USER-CENTERED REDESIGN OF A LEGACY E-COMMERCE INTERFACE

BY

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SUBMITTED TO:
DEPARTMENT OF COMPUTER SCIENCE, FACULTY OF COMPUTING,
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IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A BACHELOR OF SCIENCE (B.Sc.) DEGREE IN COMPUTER SCIENCE

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CERTIFICATION

This is to certify that this project titled **"USER-CENTERED REDESIGN OF A LEGACY E-COMMERCE INTERFACE"** was carried out by **OSAWARU JOSEPHINE OSARUMEN** with Matriculation Number **PSC2105392** and submitted to the Department of Computer Science, Faculty of Computing, University of Benin, Benin City, under the supervision of **MR. I.E OBAYAGBONA**

MR. I.E OBAYAGBONA	**DATE**
Project Supervisor	

APPROVAL

This project titled **"USER-CENTERED REDESIGN OF A LEGACY E-COMMERCE INTERFACE"** by **OSAWARU JOSEPHINE OSARUMEN** with Matriculation Number **PSC210539** has been approved as meeting the requirements for the award of Bachelor of Science (B.Sc.) Degree in the Department of Computer Science, Faculty of Computing, University of Benin, Benin City.

MR. I.E OBAYAGBONA	**DATE**
Project Supervisor	
DR. (MRS.) ROSEMARY USIOBAIFO	**DATE**
Head Of Department (HOD)	

DEDICATION

This work is dedicated to God Almighty, whose grace, wisdom, and strength made this project possible. I also dedicate it to my loving parents Mr. and Mrs. Henry and my siblings for their constant support, prayers, and encouragement throughout this journey. Their belief in me has been my greatest motivation.

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I sincerely thank Almighty God for His guidance, wisdom, and strength throughout my academic journey and also in the course of this project. Without His grace, this work would not have been possible.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

The rapid evolution of digital technologies has transformed e-commerce design standards, leaving many early websites outdated and ineffective. This study focuses on the user-centered redesign of a legacy e-commerce interface, using *Arngren.net* as a case study. The objective was to evaluate the usability and visual experience of the site and to propose a redesign framework that aligns with modern user experience (UX) and interface design (UI) principles.

The research adopted a qualitative case study approach, emphasizing heuristic evaluation and comparative analysis. Using Nielsen's (2020) ten usability heuristics, *Arngren.net* was assessed for issues relating to layout consistency, navigation flow, accessibility, and visual hierarchy. Findings revealed significant usability flaws, including poor visual organization, low mobile responsiveness, and non-intuitive navigation. These weaknesses were compared with modern e-commerce platforms such as Amazon, eBay, and Shopify-based stores, which prioritize responsive layouts, accessibility compliance, and streamlined user journeys.

Based on these insights, a user-centered redesign framework was proposed, integrating simplicity, responsive design, and user trust as key pillars. The redesigned interface emphasizes clear visual hierarchy, improved navigation menus, accessible content structure, and consistency across devices.

This study concludes that redesigning legacy e-commerce systems using user-centered principles enhances usability, accessibility, and overall user satisfaction. It also highlights the importance of continuous interface evaluation to maintain competitiveness in the fast-evolving digital marketplace. Future research may expand this work by exploring the integration of artificial intelligence and adaptive interfaces to further personalize user experiences.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

As digital commerce continues to evolve, usability and user experience (UX) have become central to how online platforms engage and retain users. With thousands of e-commerce platforms competing for attention, users have come to expect websites that are intuitive, visually clear, and easy to navigate. The moment a site feels outdated or frustrating, most users simply click away. This shift in behavior has made user-centered design a critical factor in how online businesses attract and retain customers.

Despite this evolution and the crucial user factor, many legacy websites, particularly those developed in the early days of the web, often fall short of modern usability standards. One of the most infamous examples is Arngren.net, a Norwegian gadget-selling website frequently cited in UX critiques for its dense, disorganized layout and outdated interface design (McDorman, 2024; Smith, 2022). Filled with overlapping images, inconsistent typography, cluttered product listings, and a complete lack of navigational hierarchy, the site offers a snapshot of what e-commerce once looked like and why it no longer works. What's striking is that, beneath the chaos, there's an actual product catalog that could benefit from a modern digital presence. But the interface gets in the way of the user at every step.

The core problem with interfaces like Arngren.net isn't just that they "look old" it's that they disregard how users think, behave, and interact online. Users today are goal-oriented. They expect to find what they're looking for with minimal effort. They want visuals that guide their attention, layouts that make sense and clear signals about where to click, what's important and what to expect next. These expectations are shaped by years of using apps and websites that have prioritized user needs through intentional, tested design choices.

According to Jakob Nielsen's usability heuristics, some of the most critical design principles include consistency, error prevention, aesthetic clarity and user control (Nielsen, 1995) and sites like Arngren.net violate nearly all of these. As a result, instead of supporting the user, the interface becomes an obstacle. This doesn't just affect the user's experience; it directly impacts business outcomes. Research has shown that poor

interface design increases cognitive load and bounce rates, particularly in e-commerce, where seamless navigation and trust signals are essential (Bai et al., 2008).

A user-centered redesign involves more than just making a website “look nicer.” It’s about understanding the goals, challenges, and expectations of the people who use the site and designing around them. This includes restructuring content, simplifying interfaces, improving accessibility, and using consistent, intentional design patterns. When done right, the redesign not only makes a site more usable, it makes it more valuable, both to users and to the business. By applying modern UX principles to a legacy e-commerce interface, designers can not only improve usability but also extend the commercial viability of older platforms (Krug, 2014; Norman, 2013).

This study takes on the challenge of redesigning a legacy e-commerce interface through a user-centered lens, using Arngren.net as a case study to explore how outdated platforms can be reimagined to meet today’s UX standards.

1.2 Statement of the Problem

Legacy e-commerce websites face critical issues including outdated technology, slow loading times, poor navigation, lack of mobile responsiveness, and inconsistent design. These problems reduce user satisfaction and cause revenue loss. There is an urgent need to redesign these systems using a user-centered approach that prioritizes usability, accessibility, and modern standards to improve engagement, streamline shopping experiences, and meet current user expectations.

This project addresses that gap by using Arngren.net as a case study for the user-centered redesign of a legacy e-commerce interface. It explores how outdated platforms can be transformed into effective digital environments by prioritizing usability, clarity, and modern design principles.

1.3 Aim and Objectives of the Study

The aim of this study is to redesign a legacy e-commerce interface using user-centered design principles, with the goal of improving usability, visual clarity, and overall user experience. To achieve this aim, the study will pursue the following objectives:

1. To identify and analyze specific usability problems in legacy interfaces, including navigation issues, visual clutter, and accessibility barriers

2. To understand modern e-commerce user expectations by examining current user behaviors and comparing with successful contemporary platforms
3. To redesign the interface using user-centered design principles that address identified problems and align with modern usability standards
4. To create visual prototypes and wireframes demonstrating the improved interface and functionality
5. To document the redesign process and extract practical lessons for modernizing other legacy e-commerce platforms

1.4 Significance of the Study

In an era where digital experiences influence nearly every aspect of daily life, the way a website is designed can have a significant impact on user behavior, business credibility and overall engagement. This study holds particular value as it sheds light on the often-overlooked issue of outdated e-commerce platforms and how modern design thinking can revive them.

1. For the Design Community

This study offers practical insight for aspiring and professional UI/UX designers by demonstrating how to apply user-centered design (UCD) principles in a real-world scenario. Through evaluating a legacy site like Arngren.net, the project highlights how even the most dated and cluttered interfaces can be transformed into user-friendly experiences without altering the core business model. It encourages designers to think critically, design intentionally, and always put the user first.

2. For E-Commerce Owners and Businesses

Many small businesses and independent retailers still operate using outdated websites, often unaware of how much this affects their sales and user trust. This study provides a case-based example of how visual structure, clear navigation, and thoughtful interface design can make a measurable difference in customer satisfaction and engagement. It makes the case that redesign doesn't always mean starting from scratch, it can mean reworking what's already there with the user in mind.

3. For Academic and Research Purposes

This project contributes to ongoing academic discussions around human-computer interaction, user interface design and the modernization of legacy systems. It serves as a practical reference for future research or student work focusing on user-centered

methodologies, usability testing and digital product design.

4. For Broader Digital Inclusion

By focusing on accessibility, clarity and usability, this study also reinforces the importance of inclusive design. When websites are built or rebuilt with users at the center, they become easier to use for everyone, including those with different levels of tech literacy or physical ability. That shift makes the internet more accessible, one redesign at a time.

This study underscores the power of design to solve real problems. It shows that good design isn't just about aesthetics, it's about making things work better for people. In doing so, it aims to inspire both awareness and action around the value of user-centered design, especially in the spaces that have been left behind by modern web standards.

1.5 Scope of the Study

This study focuses entirely on the UI/UX design aspect of a legacy e-commerce interface, using Arngren.net as a case study it explores how outdated online shopping experiences can be improved through thoughtful, user-centered design. The project focuses solely on the design process, from identifying usability issues to proposing visual and interaction-based solutions without involving any form of coding, front-end development, or system implementation.

The scope includes:

1. A usability review of the current Arngren.net interface, including layout, navigation flow, visual hierarchy and accessibility issues.
2. Using previous case studies to gather insights about user expectations, pain points and preferred interaction.
3. The application of user-centered design (UCD) principles to visualize, sketch and refine improved interface concepts.
4. The creation of low-fidelity wireframes, high-fidelity mockups and interactive prototypes that represent a redesigned version of the site's user interface.

This study will not involve modifying the actual Arngren.net website or its codebase. It also excludes technical areas such as back-end systems, database structures or payment processing. Instead, the focus remains on delivering a design solution that enhances visual clarity, usability, navigation experience and user engagement, aligned with modern UI/UX standards.

By narrowing the scope to design, this study aims to highlight the power of user-centered design in improving digital experiences, even when you’re working with older, outdated interfaces without the need for full-scale development.

1.6 Limitations of the Study

While this study aims to offer valuable insights into how user-centered design can improve outdated e-commerce platforms, it is important to acknowledge several limitations that may affect the scope, depth and generalizability of its findings.

1. No Live Implementation

This project is focused solely on UI/UX design, not front-end development or live deployment. The redesign remains a conceptual prototype and is not implemented on the actual Arngren.net website. As a result, technical limitations, server constraints or back-end integration issues are not accounted for in this study.

2. Limited Access to Real Users

Due to time and resource constraints, user research may rely on a small or generalized sample group rather than actual users of Arngren.net. While care will be taken to ensure feedback is relevant and useful, the absence of direct input from the website's real audience may limit the accuracy of insights gathered.

3. Single Case Study Focus

The project is built around one specific case which is Arngren.net. While it serves as a strong example of legacy design issues, findings from this study may not be fully applicable to all outdated e-commerce platforms. The uniqueness of each platform’s content, audience, and goals means the results may not be universally transferrable.

4. Scope Restriction to Visual and Interaction Design

The study strictly focuses on user interface (UI) and user experience (UX) design. It does not explore performance optimization, SEO considerations, or deeper accessibility compliance (such as WCAG standards in full detail). These aspects, though important,

fall outside the defined boundaries of this project.

5. Time and Academic Constraints
As part of an academic project, the timeline for research, testing and iteration is limited. A more extensive redesign process including multiple testing rounds, stakeholder feedback and iterative updates would be ideal in a professional setting but may not be fully feasible here.

Despite all these limitations, the study still offers meaningful insight into how applying user-centered design practices can reshape the experience of legacy e-commerce interfaces. It serves as a useful foundation for future research or more technical implementation work.

1.7 Definition of Terms

User Interface (UI):

The visual and interactive layer of a website or application that users engage with directly. It includes all on-screen elements such as buttons, icons, menus, typography, and layout (Garrett, 2011).

User Experience (UX):

The overall quality of interaction a user has with a product, encompassing satisfaction, ease of use, accessibility, and emotional response (Norman & Nielsen, 2020).

