) Developed by Author

Analyzed reports on the feedback given by the end users on the Alpha Version I prototype of the Kuoni Leisure web based application

In the Questionary form author made a drive link and paste to questionnaire form to get the idea about the authors interfaces. So in here the analyzing part of the alpha version I.

Question 01

Are you Satisfied with the UI on first sight?

22 responses

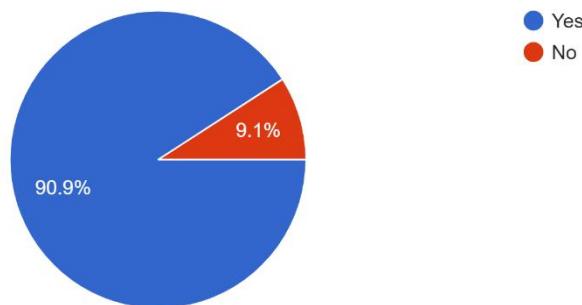


Figure 34: Alpha version I (Feedback Analysis) Developed by Author

In this chart shows the how the users satisfied about the UI on first sight. So as the highest number percentage of 90.9% are satisfied with the UI on first sight and the percentage of 9.1% are not satisfied with it .Basically the author can the idea that most people satisfied the content and the detailed of the interfaces.

Question 2

Does the interfaces look user-friendly?

22 responses

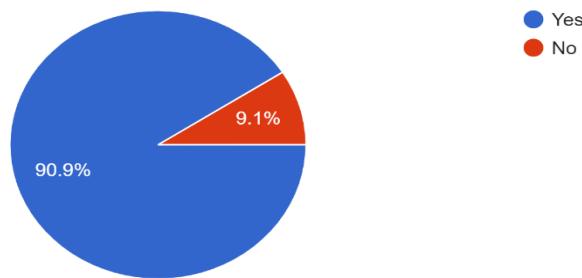


Figure 35: Alpha version I (Feedback Analysis) Developed by Author

In this chart shows about interfaces that is it looked user friendly to the users. As the result of it Most of users select yes to it and the percentage of it is 90.9% and 9.1% of users selected as no. So overall author guess that interfaces looks like user-friendly to the users.

Question 3

What kind of user experience did you get from this web application?

22 responses

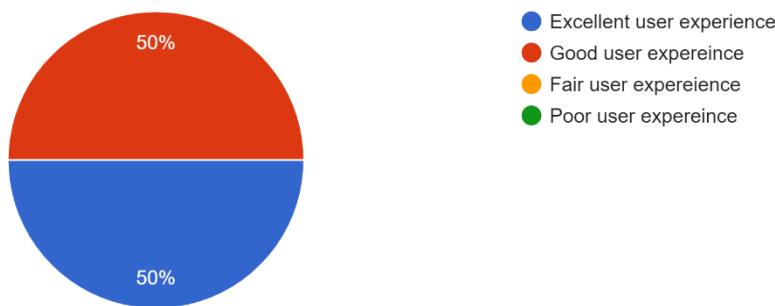


Figure 36: Alpha version I (Feedback Analysis) Developed by Author

This chart shows the what kind of user experience can get from the web application that users selected. So equal percentage of users selected as excellent user experience and Good user experience. The percentage is the 50%. If the author get the overall of the chart author can get a idea that most of users are have a good experience from web application.

Question 4

What are the elements that need to be re-edited in these interfaces

22 responses

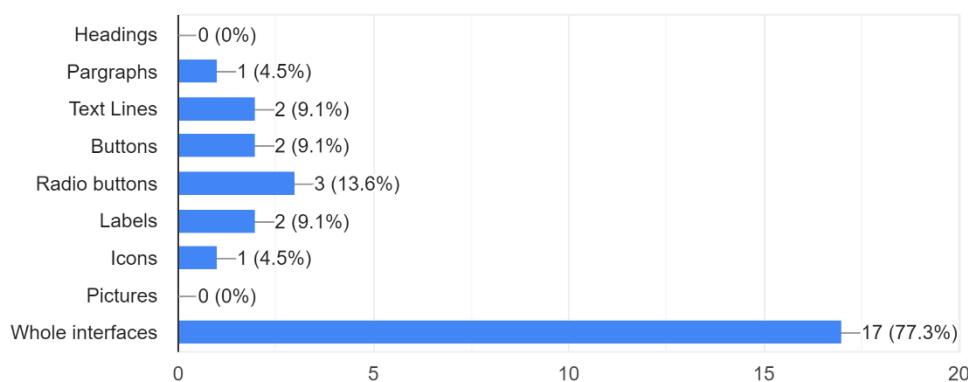


Figure 37: Alpha version I (Feedback Analysis) Developed by Author

In the above chart shows the elements that needed to be re-edited of the web application. So the highest number of percentage users selected to re-edit the whole interface and the percentage is 77.3%. 13.6% of users select to re-edit the radio buttons and 9.1% of users select text lines, buttons , labels tore-edit. 4.5% of users selected to re-edit the paragraphs and the Icons of the web application interfaces.

Question 5

Rate the interfaces from 1-10

22 responses

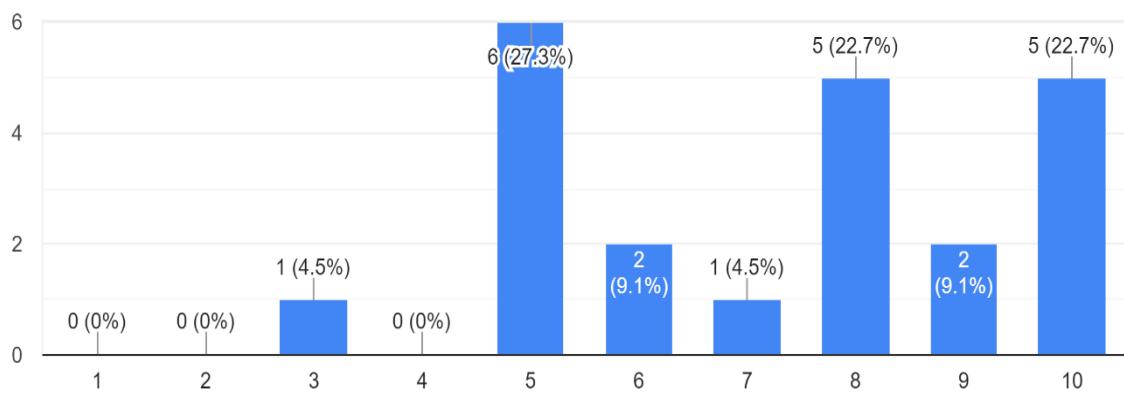


Figure 38: Alpha version I (Feedback Analysis) Developed by Author

In the above chart shows the rate from 1-10 of the interfaces how looks. As the result of the highest percentage of users select 5 and the percentage is 27.3%. Equal number of users select 3 and 7 the percentage of it is 4.5% and also there is another equal number of users select the 6 and 9 the percentage of it is 9.1%. Another equal number of users select 8 and 10 the percentage of it is 22.7%.Overall author guess that it is average percent of users like the interfaces . Because of that user think to develop better interfaces.

Justifications from Author

In the first moment author would like to tell about the Alpha I version .In alpha version I author decided to in figma as a wireframe. When the designs done author used a google form to get the analyses from the users about the interfaces are user-friendly and is the interfaces looks are good.

After that author get 22 responses from the users and overall users does not like about the way of the interfaces looks most of users said that whole interfaces need to re-edited .Users also selected that the way looks the interfaces does not good and most of users like to do the interfaces in the digital way. As the result of this author decided to do Alpha version II in Digital prototype. The selected prototype is Figma. So in Alpha version II user can experienced it.

