Bowl Ease

An Ephemeral E-Commerce Vending System

Isha Chericham

(12) **United States Patent**
Kaltenbach et al.

(10) **Patent No.: US 10,486,365 B2**
(45) **Date of Patent: *Nov. 26, 2019**

(54) **INTERNET-ENABLED APPARATUS, SYSTEM AND METHODS FOR PHYSICALLY AND VIRTUALLY RENDERING THREE-DIMENSIONAL OBJECTS**

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(73) Assignee: **TRIPETALS, LLC**, Albuquerque, NM (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 16 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **15/862,861**

(22) Filed: **Jan. 5, 2018**

(65) **Prior Publication Data**

US 2018/0194067 A1 Jul. 12, 2018

Related U.S. Application Data

(60) Continuation of application No. 13/961,195, filed on Aug. 7, 2013, now Pat. No. 9,902,109, which is a (Continued)

(51) **Int. Cl.**
B29C 64/386 (2017.01)
B29C 64/357 (2017.01)
(Continued)

(52) **U.S. Cl.**
CPC ***B29C 64/386*** (2017.08); ***B29C 64/00*** (2017.08); ***B29C 64/357*** (2017.08); *B33Y 50/02* (2014.12)

(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

741,518 A 10/1903 Mackie
5,241,464 A 8/1993 Greulich et al.
(Continued)

FOREIGN PATENT DOCUMENTS

EP 1 168 266 A2 1/2002
EP 1 168 266 A3 6/2002
(Continued)

OTHER PUBLICATIONS

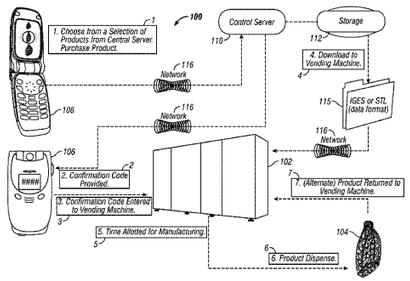
Handyscan 3D Sneak Preview: Creaform Shills to 4D and Pre-Releases the VIUscanTM 3D Color Scanner; Aug. 12, 2008; www.creaform3d.com.

(Continued)

Primary Examiner — Sean Shechtman
(74) *Attorney, Agent, or Firm* — Kermit D. Lopez; Luis M. Ortiz; Ortiz & Lopez, PLLC

(57) **ABSTRACT**

Three-dimensional object bridge between virtual and physical worlds. A method, system, apparatus and/or computer-usable medium includes steps of selecting a three-dimensional item in a first state for subsequent rendering into a second state and rendering the three-dimensional item in the second state via the three-dimensional rendering apparatus. An additional step of locating a three-dimensional rendering apparatus for rendering the three-dimensional item in a second state can be included. The three-dimensional rendering apparatus can be configured as a kiosk (manned or unmanned). Internet-enabled vending machine, and the like. The first state can comprise a virtual state and the second state can comprise a physical state. Likewise, the first state can comprise a physical state and the second state can comprise a virtual state. Additionally, the three-dimensional
(Continued)



This speculative project explores issues of material culture within the context of the UAE. It redefines the supply chain of a product and the upcycling of its material.

The project is positioned within a hypothetical product delivery system. Based on a 2018 U.S. patent developed by Christopher Mark Kaltenbach and his U.S. associates, this invented system of ephemeral e-commerce imagines a unique product-service that redefines the relationship with object ownership and disposal.

The title of the patent, Internet Enabled Apparatus, System and Method for Physically and Virtually Rendering Three-Dimensional Objects examines how products are purchased, made, distributed, and disposed of through rethinking the function and material of the 3D printer. In particular, it proposes that print-on-demand technology is integrated with the vending machine. It also describes an unspecified biopolymer to be used to make products that would easily break down into their original state so as to be reconstituted into a new product within the same machine; the vending machine would provide an area in its housing for the return of the product.

As current 3D printing technology requires a great deal of time to produce an object, to present this hypothetical system, it must be established that this vending machine would take no more than three minutes to print any object.

Furthermore, the product-service in this project, in today's market, would be inexpensive to purchase due to having been produced in China. So, it is established that the general cost to produce the product-service, in the vending machine, would be in the range of what a similar product would cost (or cheaper).

Contents

01 INTRODUCTION

Context

Product

Bowling shoes are specialized footwear designed to enhance safety, performance, and hygiene during bowling. Their primary function is to provide a controlled balance between sliding and traction, supporting the bowler's approach, release, and overall stability. The sliding sole allows smooth forward motion while the braking sole ensures grip during the final step, reducing the risk of falls or ankle injuries. By maintaining clean, non-marking soles, bowling shoes also protect the polished lane surface, preventing damage and maintaining consistent gameplay conditions.

In practice, bowling shoes are an essential part of both casual and professional bowling environments. They are commonly used in bowling centers where players depend on rental shoes due to lane requirements and house regulations. However, rental shoes are often reused by hundreds of customers, raising concerns about hygiene, odor, comfort, and fit. Many users experience discomfort due to worn-out interiors, stiff materials, or mismatched sizing, which can negatively affect their playing experience. These recurring issues highlight a clear need for cleaner, more user-friendly, and accessible footwear solutions.Modern improvements in bowling footwear emphasize comfort, lightweight construction, and better material performance. Updated designs aim to reduce break-in time, improve flexibility, and offer a more hygienic experience. In contemporary leisure environments, users increasingly expect convenience and cleanliness, which creates an opportunity for product–service systems that offer fresh, comfortable, and friction-free access to bowling shoes without relying on traditional rentals.

Gemini (2025). Man putting bowling shoes [AI-generated image].

ChatGPT (2025). Men cheering while playing bowling [AI-generated image].

Historical Context

Bowling is one of the oldest known sports, with origins tracing back over 4,000 years to ancient Egypt, where early forms of bowling were played using stone balls and primitive pins. Variations of the game appeared in ancient Germany and throughout medieval Europe, evolving into structured lawn games before eventually moving indoors. Modern bowling began to take shape in the 19th century, particularly in the United States, where standardized rules, wooden lanes, and organized leagues were established. By the early 20th century, the introduction of mechanical pinsetters and official associations helped transform bowling into a popular recreational and competitive sport, paving the way for the contemporary bowling experience seen today.

Bowling shoes have developed alongside the growth of modern bowling. In the early 1900s, players wore regular shoes, which damaged the polished wooden lanes. This led to the introduction of non-marking, leather bowling shoes designed to protect the surface and support controlled movement.As the sport became popular through the mid-20th century, the dual-sole design—one sliding sole and one traction sole became standard to improve balance and accuracy. With the rise of recreational bowling, rental shoes became common in bowling centers, but frequent reuse created issues of hygiene, comfort, and wear.Today, changes in user expectations, especially among younger bowlers, highlight the need for cleaner, more comfortable, and convenient footwear options beyond traditional rentals.

https://jmar-entertainment-v1755477750.websitepro-cdn.com/wp-content/uploads/2024/07/bowlingrichonly.jpg

https://bowlingvision.com/wp-content/uploads/2021/11/Musee-de-la-boule1.jpg

https://i0.wp.com/fuzzylizzie.com/myPictures/sports/bowling/30shoes/30sbowling1.jpg

User Demograghic

The primary users of the disposable bowling shoes system are male individuals aged 15 to 25 who visit bowling centers for recreation and social activities. This group is active, convenience driven, and often bowls occasionally rather than professionally, making them dependent on rental shoes.They are particularly sensitive to issues such as hygiene, worn-out footwear, and improper fit, which can affect comfort and performance. As they prefer quick, modern, and hassle-free solutions, this demographic benefits from a product that offers clean, ready-to-use shoes without waiting or relying on staff.

Gemini (2025).Males(15-25)in bowling alley enjoying [AI-generated image].

Site

The vending machine will be placed inside modern bowling centers across the UAE, where hygiene, convenience, and quick service are priorities.For this test case, Dubai Bowling Center (DBC) has been selected known for its vibrant interiors, family-friendly environment.
The vending machine will be positioned right before the alley so users can get to it after the payment for the game, allowing customers to easily purchase, collect, and return disposable shoes without staff assistance.

Gemini (2025).Better Quality of given DBC bowling alley [AI-generated image].

Scientific Rationale

The design of bowling shoes is based on principles of biomechanics, friction control, and material performance. During a bowling approach, players require a smooth sliding motion followed by stable braking. To support this, bowling shoes use a dual-sole system: one sole with reduced friction for controlled sliding, and another with increased grip for stability during release.This combination helps maintain balance, reduces joint strain, and supports accurate movement.Hygiene and comfort are also grounded in scientific reasoning. Traditional rental shoes accumulate moisture and bacteria over repeated use, which can affect foot health. Using lightweight, clean, and short-term use materials reduces microbial buildup, minimizes odor retention, and maintains consistent interior cushioning.

Gemini (2025).Grip of bowling shoes [AI-generated image].

Gemini (2025).Dirty bowling shoes [AI-generated image].

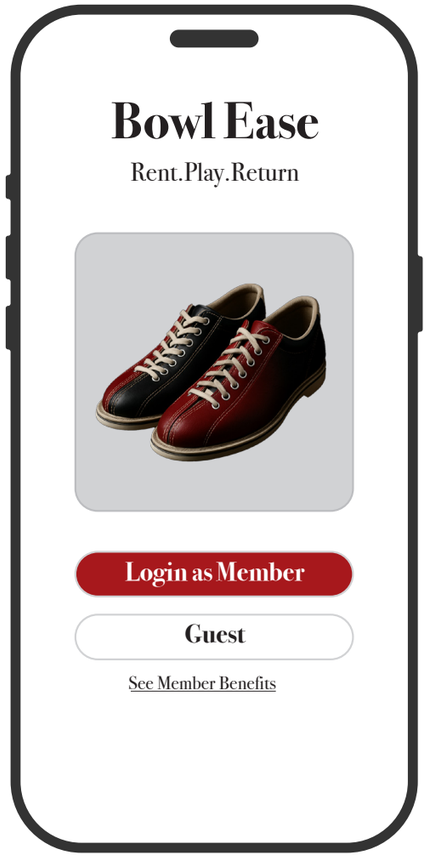
Entertainment Experience

Bowling is widely recognized as a social and entertainment-driven activity, attracting young users who seek enjoyable group experiences. Beyond the technical aspects of the game, the atmosphere as in music, lighting, competition, and teamwork plays a central role in why people visit bowling centers.