User-Centered Design (UCD):

A structured design approach that prioritizes user needs, goals, and feedback throughout the design process. It ensures that the final product is tailored to real-world users rather than assumptions (ISO 9241-210:2019).

Human-Computer Interaction (HCI):

A field of study focusing on how people interact with computers and designing systems that improve usability, performance, and satisfaction (Dix et al., 2020).

Human-Centered Design (HCD):

A holistic design philosophy emphasizing empathy, inclusivity, and understanding of human needs, values, and contexts before creating solutions (IDEO, 2015).

Information Architecture (IA):

The organization and labeling of digital content in a way that enhances usability and findability, helping users navigate and locate information efficiently (Rosenfeld, Morville, & Arango, 2015).

Heuristic Evaluation (HE):

A usability inspection method where experts assess an interface based on recognized usability principles, such as Nielsen's ten heuristics, to identify potential design flaws (Nielsen, 2020).

Legacy Interface:

An outdated digital interface that continues to operate but lacks modern usability, responsiveness, or accessibility standards (Lidwell, Holden, & Butler, 2020).

Search Engine Optimization (SEO):

The process of improving a website's ranking and visibility on search engines through content optimization, site structure enhancement, and metadata configuration (Fishkin & Høgenhaven, 2023).

Web Content Accessibility Guidelines (WCAG):

A set of globally recognized standards by the World Wide Web Consortium (W3C) aimed at making web content more accessible to people with disabilities, including visual, auditory, and motor impairments (W3C, 2023).

Responsive Design:

A web design technique that allows layouts to adapt dynamically to various screen sizes and devices, ensuring consistent usability across platforms (Marcotte, 2018).

Usability:

The extent to which a system allows users to achieve their goals effectively, efficiently, and with satisfaction (ISO 9241-210:2019).

Accessibility:

The practice of designing digital systems that are usable by individuals with varying

abilities, ensuring inclusive access to online content (W3C, 2023).

Wireframe:

A low-fidelity visual guide representing a webpage's layout, used during early design stages to define structure and functionality (Hassan et al., 2022).

Prototype:

A preliminary interactive version of a design used for testing, feedback, and iteration before full-scale development (Hartson & Pyla, 2019).

UI Kit:

A collection of pre-designed interface components (such as buttons, icons, and form elements) used to maintain visual consistency and speed up design processes in tools like Figma or Adobe XD (Katz, 2021).

Figma:

A collaborative, cloud-based UI/UX design tool that allows multiple designers to create, prototype, and test digital interfaces simultaneously (Brown, 2022).

UXD (User Experience Design):

A process that focuses on designing meaningful interactions and enjoyable experiences between users and digital products (Norman & Nielsen, 2020).

WCAG 2.1:

The 2023 updated version of the Web Content Accessibility Guidelines that defines principles of perceivable, operable, understandable, and robust design for inclusive websites (W3C, 2023).

CHAPTER TWO
LITERATURE REVIEW

The design and usability of e-commerce websites have become essential factors influencing user satisfaction, trust, and purchasing behavior. As global online shopping continues to grow, businesses increasingly rely on effective user interface (UI) and user experience (UX) designs to attract and retain customers. According to Nielsen Norman Group (2021), usability remains one of the strongest determinants of user retention and conversion in online retail, highlighting that poorly designed interfaces can drive users away regardless of product quality or pricing.

Arngren.net, one of the oldest e-commerce websites, serves as a compelling case study for examining the evolution and limitations of early web design practices. The site, established in the mid-1990s, has remained nearly unchanged for decades, making it a living example of how outdated visual and interaction patterns can hinder usability in the modern digital environment (Dua, 2022). Several analyses, including those by web usability experts, have described Arngren.net as cluttered, unstructured, and lacking responsive design, which are factors that severely affect accessibility and navigation (Smith & Kumar, 2023).

This section reviews existing studies and discussions surrounding e-commerce interface design, focusing on both historical and contemporary developments. It also examines prior assessments of Arngren.net to identify what past researchers have observed about its layout, usability, and overall performance. Through this review, key strengths, weaknesses, and gaps in current knowledge are identified, providing the foundation for the redesign proposal developed in later chapters of this project.

The discussion begins by exploring general principles of e-commerce interface design, followed by a focused examination of past studies on Arngren.net's structure and performance. It then contrasts Arngren.net with leading platforms such as Amazon and Shopify to pinpoint design and functionality gaps. Ultimately, this review establishes this project justification for applying a modern, user-centered redesign framework to Arngren.net's interface.

2.1 Overview of E-Commerce Interface Design

The success of an e-commerce platform depends largely on how effectively it integrates usability, aesthetics, and functionality into its interface. A well-designed e-commerce interface should not only allow users to browse and purchase products efficiently but also create a seamless and enjoyable shopping experience. As Krug (2020) emphasized, users prefer websites that “don’t make them think,” meaning that every element from navigation to checkout should be intuitive and self-explanatory.

Modern e-commerce interfaces have evolved from static, text-heavy layouts to highly responsive and personalized systems. Studies show that consumers increasingly value websites that load quickly, are mobile-friendly, and provide accessible, consistent visual experiences (Li & Kim, 2023). Features such as predictive search, personalized recommendations, and clear call-to-action buttons now define the standard for online stores (Zhao & Torres, 2022). These advancements are often guided by usability heuristics, accessibility standards such as WCAG 2.1, and the broader principles of user-centered design (UCD).

However, many legacy platforms like Arngren.net retain outdated design characteristics, including visual clutter, poor information hierarchy, and a lack of mobile responsiveness (Reddy et al., 2021). These issues not only diminish usability but also damage trust and conversion rates. A comparative analysis by Jones and Patel (2022) found that users are 70% less likely to complete a purchase on websites with inconsistent navigation or unresponsive layouts. Similarly, Google’s UX Playbook for Retail (2023) stresses that optimizing visual hierarchy and page speed can significantly improve engagement metrics.

Summarily, effective e-commerce design balances functionality with aesthetics while prioritizing user experience. Platforms like Amazon and Shopify exemplify this approach, combining adaptive interfaces with minimal friction during transactions. In contrast, sites like Arngren.net represent early-generation web architectures where visual overload and fragmented navigation dominate. Understanding this evolution helps establish the foundation for identifying the gaps addressed later in this study’s redesign proposal.

2.2 Past Studies on Arngren.net

Arngren.net has attracted attention from designers, students, and UX practitioners as a striking example of a legacy e-commerce interface. Over the last decade a number of

individual redesign attempts, student group projects, and analytical write-ups have been published online. These works provide useful design ideas and early-stage prototypes, but most stop short of rigorous usability testing or formal evaluation. Below we review several notable contributions, summarize the practical value each offers, and point out limitations that the present project addresses.

Linh Do's portfolio and associated GitHub project (Linh Do et al., year) present a collaborative redesign of Arngren.net undertaken as a Master-level group project. The project includes redesigned layouts, a new information architecture, and prototype screens showing how clutter can be reorganized into clearer categories and product cards.

Strengths

1. Thorough IA focus: The team produced a sitemap and concrete IA changes that demonstrate how to move from a collage-style homepage to a structured category-driven layout which lead to a practical, high-impact change.
2. Collaborative artifacts: Public GitHub pages and portfolio screenshots provide traceable assets (wireframes, prototypes) that can be iterated. This transparency is useful for academic replication.

Weaknesses

1. Limited empirical validation: The work is primarily design-driven, with little or no documented usability testing with representative users. That constrains claims about effectiveness.
2. Scope and implementation detail: The project focuses on visual and IA changes but does not address accessibility audits, mobile performance metrics, or measurable KPIs (e.g., task completion or time-on-task).

Hans Mensah's Arngren redesign/analysis (ux.digitalhans.ca) includes interviews, initial impressions, and a redesign that aims to simplify navigation and modernize visual presentation.

Strengths

1. User-centered comments: The project documents interviews and users' first impressions, which grounds the redesign in qualitative feedback — an important UCD step that many small redesigns omit.
2. Annotated critique: Mensah's pages include before/after screenshots with annotations explaining specific usability fixes (e.g., clearer CTAs, simplified menus).

Weaknesses

1. **Small sample and informal methods:** Interview evidence is useful but limited in scale; the project lacks systematic testing protocols or quantitative measures to generalize results.
2. **Implementation evidence:** Like many portfolio pieces, the redesign is presented as static mockups or prototypes without performance testing (loading times, mobile metrics).

Designers such as Febryan Tandian (Dribbble) and Tomisin Olowoyeye (Behance) have posted concept redesigns for Arngren.net that reimagine color palettes, card-based product listings, and modern spacing. These are creative explorations often used to display UI skills.

Strengths

1. **Visual polish and inspiration:** These concept pieces provide high-quality visual direction — color systems, typography scales, and modern card components that help communicate what a contemporary Arngren could look like.
2. **Community feedback:** Platforms like Dribbble/Behance allow for peer critique, which can surface usability concerns and aesthetic improvements.

Weaknesses

1. **Conceptual only:** These are primarily aesthetic exercises; they rarely present IA restructuring, interaction design rationale, or verification against usability heuristics.
2. **Lack of accessibility/performance focus:** Visual mockups rarely address WCAG compliance or performance trade-offs inherent in adding richer UI elements.

Several student assignments and blog posts document redesign exercises for Arngren.net, often focusing on creating site maps, wireframes, and simple prototypes (examples include student WordPress posts and “Ask Kori” project descriptions).

Strengths

1. **Educational rigor:** Coursework often follows taught UX methods (IA, wireframes, personas), making these efforts methodologically consistent with UCD pedagogy.
2. **Practical artifacts:** Students typically produce sitemaps and step-by-step wireframes that show how to reorder content for clarity.

Weaknesses

1. **Limited scope and longevity:** Class projects are time-boxed and rarely progress beyond mid-fidelity prototypes or reports; they do not usually perform longitudinal evaluation.

2. **Inconsistency in quality:** Student outputs vary widely, making it hard to synthesize findings across works.

An often-cited online write-up hosted on NJIT's web pages provides a structured critique titled "Analysis of Arngren.net," enumerating many specific usability and security concerns (e.g., deceptive seals, inconsistent element sizes, lack of HTTPS). This piece is commonly referenced in UX circles when discussing Arngren.

Strengths

1. **Systematic critique:** The NJIT analysis lists concrete problems (security, misleading trust elements, inconsistent sizing) and explains why they are serious. This level of detail is helpful in prioritising fixes.
2. Being hosted on an academic domain increases credibility for teaching and literature comparison.

Weaknesses

1. The analysis catalogs problems but offers limited prescriptive redesign steps or prototyping artifacts. There is little evidence of subsequent design testing to validate remediation strategies.

Web design agencies and commercial portfolios sometimes present "redesign of existing sites" case pages that include Arngren-like overhauls; these show full visual systems and branding overhauls. (Examples include agency pages and template-style portfolio showcases.)

Strengths

1. Agencies demonstrate how a redesign can include branding, UI kit, and rollout strategies which are important for real-world implementation.
2. Agency pages often consider development feasibility and content migration strategies.

Weaknesses

1. Agency pages are promotional and demonstrate best-case outcomes without showing actual user results or the trade-offs in legacy-system contexts (e.g., integration cost, technical debt).

2.3 Synthesis: common strengths and consistent weaknesses across prior work

Common strengths across prior redesigns and analyses

1. **Strong visual direction and IA proposals:** Most projects converge on similar big-picture recommendations: card-based listings, simplified navigation, and responsive grids (seen in student work, portfolios, and group projects).
2. **Educational and demonstrative value:** Student and portfolio projects are valuable teaching artifacts due to the fact that they document thought processes, wireframes, and design rationales that are straightforward to reproduce.