Alpha Version II of Kuoni Leisure Web Based Application Prototype

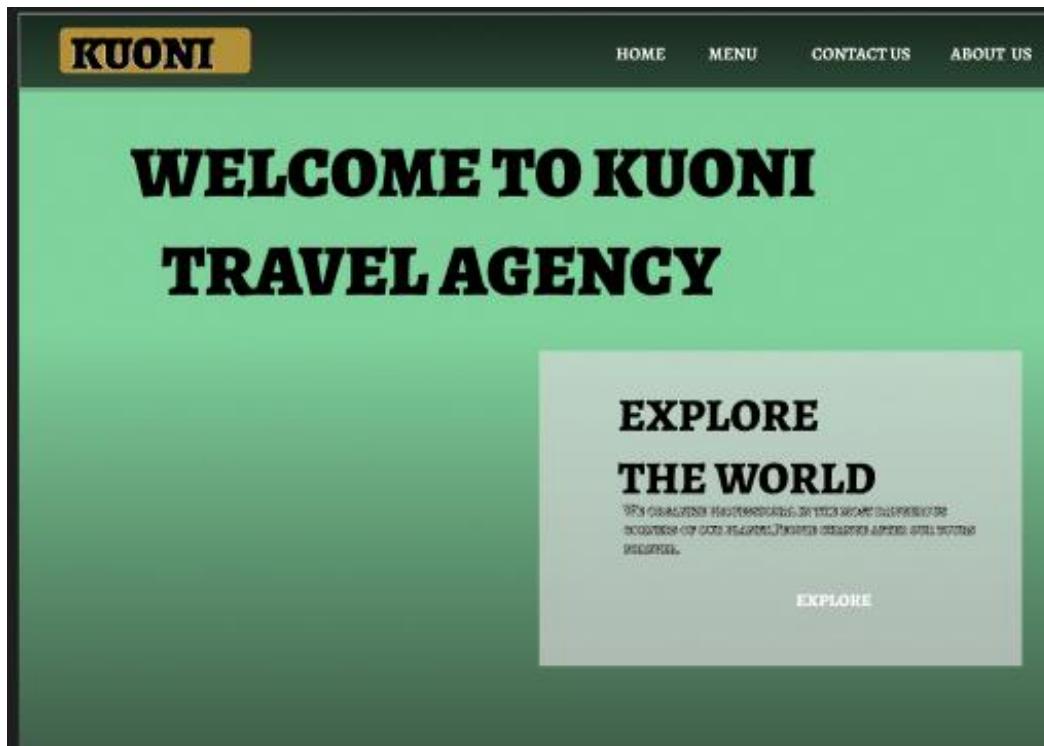


Figure 39 : Alpha version II (Home Page Interface) Developed by Author

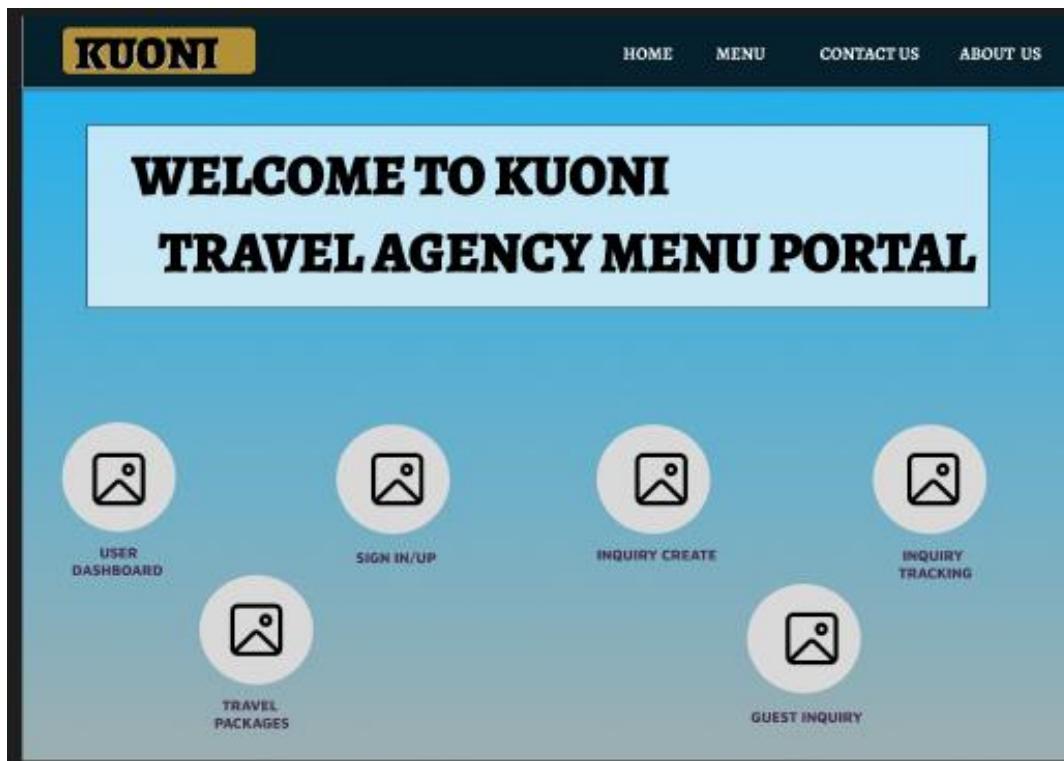


Figure 40 : Alpha version II (User Menu Page Interface) Developed by Author

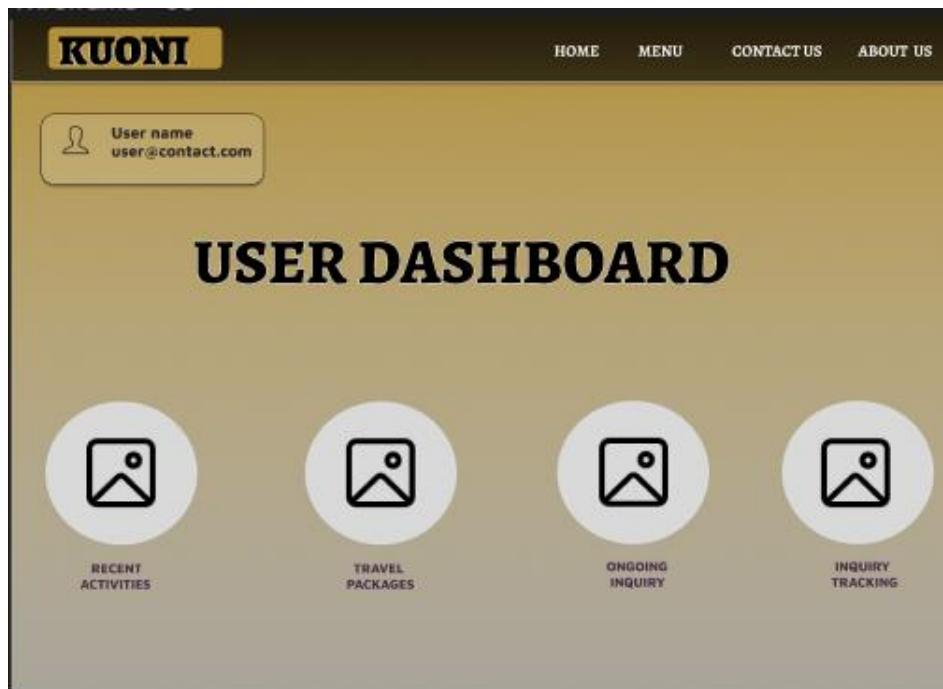


Figure 41 : Alpha version II (User Dashboard Page Interface) Developed by Author

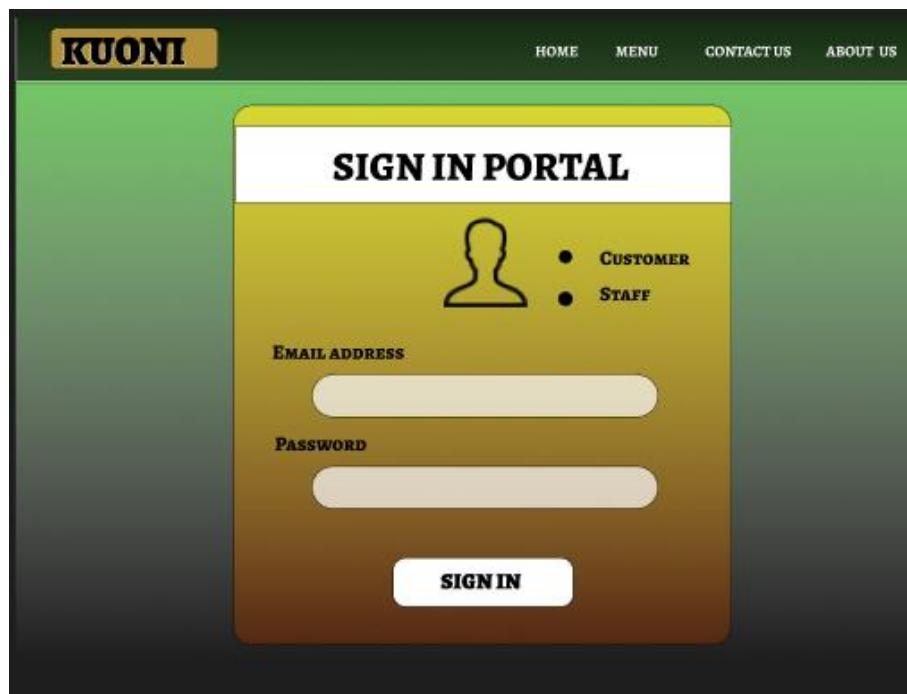


Figure 42: Alpha version II (Sign In Page Interface) Developed by Author

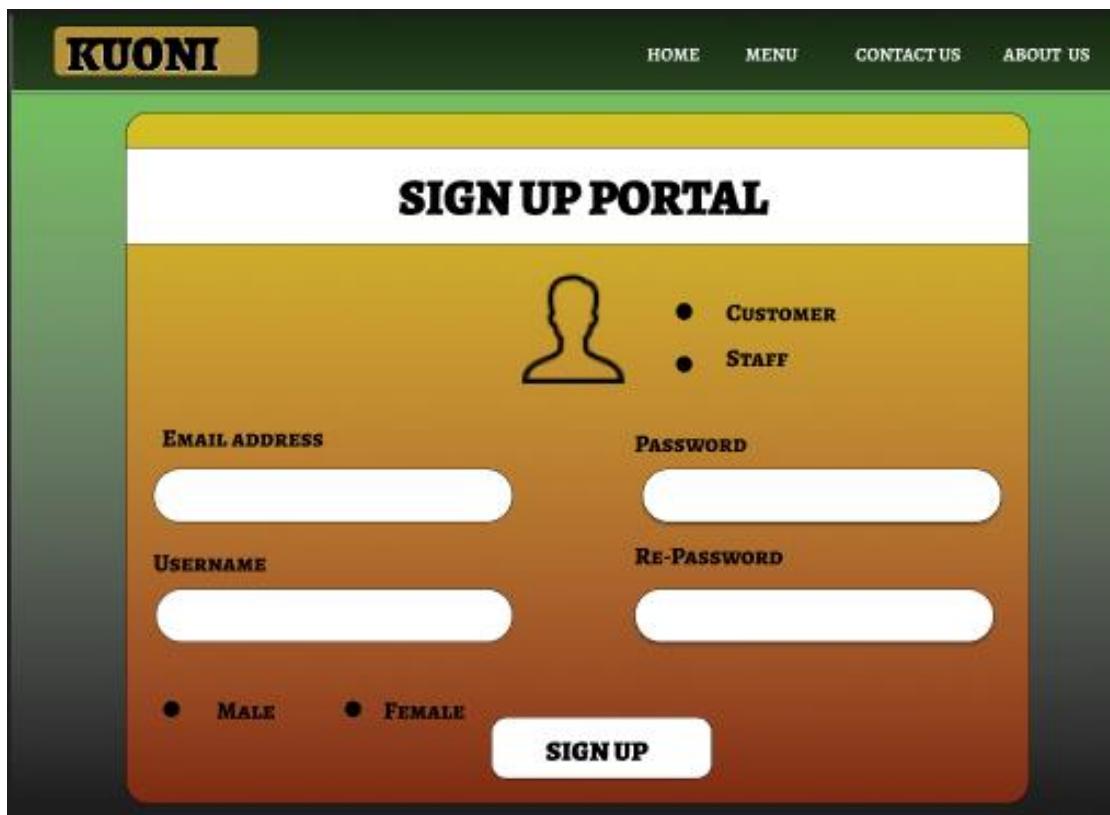


Figure 43: Alpha version II (Sign up Page Interface) Developed by Author

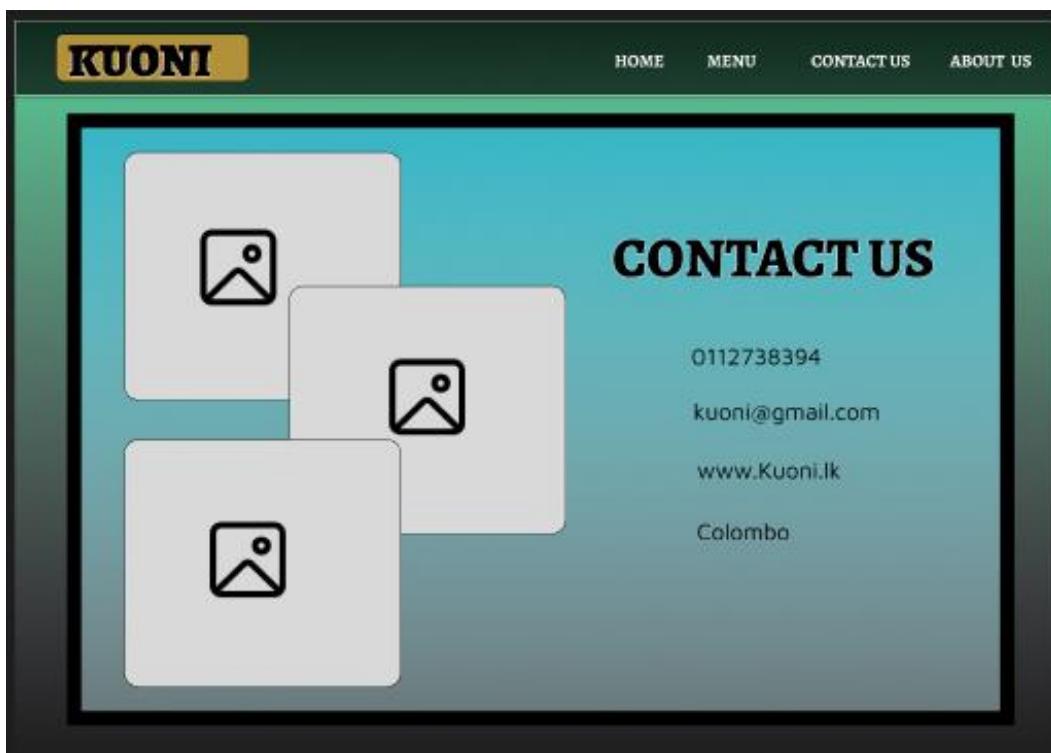


Figure 44: Alpha version II (Contact Us Page Interface) Developed by Author

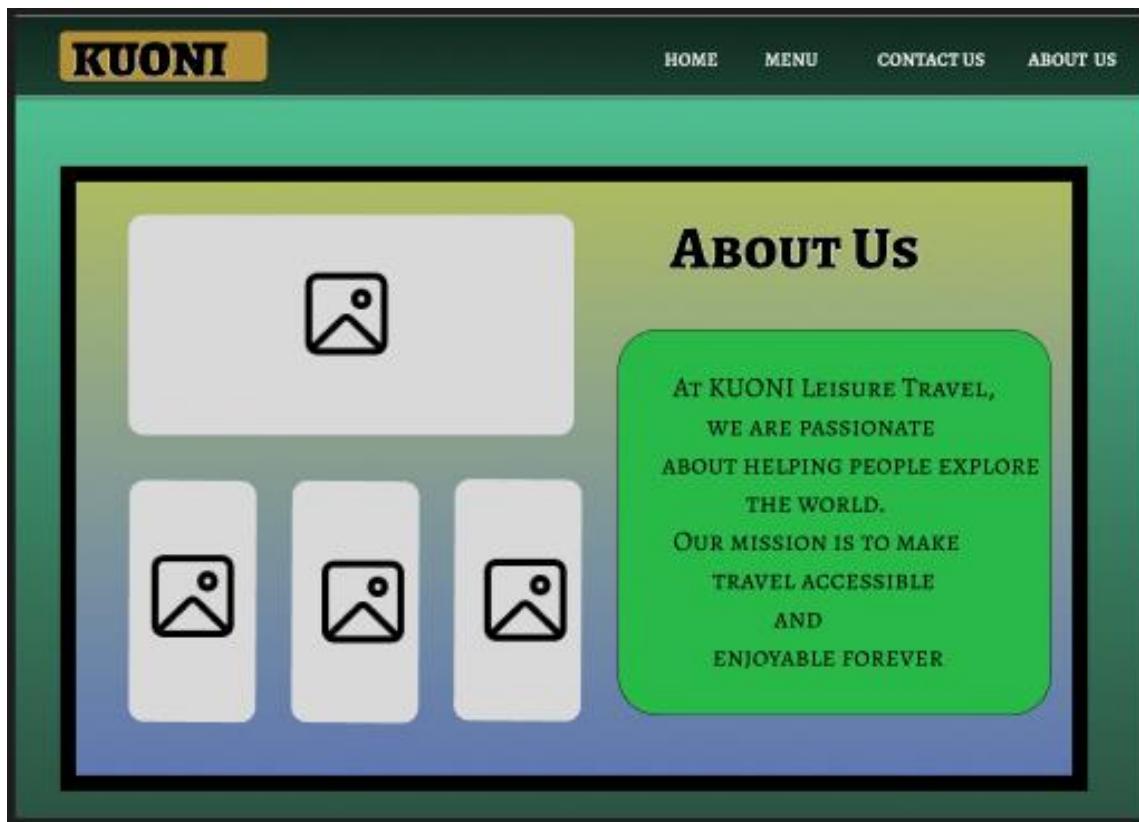


Figure 45: Alpha version II (About us Page Interface) Developed by Author

The screenshot shows the 'MAKE A INQUIRY FOR YOUR TOUR WITH KUONI TRAVEL AND TOURISM AGENCY' page. At the top, there is a navigation bar with links for HOME, MENU, CONTACT US, and ABOUT US. The main form area has various input fields for user information and travel details. The fields include:

- Inquiry ID : [Text Input]
- Customer name : [Text Input]
- Email Address : [Text Input]
- Customer : Local Foreign
- Gender : Male Female
- Person count : [Text Input]
- Adult's count : [Text Input]
- Children's count : [Text Input]
- Start Date : [Text Input]
- End Date : [Text Input]
- Days count : [Text Input]
- Nights count : [Text Input]
- Hotel token No: [Text Input]
- Rooms Category: [Select Box]
- Room count : [Text Input]
- Hotel cost : [Text Input]
- Other services cost : [Text Input]
- Transport cost : [Text Input]
- Tracking ID : [Text Input]

On the right side of the form, there is a button labeled 'CREATE AN INQUIRY'.

Figure 46: Alpha version II (Inquiry Page Interface) Developed by Author

KUONI

HOME MENU CONTACT US ABOUT US

MAKE A INQUIRY FOR YOUR TOUR WITH KUONI TRAVEL AND TOURISM AGENCY AS A GUEST

Inquiry ID :	<input type="text"/>	Days count :	<input type="text"/>
Customer name :	<input type="text"/>	Nights count :	<input type="text"/>
Email Address :	<input type="text"/>	Hotel token No :	<input type="text"/>
Customer :	<input checked="" type="radio"/> Local <input type="radio"/> Foreign	Rooms Category :	<input type="button" value="▼"/>
Gender :	<input checked="" type="radio"/> Male <input type="radio"/> Female	Room count :	<input type="text"/>
Person count :	<input type="text"/>	Hotel cost :	<input type="text"/>
Adult's count :	<input type="text"/>	Other services cost :	<input type="text"/>
Children's count :	<input type="text"/>	Transport cost :	<input type="text"/>
Start Date :	<input type="text"/>	Tracking ID :	<input type="text"/>
End Date :	<input type="text"/>	CREATE AN INQUIRY	

Figure 47: Alpha version II (Guest Inquiry Page Interface) Developed by Author

KUONI

HOME MENU CONTACT US ABOUT US

INQUIRY TRACKING PORTAL

INQUIRY ID	<input type="text"/>
SEARCH	DELETE

Figure 48: Alpha version II (Inquiry Tracking Page Interface) Developed by Author

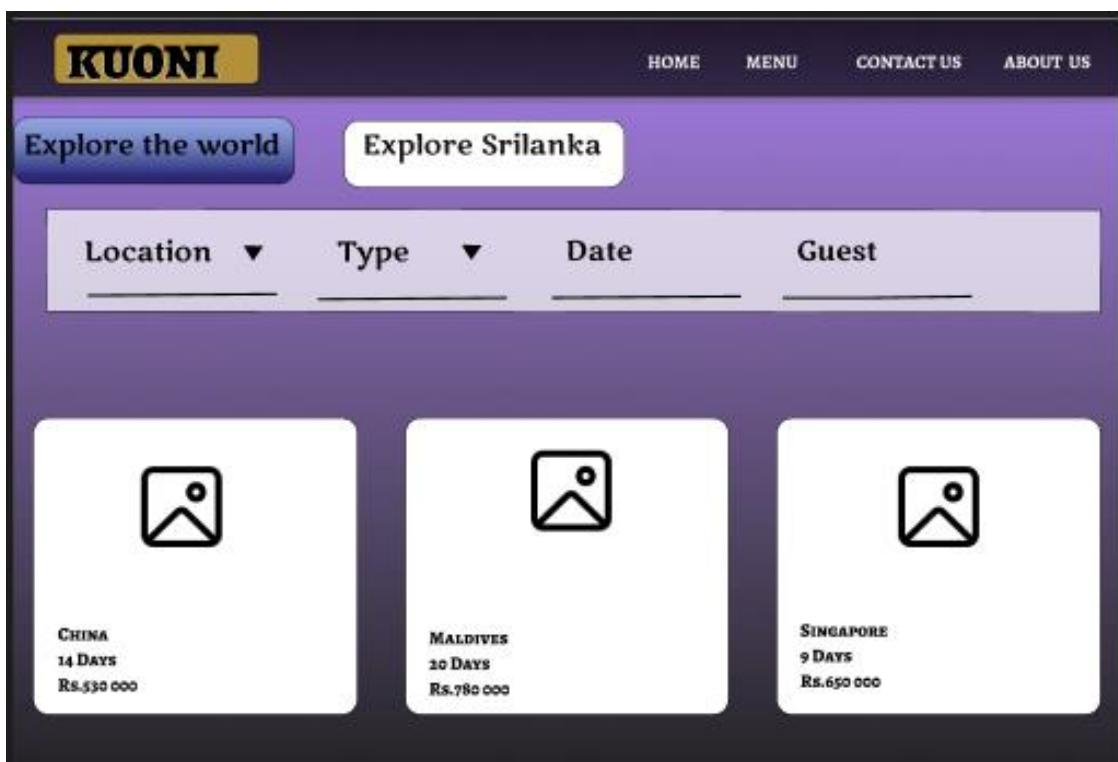


Figure 49: Alpha version II (Travel Packages world Page Interface) Developed by Author

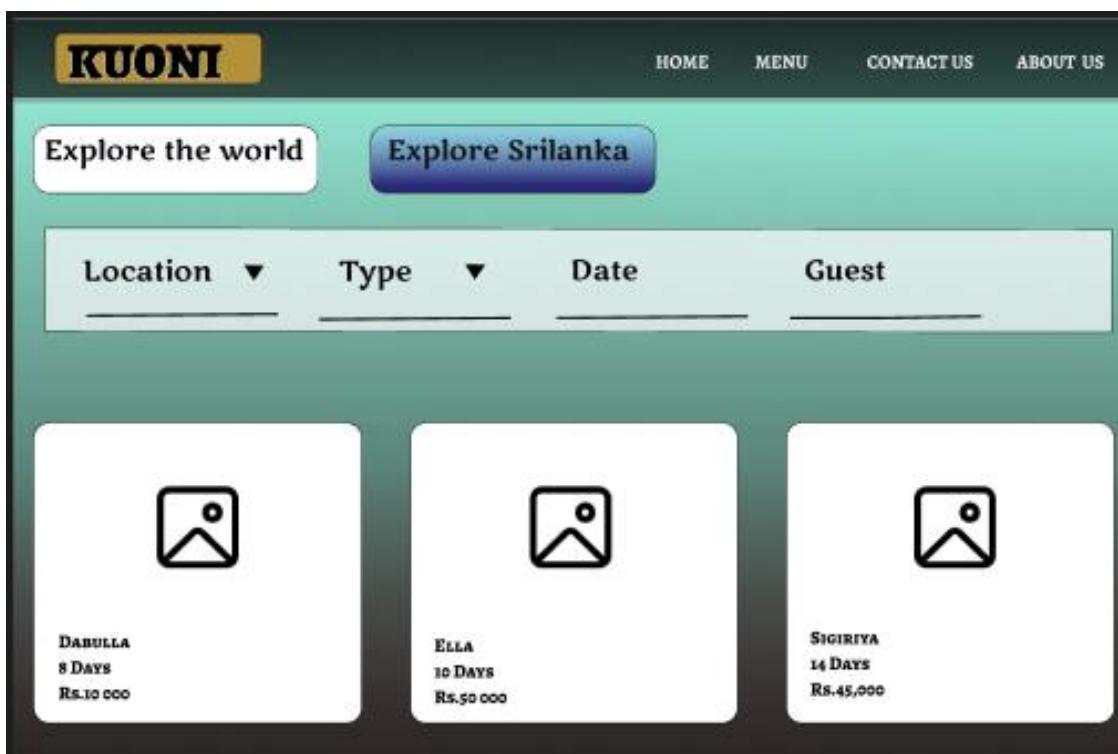


Figure 50: Alpha version II (Travel Packages Sri Lanka Page Interface) Developed by Author