The enjoyment of the sport depends not only on performance but also on the comfort and ease of participation. When equipment, including footwear, is comfortable, hygienic, and convenient to access, it enhances the overall entertainment value. For users aged 15–25, minimizing friction points such as long rental queues or uncomfortable shared shoes contributes directly to a smoother, more engaging, and more enjoyable bowling experience.

Gemini (2025).Entertainment side of bowling(only males) [AI-generated image].

Ephemeral E-Commerce Vending System

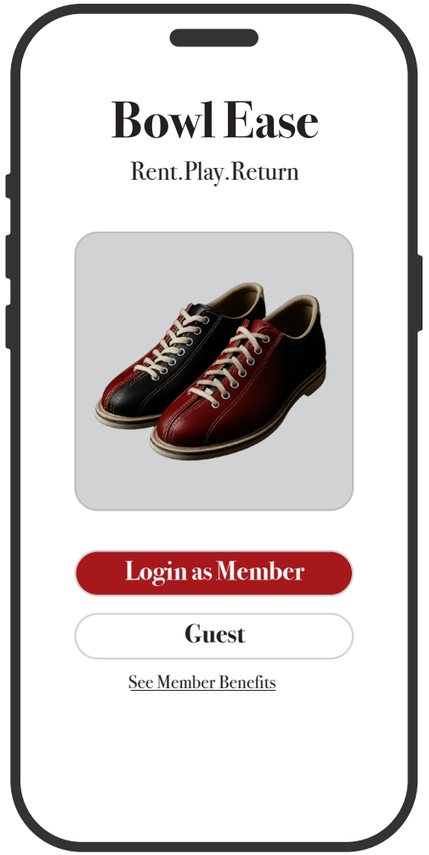


App

Vending machine

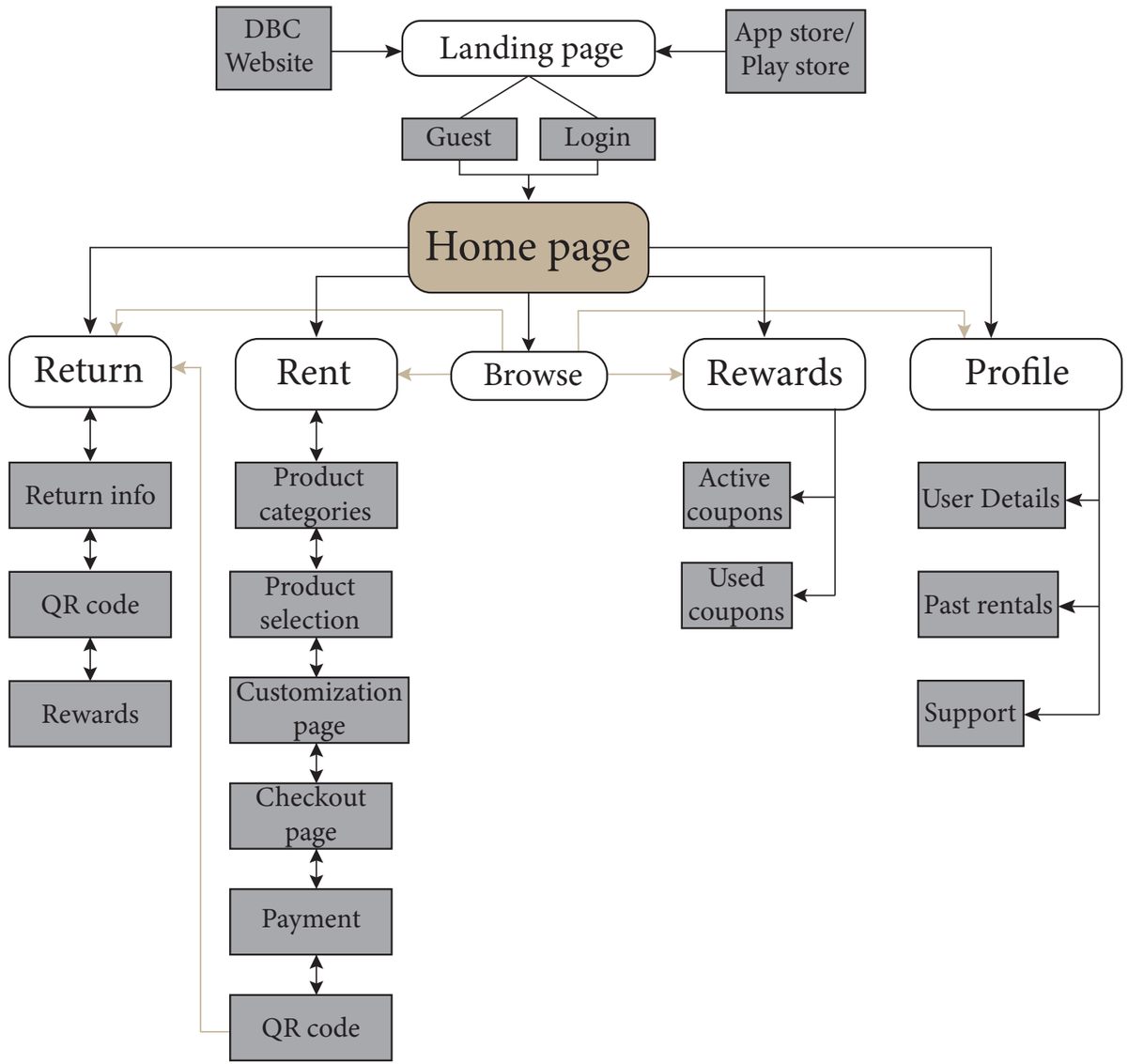
Product-service

02

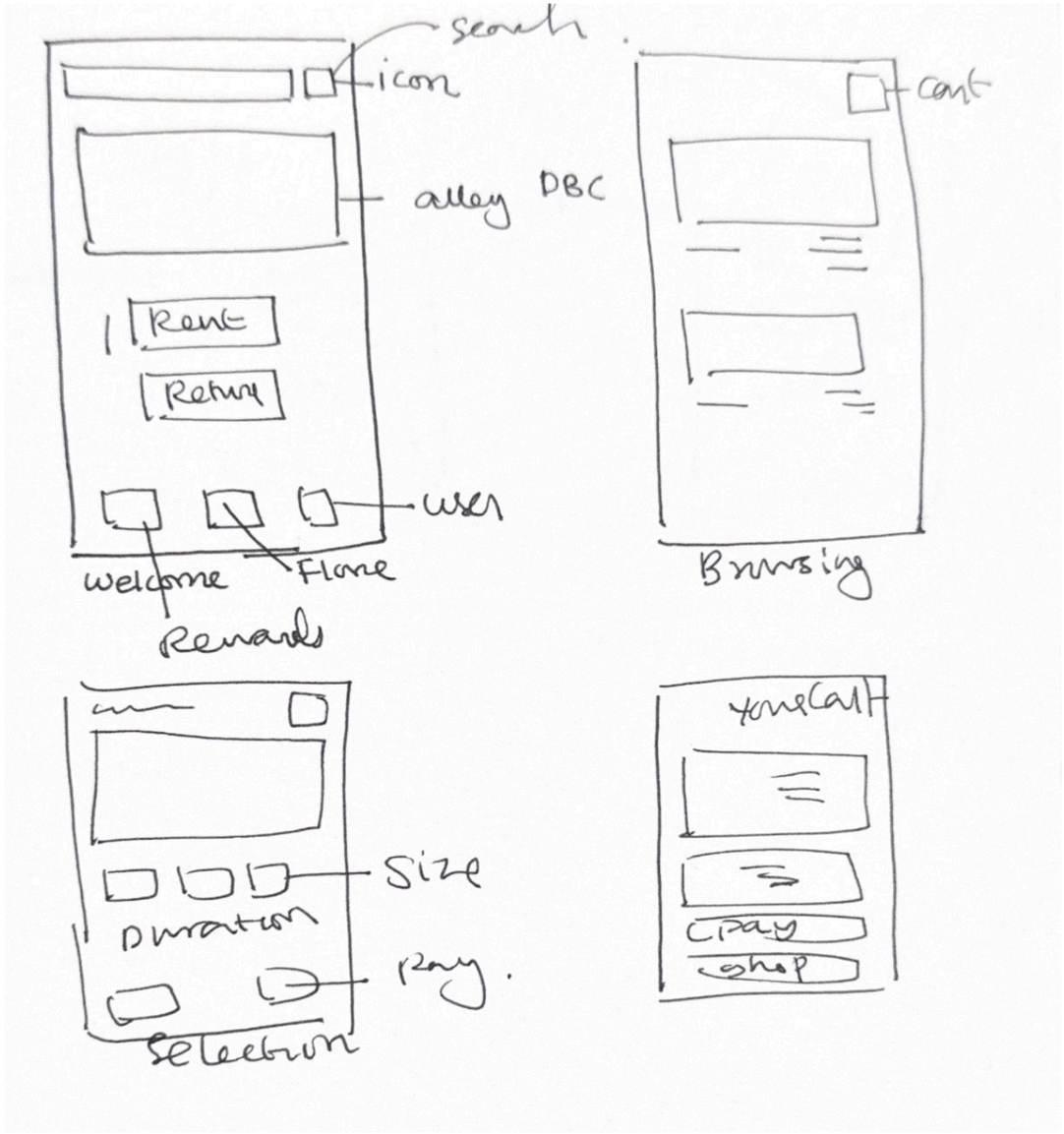

Bowl Ease
Rent.Play.Return
Login as Member
Guest
See Member Benefits

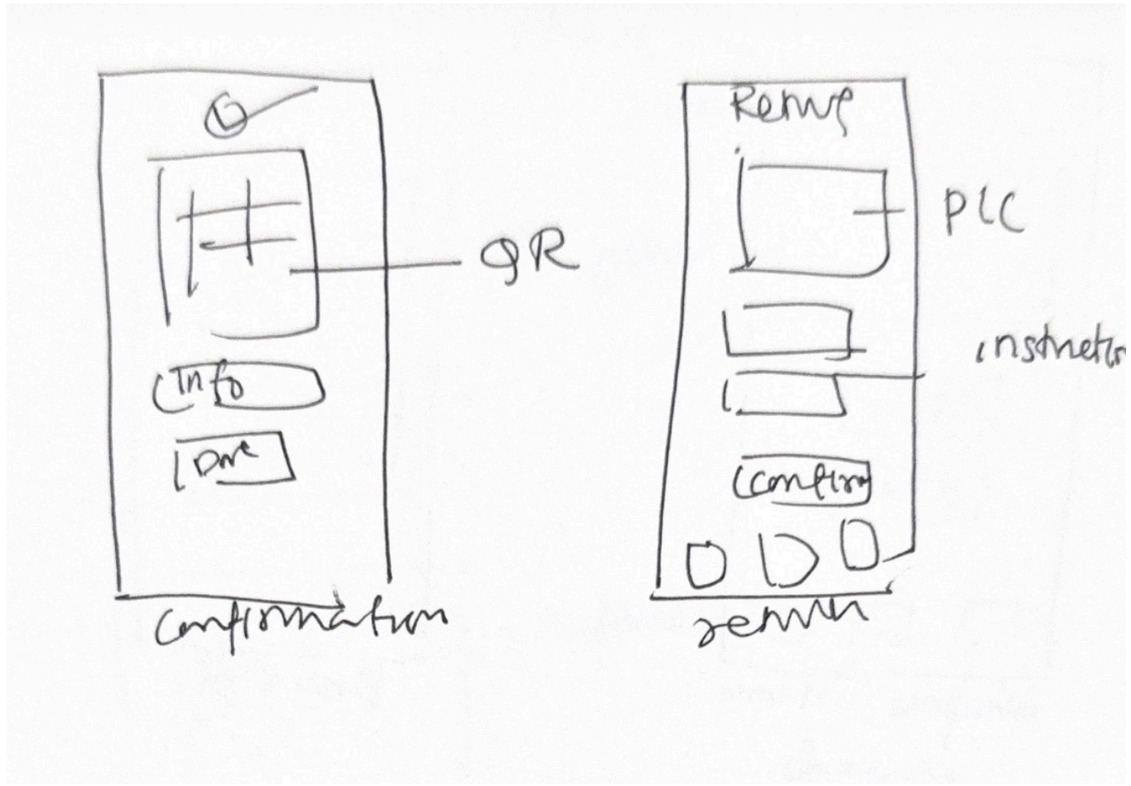
APP

App Design Sitemap



LoFi Wireframes



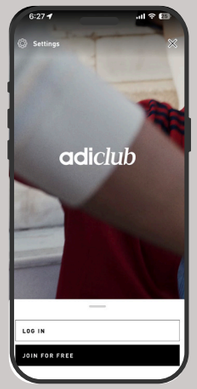


App Design Inspiration

ADIDAS : *App Analysis*

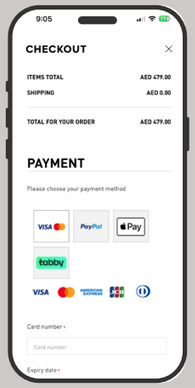
Cover

Login

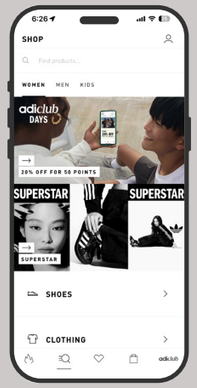


Homepage

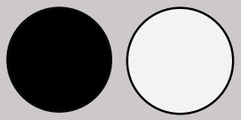
Payment



Browse



Color Palette



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Font Name
ITC Avant Garde Gothic

Background Information
Adidas is a leading sportswear brand with a global presence. The app combines online shopping with a membership rewards system (AdiClub), making it not only a retail platform but also a loyalty hub for customers.

Product Selection
Products are organized into Men, Women, Kids.Subcategories include Shoes, Clothing, Accessories.Personalized recommendations appear under “Recommended for You.”

Points / Rewards (AdiClub)
Free membership program.Earn points for purchases.Redeem points for discounts (e.g., 20% off for 50 points).Unlock early access to drops and exclusive events.

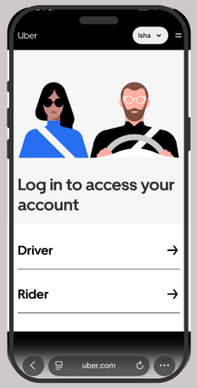
Customization
