

# Project Pokédex: Product Requirements Document

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## Introduction

The purpose of this Product Requirements Document is to outline the specifications for Project Pokédex, an interactive and nostalgic web application. The application utilizes machine learning to offer an engaging card collecting and learning experience.

## Objective

The primary objective is to develop a Minimum Viable Product (MVP) that employs machine learning for accurate card identification using a camera. The application will provide meta information about the card including trade value, set details, and card game utility.

## System Description

Project Pokédex is an interactive web application that combines computer vision, machine learning, and accessible design to create an engaging, educational card collection experience. The system is built as a modular web platform consisting of four primary layers: the frontend interface, backend services, machine learning engine, and data storage infrastructure.

### 1. Frontend (User Interface):

The frontend is a responsive web interface optimized for mobile and tablet devices. It allows users to scan cards via their device camera, view card details, manage their profile, and access a personal library of past scans. Accessibility is a core focus — all UI components will meet WCAG 2.1 compliance.

### 2. Backend (Application Server):

The backend manages user authentication, and data handling, and retrieving relevant metadata, such as card value, set number, and trading details, from a central card database or third-party APIs, ensuring that users receive accurate and real-time information.

### 3. Machine Learning Engine:

At the heart of Project Pokédex is the image recognition module. This processes live or uploaded images to identify cards. The model is trained on a comprehensive dataset of Pokémon Trading Card Game (TCG) images to identify cards with at least 90% accuracy. The engine provides classification results, which are then paired with additional metadata and relayed to the user.

#### **4. Data Storage & User Profiles:**

User data is securely stored in cloud storage solution hosted and maintained by Supabase. Each user's scan library allows them to revisit previous identifications, view trends, and organize their collection. All personal data follows best practices in encryption and storage security.

#### **5. Audio Interaction Layer (AI Voice Interlude):**

A lightweight audio subsystem provides dynamic voice feedback for scans to emulate the classic anime experience. This component utilizes OpenAI API to convert a card synopsis into spoken feedback, making the app more accessible and immersive.

#### **6. System Architecture Overview:**

The architecture follows a client-server model, where the client (web app user) communicates with backend APIs on Supabase to handle authentication, data retrieval, and ML inference requests. The ML model can be hosted on a separate inference service (TBD) for scalable performance.

#### **High-Level Flow:**

1. The user opens the web app and logs in.
2. The user scans a card using the camera.
3. The image is sent to the backend for preprocessing and ML inference.
4. The ML model identifies the card and returns metadata.
5. The backend fetches supplementary details (trade value, set, etc.).
6. The frontend displays results and optionally delivers spoken feedback.
7. The scan and metadata are stored in the user's profile for future access.

## Core Features

ID	Requirement	Description	Priority
A01	Card scanning with ML	Identify cards with 90% accuracy using machine learning.	High
A02	AI voice interlude	Engages users with dynamic audio feedback.	High
A03	Text and data relay	Provides accurate and up-to-date card information.	High
A04	Text to speech	Converts text information to audible feedback for enhanced accessibility.	High
A05	Profile creation	Allows users to create and manage personalized profiles.	High
A06	Phone camera access and use	Ensures seamless integration with device camera functionality.	High
A07	Library of previous scans	Stores and organizes past scanned cards for user reference.	High
A08	WCAG compliant accessibility settings	Guarantees an inclusive experience for all users.	High

## Desired Features

ID	Requirement	Description	Priority
B01	Interactive AI agent	Guides users through the application, enhancing user engagement.	Medium
B02	Comprehensive card library	Includes an extensive range of cards in the Trading Card Game (TCG).	Medium
B03	Additional accessibility features	Offers enhanced user support for outlier conditions and disabilities.	Medium

## Aspiring Features

ID	Requirement	Description	Priority
C01	Customizable themes	Allows users to personalize the user interface according to their preferences.	Low
C02	Unlockable card sleeves	Enhances user collection by offering unique sleeve designs.	Low
C03	Animated libraries	Provides a more dynamic and engaging visual experience.	Low
C04	Interactive card viewer	Offers immersive exploration of card details and features.	Low
C05	Sound effects and AI reactions	Enriches user experience with additional auditory elements.	Low

## Functional Requirements

- Card scanning accuracy of 90% or higher.
- 100% accuracy in information relayed to users.

## Non-Functional Requirements

- Application responsiveness with a 300 millisecond response time.
- User data must be stored securely.
- Compliance with WCAG 2.1 accessibility standards.
- Reliable accessibility with minimal downtime.
- Responsive design optimized for phones and tablets.