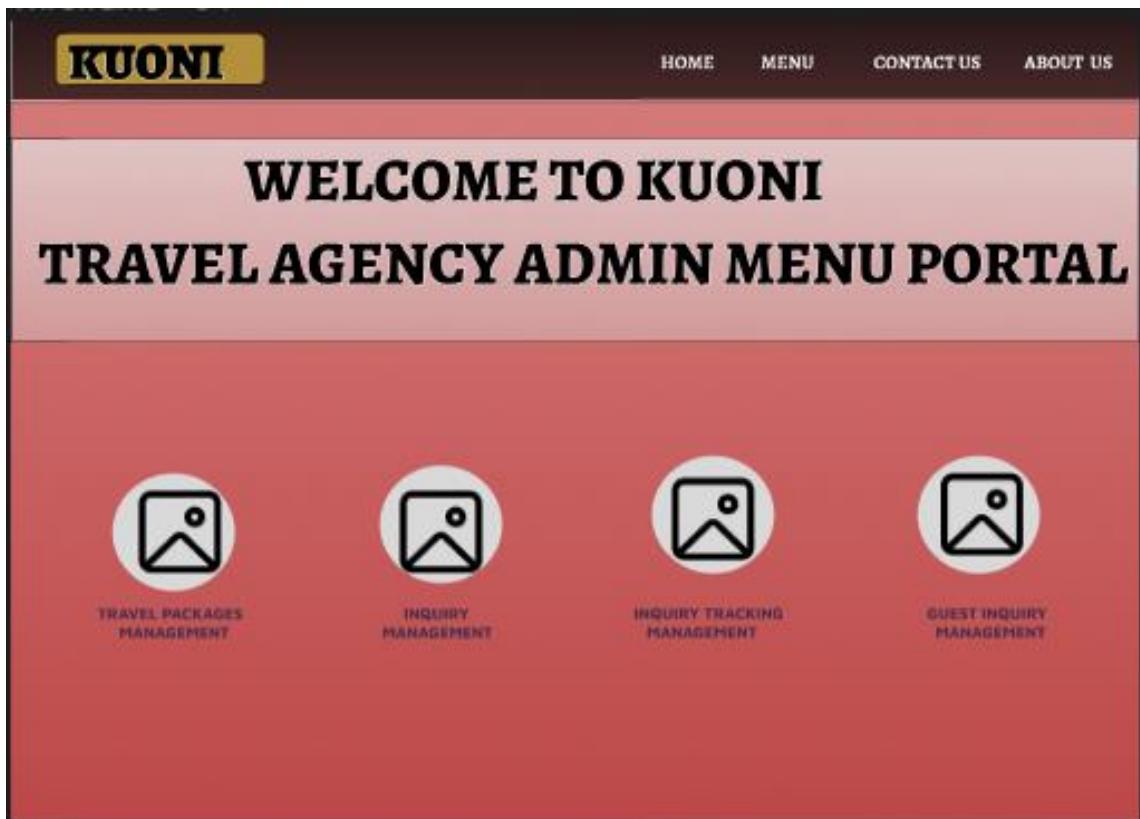


Figure 51: Alpha version II (Admin Menu Page Interface) Developed by Author

The screenshot shows the 'INQUIRY MANAGEMENT PORTAL' section of the application. It contains various input fields and dropdown menus for managing inquiries, along with four rounded rectangular buttons on the right side:

- CREATE AN INQUIRY**
- UPDATE AN INQUIRY**
- DELETE AN INQUIRY**
- SEARCH AN INQUIRY**

The form fields include:

- Inquiry ID : [Text Input]
- Customer name : [Text Input]
- Email Address : [Text Input]
- Customer : Local Foreign
- Gender : Male Female
- Person count : [Text Input]
- Adult's count : [Text Input]
- Children's count : [Text Input]
- Start Date : [Text Input]
- End Date : [Text Input]
- Days count : [Text Input]
- Nights count : [Text Input]
- Hotel token No: [Text Input]
- Rooms Category : [Dropdown Menu]
- Room count : [Text Input]
- Hotel cost : [Text Input]
- Others services cost : [Text Input]
- Transport cost : [Text Input]
- Tracking ID : [Text Input]

Figure 52: Alpha version II (Inquiry Management Page Interface) Developed by Author

KUONI

HOME MENU CONTACT US ABOUT US

INQUIRY GEUST MANAGEMENT PORTAL

Inquiry ID :	Days count :	CREATE AN INQUIRY
Customer name :	Nights count :	
Email Address :	Hotel token No. :	UPDATE AN INQUIRY
Customer : <input type="radio"/> Local <input type="radio"/> Foreign	Rooms Category :	
Gender : <input type="radio"/> Male <input type="radio"/> Female	Room count :	DELETE AN INQUIRY
Person count :	Hotel cost :	
Adult's count :	Other services cost :	
Children's count :	Transport cost :	SEARCH AN INQUIRY
Start Date :	Tracking ID :	
End Date :		

Figure 53: Alpha version II (Inquiry Guest ManagementPage Interface) Developed by Author

KUONI

HOME MENU CONTACT US ABOUT US

TRAVELING PACKAGES AND PLANS MANAGEMENT PORTAL

Inquiry ID :	Duration :
Package ID :	Distance :
Package Name :	Location :
Package Type :	Person Count :
Package Price :	Hotel No. :

INSEERT UPDATE Package Image

DELETE SEARCH

Figure 54: Alpha version II (Travel packages Management Page Interface) Developed by Author

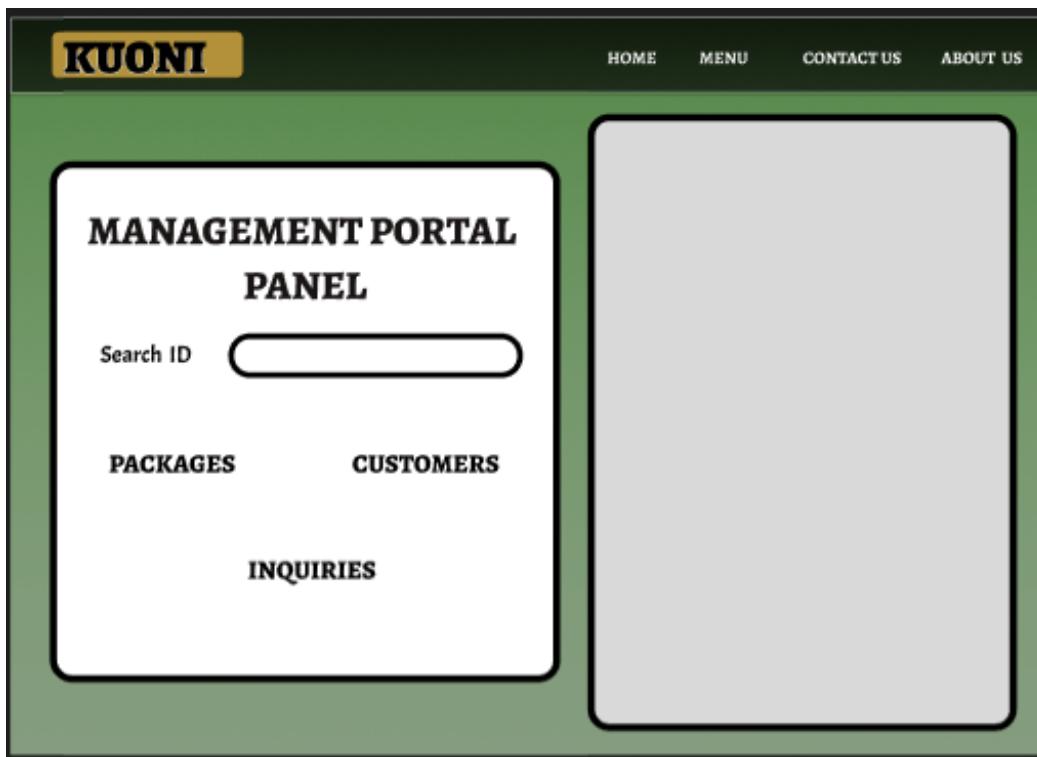


Figure 55: Alpha version II (Management Portal Panel Page Interface) Developed by Author

End user feedback analysis for Alpha Version II prototype

Kuoni Leisure Web Based Application Usability Testing Questionnaire (Alpha version II)

Form description

Name *

Short answer text

As for the viewers I will share some interfaces to get the feedbacks of it.
please kind enough to fill this form.

Home Page of the Kuoni Leisure

What is the opinion regarding the Home interface of the web based application? *

1 2 3 4 5

Not user Freindly User Frendly

Figure 56: Alpha version II (Question Form Part 1) Developed by Author

Are you satisfied about this Home page interface? *

1 2 3 4 5

Not satisfied at all

Yes Ver satisfied

What are the elements that should be re-edited through the elements included in the interface * of this application?

- Headings
- Logo
- Buttons
- Icons
- None
- Other...

Which Features should be changed in Home page ? *

- Font size of Heading
- Font size of Sub headings
- Font Family
- Background
- Colors
- None
- Other...

Figure 57 : Alpha version II (Question Form Part 2) Developed by Author

User Menu



User Dashboard



What is the opinion regarding the User menu and User Dashboard interfaces of the web based * application?

1 2 3 4 5

Not User Freindly User Freindly

Figure 58 : Alpha version II (Question Form Part 3) Developed by Author

Are you satisfied about this User Menu and the User Dashboard interfaces? *

1 2 3 4 5

Not satisfied at all Yes very Satisfied

What are the elements that should be re-edited through the elements included in the interface * of these applications?

Headings
 Icons
 None
 Other...

Which Features should be changed in these interfaces ? *

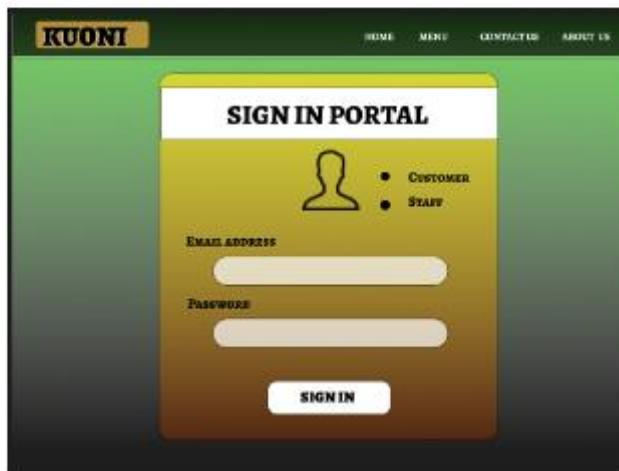
Font sizes
 Font Family
 Background
 Background color
 Text colors
 None
 Other...

Figure 59 : Alpha version II (Question Form Part 4) Developed by Author

Section 2

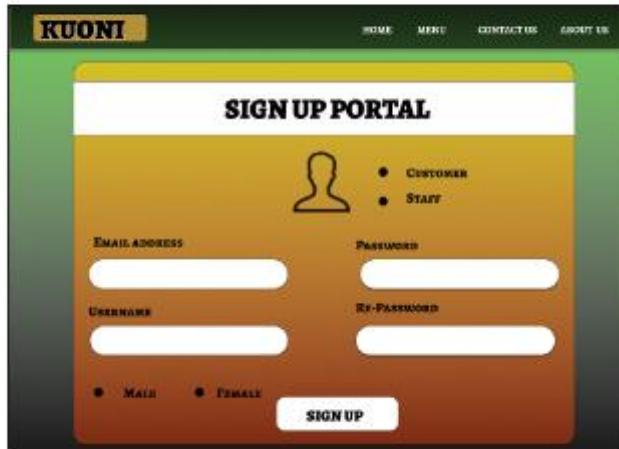
Description (optional)

Sign in interface



The image shows the 'SIGN IN PORTAL' page for Kuoni. At the top, there is a navigation bar with links for HOME, MENU, CONTACT US, and ABOUT US. Below the navigation bar is a yellow header with the word 'KUONI'. The main form is titled 'SIGN IN PORTAL' and features a user icon. It includes two radio buttons labeled 'CUSTOMER' and 'STAFF'. There are two input fields: 'EMAIL ADDRESS' and 'PASSWORD', each with a placeholder text 'Enter Email Address' and 'Enter Password'. A 'SIGN IN' button is located at the bottom of the form.

Sign Up interface



The image shows the 'SIGN UP PORTAL' page for Kuoni. At the top, there is a navigation bar with links for HOME, MENU, CONTACT US, and ABOUT US. Below the navigation bar is a yellow header with the word 'KUONI'. The main form is titled 'SIGN UP PORTAL' and features a user icon. It includes two radio buttons labeled 'CUSTOMER' and 'STAFF'. There are four input fields: 'EMAIL ADDRESS' and 'PASSWORD' (both with placeholder text 'Enter Email Address' and 'Enter Password'), 'USERNAME' (placeholder text 'Enter Username'), and 'RE-PASSWORD' (placeholder text 'Enter Re-Password'). Below the input fields are two radio buttons for gender: 'MALE' and 'FEMALE'. A 'SIGN UP' button is located at the bottom of the form.

Figure 60 : Alpha version II (Question Form Part 5) Developed by Author

What is the opinion regarding these interfaces of the web based application? *

1 2 3 4 5

Not user freindly User friendly

Are you satisfied about these interfaces? *

1 2 3 4 5

Not satisfied at all Yes Vey satisfied

What are the elements that should be re-edited through the elements included in the interfaces of this application? *

- Headings
- Icons
- short texts
- buttons
- None
- Other...

Which Features should be changed in these interfaces? *

- Font sizes of headings
- Font size of texts
- Font family
- Background color
- None
- Other...

After section 2 Continue to next section

Figure 61 :Alpha version II (Question Form Part 6) Developed by Author

Section 3 of 4

3rd section

Description (optional)

About Us



Contact Us



Figure 62: Alpha version II (Question Form Part 7) Developed by Author

What is the opinion regarding these interfaces of the web based application? *

1	2	3	4	5	
Not user Freindly	<input type="radio"/> User Freindly				

Are you satisfied about these interfaces? *

1	2	3	4	5	
Not satisfied at all	<input type="radio"/> Yes very satisfied				

What are the elements that should be re-edited through the elements included in the interfaces of this application? *

- Headings
- Shapes
- Texts
- None
- Other...

Which Features should be changed in These interfaces ? *

- Font sizes
- Font Family
- Text colors
- Background Colors
- None
- Other...

Figure 63: Alpha version II (Question Form Part 8) Developed by Author

4th section

Description (optional)

Tour packages worldwide

Tour packages in Sri Lanka

What is the opinion regarding these interfaces of the web based application? *

1	2	3	4	5	
Not user Freindly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	User Freindly

Figure 64: Alpha version II (Question Form Part 9) Developed by Author

Are you satisfied about these interfaces? *

1 2 3 4 5

Not satisfied at all Yes very satisfied

What are the elements that should be re-edited through the elements included in the interfaces of this application?

Headings Checkboxes

Buttons None

Other... Add option

Required

Which Features should be changed in these interfaces ? *

Font sizes Font family

Text colors Background colors

None Other...