Users set their shopping preference (Menswear, Womenswear, Kidswear).
Certain shoes allow custom designs through Adidas’ personalization feature.

Notifications & Tracking
Push notifications for new releases, offers, and promotions.
Order updates with live delivery tracking.

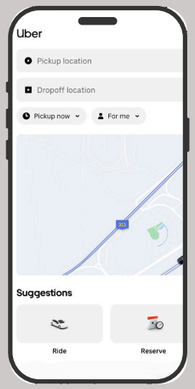
Payment
Credit/Debit Cards , Apple Pay
PayPal , Tabby

UBER : *Website Analysis*

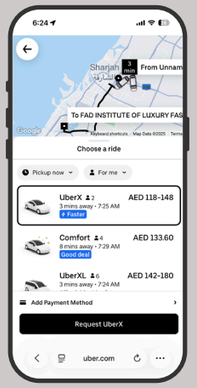
Login



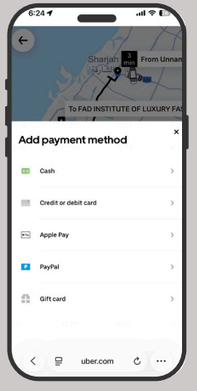
Homepage



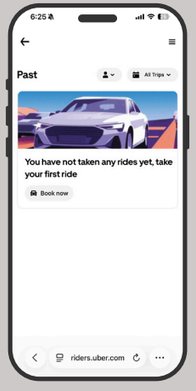
Browse



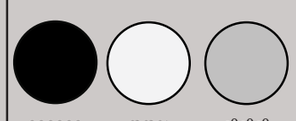
Payment



History



Color Palette



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6173b7

Font Name
Sans-Serif :Uber Move

Background Information
Uber is a global ride-hailing service that connects riders and drivers through its platform. The website and app focus on easy ride booking, secure payments, and real-time trip tracking.

Product Selection
Users choose between Driver / Rider accounts at login.Riders can select from services such as UberX, Comfort, and UberXL.Booking options include Ride Now or Reserve for later.

Customization
Riders set pickup and drop-off locations.Vehicle options allow customization by capacity, comfort, and price range.Saved addresses make future bookings faster.

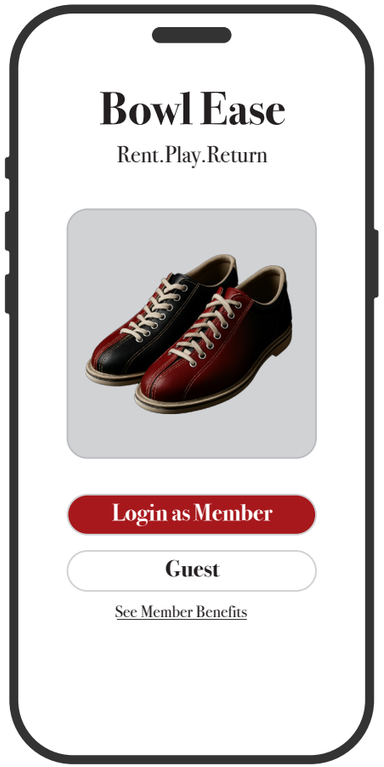
Points / Rewards
Instead of a points system, Uber offers discounts and promotions visible in the account section.Wallet integration helps manage payments and ride history.

Past Rides
The app keeps a history of past trips, allowing users to review details, receipts, and routes. Useful for expense tracking and rebooking frequently traveled routes.

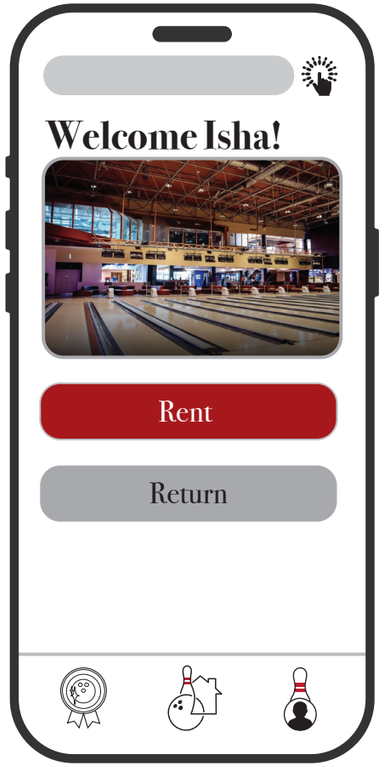
Notifications & Tracking
Real-time map view with driver location and ETA.Notifications for driver arrival, ride progress, and receipts.Account checkups and safety reminders included.