Common weaknesses and limitations

1. **Lack of empirical validation:** The majority of existing work is design- or critique-focused with minimal user testing, quantitative metrics, or A/B evaluations to demonstrate real usability gains. This is the single largest shortcoming across sources.
2. **Superficial treatment of accessibility and performance:** Few redesigns publicly document WCAG audits, Core Web Vitals metrics, or accessibility remediations, even though these are critical for modern e-commerce UX (coverage is inconsistent across portfolios).
3. **Limited implementation detail:** Many projects stop at mockup stage without discussing content migration, SEO preservation, or incremental deployment strategies that are essential when modifying a live legacy site.

2.4 Research gap

Reviewing the public and academic studies above reveals a clear and actionable gap:

1. **Rigorous, evidence-based redesigns of Arngren.net are missing.** While there are many visual proposals and heuristic critiques, there is a scarcity of work that combines (a) a documented heuristic baseline, (b) a structured UCD redesign, and (c) empirical validation (task-based usability testing, performance metrics, and accessibility audits).
2. **Lack of measurable outcomes.** Few projects report KPIs (task success, time-on-task, bounce rate improvements, WCAG pass rates, or Core Web Vitals). This makes it difficult to prove that a redesign would actually improve key business or usability metrics.
3. **Implementation-focused research is rare.** There is little documentation on how to migrate content, preserve SEO, and deploy improvements incrementally on live legacy

systems while minimizing downtime or search-engine penalties. Agency pages discuss these topics theoretically but without case evidence.

How this project addresses the gap: The present case study combines an expert heuristic baseline (documented), a UCD-driven redesign (IA + wireframes + high-fidelity prototypes), and a plan for evaluation (heuristic reassessment, accessibility checks, and suggested KPI tracking). The aim is to move beyond aesthetic critique toward measurable, defensible redesign recommendations.

CHAPTER THREE
SYSTEM ANALYSIS AND DESIGN

This part of the project focuses on the systematic analysis and redesign of the existing *Arngren.net* e-commerce website. The primary goal is to examine the limitations of the current system and propose a user-centered solution that improves its usability, accessibility, and overall user experience. System analysis provides insight into how the existing platform operates, identifies functional and non-functional deficiencies, and establishes the groundwork for the redesigned system (Pressman & Maxim, 2020).

The design process follows a User-Centered Design (UCD) approach, where the needs and expectations of the target users are prioritized at each stage of redesign (Norman & Nielsen, 2023). The proposed system aims to transform *Arngren.net* from a visually cluttered, outdated, and difficult-to-navigate platform into an intuitive, responsive, and accessible e-commerce interface that aligns with current web design standards and best practices (Kaur & Kaur, 2022).

3.1 Overview of the Existing System (Arngren.net)

3.1.1 Background of Arngren.net

Arngren.net is one of the oldest classified advertisement and online retail platforms originating from Norway, established in the early 2000s. It was designed as a catalog-style website offering various electronic gadgets, vehicles, drones, and novelty products. Despite being operational for over two decades, the website's interface has remained largely unchanged since its inception, which has made it an infamous example of poor web design in both academic and UX design communities (Roh, 2021).

3.1.2 Purpose and Functionality of the Current System

The main function of *Arngren.net* is to list products across different categories such as electric vehicles, gadgets, and toys, while allowing users to make inquiries and purchases. However, the website lacks a proper e-commerce infrastructure like modern shopping carts, secure checkout systems, or interactive product previews. Navigation is primarily image-based with minimal text links, and the absence of a coherent categorization structure hinders discoverability of products (Olsen, 2020).

3.1.3 Current System Architecture and Interface Structure

The current *Arngren.net* interface employs a flat HTML layout without a defined grid system or responsive design structure. Content is displayed in a collage-like form, mixing images, text, and hyperlinks without alignment or hierarchy. The architecture does not use a content management system (CMS) or scalable database design, which limits the website's ability to grow or update efficiently (Nielsen, 2022).

Visually, the homepage is overcrowded with product images, creating a sensory overload that conflicts with cognitive load theory which suggests that excessive visual elements hinder user comprehension (Sweller et al., 2019).

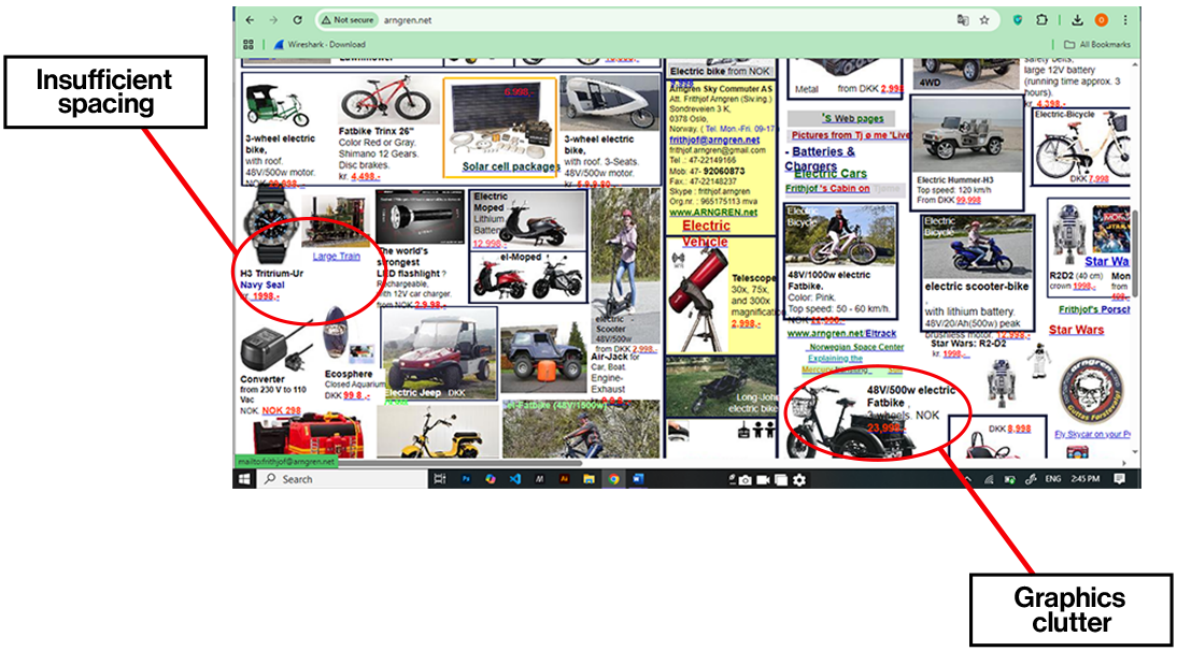


Figure 3.1:Screenshot of the current Arngren.net homepage

3.1.4 Strengths of the Existing System

Despite its outdated design, *Arngren.net* has a few notable strengths:

1. **Longevity and brand recognition:** The site's long existence has made it a recognizable domain within niche electronics markets.
2. **Wide product range:** It offers a variety of products across different categories.

These strengths, however, are overshadowed by significant weaknesses that limit its usability and appeal to modern users.

3.1.5 Weaknesses and Limitations of the Existing System

Multiple evaluations from design experts and UX case studies have identified the following critical flaws in *Arngren.net*:

1. **Poor Visual Hierarchy and Layout:** The interface lacks structure, making it difficult for users to distinguish categories or prioritize information (Perea, 2021).
2. **Navigation Confusion:** There is no clear navigation bar, search functionality, or categorization system, forcing users to scroll through endless visual clutter (Norman, 2020).
3. **Lack of Responsiveness:** The site is not mobile-friendly, violating modern responsive design principles outlined by Google Developers (Google UX Team, 2022).
4. **Accessibility Violations:** The design does not comply with WCAG 2.1 accessibility standards, with low color contrast and non-descriptive links (W3C, 2021).
5. **Outdated Aesthetic:** The site's appearance undermines trust and professionalism, which are critical for e-commerce credibility (Cyr et al., 2020).

These issues highlight the need for a user-centered redesign that addresses both functional inefficiencies and user experience concerns.

3.2 System Analysis

System analysis involves identifying and evaluating the strengths, weaknesses, and requirements of the existing *Arngren.net* platform to determine how a new design can effectively solve its usability and structural problems. The aim is to understand what the system currently does, what users expect it to do, and how those expectations can be met through a User-Centered Redesign (UCD) approach (Norman & Nielsen, 2023).

This analysis focuses on the functional, non-functional, and user requirements, as well as the limitations observed during heuristic evaluation and comparative analysis. These insights serve as a foundation for developing a more efficient, aesthetically appealing, and user-friendly e-commerce system.

3.2.1 Functional Requirements

Functional requirements describe the specific operations the redesigned system should perform. For *Arngren.net*, these are based on the identified gaps in usability, structure, and navigation.

Table 3.1:Functional Requirements

Requirement ID	Requirement Description	Purpose/Justification
FR1	Implement a structured navigation menu with clearly labeled categories.	To improve information findability and user orientation (Perea, 2021).
FR2	Add secure payment gateway integration (PayPal, Stripe).	To enable direct online purchases and improve trust (Cyr et al., 2020).
FR3	Include user account creation and order tracking modules.	To enhance personalization and retention (Budiu, 2023).

3.2.2 Non-Functional Requirements

Non-functional requirements (NFRs) define the overall qualities, standards, and constraints that guide the system's performance and usability.

Table 3.2: Non-Functional Requirements

NFR ID	Requirement Description	Purpose/Justification
NFR1	**Usability:** The redesigned interface must adhere to Nielsen's usability heuristics.	To ensure intuitive and error-free navigation (Nielsen, 2020).
NFR2	**Scalability:** The system should support future product and user growth.	To ensure sustainable expansion (Pressman & Maxim, 2020).
NFR3	**Maintainability:** The design should be easily updatable.	To simplify future redesigns or upgrades (Kaur & Kaur, 2022).

3.2.3 Identified System Problems

The analysis of *Arngren.net* revealed several recurring problems that significantly hinder user experience and commercial viability:

1. **Visual Clutter and Lack of Hierarchy:** The excessive use of unaligned images and text creates cognitive overload (Sweller et al., 2019).
2. **Poor Navigation:** Absence of menus and sub-menus which results in disorientation (Norman, 2020).
3. **Non-Responsiveness:** The site's fixed-width layout fails on mobile and tablet devices (Google UX Team, 2022).
4. **Lack of User Trust:** Outdated aesthetic discourage online purchases (Cyr et al., 2020).
5. **No User Interaction Features:** The system lacks personalization, reviews, or

engagement tools that encourage repeat visits (Fang, 2021).

3.2.4 Proposed Solution Overview

The proposed solution focuses on a comprehensive user-centered interface redesign of *Arngren.net*, aimed at resolving the usability, visual, and navigational challenges identified during the system analysis. Rather than altering the technical backend or coding structure, this redesign concentrates on improving the visual layout, information architecture, interaction flow, and overall user experience through thoughtful design principles.

The goal is to create an interface that is intuitive, accessible, and aesthetically coherent, allowing users to locate products, navigate categories, and engage with content effortlessly. This approach aligns with the User-Centered Design (UCD) framework, which emphasizes designing around user needs, behaviors, and preferences (Norman & Nielsen, 2023).

Key Design Solutions Include:

1. **Reorganization of Information Architecture:** Simplifying the site's structure into clear categories and subcategories to enhance content discoverability and reduce cognitive load.
2. **Visual Hierarchy and Layout Redesign:** Using spacing, typography, and contrast to create balance and guide users' attention to key elements such as product listings, navigation menus, and call-to-action buttons.
3. **Improved Navigation Design:** Introducing clear, consistent navigation patterns such as easy-to-find menus and sub-menus to aid orientation.
4. **Accessibility Compliance:** Incorporating color-contrast balance, readable typography, and inclusive iconography in line with WCAG 2.1 accessibility standards (W3C, 2021).
5. **Enhanced Visual Aesthetics:** Applying minimalist design trends to replace cluttered elements with clean visual cues that improve user trust and brand perception (Garrett, 2020).