What kind user experience did you get from this web application? *

1 2 3 4 5

Bad experience Excellent expereince

Figure 65: Alpha version II (Question Form Part 10) Developed by Author

Analyzed reports on the feedback given by the end users on the Alpha Version II prototype of the Kuoni Leisure web based application

As the author mentioned the users that in the Questionnaire form author will be given some of interfaces to get the feedback because it is easy to get the real feedbacks from users. So as mentioned below the analyzed reports are categorized also author will explain the overall analysis part in the end of this analysis.

Home page**Question 1**

What is the opinion regarding the Home interface of the web based application?

7 responses

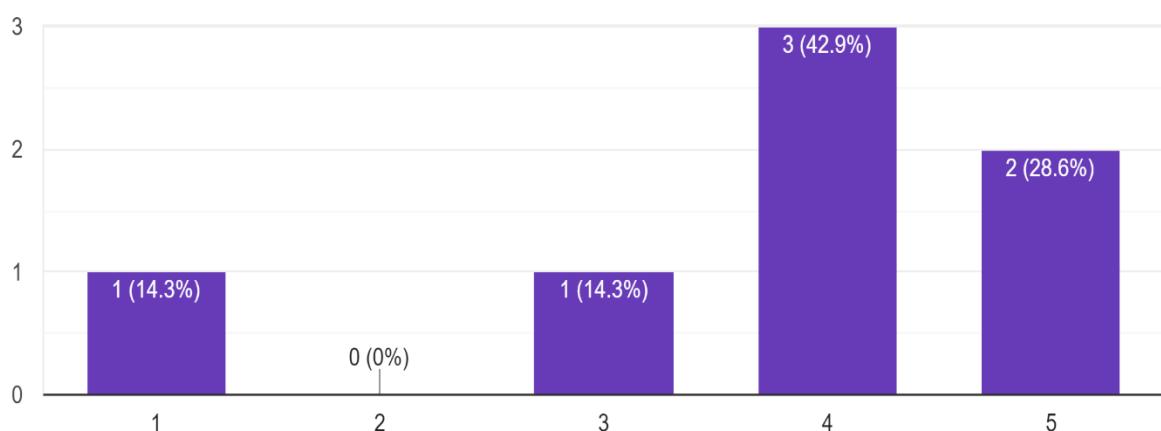


Figure 66: Alpha version II (Feedback Analysis) Developed by Author

So above the chart shows the what is the opinion regarding the home interface. So author put a linear scale. In there the 1 means Not user friendly and 5 means user friendly. In the chart 14.3% percent vote for 1 that means not user friendly . for 2 there are no users vote for that and as same as the previous one users vote for 3rd. As the Highest number of users 42.9% of users vote for 4th and lastly 28.6% users vote for 5 that means user friendly. Overall as a guess that the home page is averagely user friendly.

Question 2

Are you satisfied about this Home page interface?
7 responses

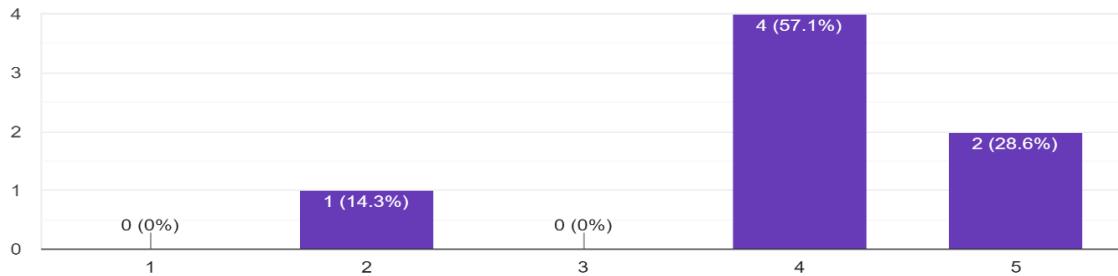


Figure 67: Alpha version II (Feedback Analysis) Developed by Author

In this chart shows about the satisfaction of the home page and 1 indicates that it is not satisfied and the 5 indicates it is very satisfied. As above chart no one chose 1 and 3 as feedbacks . 2nd one chose 1 user that means 14.3%. The heights number of users chose 4 that is 57.1 % and lastly the 5 was chosen by only 28.6% of users. In this chart also the author can guess that it is average number of users satisfied about the home page.

Question 3

What are the elements that should be re-edited through the elements included in the interface of this application?

7 responses

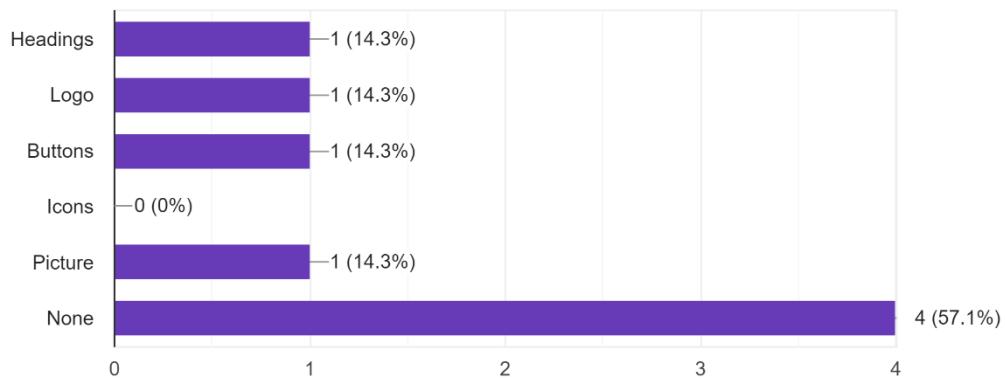


Figure 68: Alpha version II (Feedback Analysis) Developed by Author

In the above chart shows the elements that useres idetyfied about that interface that has to re-edited. As the chart 14.3% of useres select the hedadings,Log ,Buttons and the pictures should be re-edited. As the highest percentage of people said that it doesn't have to re-edited. Basicaly author geust that it doesn't have to Re-edited.

Question 4

Which Features should be changed in Home page ?

7 responses

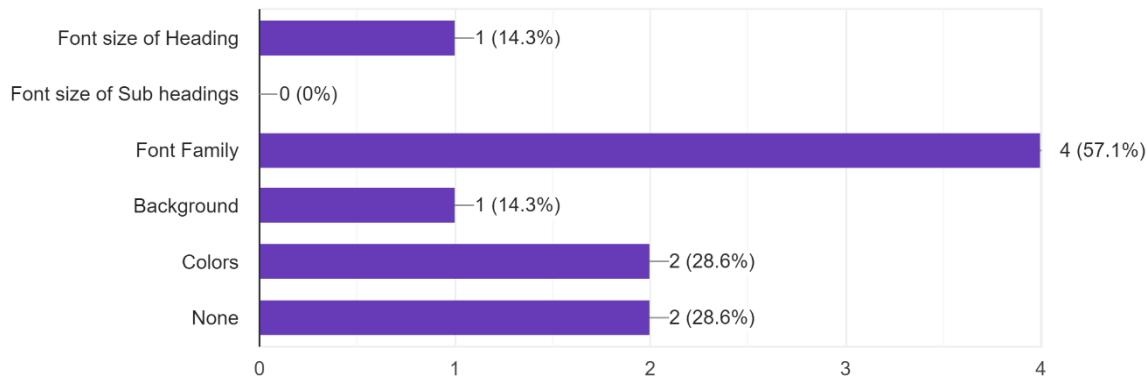


Figure 69: Alpha version II (Feedback Analysis) Developed by Author

In the above chart shows the features that have to change in the Home page that users selected in the questionnaire form. As the analysis Most of people like 57.1% of people say that font family should have to change and 14.3% people said that Font size of Headings and Background have to change. Also there are 28.6% people say that it should have to change colors and equal number of people say that there nothing to change. Also no users choose to change the Font size of Home page. Overall author guess that it has some changes to made .

User Menu and User Dashboard

Question 1

What is the opinion regarding the User menu and User Dashboard interfaces of the web based application?

7 responses

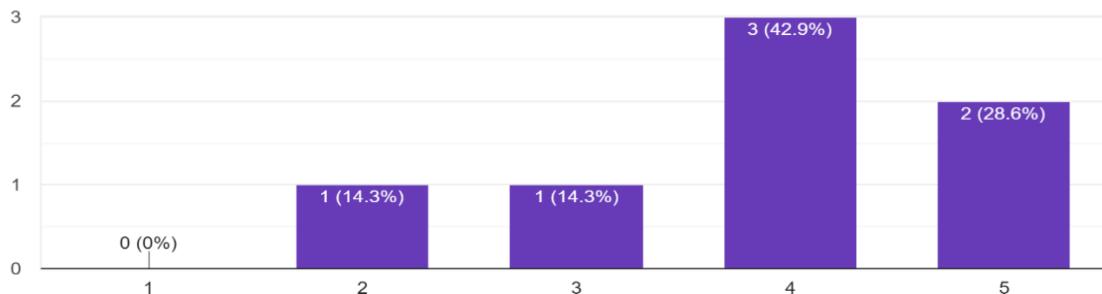


Figure 70: Alpha version II (Feedback Analysis) Developed by Author

In above chart shows the opinion regarding user dashboard and user menu. So author used a linear scale to select and 1 represent not user friendly and 5 represent as user friendly. In chart

users do not choose 1 and 14.3% of users choose 2 as the opinion. Also users choose 3 also equal to 2 percentage. The highest percentage of opinion that means user friendliness choose 4 and that is 42.9% of users. Lastly 28.6% of users choose 5 as the opinion. Overall author can guess that average it is user friendly.

Question 2

Are you satisfied about this User Menu and the User Dashboard interfaces?

7 responses

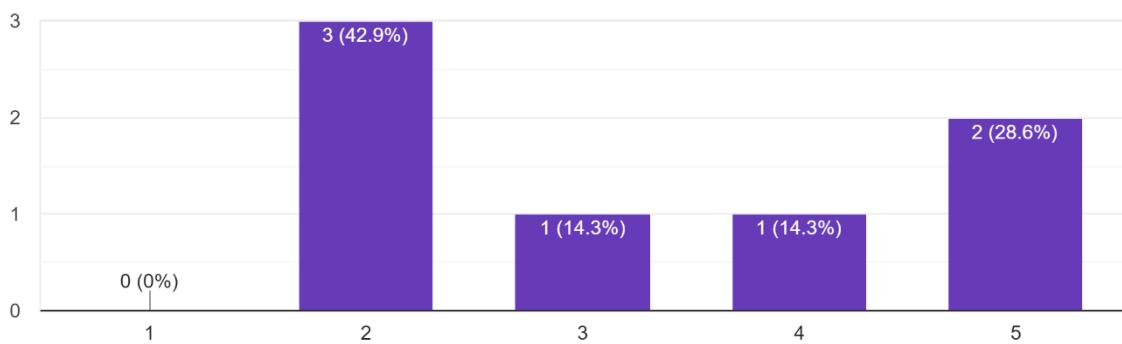


Figure 71: Alpha version II (Feedback Analysis) Developed by Author

In this chart shows the satisfaction rates about the user menu and user dashboard. As the chart shown in 1 it represents not satisfied at all and 5 represented as very satisfied about the user menu and the user dashboard. So users do not choose the 1 as the satisfaction. The highest satisfaction rate is 42.9%. So as the 3rd and 4th users equally choose as 14.3% and lastly for the 5th one 28.6% of chosen. Overall author guess that users not pretty much satisfied about the two interfaces.

Question 3

What are the elements that should be re-edited through the elements included in the interface of these applications?

7 responses

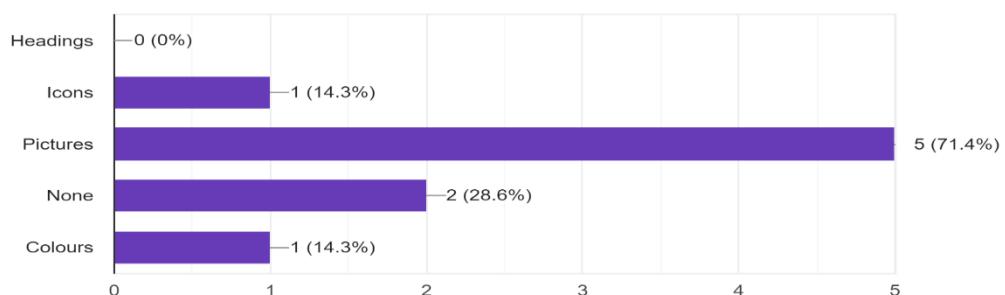


Figure 72: Alpha version II (Feedback Analysis) Developed by Author

Above the chart is shown about the that useres select about that should re-edited elements. So as the chart most of useres select to re-edit the pictures that is 71.4% and 28.6% of useres select none that doesn't have to re-edit anything. Equal percent of useres select to re-edit the icons and the colours of the user menu and user dashboard. So lookafter this author guess that need to change the pictures of the interfaces.

Question 4

Which Features should be changed in these interfaces ?

7 responses

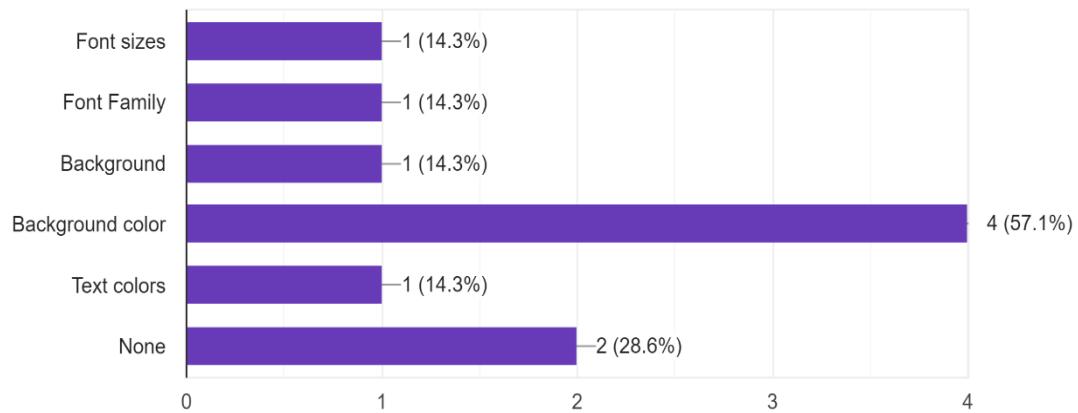


Figure 73: Alpha version II (Feedback Analysis) Developed by Author

In this chart it shows about the features that should changed in interfaces of User menu and the user dashboard.Highest percentage of users select to change the background color of the user menu and user dashboard. The percentage of it is 57.1% and equal percentage of says to change the font sizes, Font family, Text colors.the percentage of is 14.3%.28.6% of selected as none. Overall author can guess that it should have to change some of feautures.

Sign in and Sign up

Question 1

What is the opinion regarding these interfaces of the web based application?

7 responses

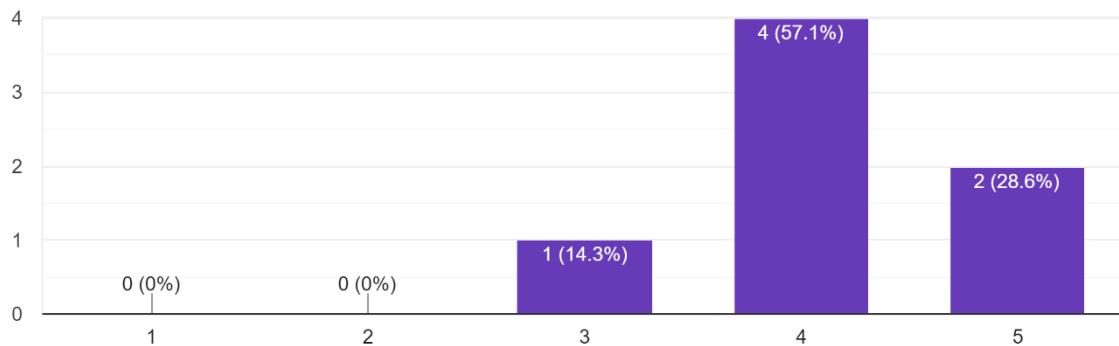


Figure 74: Alpha version II (Feedback Analysis) Developed by Author

In this chart shows the opinions of sign in and sign up interfaces. In the chart 1 is represented as not userfreindly and the 5 represented as very userfreindly. So the heigt number of percentage users select 4 the percentage is 57.1%. 14.3% percent select 3 as the user freindliness and 28.6% of useres select 5 as the user freindliness. So the author can guess that this interfaces are pretty much user friendly to the useres.