Payment
CashCredit/Debit Cards , Apple Pay
PayPal , Gift Cards

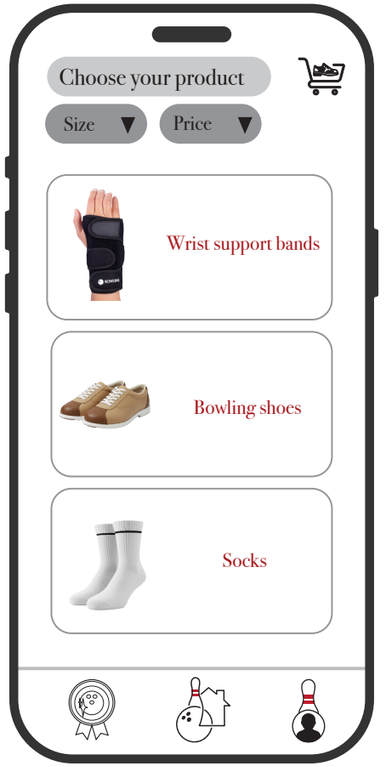
App Design: HiFi Wireframes



Landing page

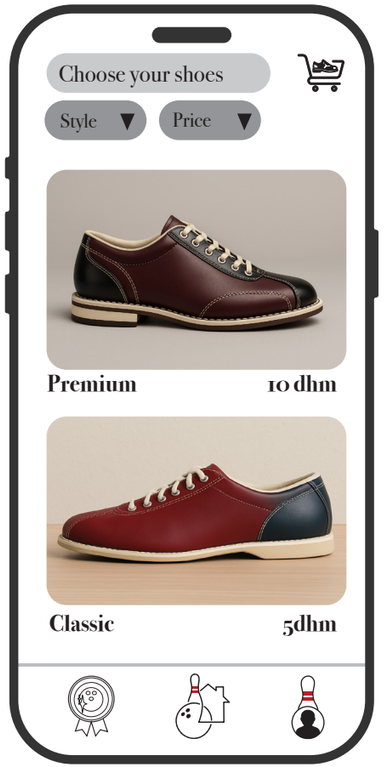


Welcome/Home page

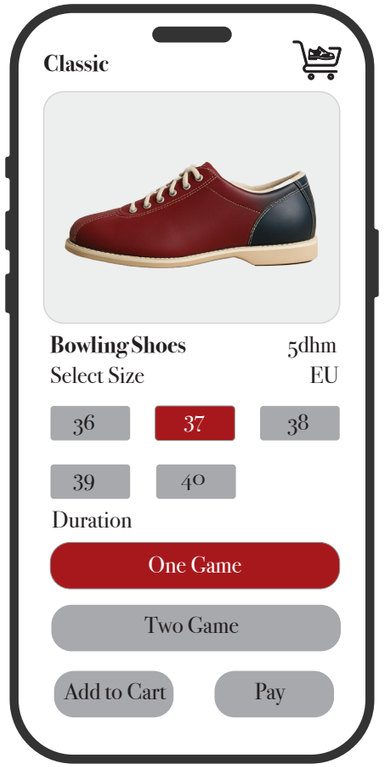


Product categories page

App Design: HiFi Wireframes



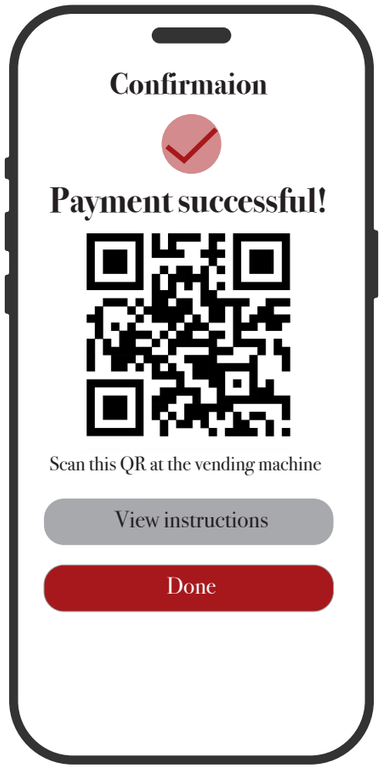
Product selection page



Customization page

Checkout page

App Design: HiFi Wireframes



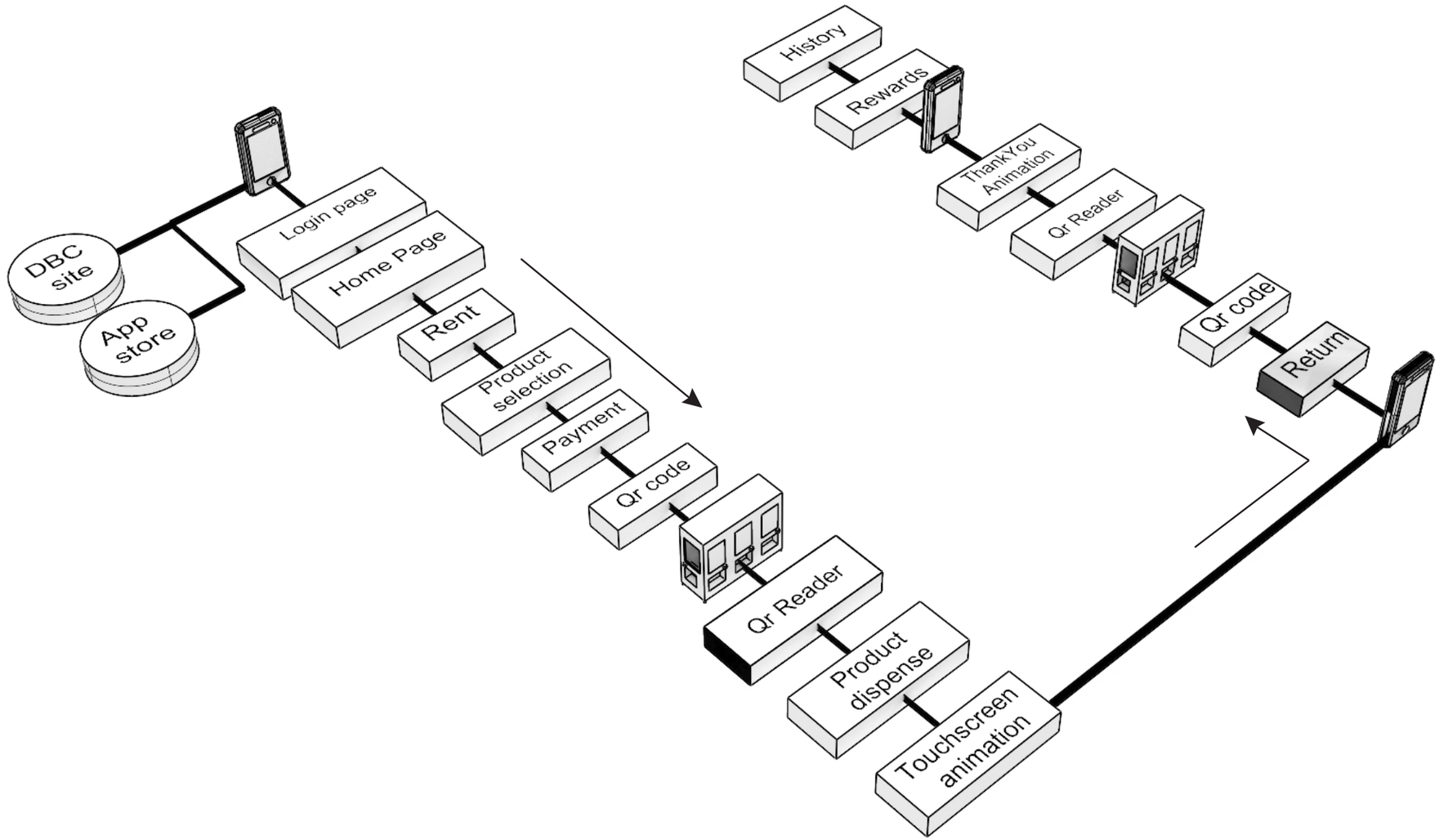
Confirmation page

Return Information

03 VENDING MACHINE

Vending machine site

Navigational Diagram



Vending Machine Inspiration

Company

Acure Pass , installed by JR East Water Business Co., Ltd.

Product

Digital Vending Machine

Designer

Fumie Shibata

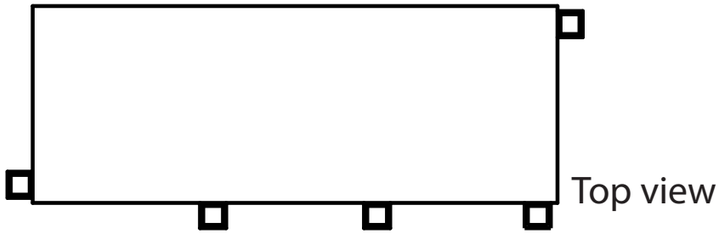
Region

Japan

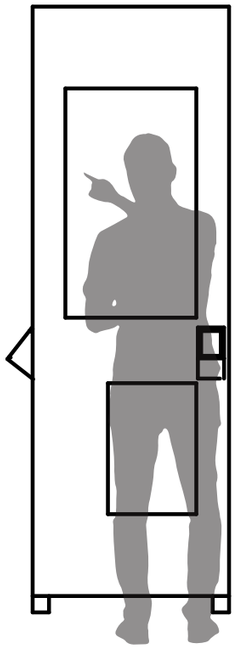
Description

The Acure Pass vending machine is part of Japan’s modern smart-vending ecosystem, introduced in 2016 to upgrade traditional beverage machines. It features a large touchscreen display, allowing users to browse products visually instead of using physical buttons. The machine supports multiple payment methods including QR-based purchases through the Acure Pass app, IC cards (Suica/Pasmo), and digital wallets. Its design focuses on speed, hygiene, and accessibility, offering a streamlined experience for commuters. The machine’s minimalist form and illuminated product layout reflect Japan’s emphasis on functional yet aesthetically refined public technology.