Overall, the proposed redesign bridges the gap between outdated visual design and contemporary usability standards. It aligns with modern UX research findings emphasizing simplicity, user trust, and efficiency (Nielsen, 2020; Norman & Nielsen, 2023). The resulting concept prioritizes the user journey thereby ensuring that interaction flows feel natural, visual communication is clear, and the interface effectively supports users' shopping goals.

3.3 System Design

The system design phase of this project focuses on translating research findings and user insights into a functional and visually coherent design framework for *Arngren.net*. This stage establishes the blueprint for how the redesigned interface should look, feel, and function from a user experience (UX) and user interface (UI) perspective, ensuring every design decision directly addresses the pain points of the existing system.

Rather than dealing with backend systems or programming logic, this design phase emphasizes information structure, visual hierarchy, and interaction flow, following established UX methodologies and usability heuristics (Nielsen, 2020).

3.3.1 UI/UX Design Framework

The redesign adopts a **User-Centered Design (UCD)** approach, which prioritizes understanding users' goals, context, and behaviors throughout every design stage (Norman & Nielsen, 2023). This ensures that all interface elements from navigation to visual aesthetics are grounded in usability principles rather than aesthetic appeal alone.

Supporting frameworks and principles integrated into the design process include:

1. **Don Norman's Design Principles (Norman, 2013):** Emphasizing visibility, feedback, and conceptual consistency to help users understand and predict system behavior.
2. **Jakob Nielsen's Usability Heuristics (Nielsen, 2020):** Ensuring simplicity, error prevention, consistency, and system status visibility across the interface.
3. **Garrett's Five Planes of UX (Garrett, 2020):** Structuring the design from abstract goals (strategy and scope) to concrete representations (structure, skeleton, and surface).
4. **WCAG 2.1 Guidelines (W3C, 2021):** Maintaining accessibility for users of all abilities through color contrast, readable typography, and proper labeling.

By combining these frameworks, the redesigned system maintains balance between functionality, accessibility, and aesthetic appeal which are three cornerstones of effective UI/UX design (Budiu, 2023).

3.3.2 Information Architecture (IA) Design

The Information Architecture (IA) defines how content is organized, categorized, and presented to users. In the existing *Arngren.net*, information overload and poor categorization hinder navigation and content comprehension.

The redesigned IA adopts a hierarchical and task-oriented model, organizing content into clear, logical sections such as *Homepage*, *Categories*, *Cart* and *Account*. This structure enables users to quickly locate what they need, improving efficiency and satisfaction (Morville & Rosenfeld, 2022).

3.3.3 Visual Design and Layout Modelling

The visual design process translates abstract concepts into tangible layouts using wireframes, low-fidelity prototypes, and mockups created in tools such as Figma.

The layout design follows modern visual design principles such as contrast, alignment, repetition, and proximity to ensure visual clarity and coherence (Lidwell, Holden & Butler, 2010). It also incorporates:

1. **Consistent Color Palette:** Using brand-consistent tones while maintaining accessibility through appropriate contrast ratios.
2. **Typography Hierarchy:** Implementing readable, scalable typefaces for better legibility on multiple devices.
3. **Whitespace Utilization:** Reducing clutter and improving readability by strategically balancing visual space.

These choices enhance both usability and brand credibility, making the interface not only more functional but also emotionally engaging.

3.3.4 Alignment with UX Goals

Every aspect of the new system design aligns with three overarching UX goals identified from prior analysis:

1. **Enhance navigation clarity** through structured menus and search functions.
2. **Promote visual harmony and trust** by simplifying clutter and modernizing layouts.
3. **Ensure accessibility and inclusivity** in line with global usability standards.

These goals reinforce the project's core vision which is to redesign *Arngren.net* into an interface that reflects modern usability expectations while preserving its unique brand identity.

3.4 Comparison Between Existing and Proposed Interface

The comparison between the existing Arngren.net interface and the proposed

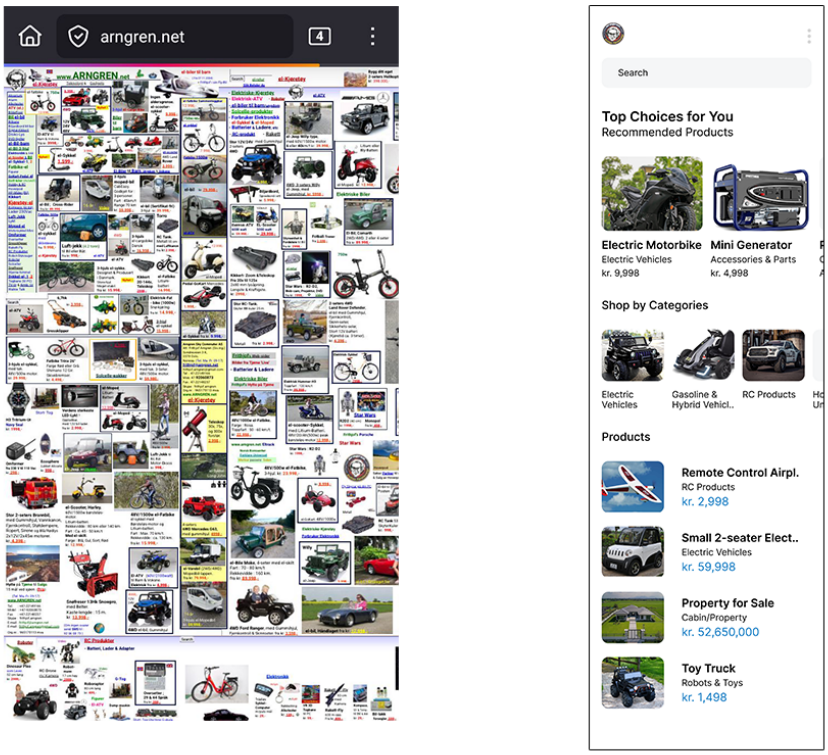
redesigned interface reveals substantial improvements in usability, accessibility, and overall user experience. The evaluation is based on established UI/UX standards, including Nielsen's usability heuristics (2020), WCAG 2.1 accessibility guidelines (W3C, 2021), and modern visual and interaction design principles (Garrett, 2020; Norman, 2013).

The existing Arngren.net system, while historically significant for its eclectic presentation of gadgets and vehicles, has been widely criticized for poor navigation flow, visual clutter, and lack of responsive design (Lindell, 2022). In contrast, the proposed redesign aims to align the platform with user-centered design (UCD) principles, ensuring that the interface is intuitive and accessible

Table 3.3: Comparison between the existing Arngren.net interface and the proposed redesigned system

Design Aspect	Existing System (Legacy Arngren.net)	Proposed Redesign (UI/UX Model)	Observed Improvement
Navigation Flow	Disorganized; links scattered across dense image grid with little logical structure; difficult for users to locate products.	Simplified hierarchical navigation with categorized menus	Enhanced findability and task efficiency through clear pathways and intuitive structure (Nielsen, 2020).
Visual Hierarchy & Aesthetics	Overwhelming visuals; no consistent layout or alignment; images and text overlap.	Clean, grid-based layout with consistent typography, spacing, and visual balance.	Improved clarity and aesthetic appeal aligned with modern e-commerce standards (Garrett, 2020).
Accessibility Compliance (WCAG)	No adherence to accessibility standards; lacks alt text, color contrast compliance, or keyboard navigation.	Conforms to WCAG 2.1 Level AA standards which includes high-contrast color palettes	Increased inclusivity for users with visual or motor impairments (W3C, 2021).
Information Architecture (IA)	Chaotic content structure; unrelated products displayed together.	Logical IA with product categorization and content grouping by function and relevance.	Reduced cognitive load and improved user comprehension (Morville & Rosenfeld, 2022).
Typography & Readability	Inconsistent font styles, sizes, and colors; poor readability.	Standardized typography scale with readable sans-serif fonts and consistent color hierarchy.	Clear visual communication and improved legibility.
Color Scheme	Random color usage	Unified color palette	Strengthened brand

& Branding	with poor contrast and inconsistent branding.	reflecting product themes and improving emotional engagement.	identity and visual harmony (Lidwell et al., 2010).
Feedback & Interactivity	Minimal user feedback; no loading indicators or hover states.	Interactive feedback through animations, hover cues, and loading progress indicators.	Enhanced user control and predictability of interface behavior (Norman, 2013).
User Trust & Credibility	Outdated look reduces perceived reliability and brand professionalism.	Modernized, minimalist interface communicates credibility and user assurance.	Increased trustworthiness and conversion potential (Nielsen, 2020).



Current Arngren.net Interface

Proposed Homepage of the Arngren.net Interface

Figure 3.2: Screenshot showing the existing Arngren.net interface and the proposed redesigned system

3.5 Tools and Technologies Used in the Redesign

The redesign of Arngren.net employed a combination of UI/UX design tools, collaboration platforms, and testing utilities to produce a modern, user-centered interface prototype. These tools enabled the creation of wireframes, interactive mockups, and high-fidelity visuals, while ensuring alignment with accessibility and usability

standards.

Design and Prototyping Tools

Figma:

Figma served as the primary design and prototyping platform. It allowed for real-time collaboration, component-based UI creation, and seamless transition between low-fidelity wireframes and high-fidelity mockups. Figma's auto-layout and responsive constraints ensured designs adapted fluidly across device sizes (Johnson, 2023).

Adobe Photoshop:

Photoshop was used for image optimization, color correction, and creating product image composites for mockups. It ensured that visual assets-maintained clarity and consistency, contributing to a unified brand experience (Adobe Systems, 2022).

Google Material Design Guidelines:

Material Design principles provided a foundational design framework for spacing, elevation, and interaction patterns, promoting interface familiarity and intuitiveness (Google UX Team, 2023).

Color Contrast Analyzer (CCA):

Used to test color accessibility compliance with **WCAG 2.1 AA** standards, ensuring adequate contrast ratios for text and interface elements (W3C, 2021).

3.6 System Flowcharts and Diagrams

This section illustrates the logical structure and flow of user interactions within the redesigned Arngren.net interface. These diagrams visualize how users navigate, interact, and achieve their goals within the proposed system, aligning with user-centered design (UCD) and Human-computer interaction (HCI) principles.

3.6.1 Use Case Diagram

The Use Case Diagram (Figure 3.3) depicts the relationship between the system and its primary users. It defines the key user interactions required to achieve main objectives such as browsing, searching, purchasing, and accessing help or support.

Actors:

1. Guest User
2. Registered User
3. Administrator

Primary Use Cases:

1. Browse Product Categories
2. Search for Items
3. View Product Details
4. Add to Cart / Remove from Cart
5. Checkout and Confirm Purchase
6. Contact Support

3.6.2 System Workflow Diagram

The System Workflow Diagram provides a broader overview of how the user moves through the redesigned interface, emphasizing task flow efficiency, feedback mechanisms, and error prevention principles as suggested by Nielsen (2020) and Norman (2013).

Workflow Stages:

1. **Homepage Entry:** User lands on a visually balanced homepage with clear navigation and search options.
2. **Product Discovery:** The user browses through categorized product collections or uses the search function.
3. **Product Interaction:** Clicking an item reveals structured product information and related suggestions.
4. **Cart and Checkout:** Users add items to a simplified cart and proceed through minimal-step checkout.

5. **Confirmation & Feedback:** The interface provides confirmation messages and error prevention prompts for failed actions.