Question 2

Are you satisfied about these interfaces?

7 responses

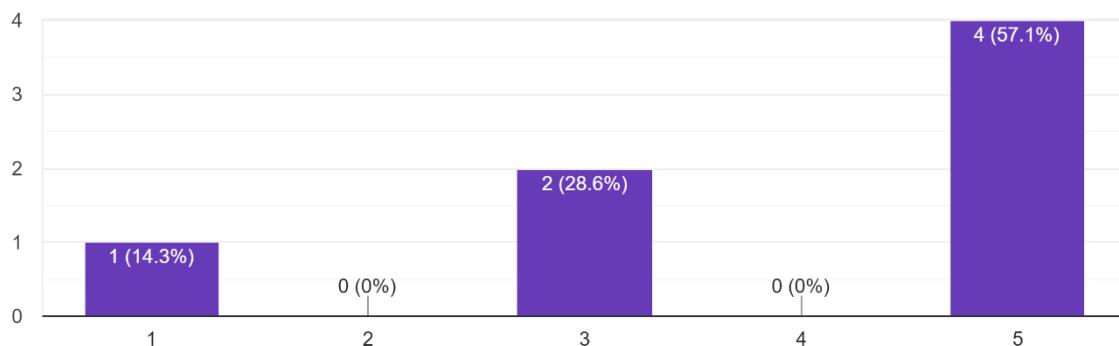


Figure 75: Alpha version II (Feedback Analysis) Developed by Author

In this chart user have to select about the satisfaction about the sign in and sign-up interfaces. So in here 1 means that is not satisfied at all and the 5 means it is very satisfied. In the bar graph the highest number of users select these interfaces as very satisfied the percentage of the selected is 57.1% and 28.6% of users choose the 3rd one. Also the minimum number of

percentage select 1st as the satisfaction. As the chart represent author guess that most of users satisfied about the interfaces.

Question 3

What are the elements that should be re-edited through the elements included in the interfaces of this application?

7 responses

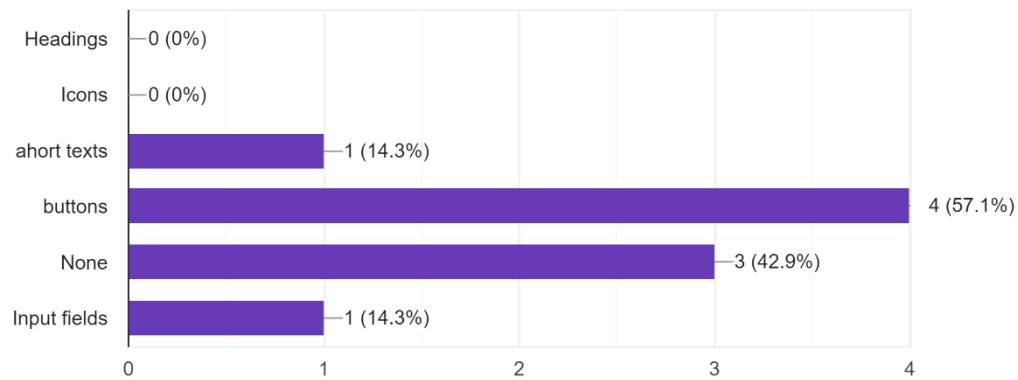


Figure 76: Alpha version II (Feedback Analysis) Developed by Author

In this chart it shows the elements that should re-edited in these interfaces. So the highest percentage of say that need to re-edited the buttons of the interfaces. The percentage is of it is 57.1% and the users select none in percentage is 42.9%. Equal number of percentage choose the short texts and need to add input fields. So overall author guess that there are need to re-edit in these interfaces.

Question 4

Which Features should be changed in these interfaces?

7 responses

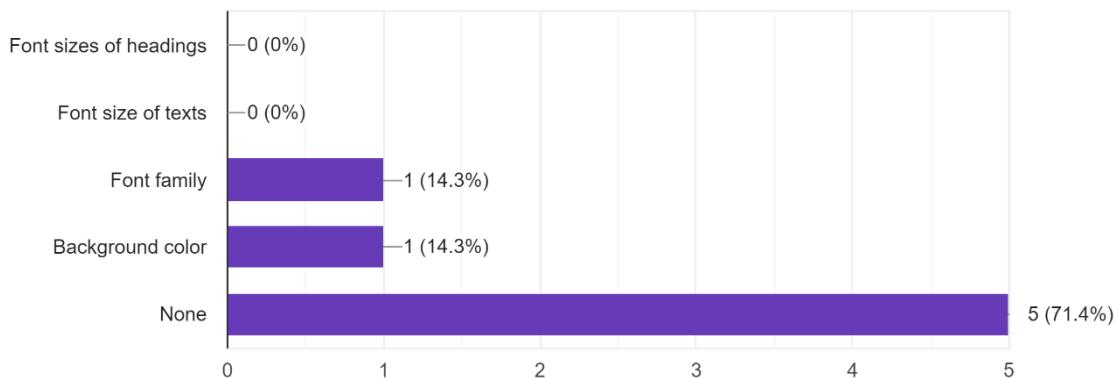


Figure 77: Alpha version II (Feedback Analysis) Developed by Author

In this above chart shows about the features that should change in sign in and sign up interfaces. So highest number of users choose none that means not have to change anything. The percentage of it is 71.4%. Equal number of percentages that means 14.3% of users say to change the font family and the background color of it. Overall, the author guess that it is not necessary to change the features because most of users choose none .

Contact us and About us

Question 1

What is the opinion regarding these interfaces of the web based application?
 7 responses

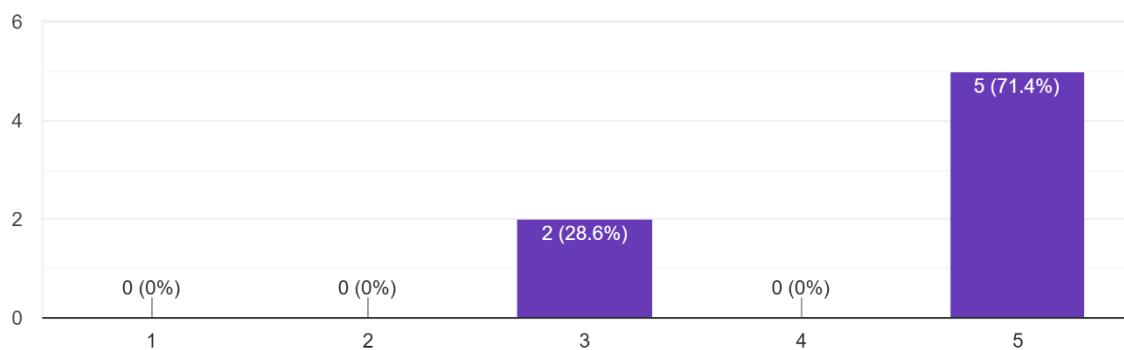


Figure 78: Alpha version II (Feedback Analysis) Developed by Author

In this chart shows about the opinion regarding the contact us and about us interfaces. In 1 it represents about the not user-friendly and 5 represent as the user-friendly. As the chart the Highest number of percentages that means 71.4% of users choose the 5. 28.6% of users choose 3rd as the user-friendliness of these interfaces. For 1st 2nd and 4th none of the users choose. So after seeing this author guest that these interfaces are very userfreindly for the users.

Question 2

Are you satisfied about these interfaces?
 7 responses

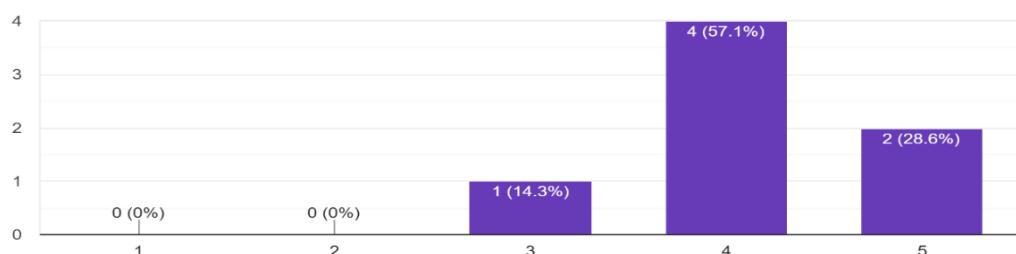


Figure 79: Alpha version II (Feedback Analysis) Developed by Author

This chart shows the satisfaction of contact us and about us interfaces. In 1 represent that not satisfied at all and 5th represent that very satisfied. The highest number of users choose the 4th one as the satisfaction. The percentage is 57.1% and 28.6% of users select 5 as the satisfaction also 14.3% users choose the 3rd as the satisfaction. Overall author guess that it is pretty much satisfied for the users.

Question 3

What are the elements that should be re-edited through the elements included in the interfaces of this application?

7 responses

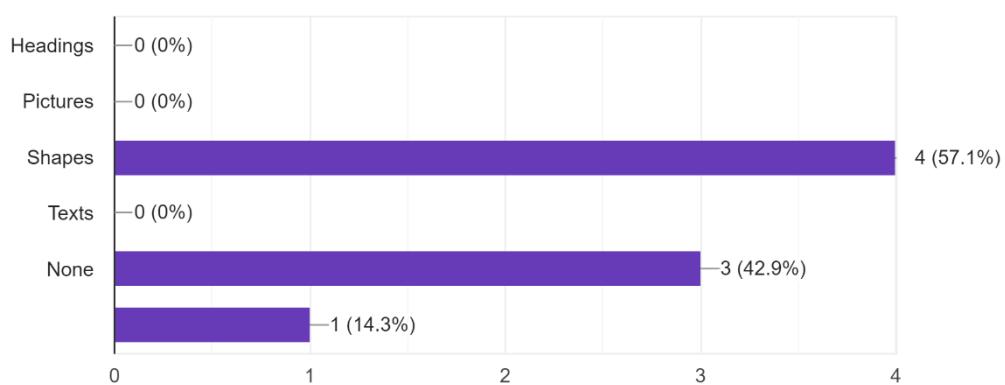


Figure 80: Alpha version II (Feedback Analysis) Developed by Author

In this chart it shows the elements that should re-edited in these interfaces. So the highest percentage of say that need to re-edited the shapes of the interfaces. The percentage is of it is 57.1% and the users select none in percentage is 42.9%. So overall author guess that there are need to re-edit in these interfaces.

Question 4

Which Features should be changed in These interfaces ?

7 responses

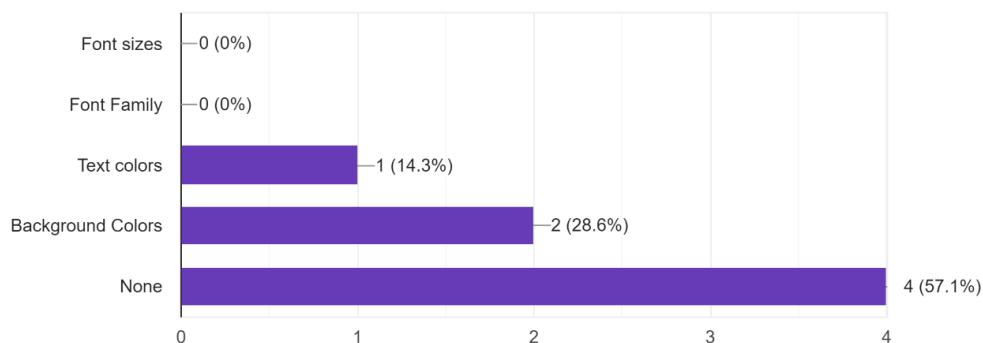


Figure 81: Alpha version II (Feedback Analysis) Developed by Author

In this above chart shows about the features that should change in contact us and about us interfaces. So highest number of users choose none that means not have to change anything. The percentage of it is 57.1 .28.6% of users choose background color should be changed and 14.3% of users choose text colors should also changed. Overall, the author guess that there are minimum number of changes have to change in these interfaces.

Travel Packages

Question 1

What is the opinion regarding these interfaces of the web based application?
7 responses

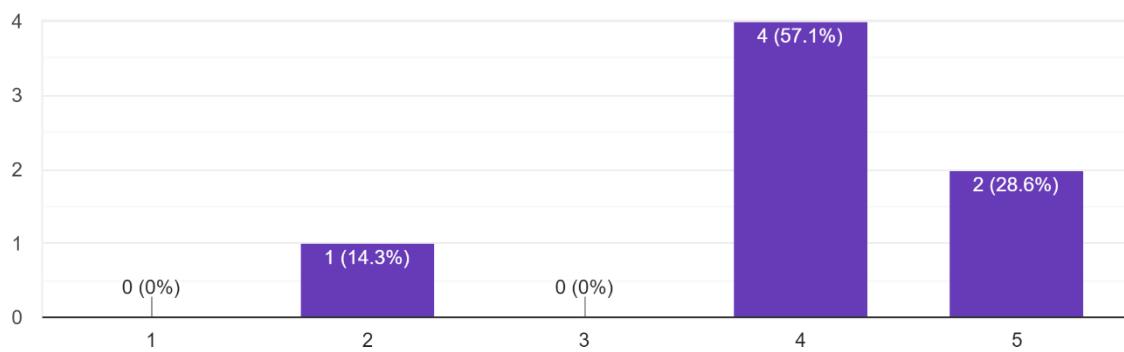


Figure 82: Alpha version II (Feedback Analysis) Developed by Author

In this chart shows about the opinion regarding the travel packages interfaces. In 1 it represents about the not user-friendly and 5 represent as the user-friendly. As the chart the Highest number of percentages that means 57.1% of users choose the 4. 28.6% of users choose 5th as the user-friendliness of these interfaces. User choose 2nd and the percentage of it is 14.3%. So after seeing this author guest that these interfaces are user-friendly for the users

Question 2

Are you satisfied about these interfaces?
7 responses

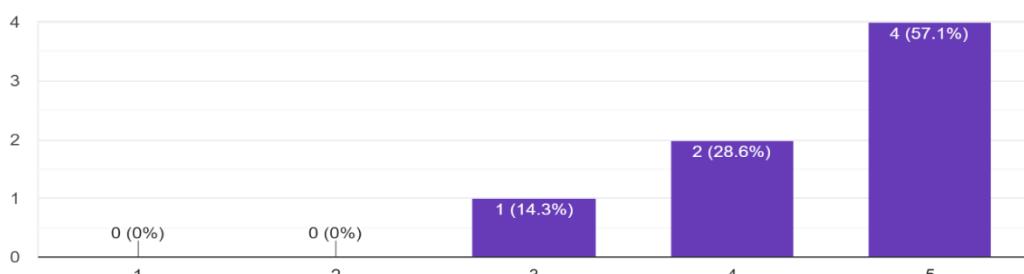


Figure 83: Alpha version II (Feedback Analysis) Developed by Author

This chart shows the satisfaction of Travel package interfaces. In 1 represent that not satisfied at all and 5th represent that very satisfied. The highest number of users choose the 5th one as the satisfaction. The percentage is 57.1% and 28.6% of users select 4 as the satisfaction also 14.3% users choose the 3rd as the satisfaction. Overall author guess that it is very satisfied about the interfaces.

Question 3

What are the elements that should be re-edited through the elements included in the interfaces of this application?

7 responses

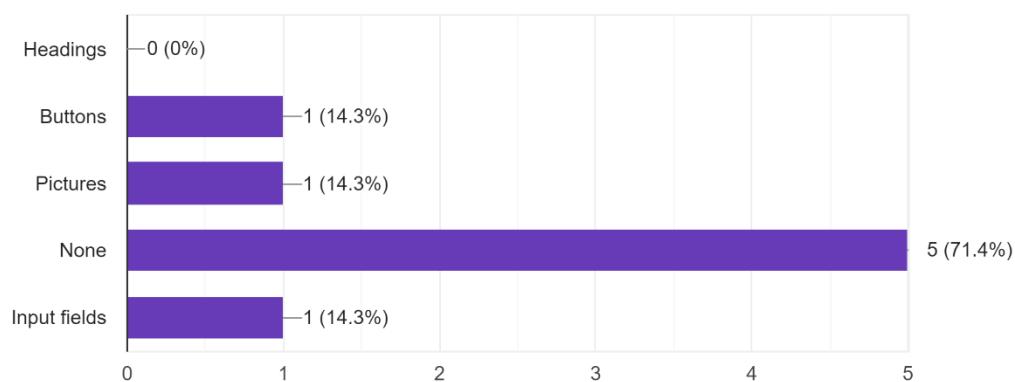


Figure 84: Alpha version II (Feedback Analysis) Developed by Author

In the above chart shows the elements that useres idetyfied about that interface that has to re-edited. As the chart 14.3% of useres select the Buttons and the pictures should be re-edited. As the highest percentage of people said that it doesn't have to re-edited. The percentage of it is 71.4% Basicaly author geust that it doesn't have to Re-edited.