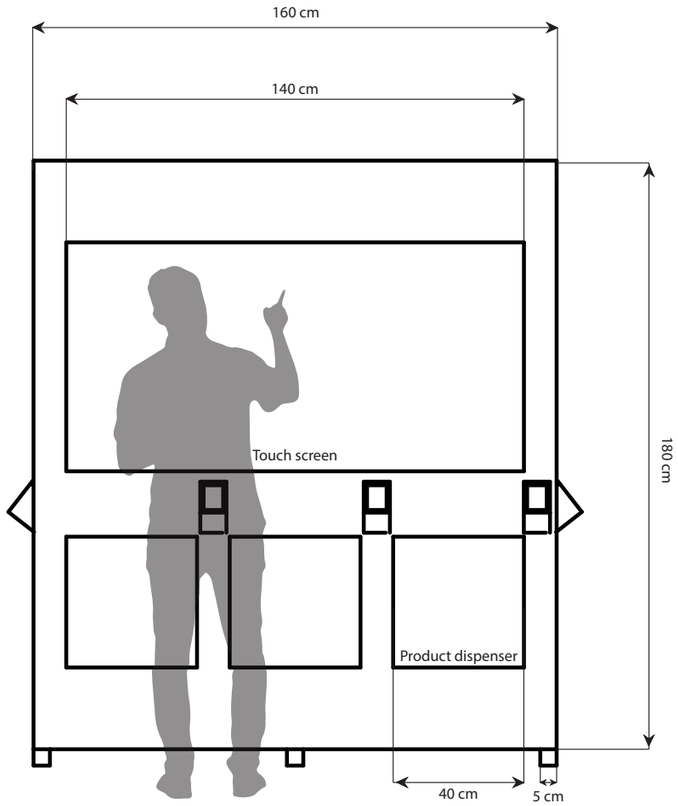
Vending Machine Interface



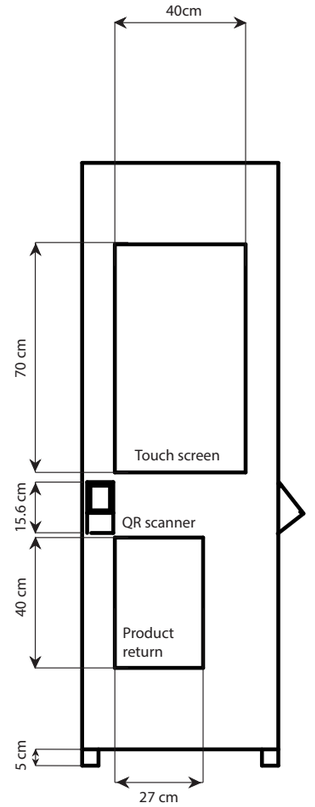
Top view



Left view

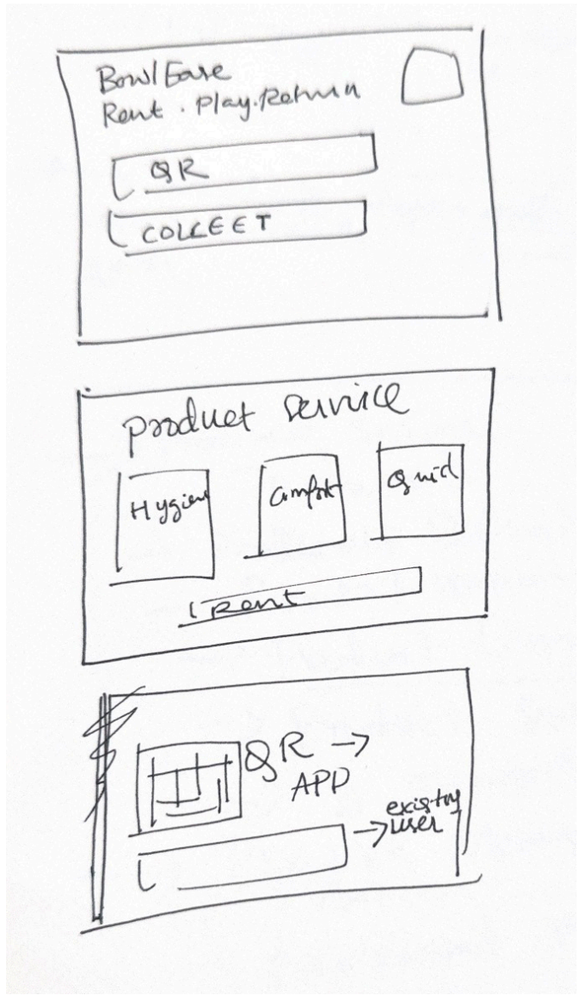


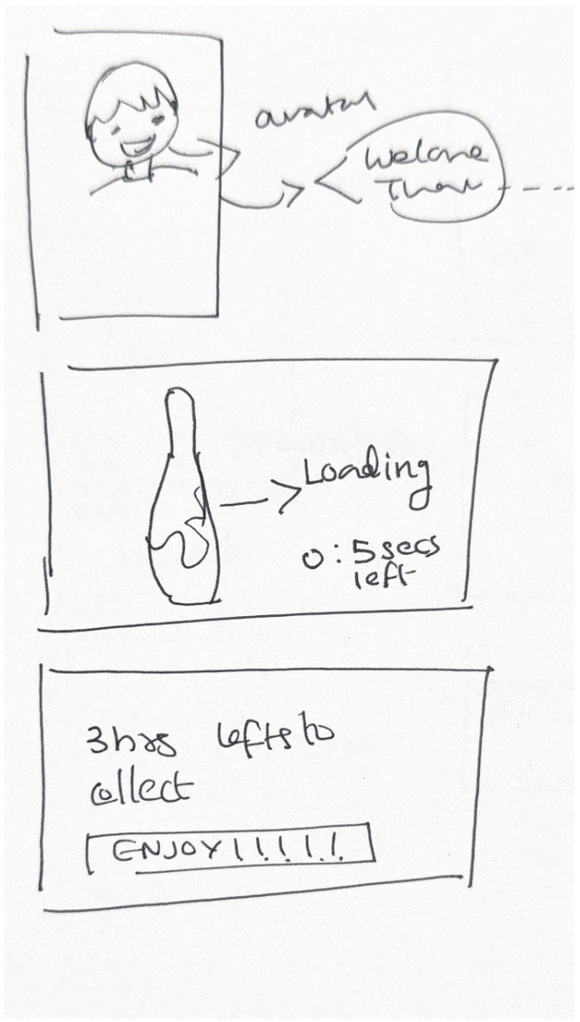
Front view

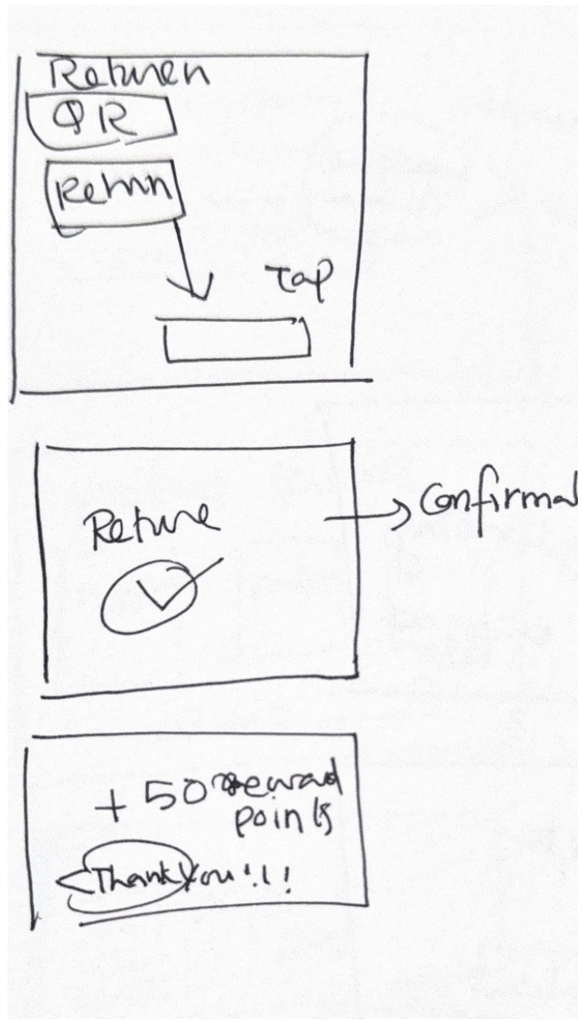