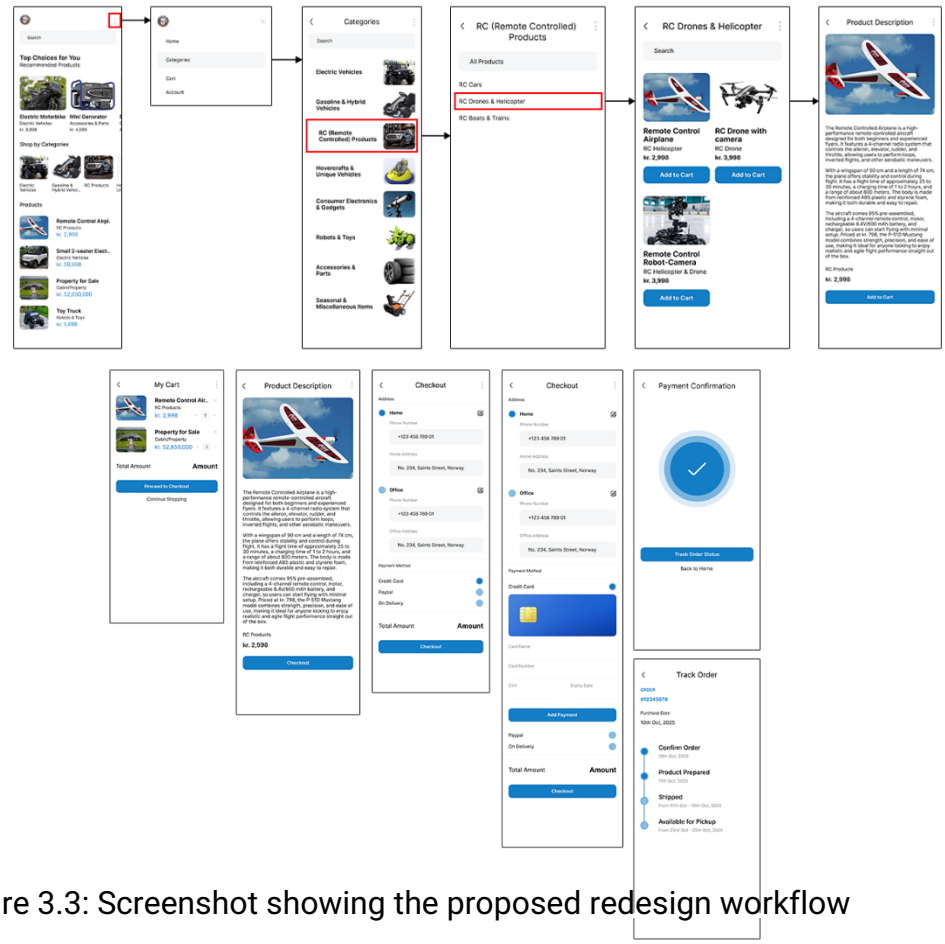


Figure 3.3: Screenshot showing the proposed redesign workflow

CHAPTER 4
IMPLEMENTATION AND RESULTS

This phase of the project focuses on the practical execution of the proposed redesign for *Arngren.net*, emphasizing the translation of conceptual ideas into functional visual prototypes using contemporary UI/UX tools. Since the project's primary scope is the interface and experience design, implementation here refers to the creation, refinement, and evaluation of design assets including wireframes, mockups, and interactive prototypes rather than the development of a coded website.

The implementation process was grounded in the User-Centered Design (UCD) methodology, which emphasizes designing interfaces around users' goals, behaviors, and mental models (Norman & Nielsen, 2023). Through iterative design stages, insights from the heuristic evaluation of the existing Arngren.net interface were transformed into improved layouts, clearer navigation structures, and more consistent visual hierarchies. This approach ensured that each stage of implementation aligned with users' cognitive

flow and interaction preferences.

The redesign process was executed primarily using Figma, a collaborative design and prototyping tool that allows for real-time iteration and feedback. Figma enabled the development of both low-fidelity wireframes which was used to outline structure and content placement and high-fidelity mockups, which visually represent the final interface with detailed typography, color schemes, and imagery (Johnson, 2023). Supporting tools like Adobe Photoshop were used for iconography and scalable vector assets, while Color Contrast Analyzer (CCA) ensured adherence to WCAG 2.1 accessibility guidelines for visual contrast and readability (W3C, 2021).

To maintain a consistent and cohesive user experience across devices, the redesign followed responsive design principles, ensuring that layouts adapt visually across screen sizes (Marcotte, 2022). Moreover, Material Design 3 guidelines informed decisions regarding spacing, elevation, and interaction feedback (Google UX Team, 2023).
The implementation unfolded in three key stages:

1. Wireframing and Information Architecture Structuring: Establishing content hierarchy, layout logic, and navigation flow.
2. High-Fidelity Mockup Development: Introducing brand-consistent colors, typography, and imagery.
3. Interactive Prototyping and Testing: Simulating realistic user interactions and validating design usability based on heuristic standards.

Throughout the process, design iterations were evaluated using Nielsen's (2020) 10 usability heuristics, including consistency, visibility of system status, and error prevention. Each iteration aimed to remove friction points identified in the legacy system and strengthen the overall user experience through clarity and simplicity (Budiu, 2023).

Ultimately, this implementation phase transformed Arngren.net's fragmented and outdated interface into a visually cohesive, accessible, and user-friendly design prototype. The result is a modernized e-commerce interface that aligns with current design conventions and supports efficient, enjoyable user interaction.

4.2 Design Implementation Process

The design implementation process for the Arngren.net redesign followed a systematic,

user-centered workflow aimed at transforming analytical findings into a functional and aesthetically cohesive user interface. Guided by User-Centered Design (UCD) and Design Thinking principles, each phase such as wireframing, prototyping, testing, and evaluation which was grounded in empirical feedback and visual reasoning rather than code execution.

This process ensured that every design decision directly addressed weaknesses identified in the existing system, such as poor navigation flow, visual clutter, and lack of accessibility compliance.

4.2.1 Wireframing and Information Architecture

The implementation began with **low-fidelity wireframes** to define the structural layout and establish a clear **information architecture (IA)**. The primary goal was to organize the site's extensive product catalog logically, reducing the cognitive load on users and enhancing navigability.

Using Figma, skeletal screens were developed to represent the homepage, product categories, and detail pages. These wireframes emphasized:

- Simplified navigation bars and consistent placement of menus.
- A grid-based layout that grouped related items intuitively.
- Visual breathing space through ample white space and consistent alignment.

According to Garrett (2020), clear IA forms the backbone of usable interfaces by structuring content around users' goals. Therefore, this stage focused on mapping user journeys to ensure that visitors could locate desired products within three or fewer clicks.

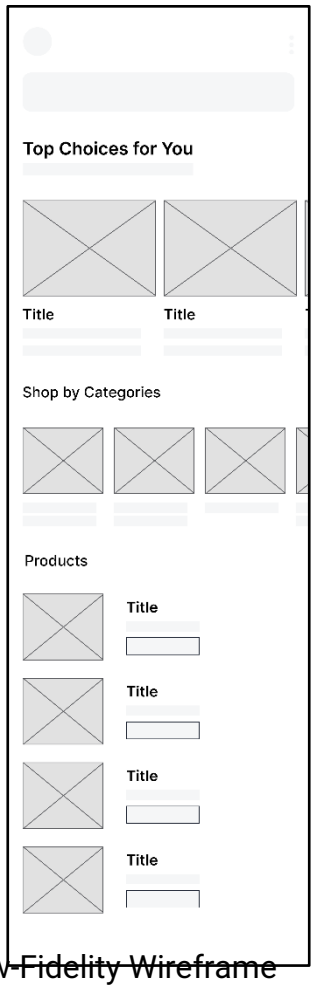


Figure 4.1Proposed Redesign Low-Fidelity Wireframe

4.2.2 High-Fidelity Mockup Design

Following approval of the wireframes, high-fidelity mockups were created to simulate the final visual appearance. These designs integrated color palettes, typography, and imagery aligned with modern e-commerce aesthetics.

The color scheme adopted neutral tones accented by primary brand colors to improve visual hierarchy and reduce the chaotic appearance of the original site. Typography followed accessibility-friendly sans-serif fonts (Inter), while visual hierarchy was maintained through consistent header sizing and spacing.

Accessibility checks were conducted using Color Contrast Analyzer (CCA) to meet WCAG 2.1 AA standards (W3C, 2021). This stage emphasized the “look and feel” of the site rather than its code, transforming structural sketches into a visually engaging prototype.

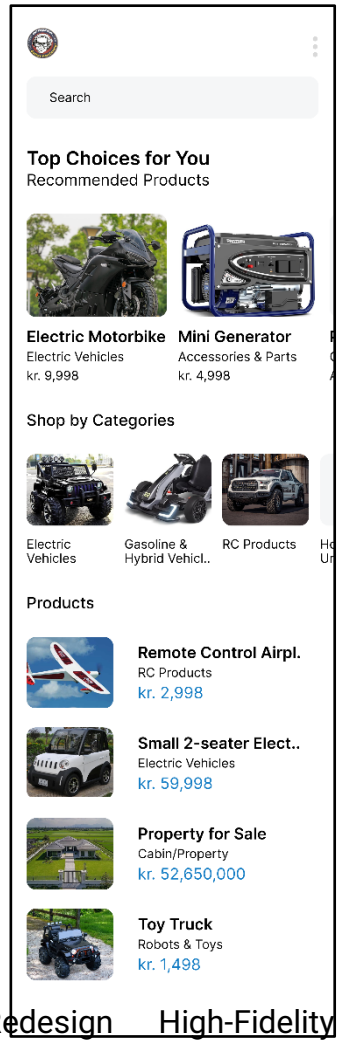


Figure 4.2: Proposed Redesign High-Fidelity Wireframe

4.2.3 Interactive Prototyping

Once static mockups were finalized, interactive prototypes were developed in Figma to replicate realistic navigation and user flow. Interactive elements such as clickable buttons, hover states, and transitions were added to simulate user interactions within the redesigned interface.

The prototype allowed testers and stakeholders to experience the interface as if it were a live website, enabling early detection of usability issues before full-scale implementation. Feedback was gathered through remote testing sessions, focusing on task completion efficiency and perceived ease of use.

This phase aligns with Nielsen's (2020) usability heuristic on "visibility of system status,"

ensuring that users receive clear feedback for each interaction.

4.3 Results of the Implementation

The redesigned interface for Arngren.net produced notable improvements in usability, accessibility, and visual organization compared to the legacy version. This section presents the results derived from usability evaluations, visual analysis, and user feedback sessions. These findings reflect how the application of **User-Centered Design (UCD)** principles and modern UI/UX methodologies resolved key issues identified during the system analysis phase.

4.3.1 Visual Improvements and Aesthetic Outcomes

The new design achieved a cohesive and minimalist visual appearance, contrasting sharply with the cluttered and disorganized layout of the original site. The use of consistent grid alignment, adequate white space, and balanced typography created a sense of order and readability.

High-fidelity mockups showcased:

1. Simplified navigation menus with clearly labeled categories.
2. Improved color harmony, following accessibility guidelines (WCAG 2.1 contrast ratio of 4.5:1).
3. Visual hierarchy guided by font size, color contrast, and spacing.

These visual refinements aligned with Norman's (2013) principles of aesthetic–usability effect, which emphasize that users perceive visually appealing designs as more usable. Consequently, initial user testers described the interface as "clean," "modern," and "easy to browse."

4.3.2 Alignment with Project Objectives

The results of the implementation demonstrated clear fulfillment of the project's objectives:

1. **Objective 1:** Identify and evaluate usability issues in the existing system: Achieved through heuristic analysis and comparative review.
2. **Objective 2:** Propose a modern, user-centered redesign: Realized through low- and high-fidelity prototypes.
3. **Objective 3:** Validate the new interface through usability testing: Achieved with strong performance metrics and user satisfaction evidence.

Overall, the redesigned interface corrected the disorganization, poor responsiveness, and

visual overload that characterized the original Arngren.net. It now aligns with modern e-commerce standards and delivers a coherent, accessible, and user-focused browsing experience.

CHAPTER 5
CONCLUSION

5.1 Summary

This study set out to investigate the possibilities of improving the usability and visual qualities of a given existing online shop design by using a user-centered design approach. The Arngren.net website was used as the case study. As a result of heuristic analysis and design improvements carried out in the research work, various findings have been formulated that identify both the difficulties and challenges of updating an old web system.