Question 4

Which Features should be changed in these interfaces ?

7 responses

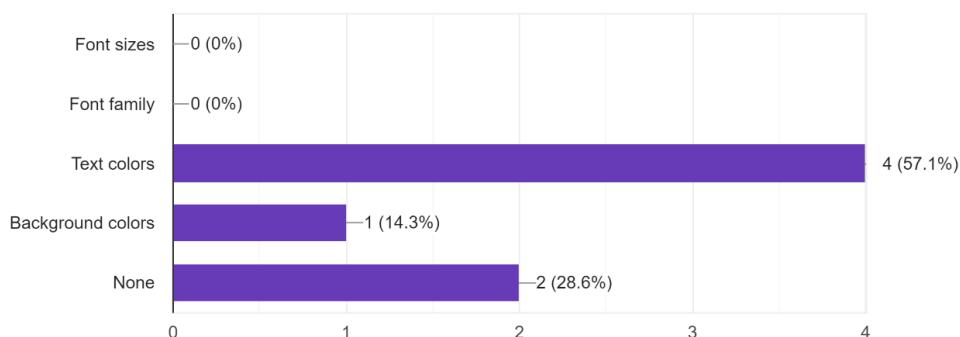


Figure 85: Alpha version II (Feedback Analysis) Developed by Author

In this above chart shows about the features that should change in Travel package interfaces. So highest number of users choose the Text colors should be changed. The percentage of it is 57.1 . 28.6% of users choose none and 14.3% of users choose Background colors should also changed. Overall, the author guess that there are Some changes have to change in these interfaces.

Question 5

What kind user experience did you get from this web application?

7 responses

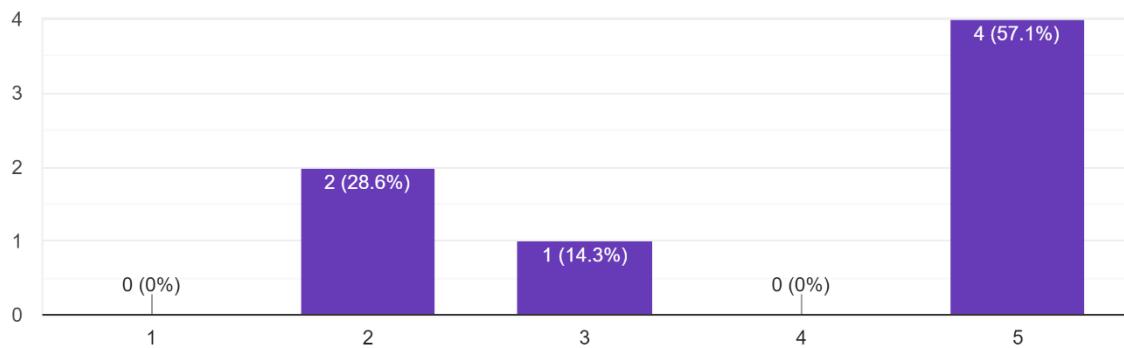


Figure 86: Alpha version II (Feedback Analysis) Developed by Author

In this interface shows about the user experience from the web application. 1 represent as bad experience and 5 represent as Excellent Experience. So as the highest number of users choose the 5th one and the percentage is 57.1% and 28.6% of users choose the 2nd one. 14.3% of users choose the 3rd one. As the chart author guess that users had excellent experience.

Justification from Author

As the analysis Author need to say that the Alpha version II is success more than the Alpha version I. But in version II also there are lots of issues that identified by the users. So as the requests from the users author decide to design the Beta version from getting these changes and correct them and build a new version . As mentioned most of users select that the interfaces have background color issues, text color issues , pictures are not very satisfied , font size are not satisfied ,buttons are not satisfied also some said that there are headings issues because of that author developing a new version called Beta version.

Beta Version of Kuoni Leisure Web Based Application Prototype

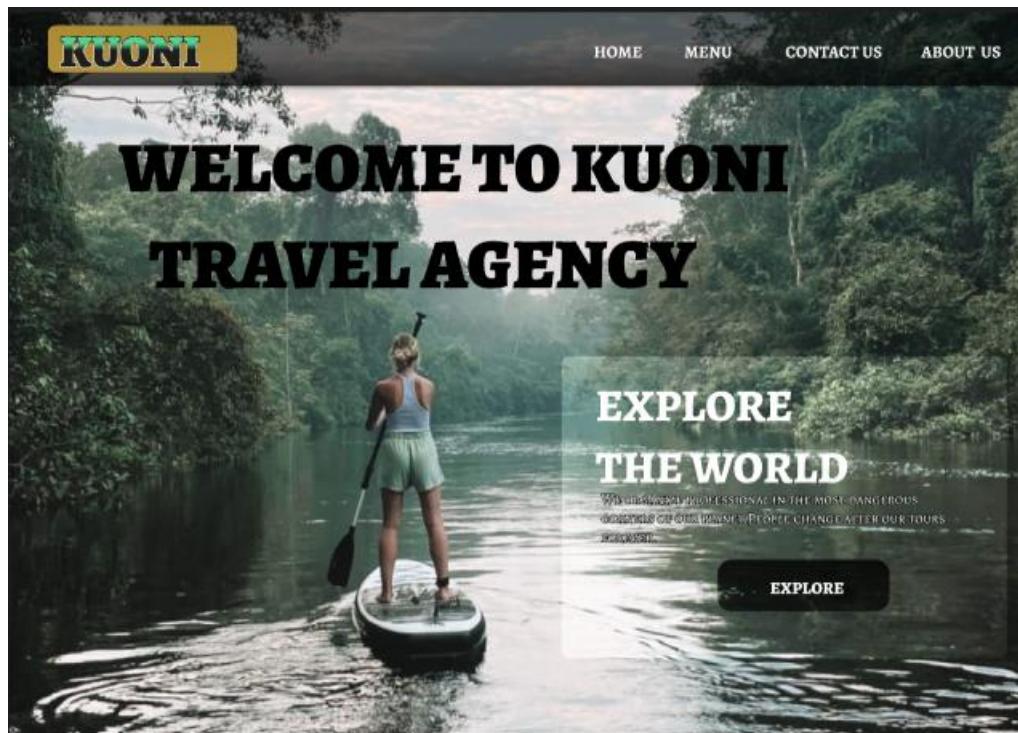


Figure 87: Beta version (Home Page Interface) Developed by Author

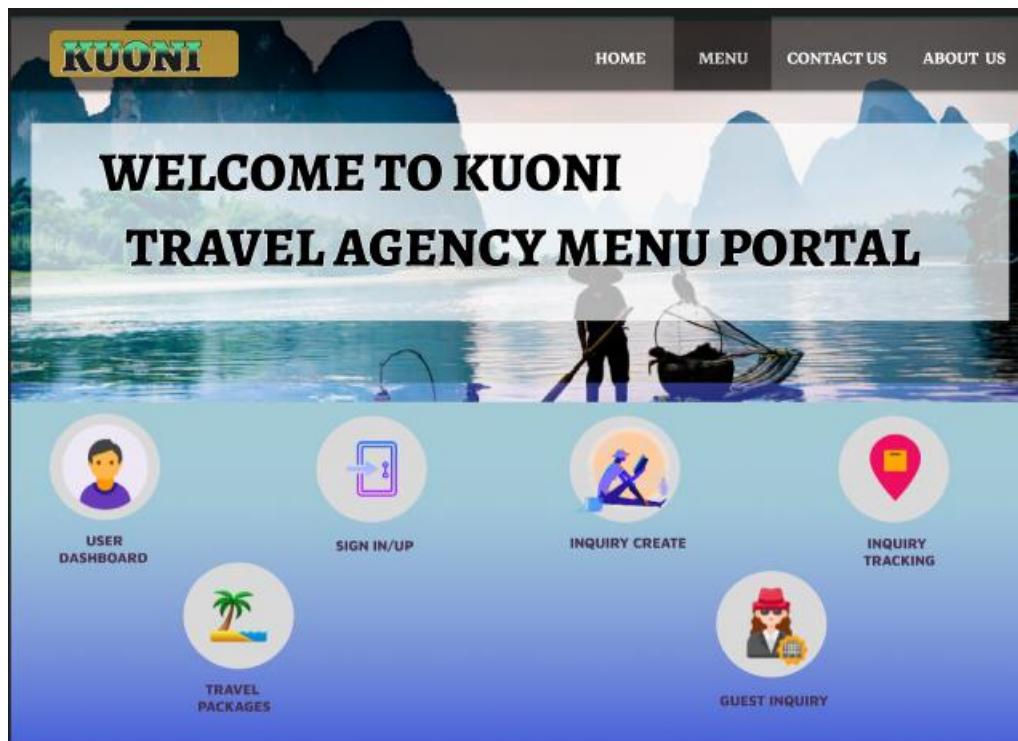


Figure 88: Beta version (User Menu Page Interface) Developed by Author

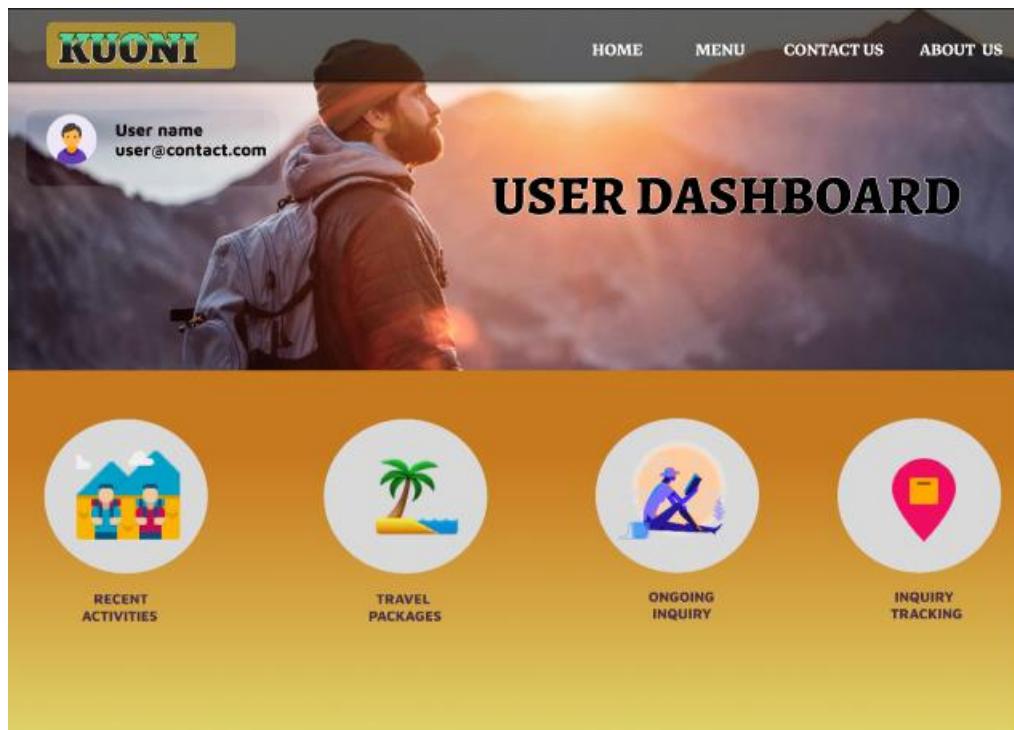


Figure 89: Beta version (User Dashboard Page Interface) Developed by Author

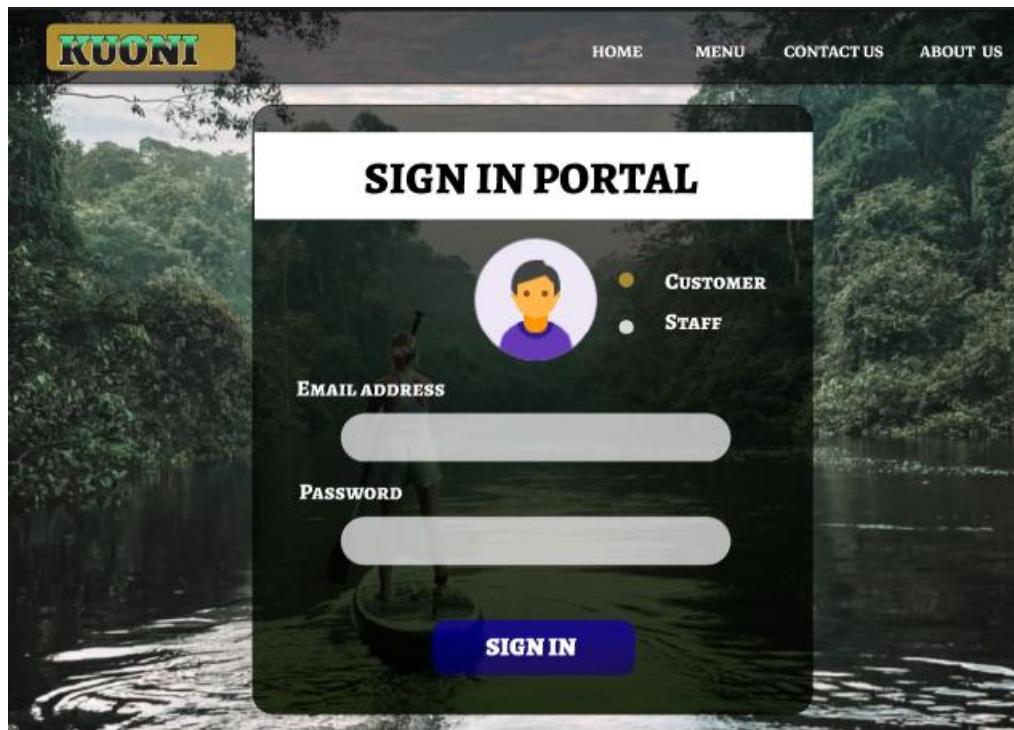


Figure 90: Beta version (Sign In Page Interface) Developed by Author

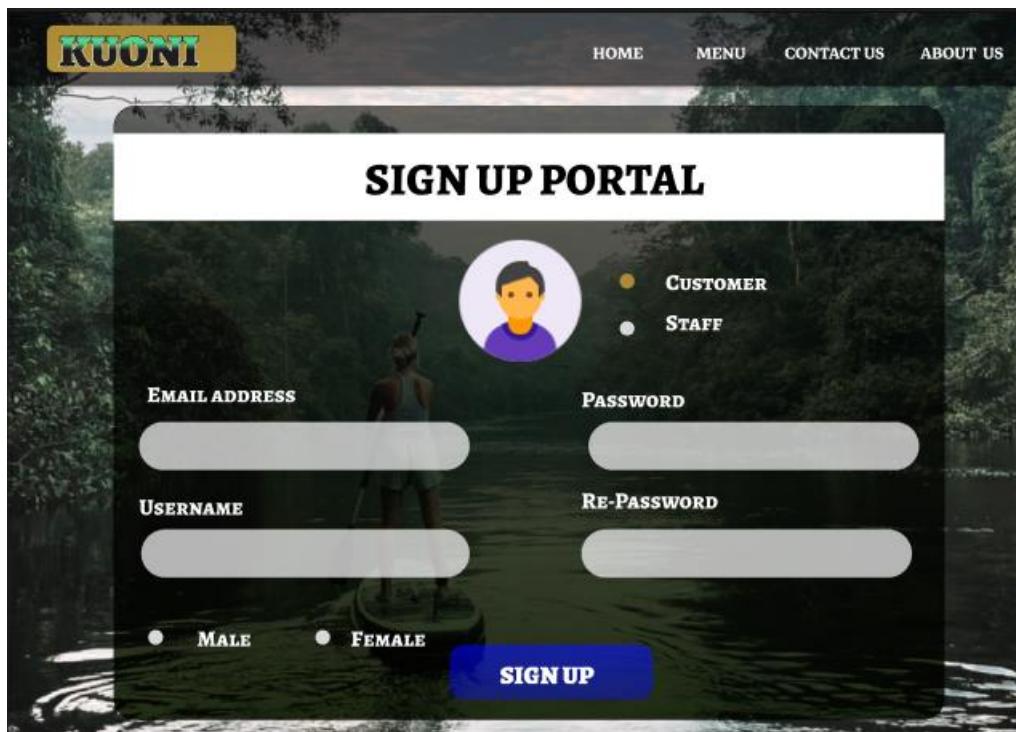


Figure 91: Beta version (Sign Up Page Interface) Developed by Author



Figure 92: Beta version (About Us Page Interface) Developed by Author



Figure 93: Beta version (Contact Us Page Interface) Developed by Author

The screenshot shows the 'MAKE A INQUIRY FOR YOUR TOUR WITH KUONI TRAVEL AND TOURISM AGENCY' page. The form consists of several input fields arranged in pairs across the page. From top to bottom, the fields are: 'Inquiry ID' and 'Days count'; 'Customer name' and 'Nights count'; 'Email Address' and 'Hotel token No.'; 'Customer' (with options 'Local' and 'Foreign') and 'Rooms Category' (with a dropdown menu); 'Gender' (with options 'Male' and 'Female'); 'Person count' and 'Room count'; 'Adult's count' and 'Hotel cost'; 'Children's count' and 'Other services cost'; 'Start Date' and 'Transport cost'; and 'End Date' and 'Tracking ID'. On the right side of the form, there is a green button labeled 'CREATE AN INQUIRY'.