Right view

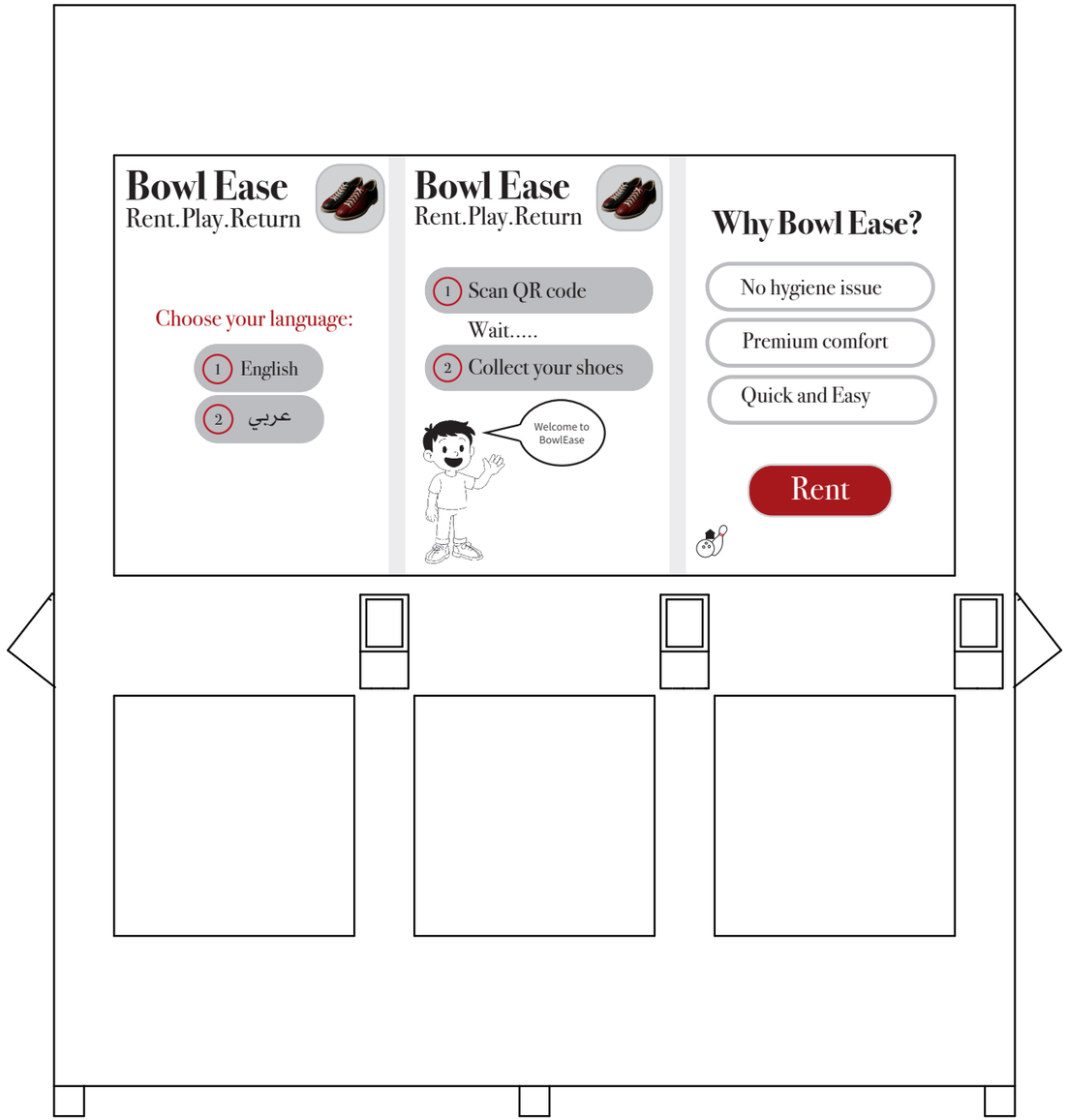
LoFi Wireframes







HiFi Wireframes



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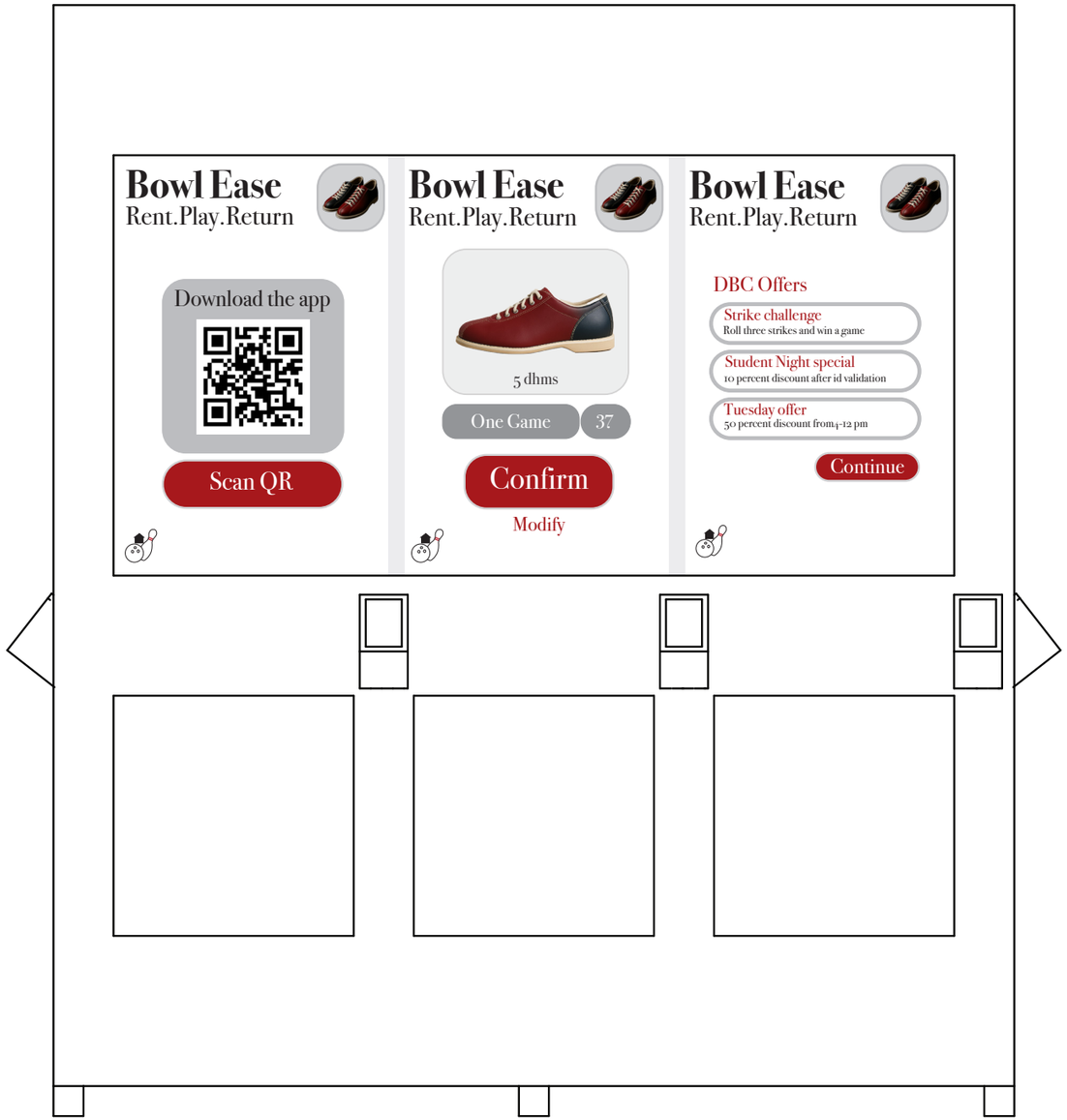

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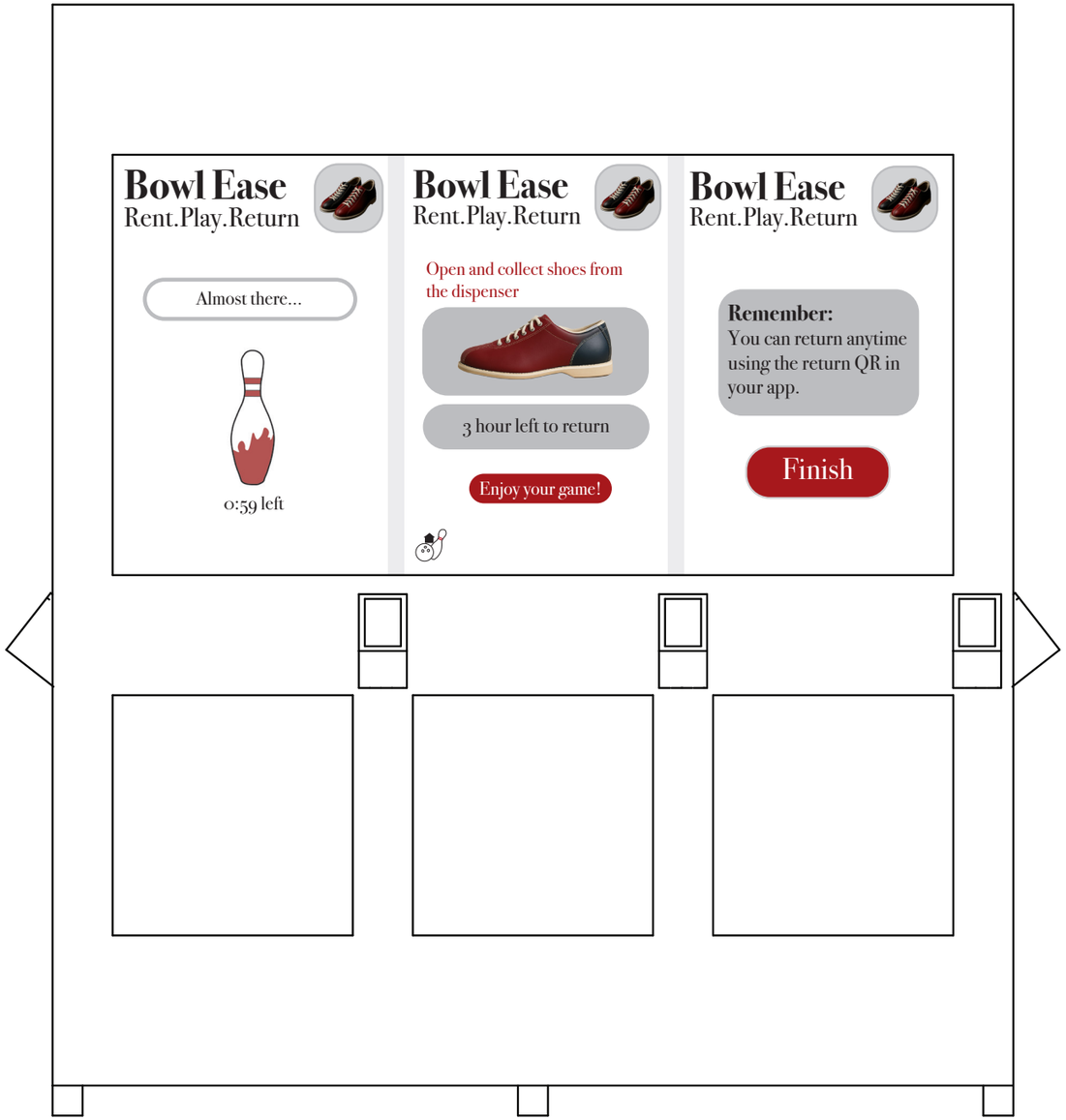