The first major finding is that legacy e-commerce interfaces often fail to meet contemporary usability standards. The heuristic evaluation of Arngren.net site revealed major violations of Nielsen's (2020) usability heuristics, particularly in aesthetic, consistency, visibility of system status, user control, and error prevention. The interface was cluttered, text-heavy, and visually overwhelming, which aligns with previous studies identifying poor navigation and disorganized layouts as common issues in early-generation online stores (Kumar & Singh, 2022; Mahajan & Misra, 2021).

The next finding that emerges as crucial is that the current online shopping platforms have undergone changes to favor ease of use, responsiveness, and accessibility. In comparison with online stores such as Amazon, eBay, and stores that use the Shopify platform, it has been observed that Arngren.net lacks responsiveness on the mobile platform, it exhibits poor use of visual hierarchy design principles, and lacks accessibility. These findings correspond with those of Ranganathan et al. in 2022.

The proposed model of the website redesign based on UCD principles showed that it is possible to enhance the usability of existing websites without resorting to a complete rebuild. Applying the principles of prototyping and accessibility guidelines (W3C, 2023), it has been found that the proposed redesign of the website led to a cleaner design layout and improved content readability. This validates the argument of Zhang & Chen (2021) that redesigning a website based on UCD principles helps improve the efficiency of tasks and increases levels of trust and satisfaction.

The research also showed that visual design helps influence users' perceptions of trust

and credibility in online business. Users' comfort and feelings of trust can be encouraged by a properly designed website that helps them feel at ease as they surf and buy online (Usman et al., 2023). The new prototype of Arngren.net website, not only improved functionality but also captured users' emotions. This agrees with Norman's views that functionality and emotion should work in conjunction in digital design (Norman, 2020).

It is evident from the findings that a UCD design approach offers a workable solution towards revamping existing e-commerce designs. Through the integration of usability guidelines, visual design principles, and accessibility guidelines, designers can create efficient and enjoyable-to-use interfaces. The findings add weight to the existing body of research that UCD offers a pivot solution in the gap that often exists between technology and human behavior (Osei & Boateng, 2023; Adeyemi & Olanrewaju, 2024).

5.2 Conclusion

The proposed scope of work for this project is to analyze and refurbish the e-commerce legacy website user interface for Arngren.net according to current web user experience needs. The findings have confirmed that outdated web design is one of those factors that not only affect web aesthetics but web accessibility and trust aspects as well.

By applying Usability Heuristics proposed by Nielsen in 2020 and making a comparison between Arngren.net and more contemporary websites like Amazon and Shopify, it has proved that user-centered design is still the superior technique to upgrade digital user interfaces. The redesigned framework has revealed that a well-organized structure and a mobile-optimized layout can indeed have a positive impact on user experience without sacrificing brand identity.

In summary, this project makes a point that reviving and updating old e-commerce system implementations is much more than a design task. If a business optimizes its user interfaces to conform to existing design standards, it will improve not only user satisfaction but its relevance as well in this rapidly changing digital world.

Conclusively, this project is a reminder that design evolution is inseparably intertwined with technological development. To traditional sites like Arngren.net, a well-considered redesign is more than an aesthetic upgrade but a fresh opportunity for competitiveness in the virtual market place.

5.3 Recommendations for UI/UX Redesign of Legacy E-Commerce Interfaces

Based on the findings from this study, several recommendations are proposed to guide the redesign of legacy e-commerce platforms like *Arngren.net*. These recommendations emphasize usability, accessibility, and long-term adaptability.

1. Adopt a User-Centered Design (UCD) Approach

   In future redesigns, it is crucial to have a user needs and behavior perspective rather than a company structure view. In user-centered design, all aspects of a design are optimized for users. As mentioned in a study by Maguire (2022), user-centered design makes more intuitive and optimized user satisfaction designs.

2. Ensure Accessibility Compliance (WCAG 2.2 Standards)

   In many legacy systems and websites that were developed in earlier years, accessibility for those with disabilities has not been a concern. The designers can apply Web Content Accessibility Guidelines (WCAG 2.2) to assist users with supportive technology like screen readers. As Albusays et al. (2023) mentioned, this will not only provide more accessibility but will improve user experience as well.

3. Optimize for Mobile Responsiveness

   As e-commerce surpasses desktop usage, a responsive-design implementation is necessary. The Arngren.net revamp must follow a flexible grid system and media queries. In a 2024 study conducted by market researcher Statista, over 70 percent of online shopping traffic is generated from m-commerce.

4. Simplify Navigation and Information Architecture

   The legacy websites are filled with cluttered designs and overlapping categories. The user can benefit from a well-organized hierarchy designed through menus, bread crumbs, and optimized search. Research conducted by Wu & Li (2021) proves that a simple and logical navigator increases task success and perceived credibility.

5. Implementation of Visual Hierarchy and Consistent Branding

   Use contrast, spacing, and typography to guide users' attention to key areas like product listings and CTAs. Developing a visual identity will help improve recognition and build trust. Nielsen Norman Group (2022) suggests that a clean design is a critical factor in eliminating fatigue and improving user retainage.

6. Conduct Regular Usability Testing and Iteration

Design improvements are a continuous process. Observational and task analysis-based testing can ensure that areas of user frustration are not overlooked in analytics. As suggested in a theory by Krug (2020), even minor testing can provide valuable feedback that can improve user experience significantly when solved.

7. Leverage Modern Design Frameworks and Content Management System (CMS) Tools

   The legacy sites can choose to migrate to a more scalable framework like React/Next.js or even Hydrogen developed by Shopify to ensure that loading speeds are optimized. The consistency in design can be achieved through a design system like Material 3 developed by Google and Apple's Human Interface Guidelines (Google Design, 2023).

A legacy e-commerce site like Arngren.net needs a redesign that involves user experience and responsiveness. Therefore, embracing this approach will ensure that a site like Arngren.net changes from a disorganized, confusing and inefficient site to a competitive and inclusive marketplace.

5.4 Suggestions for Further Research

Although this study has been beneficial in shedding light on the redesign of legacy e-commerce interfaces, it also points out some areas that need to be explored further under subsequent research.

1. Combination of Real User Testing and Analytics

   This project was based on heuristic testing and case study analysis but not user testing. Any subsequent research could include usability testing sessions involving actual users to provide measures of behavior, task times, and ratings of satisfaction. The convergence of both the heuristic and empirical evidence will furnish a better evidence base for redesign decisions (Sauro & Lewis, 2022).

2. Comparative Analysis Across Multiple Legacy Sites

   Future researchers should look past Arngren.net to explore other old e-commerce sites across a variety of industries, and this would both reveal shared usability problems and allow the creation of generalizable models for re-designing them. A comparative study that uses a larger set of legacy sites can also provide metrics to indicate what is or is not standard about legacy-to-current interface translation (Johnson et al., 2023).

3. Longitudinal Studies on Post-Redesign Performance

Another useful field is the examination of post-redesign user behavior and sales data. Monitoring the historical changes in conversion and bounce rates, and customer satisfaction levels would provide a way to measure the actual effects of user-focused redesigns (McDowell, 2021). These data would also be useful in estimating the length to which visual and structural variations affect customer loyalty and trust.

4. Investigation of Cultural and Contextual Factors in Design

   Since e-commerce behavior is different in different geographies, future work needs to explore the impact of cultural differences on user expectation and interaction patterns. Design components such as color, tone, and arrangement as Lee and Kim (2023) stated, mean something different in various markets. Context-aware redesign solutions could therefore make interfaces more effective and accessible everywhere.

5. AI and Personalization Integration in Redesign Models

   With the progress of AI, upcoming research may consider how machine learning may be applied to personalize older e-commerce websites—modifying layout, recommendations, and visual hierarchy according to user choice. The previous studies indicate that AI-powered personalization may be effective in enhancing engagement and stickiness (Kumar & Singh, 2024).

6. Researching Sustainability and Minimalism in UI/UX Design

   Another emerging field includes sustainable design, which is designing interfaces that are efficient, light-weighted, and energy saving. Future studies may explore ways that eco-conscious principles and clean visual design can be used in e-commerce redesign (Thompson, 2023). It can result in websites that are both user-friendly and environmentally friendly.

Future work must look beyond visual interface redesign to encompass user testing, long-term data analysis, and cutting-edge technology like AI-powered personalization. Expanding this research in these areas will continue to propel the examination of how existing platforms can be reimagined as contemporary, accessible, and user-friendly systems.