Figure 94: Beta version (Inquiry Page Interface) Developed by Author

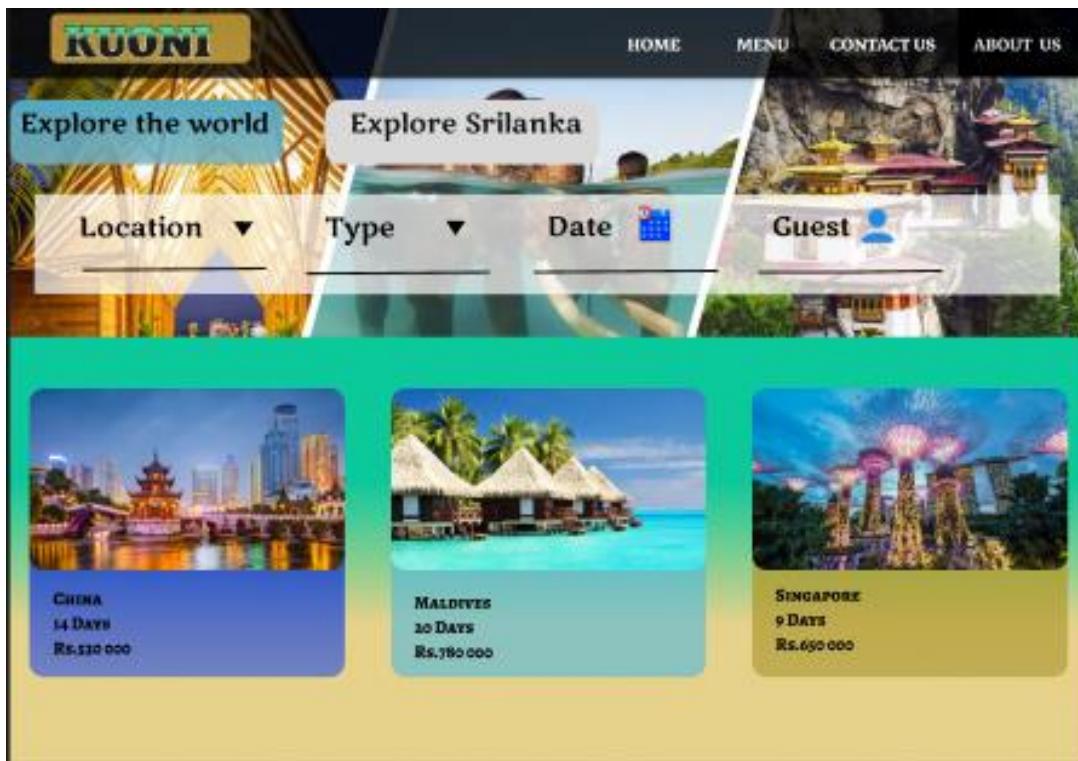


Figure 95: Beta version (Travel packages world Page Interface) Developed by Author

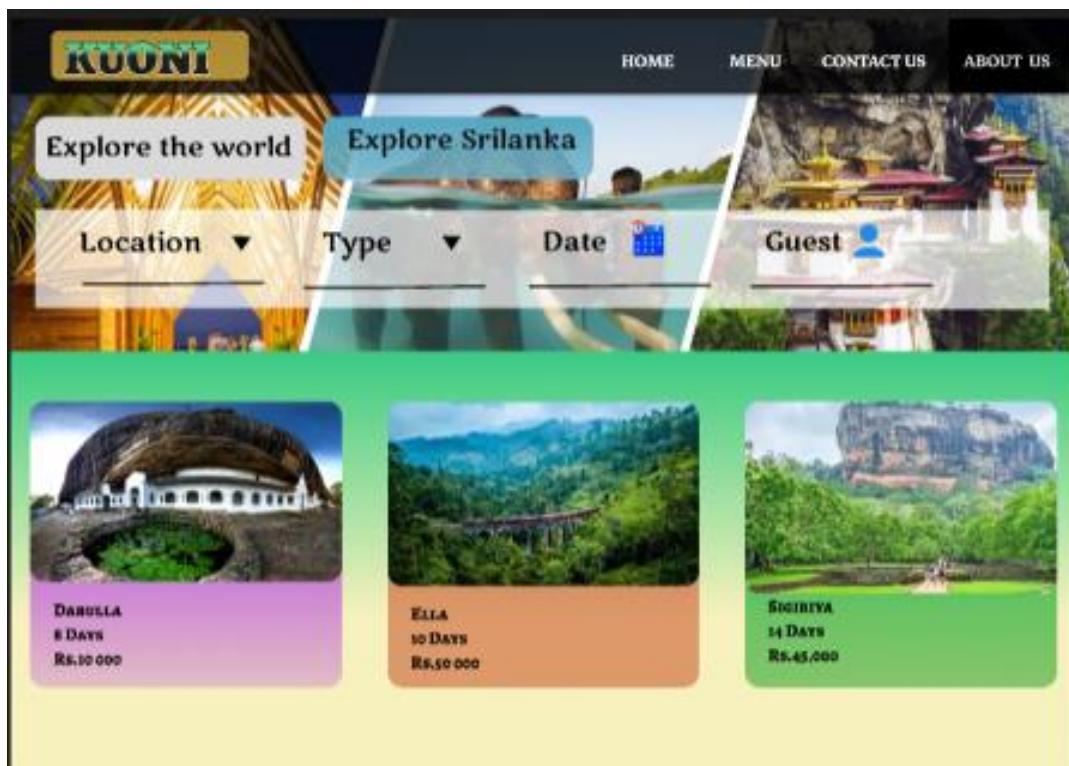


Figure 96: Beta version (Travel packages Sri Lanka Page Interface) Developed by Author

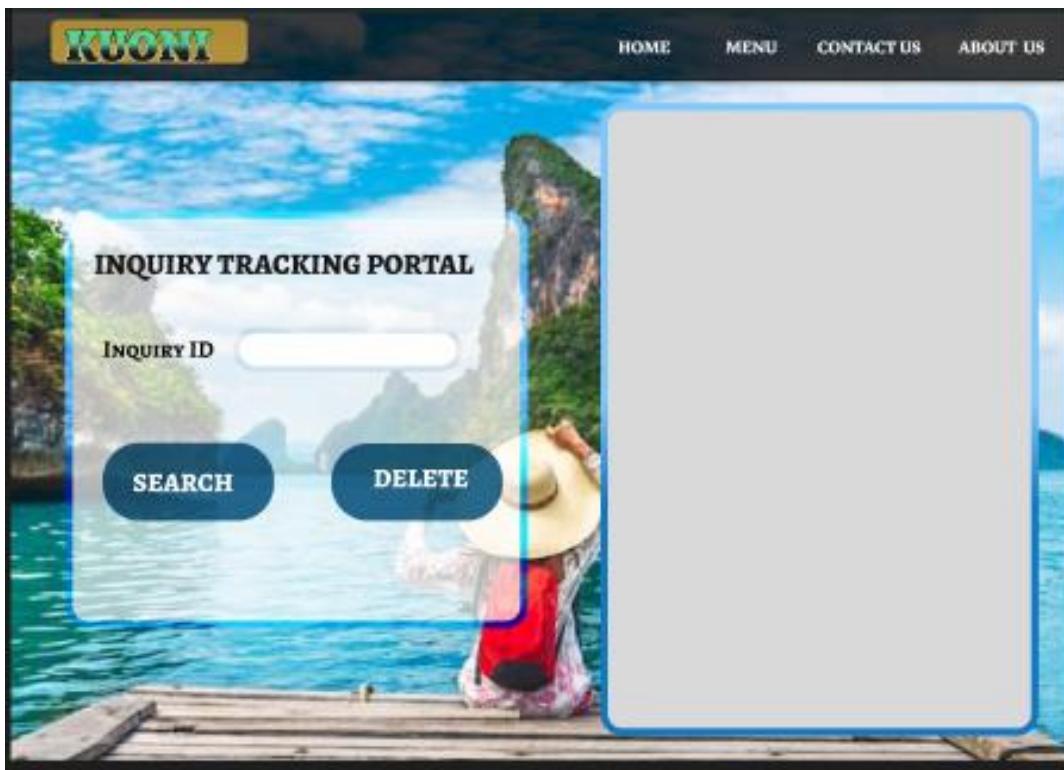


Figure 97: Beta version (Inquiry Tracking Page Interface) Developed by Author

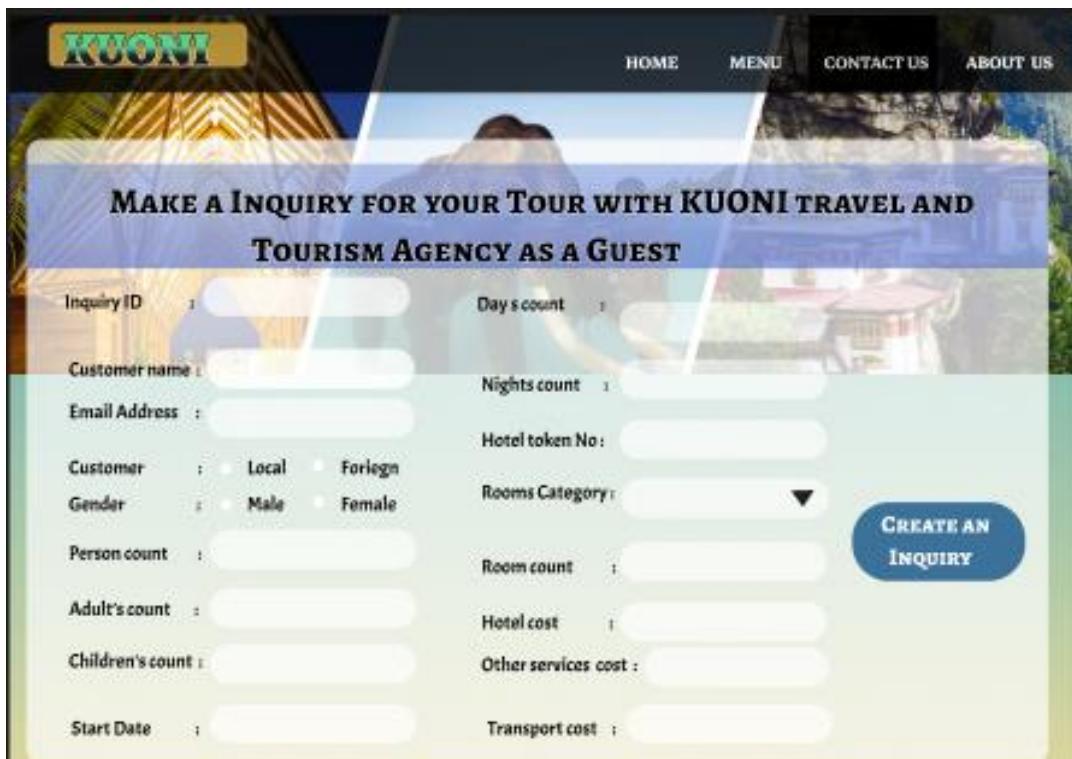


Figure 98: Beta version (Guest Inquiry Page Interface) Developed by Author

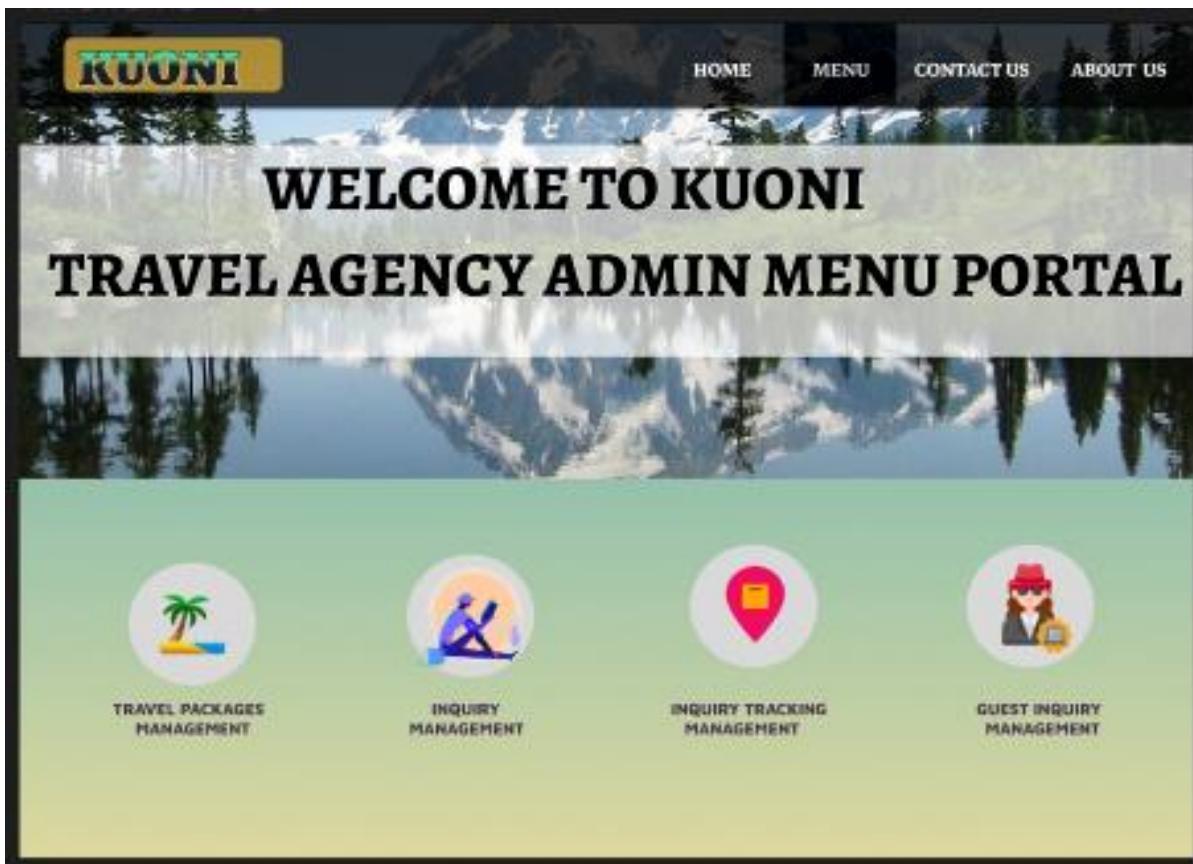


Figure 99: Beta version (Admin Menu Page Interface) Developed by Author

Figure 100: Beta version (Inquiry Management Page Interface) Developed by Author

The screenshot shows a web-based management portal for travel packages. At the top, there's a navigation bar with links for HOME, MENU, CONTACT US, and ABOUT US. Below the navigation is a header bar with the text "TRAVELING PACKAGES AND PLANS MANAGEMENT PORTAL". The main area contains several input fields for package details: Inquiry ID, Duration, Package ID, Distance, Package Name, Location, Package Type, Person Count, Package Price, Hotel No, and a placeholder for Package Image. At the bottom are five green rounded rectangular buttons labeled "INSEERT", "UPDATE", "DELETE", "SEARCH", and "Package Image".