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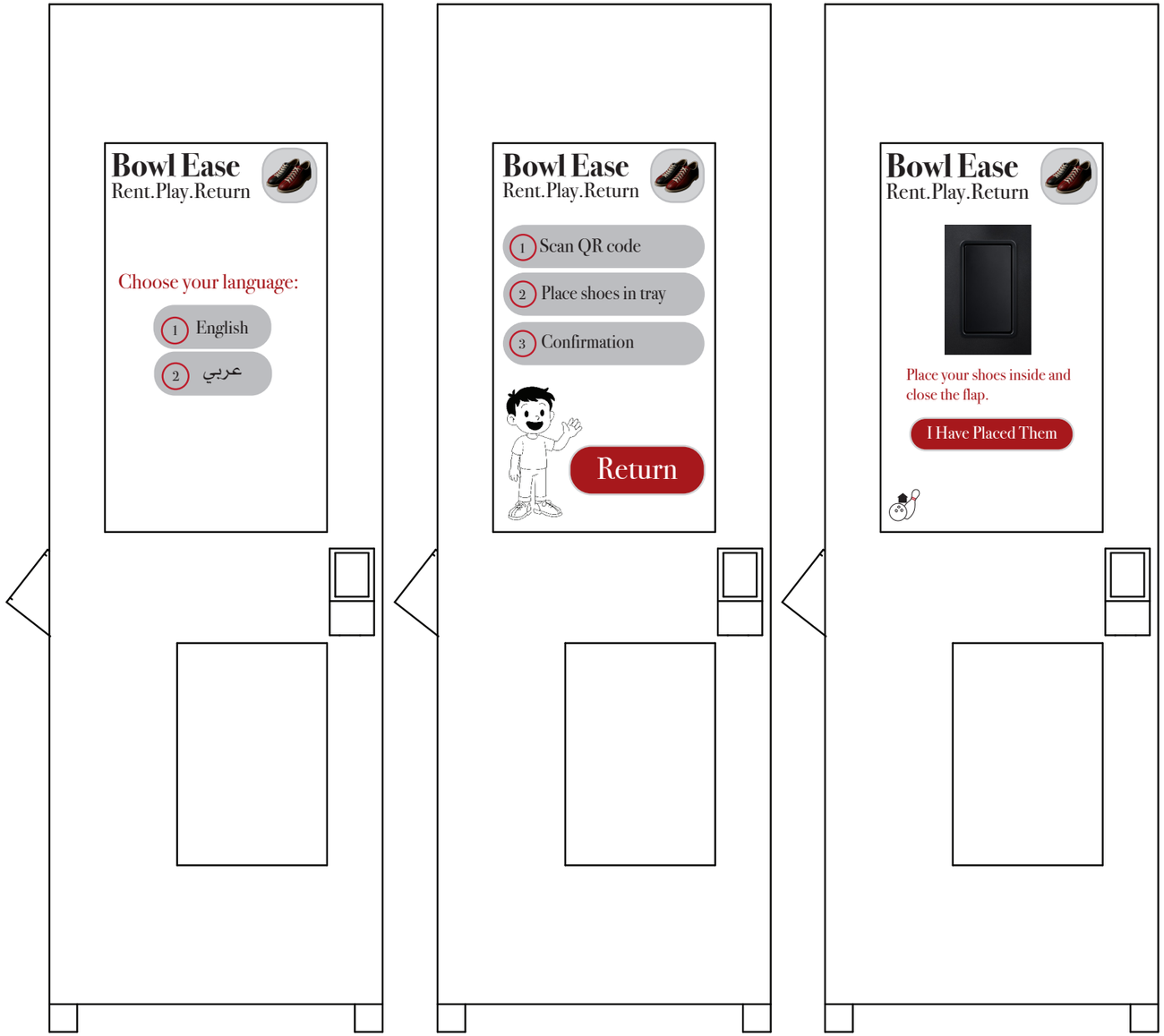

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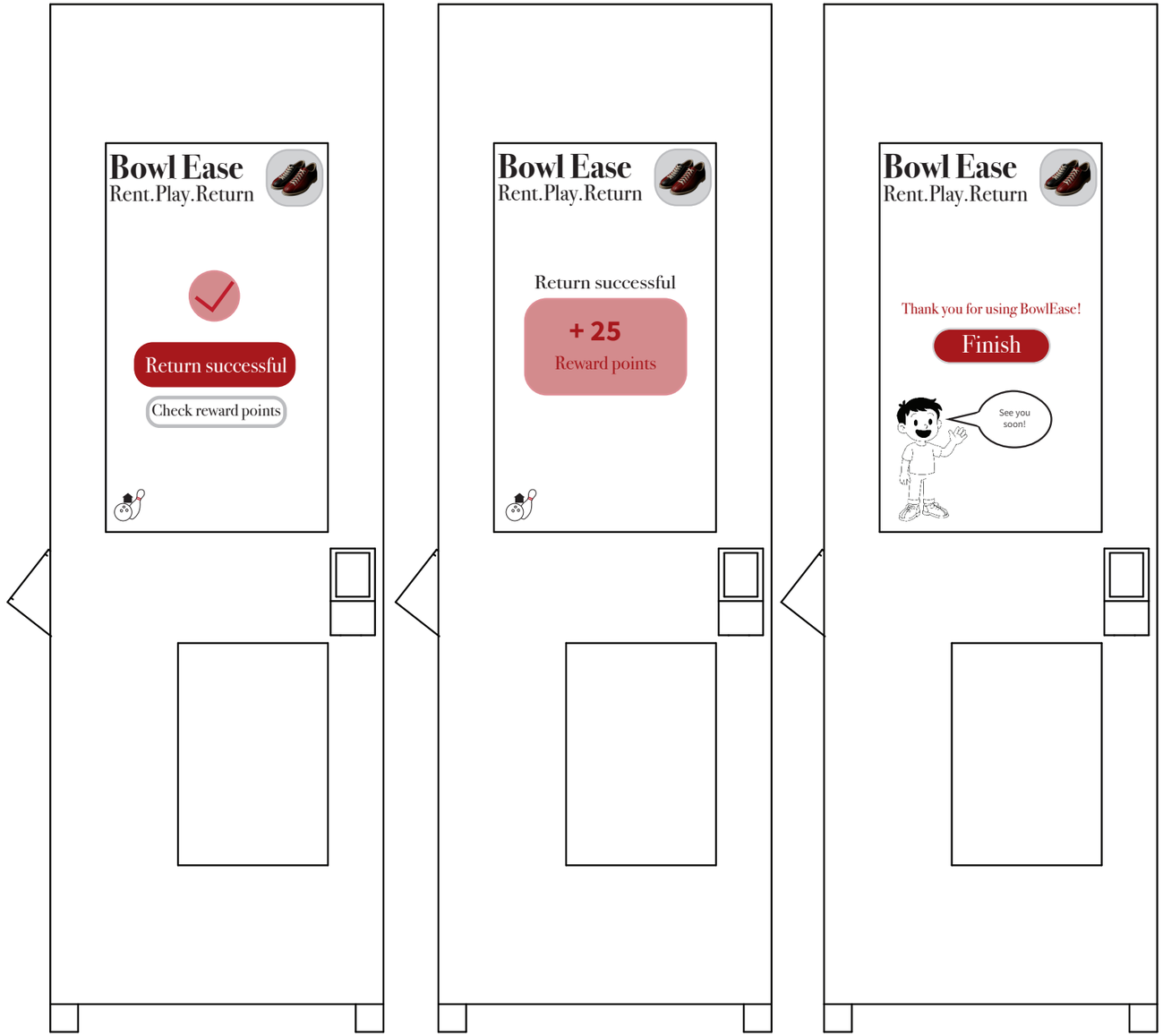

04 PRODUCT-SERVICE

Reduce Landfill Waste

https://cdn.shopify.com/s/files/1/1107/6454/files/landfill-with-burning-trash-pile_650x500.webp?v=1697468517

Hygiene

ChatGPT (2025). Unhygienic pair of bowling shoes [AI-generated image].

Maintenance from the company

ChatGPT (2025). Technician cleaning a bowling shoe sole [AI-generated image].

ChatGPT(2025). Technician replacing the slide sole [AI-generated image].

Plantar Fasciitis

https://inspiredhealthchiropractic.com/wp-content/uploads/2022/11/Heel-Pain-Could-it-be-Plantar-Fasciitis.jpeg

Challenges in Diagnosis of Plantar Fasciosis (Fasciitis)

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Abstract

Heel pain is a common complaint presenting to a general orthopedic clinic, with plantar fasciosis (PF)

In summary, plantar fasciosis or “heel pain” is actually not one diagnosis but represents a number of conditions. When a

Table 1: Possible associated factors contributing to plantar fasciosis [1- 4].

1. Obesity (body mass index of 30 or more)
2. Age over 40
3. Runners, prolonged standing and walking occupations
4. Pes planus (Excessive foot pronation)
5. High arched foot (pes cavus)
6. Ill-fitting shoes or hard soles in the shoes
7. Leg length discrepancy
8. Weakness of the Tibialis Posterior or Tightness of Achilles tendon

Product Design Inspiration

Company: Dexter

Industry: Bowling

Material: Soft, durable man-made and nylon upper

Features: Goodyear® replacement rubber traction sole Total interchangeable sole construction, Patented SST technology, Removable footbeds

Product Description: In competitive bowling, players must adapt to varying lane approach conditions to maintain a consistent slide. This shoe is ever-adaptable and designed for durability and performance. It features total interchangeable soles and heels, allowing bowlers to customize their slide and braking power. This ensures a consistent, predictable slide for optimal performance.