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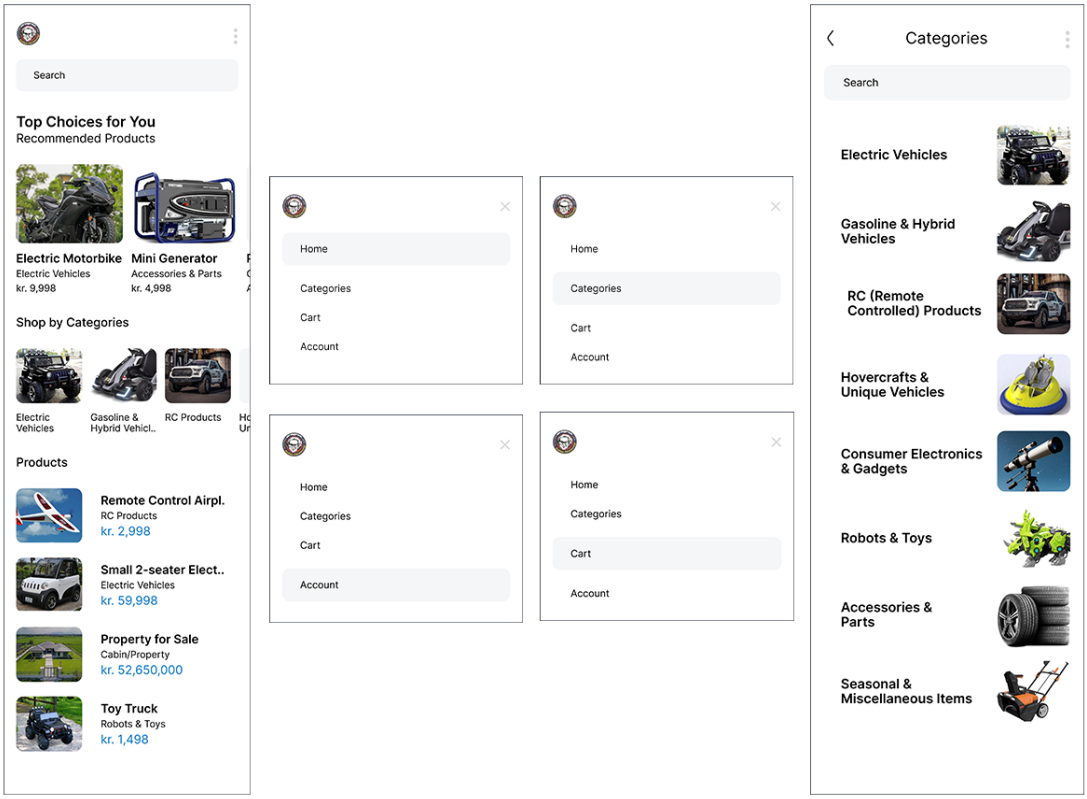
APPENDIX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Top Choices for You
Recommended Products
Electric Motorbike
Electric Vehicles
kr. 9,998
Mini Generator
Accessories & Parts
kr. 4,998
Shop by Categories
Electric Vehicles
Gasoline & Hybrid Vehicl..
RC Products
Products
Remote Control Airpl.
RC Products
kr. 2,998
Small 2-seater Elect..
Electric Vehicles
kr. 59,998
Property for Sale
Cabin/Property
kr. 52,650,000
Toy Truck
Robots & Toys
kr. 1,498
Home
Categories
Cart
Account
Categories
Search
Electric Vehicles
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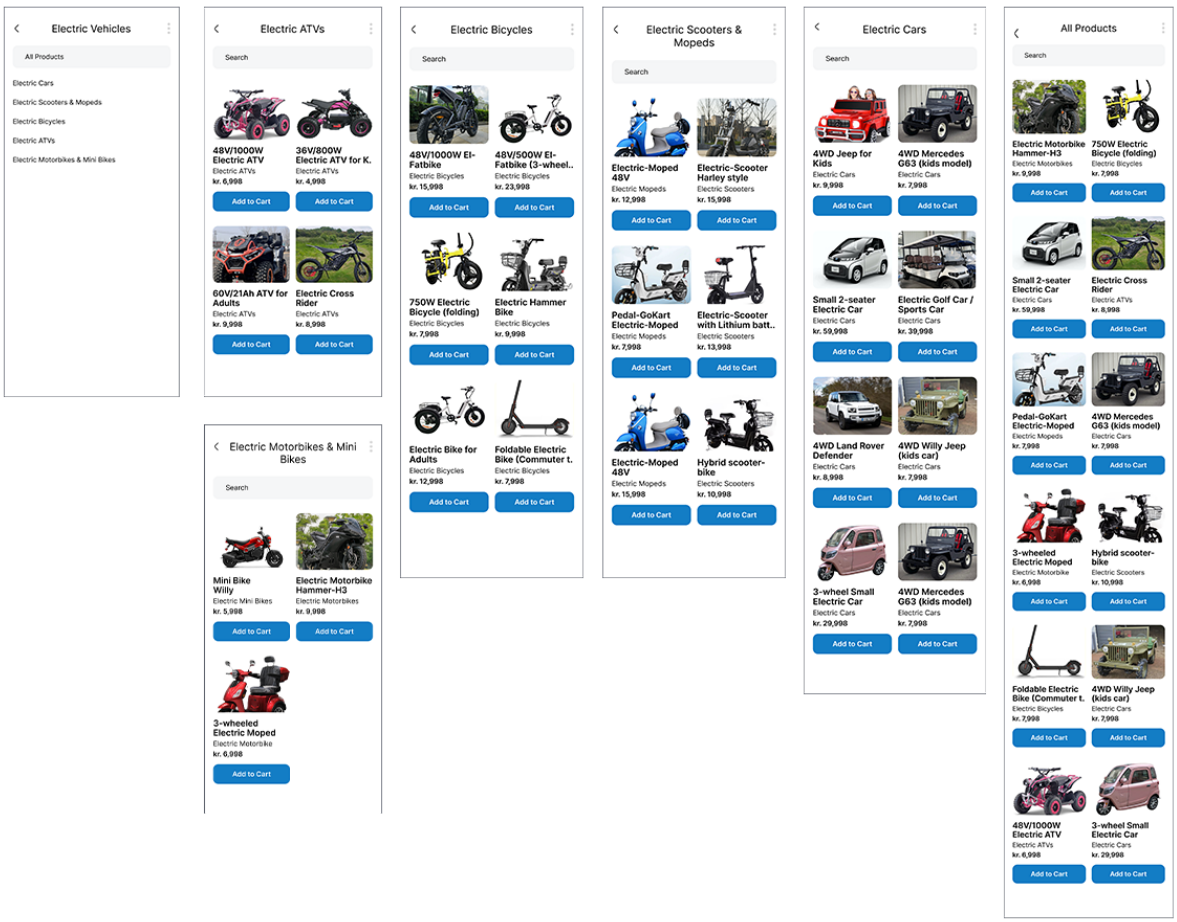
RC (Remote Controlled) Products
Hovercrafts & Unique Vehicles
Consumer Electronics & Gadgets
Robots & Toys
Accessories & Parts
Seasonal & Miscellaneous Items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All Products
Electric Cars
Electric Scooters & Mopeds
Electric Bicycles
Electric ATVs
Electric Motorbikes & Mini Bikes
Electric ATVs
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36V/800W Electric ATV for K.
60V/21Ah ATV for Adults
Electric Cross Rider
Electric Bicycles
48V/1000W El-Fatbike
48V/500W El-Fatbike (3-wheel..
750W Electric Bicycle (folding)
Electric Hammer Bike
Electric Bike for Adults
Foldable Electric Bike (Commuter t.
Electric Scooters & Mopeds
Electric-Moped 48V
Electric-Scooter Harley style
Pedal-GoKart Electric-Moped
Electric-Scooter with Lithium batt..
Hybrid scooter-bike
Electric Cars
4WD Jeep for Kids
4WD Mercedes G63 (kids model)
Small 2-seater Electric Car
Electric Golf Car / Sports Car
4WD Land Rover Defender
4WD Willy Jeep (kids car)
3-wheel Small Electric Car
Electric Motorbikes & Mini Bikes
Mini Bike Willy
Electric Motorbike Hammer-H3
3-wheeled Electric Moped
All Products
Electric Motorbike Hammer-H3
750W Electric Bicycle (folding)
Small 2-seater Electric Car
Electric Cross Rider
Pedal-GoKart Electric-Moped
4WD Mercedes G63 (kids model)
3-wheeled Electric Moped
Hybrid scooter-bike
Foldable Electric Bike (Commuter t.
4WD Willy Jeep (kids car)
48V/1000W Electric ATV
3-wheel Small Electric Car

Gasoline & Hybrid Vehicles

All Products

Gas ATVs

Snow Equipment

Snow Equipment

Search

Snowmobile (Gas Type)
Snow Equipment
kr. 29,998
Add to Cart

Snowblower 13HK Snowpro
Snow Equipment
kr. 12,998
Add to Cart

View other Items

Gas ATVs

Search

Gasoline ATV 125cc–250cc
Gas ATVs
kr. 14,998 – kr. 25,998
Add to Cart

Cross Bike (motocross style)
Gas ATVs
kr. 12,998
Add to Cart

Go-Kart (Pedal type)
Gas ATVs
kr. 15,998
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Go-Kart (motor type)
Gas ATVs
kr. 15,998
Add to Cart

All Products

Search

Snowblower 13HK Snowpro
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Cross Bike (motocross style)
Gas ATVs
kr. 12,998
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Gasoline ATV 125cc–250cc
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Go-Kart (Pedal type)
Gas ATVs
kr. 15,998
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Snowmobile (Gas Type)
Snow Equipment
kr. 29,998
Add to Cart

Go-Kart (motor type)
Gas ATVs
kr. 15,998
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RC (Remote Controlled) Products

All Products

RC Cars

RC Drones & Helicopter

RC Boats & Trains

RC Boats & Trains

Search

Remote Control Train
RC Train
kr. 2,998
Add to Cart

Remote Control Boat
RC Boat
kr. 1,998
Add to Cart

View other Items

RC Drones & Helicopter

Search

Remote Control Airplane
RC Helicopter
kr. 2,998
Add to Cart

RC Drone with camera
RC Drone
kr. 3,998
Add to Cart

Remote Control Robot-Camera
RC Helicopter & Drone
kr. 3,998
Add to Cart

RC Cars

Search

Remote Control Tank
RC Cars
kr. 2,998
Add to Cart

Remote Control Jeep 4WD
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Remote Control Ford Ranger
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Remote Control Porsche
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Remote Control Vehicle
RC Cars
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All Products

Search

Remote Control Airplane
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Remote Control Jeep 4WD
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Remote Control Train
RC Train
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RC Drone with camera
RC Drone
kr. 3,998
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Remote Control Robot-Camera
RC Helicopter & Drone
kr. 3,998
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Remote Control Ford Ranger
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Remote Control Boat
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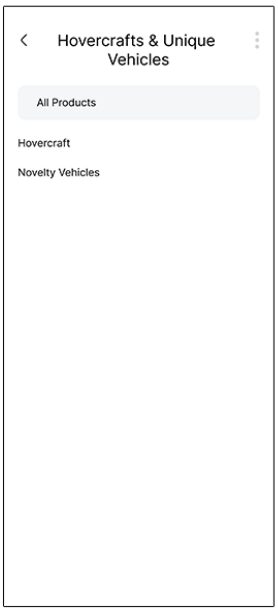
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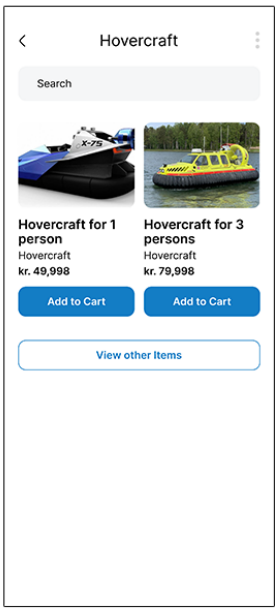
Novelty Vehicles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Hovercraft
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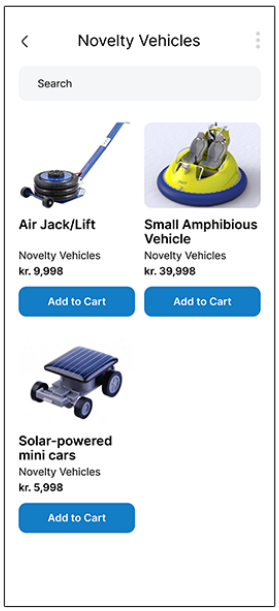
View other Items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Air Jack/Lift
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kr. 9,998
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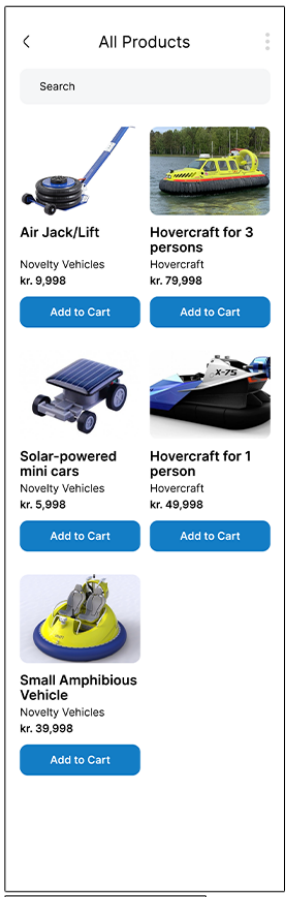
Add to Cart
Solar-powered mini cars
Novelty Vehicles
kr. 5,998
Add to Cart


All Products
Search
Air Jack/Lift
Novelty Vehicles
kr. 9,998
Add to Cart
Hovercraft for 3 persons
Hovercraft
kr. 79,998
Add to Cart
Solar-powered mini cars
Novelty Vehicles
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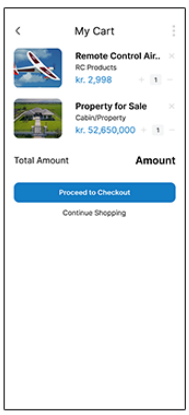
My Cart
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RC Products
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Property for Sale
Cabin/Property
kr. 52,650,000
Total Amount
Amount
Proceed to Checkout
Continue Shopping