Figure 101: Beta version (Travel packages Management Page Interface) Developed by Author

The screenshot shows a web-based management portal for inquiry guests. At the top, there's a navigation bar with links for HOME, MENU, CONTACT US, and ABOUT US. Below the navigation is a header bar with the text "INQUIRY GEUST MANAGEMENT PORTAL". The main area contains various input fields for guest information: Inquiry ID, Days count, Customer name, Nights count, Email Address, Hotel token No, Customer (Local/Foreign), Gender (Male/Female), Rooms Category, Person count, Room count, Adult's count, Hotel cost, Children's count, Other services cost, Start Date, Transport cost, End Date, and Tracking ID. To the right of these fields are four blue rounded rectangular buttons labeled "CREATE AN INQUIRY", "UPDATE AN INQUIRY", "DELETE AN INQUIRY", and "SEARCH AN INQUIRY".

Figure 102: Beta version (Inquiry Guest Management Page Interface) Developed by Author

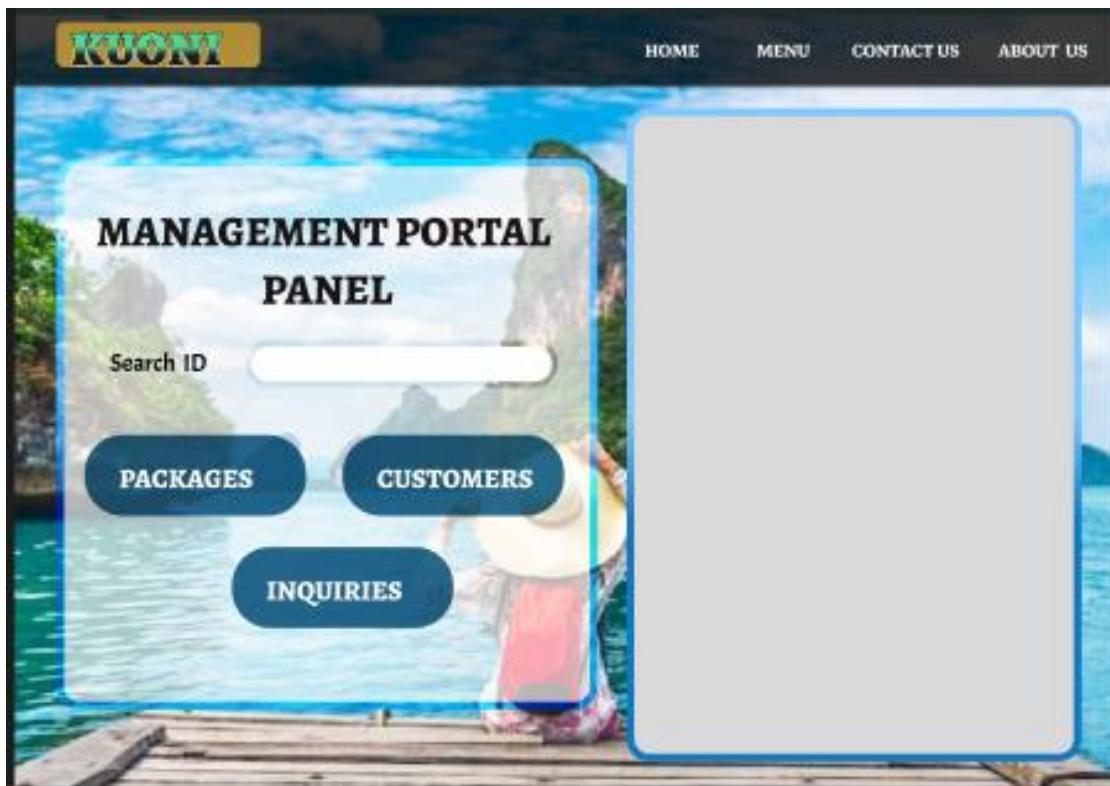


Figure 103: Beta version (Management Portal Panel Page Interface) Developed by Author

End user feedback analysis for Beta Version prototype

Kuoni Leisure Web Based Application Usability Testing Questionnaire (Beta version)

ranudigk@gmail.com Switch account 

 Not shared

* Indicates required question

As for the viewers I will share interfaces in a link to get the feedbacks of It.
[please click this to view the interfaces](#)

Name *

Your answer _____

What is the opinion about the web based application ? *

Excellent
 Good
 Fair
 Poor

What is your opinion about the interface and theme used? *

Excellent
 Good
 Fair
 Poor

Figure 104 : Beta version (Question Form Part 1) Developed by Author

What kind of user experience did you get from this web based application? *

Excellent user experience
 Good user expereince
 Fair user expereince
 Poor user expereince

What is your opinion about the usability and user Friendliness of the web based application *

Excellent
 Good
 Fair
 Poor

Are you satisfied with the prototype of the web based application that was created ? rate from 1-10 *

1 2 3 4 5 6 7 8 9 10

Needs a lot of ammendments Very satisfied

Submit **Clear form**

Never submit passwords through Google Forms.

Figure 105: Beta version (Question Form Part 2) Developed by Author

Analyzed reports on the feedback given by the end users on the Beta Version prototype of the Kuoni Leisure web based application

In beta version questionnaire form author add a drive link to view the authors designed based on Beta version of web application.

Question 01

What is the opinion about the web based application ?

20 responses

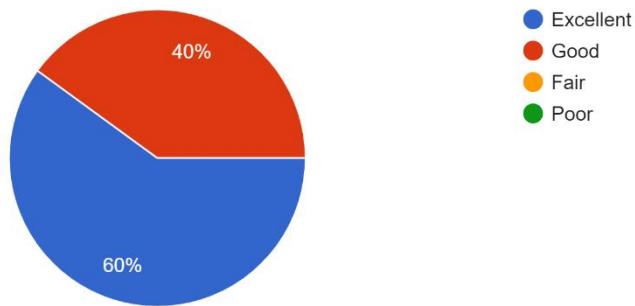


Figure 106: Beta version (Feedback Analysis) Developed by Author

In this chart it shows the opinion of the user about the web-based application. As the chart it shows highest percentage of users select the opinion is excellent and the percentage is 60%. 40% of user's opinion is selected as good. Overall author guess that it is better than the alpha version II.

Question 02

What is your opinion about the interface and theme used?

20 responses

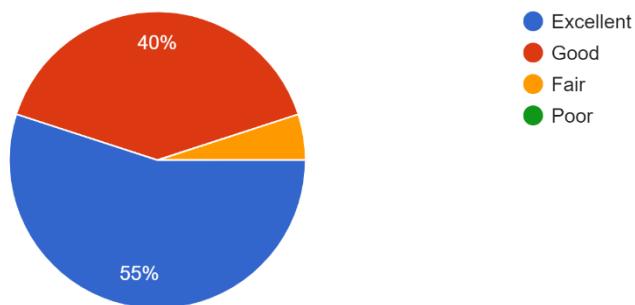


Figure 107: Beta version (Feedback Analysis) Developed by Author

In this chart it shows the opinion of the users about the interfaces and the theme used. The most of users choose the opinion as excellent and the percentage is 50%. 40% of users choose the opinion as good and few percentage of users select the opinion as fair. So the author overall think that the interfaces are better than the alpha version II.

Question 03

What kind of user experience did you get from this web based application?

20 responses

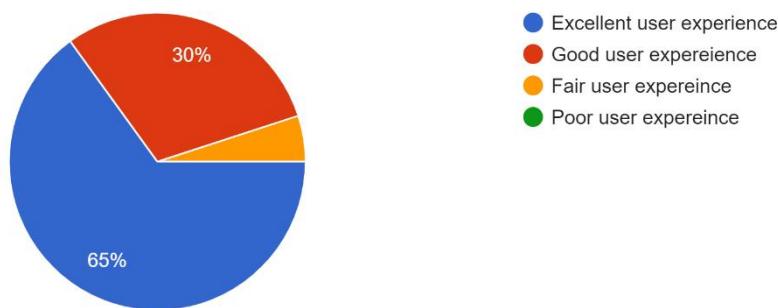


Figure 108: Beta version (Feedback Analysis) Developed by Author

In this chart it shows what kind of user experience user get from the web based application.. The most of users choose that user get a excellent user experience from it and the percentage is 65%. 30% of users choose that user get a good user experience from it and few percentage of users select that user get a fair user experience from it. So the author overall think that the user experience is excellent in this version .

Question 04

What is your opinion about the usability and user Friendliness of the web based application

20 responses

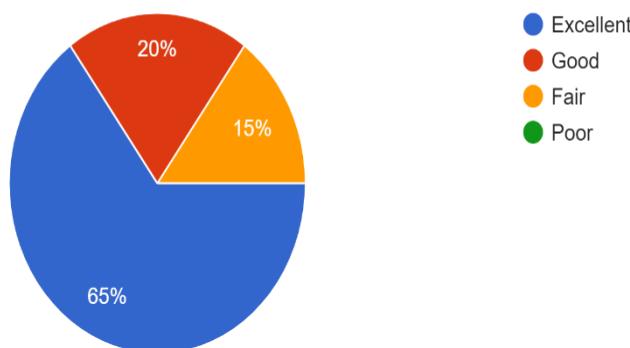


Figure 109: Beta version (Feedback Analysis) Developed by Author

In this chart it shows the opinion of the users about usability and user friendliness of the web application. The most of users choose the opinion as excellent and the percentage is 65%. 20% of users choose the opinion as good and 15% percentage of users select the opinion as fair. So the author overall think that the most users had a usability and user friendly web application.

Question 05

Are you satisfied with the prototype of the web based application that was created ? rate from 1-10
20 responses

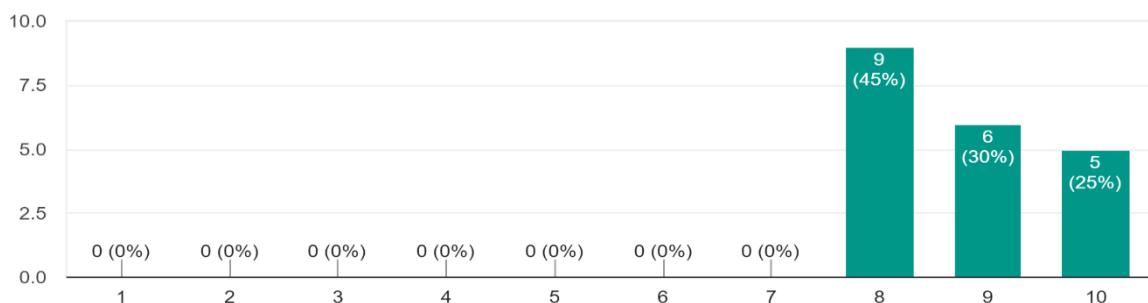


Figure 110: Beta version (Feedback Analysis) Developed by Author

This chart shows about how user satisfied about the prototype of the web based application that was created. 1 means there are more amendments to and 10 means very much satisfied with it. So most of users select 8 as the rate and the percentage of it is 45% . 30% of users selected 9 as the rate and 25% of users select 10 as the rate. So no one selected 1-7. When look at this author can identified that the beta version is the most successful interfaces developed.

Justification from Author

Finally author successfully developed the prototypes in Beta version, As the user mentioned in Alpha version II the background colors, button colors , the changes of pictures, sizes of the fonts, changes of font families are all done in this beta version. After that author decided to get the feedbacks from the users from the google forms and 20 responses were get in it. So most of users like this version more than the alpha version II as the analysis. Because most users choose the excellent as the interfaces of this web application in beta version and the user experienced also selected most of users as excellent. Also the users were very satisfied about the prototypes . As the conclusion author can say that the alpha version II is better than alpha version I and beta version is better than alpha version. Basically the best version is beta version.

Analysis of whether the final prototype met the initial requirements

Requirements	Archived	Not Achieved
Ability to make inquiries without signing in		
Ability to track inquiries using an inquiry ID		
Differentiate services based on local or international customer		
Differentiate services based on the number of days, children and adults		
Ability for the customer to choose preferences (Destinations, Hotel chains etc.)		
Generate an inquiry form based on the inquiry		
Generate an inquiry ID		
Create an admin page to manage data and perform CRUD		
Build an attractive interface		
Build interface with user friendly UI		

Table 13 : Analyze requirements Full fillment of the web based application Developed by Author

When developing the prototype, the author added a few important requirements for the application in addition to the requirements that were previously specified. This is because, in order to register for the web-based application, the customer must possess the requisite

The lack of capabilities to manage their data or information would negatively impact the application's usability, user friendliness, and overall user experience. As a result, the author has included a few features to provide users a more original experience and improve the application's security.

References

- Adams, C. (no date) | Interview Questions for Business Analysts and Systems Analysts | What is the difference between horizontal and vertical prototyping? [Online] | Available at <https://www.modernanalyst.com/Careers/InterviewQuestions/tabid/128/ID/5252/What-is-the-difference-between-horizontal-and-vertical-prototyping.aspx> | Accessed on 5th January 2022
- Babich, Nick. (Sep 2, 2018) | The Magic of Paper Prototyping [Online] | Available at <https://uxplanet.org/the-magic-of-paper-prototyping-51693eac6bc3> | Accessed on 6th January 2022
- Ibragimova, E. (Dec 28, 2016) | High-fidelity prototyping: What, When, Why and How? [Online] | Available at <https://blog.prototypio.io/high-fidelity-prototyping-what-when-whyand-how-f5bbde6a7fd4> | Accessed on 6th January 2022
- Liu, T. (Aug 10, 2017) | What Are the Advantages of Prototyping? How to Make the Most of It? [Online] | Available at <https://www.mockplus.com/blog/post/advantages-ofprototyping> | Accessed on 4th January 2022
- Stary, Chris. (2000) | Contextual Prototyping of User Interfaces [Online] | Available at www.cin.ufpe.br | Accessed on 6th January 2022
- Teach ICT, (no date) | 4. Throw away prototyping - Teach-ICT [Online] | Available at https://www.teachict.com/as_a2_ict_new/ocr/A2_G063/331_systems_cycle/prototyping_RAD/miniweb/pg_4.htm | Accessed on 5th January 2022
- Wells, J. (Feb14, 2014) | 7 Reasons Why I Use InVision for Rapid Prototyping [Online] | Available at <https://medium.com/@mrjeremywells/7-reasons-why-i-use-invision-forrapid-prototyping-ed1c33d5b86> | Accessed on 7th January 2022

Grading Rubric

Grading Criteria	Achieved	Feedback
LO1 Explore forms of prototypes appropriate for various functionality and end user testing requirements.		
P1 Recognise specific forms of prototyping functionality and end user testing requirements.		
P2 Evaluate standard tools available for use in prototyping.		
M1 Review specific forms of prototyping and the advantages and disadvantages of end user testing requirements for appropriateness to different testing outcomes		
LO2 Plan a prototype for specific target end users and planned tests.		
P3 Review different end user categorisations, classifications and behaviour modelling techniques		
P4 Explore a specific end user and an appropriate prototyping methodology to test with this user type.		
M2 Apply end user classification and behaviour modelling to select an appropriate prototyping methodology.		

M3 Suggest a plan to use appropriate prototyping methodology and tools to conduct end user testing.		
D1 Evaluate the impact of common prototyping methodology within the software development lifecycle.		
LO3Develop multiple iterations of the prototype using appropriate tools		
P5Explore appropriate tools to develop multiple prototypes.		
P6Perform end user experiments and examine feedback		
M4Employ an appropriate set of tools to develop your plan into a prototype.		
M5 Using end user feedback build a new iteration of your prototype modified using the most important feedback and enhancements.		

D2 Create multiple iterations of your prototype and modify each iteration with enhancements gathered from user feedback and experimentation.		
LO4 Evaluate user feedback and test results from multiple iterations of the prototype and end user testing		
P7 Analyse end user feedback from multiple iterations of your prototype		
M6 Undertake a critical review and compare your final prototype and your test results with your original plan..		
D3 Critique the overall success of your prototype and discuss your insight using prototyping.		