Company: KR Strikeforce

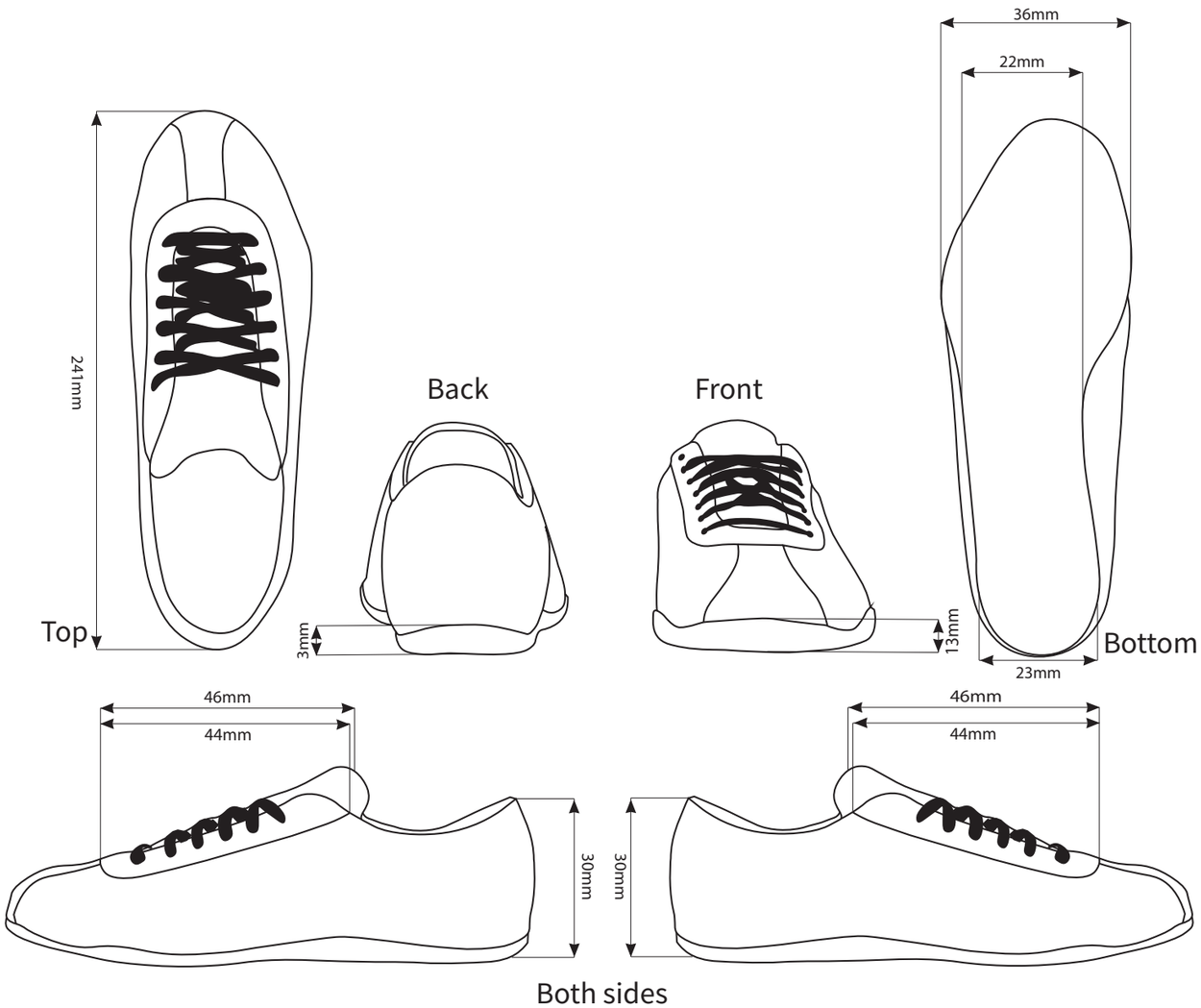
Industry: Bowling

Material: Lightweight EVA outsole, breathable engineered mesh upper, synthetic support overlays, microfiber slide sole, rubber traction pad

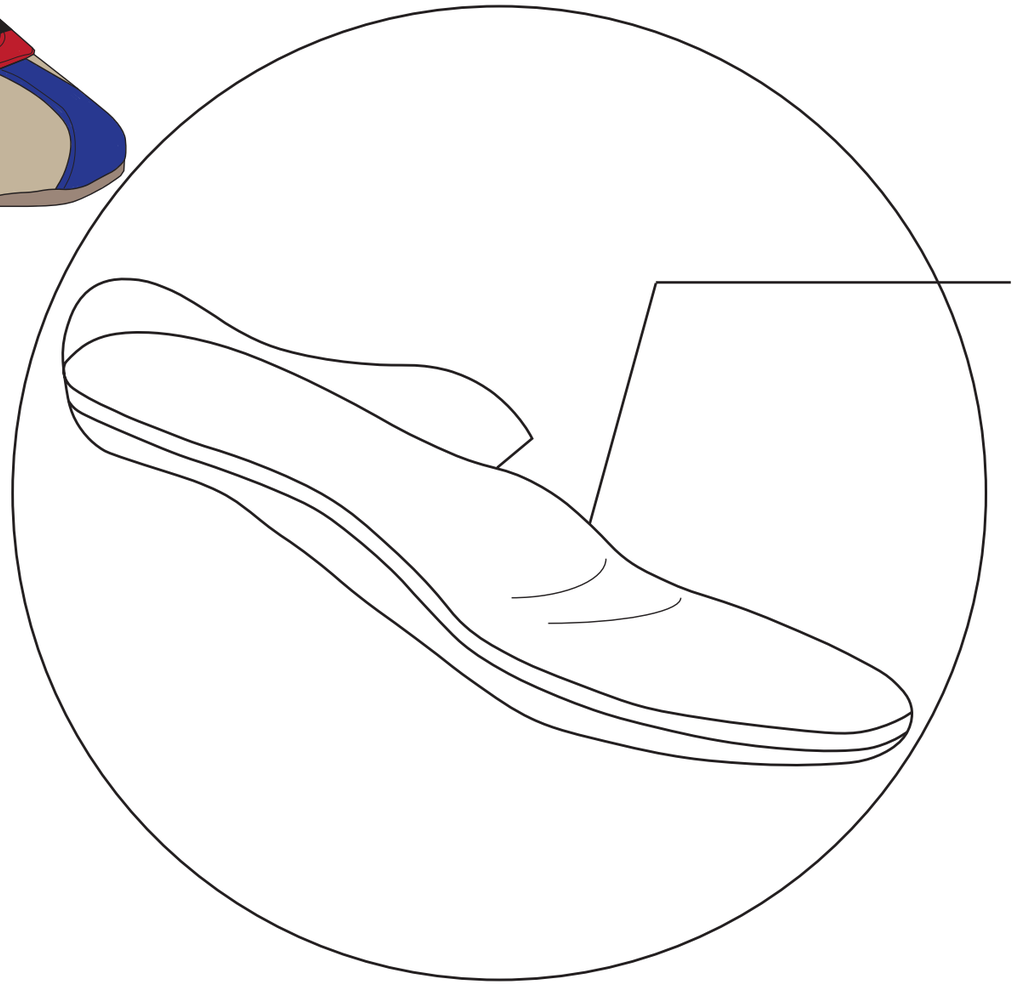
Features: FlexLite™ breathable mesh ,Microfiber slide sole, Rubber traction pad for stability , Cushioned EVA midsole for comfort, Padded tongue and collar

Product Description:The KR Strikeforce Aviator is designed to provide bowlers with a lightweight, athletic-inspired shoe that enhances comfort and mobility. The breathable mesh upper keeps the foot cool, while the cushioned EVA midsole reduces fatigue during repeated approaches. Its microfiber slide sole and rubber traction pad allow bowlers to maintain a controlled slide and stable braking action. Adapted for recreational and youth bowlers, this shoe offers a consistent and comfortable performance, making it a modern and versatile choice for a dynamic bowling environment.

Product Dimensions



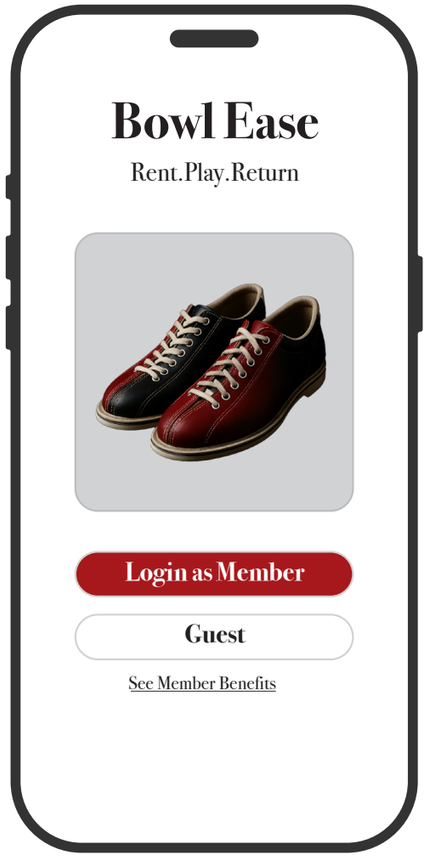
Product Detail



Enhanced cushion sole

Features a dual-density foam layer that offers superior comfort and heel support, reducing strain and helping prevent common bowling-related foot injuries such as plantar fasciitis.

Ephemeral E-Commerce Vending System



App

Vending machine

Product-service

Project Management Overview

The first stage of the project took place during Weeks 1–2, concentrating entirely on analysing the bowling environment and identifying the problems within the existing shoe-rental process. Key issues such as slow distribution, hygiene concerns, and inefficient return behaviour were defined at this stage. No product development occurred yet; the focus remained on establishing the challenges the system needed to resolve.

From Weeks 3–6, the project entered the Vending Machine Development phase. During this period, the physical form of the vending unit was explored through sketching, dimensional planning, and Rhino modelling. The structure, tray mechanism, chute opening, and overall placement logic were refined to create a functional machine suitable for bowling-center use.

The App Development phase overlapped between Weeks 5–6, during which the digital user journey was shaped. Sitemaps, task flows, and interface layouts were produced to guide users through scanning, selecting shoe sizes, and understanding the rental and return process.A continuation of Product–Service Development occurred in Weeks 7–9, expanding the early issue identification into a complete service model. This stage clarified the single-session shoe concept, user interaction patterns, return behaviour, and the connection between the physical and digital components of the system.The Vending Machine Interface Development stage took place during Weeks 10–12, focusing on the large-screen interface located on the vending unit. The layout, visual hierarchy, button placement, and instructional graphics were developed to enable fast and intuitive interactions within the bowling environment.

The final phase, Booklet/Manual, was completed from Weeks 12–15. This stage organised the entire project into a structured documentation package containing diagrams, illustrations, renders, and process summaries that present the full BowlEase system clearly and cohesively.