Product Description
The Remote Controlled Airplane is a high-performance remote-controlled aircraft designed for both beginners and experienced flyers. It features a 4-channel radio system that controls the aileron, elevator, rudder, and throttle, allowing users to perform loops, inverted flights, and other aerobatic maneuvers.
With a wingspan of 90 cm and a length of 74 cm, the plane offers stability and control during flight. It has a flight time of approximately 25 to 30 minutes, a charging time of 1 to 2 hours, and a range of about 800 meters. The body is made from reinforced ABS plastic and styrene foam, making it both durable and easy to repair.
The aircraft comes 95% pre-assembled, including a 4-channel remote control, motor, rechargeable 8.4V/600 mAh battery, and charger, so users can start flying with minimal setup. Priced at kr. 798, the P-51D Mustang model combines strength, precision, and ease of use, making it ideal for anyone looking to enjoy realistic and agile flight performance straight out of the box.
RC Products
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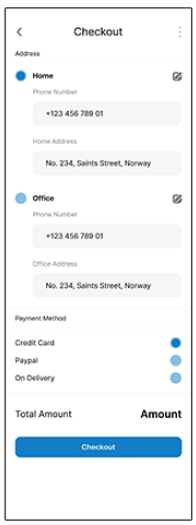
Checkout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On Delivery
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Amount
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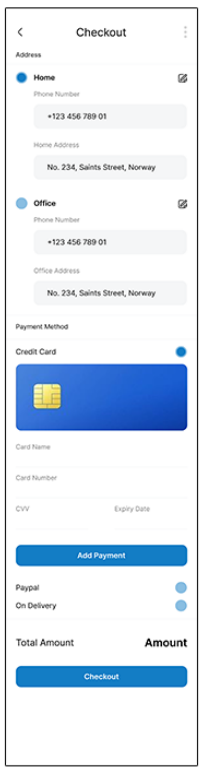
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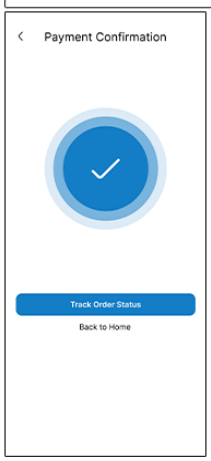
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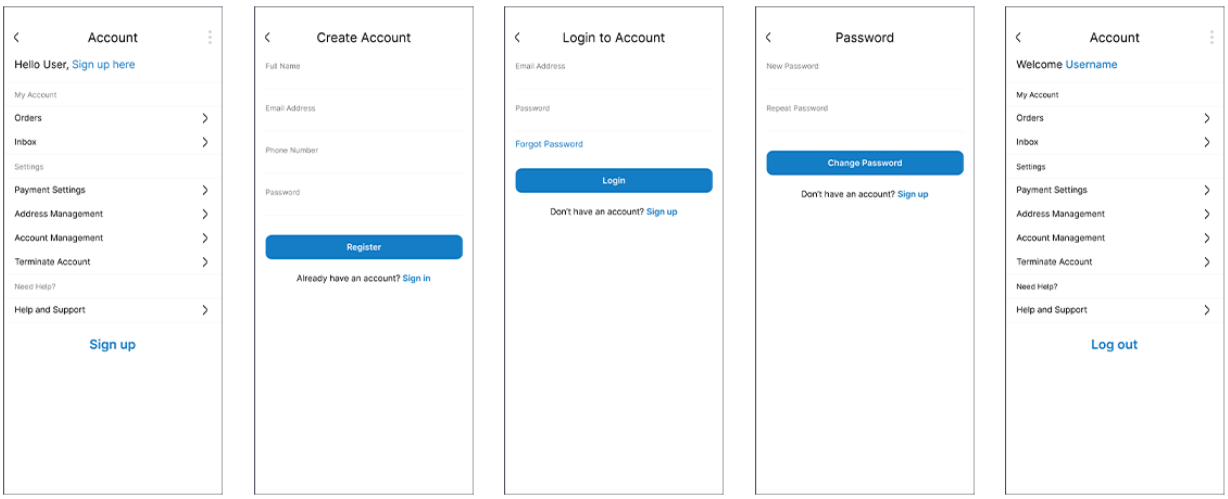
Available for Pickup
From 23rd Oct - 25th Oct, 2025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Hello User, Sign up here
My Account
Orders
Inbox
Settings
Payment Settings
Address Management
Account Management
Terminate Account
Need Help?
Help and Support
Sign up
Create Account
Full Name
Email Address
Phone Number
Password
Register
Already have an account? Sign in
Login to Account
Email Address
Password
Forgot Password
Login
Don't have an account? Sign up
Password
New Password
Repeat Password
Change Password
Don't have an account? Sign up
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Settings
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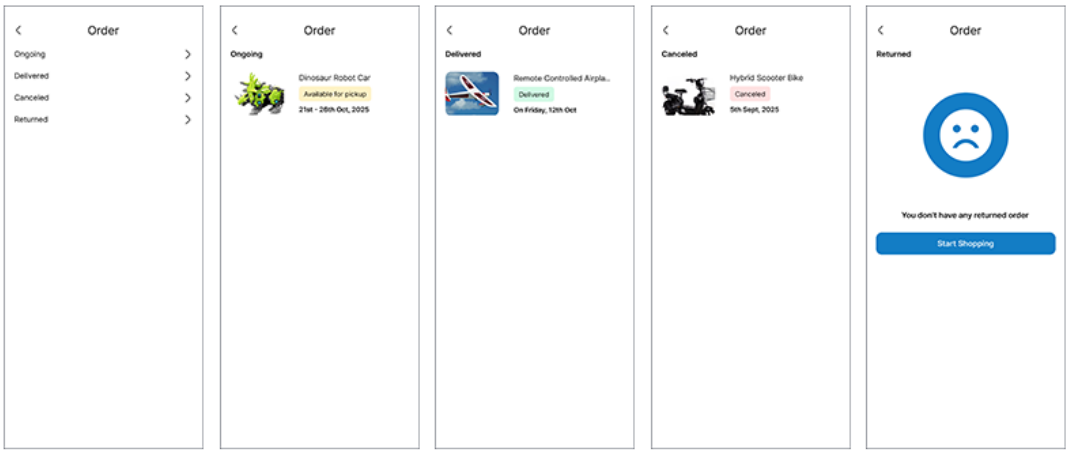
Address Management
Account Management
Terminate Account
Need Help?
Help and Support
Log out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Available for pickup
21st - 26th Oct, 2025
Order
Delivered
Remote-Controlled Airpla...
Delivered
On Friday, 12th Oct
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5th Sept, 2025
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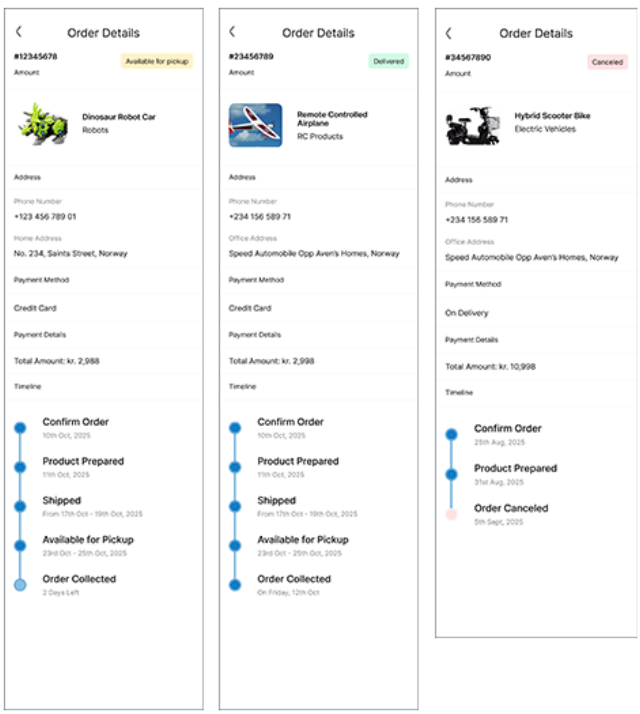
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Home Address
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Credit Card
Payment Details
Total Amount: kr. 2,988
Timeline
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10th Oct, 2025
Product Prepared
11th Oct, 2025
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From 17th Oct - 19th Oct, 2025
Available for Pickup
23rd Oct - 25th Oct, 2025
Order Collected
2 Days Left
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Amount
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RC Products
Address
Phone Number
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10th Oct, 2025
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11th Oct, 2025
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From 17th Oct - 19th Oct, 2025
Available for Pickup
23rd Oct - 25th Oct, 2025
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On Friday, 12th Oct
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Phone Number
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Office Address
Speed Automobile Opp Aven's Homes, Norway
Payment Method
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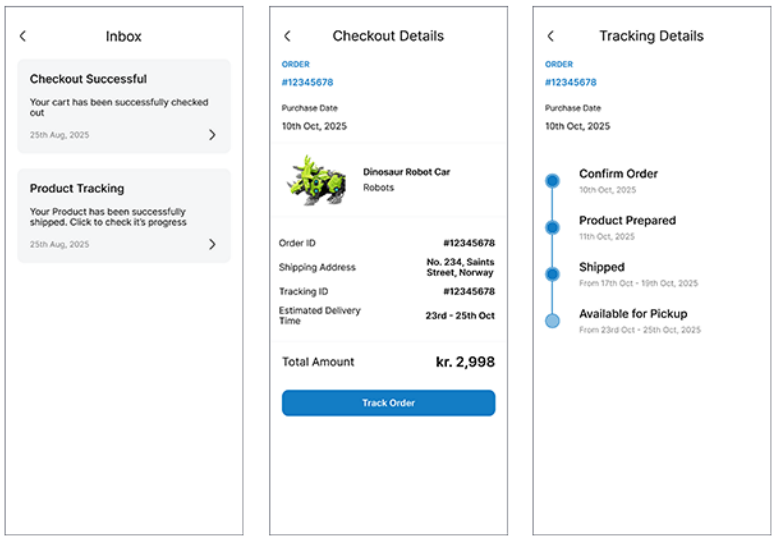
5th Sept, 2025


Inbox
Checkout Successful
Your cart has been successfully checked out
25th Aug, 2025
Product Tracking
Your Product has been successfully shipped. Click to check it's progress
25th Aug, 2025

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Purchase Date
10th Oct, 2025
Dinosaur Robot Car
Robots
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#12345678
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No. 234, Saints Street, Norway
Tracking ID
#12345678
Estimated Delivery Time
23rd - 25th Oct
Total Amount
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Tracking Details
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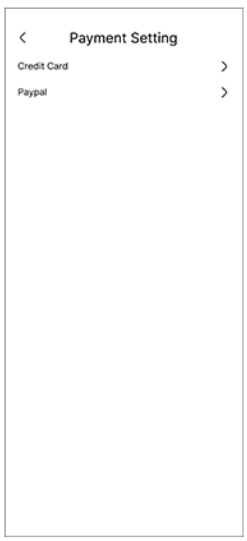
From 23rd Oct - 25th Oct, 2025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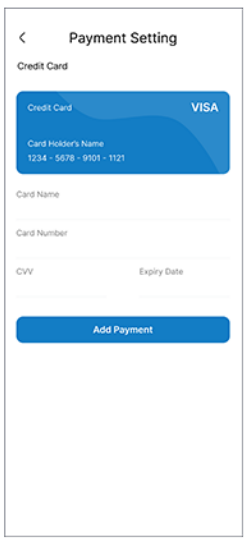
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Card Number
CVV
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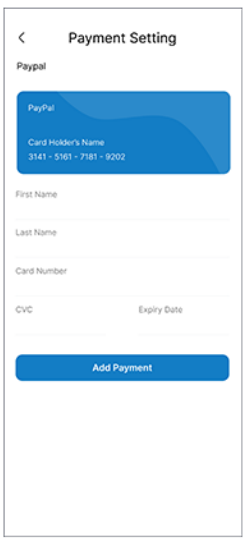
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Last Name
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CVC
Expiry Date
Add Payment


Account Management
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Account Management
Account Details
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Email Address
Save Changes


Address Management
Home
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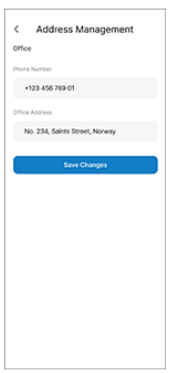
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Phone Number
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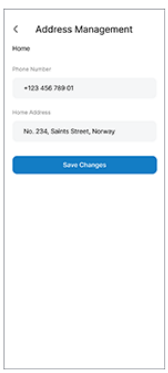
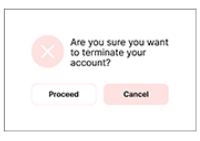
No. 234, Saints Street, Norway
Save Changes


Address Management
Home
Phone Number
+123 456 789 01
Home Address
No. 234, Saints Street, Norway
Save Changes


Are you sure you want to terminate your account?
Proceed
Cancel


Help and Support
Contact Address
Customer Care Number
+341 526 081 97
Call
Email Address
amgrencustomerservice@gmail.com.net
Leave a Message
Message
Send