Software Requirements Specification (SRS) for Dyslexia Web Portal

1. Introduction

1.1 Purpose

The purpose of this document is to define the functional and non-functional requirements for the Dyslexia Web Portal. The portal will provide an AI-powered solution to assist individuals with dyslexia in reading, writing, and speaking. The system will leverage advanced **text-to-speech (TTS), speech-to-text (STT), and AI-driven content adaptation** to enhance learning and communication for dyslexic users.

1.2 Scope

The Dyslexia Web Portal will provide a **user-friendly, accessible, and adaptive platform** for individuals with dyslexia. It will include **real-time reading assistance, writing aid, speech improvement tools, and a gamified learning experience**. The platform will be accessible via **web browsers and mobile devices**, ensuring broad accessibility.

1.3 Intended Audience and Users

- **Primary Users:** Dyslexic individuals seeking reading, writing, and speech assistance.

- **Secondary Users:** Educators, therapists, and parents assisting dyslexic users.

- **Administrators:** Managing the platform, content, and user progress.

1.4 Assumptions and Dependencies

- Users will have internet access for real-time AI functionalities.

- The system will integrate with **Google Cloud, Microsoft Azure Cognitive Services, or OpenAI APIs** for AI-powered features.

- The portal will comply with **WCAG (Web Content Accessibility Guidelines)**.

2. Functional Requirements

2.1 User Authentication & Profile Management

- Users must be able to **register, log in, and manage profiles**.

- Support for **OAuth 2.0 authentication** (Google, Apple, Facebook login).

- Role-based access control (User, Educator, Administrator).

2.2 Reading Assistance Module

- **Text-to-Speech (TTS):** Convert text to natural-sounding speech.

- **OCR (Optical Character Recognition):** Extract and read text from images/PDFs.

- **Dyslexia-friendly Fonts & Color Overlays:** Allow users to customize font style and background color for easier reading.

- **Adjustable Reading Speed & Voice Selection** for personalized experience.

2.3 Writing Assistance Module

- **Speech-to-Text (STT):** Convert user speech into text.

- **AI-powered spelling, grammar, and structure correction**.

- **Word Prediction & Auto-Complete** to assist dyslexic users in faster typing.

- **Handwriting-to-Text Conversion** for digital notetaking.

2.4 Speech Improvement Module

- AI-powered **pronunciation coach** providing real-time feedback.

- **Interactive voice exercises** to enhance verbal skills.

- Integration with **Google Speech API** for real-time assessment.

2.5 Gamified Learning & Engagement

- **Interactive exercises and quizzes** tailored for dyslexic users.

- **Rewards, achievements, and progress tracking**.

- **Multisensory learning approach**: Combining text, audio, and visuals.

2.6 Multi-Language & Customization Support

- Support for **multiple languages and regional accents**.

- **Custom learning paths** for personalized learning journeys.

2.7 Educator & Parental Dashboard

- **User progress tracking and analytics**.

- **Ability to assign exercises and monitor improvements**.

2.8 Accessibility Features

- **Screen reader compatibility** for visually impaired users.

- **Keyboard navigation support**.

- **Voice command integration**.

2.9 Integration with Third-Party Services

- **Google Cloud Speech-to-Text & Text-to-Speech**.

- **Microsoft Azure Cognitive Services for NLP**.

- **OpenAI GPT API for language enhancement**.

2.10 Admin Panel & Content Management

- **Manage user accounts, track usage, and generate reports**.

- **Moderate user-generated content** to ensure quality.

3. Non-Functional Requirements

3.1 Performance Requirements

- The system should support **100,000+ concurrent users**.

- Response time for AI functionalities should be **less than 2 seconds**.

3.2 Security Requirements

- **End-to-end encryption (TLS 1.2/1.3)** for data security.

- **Role-based access control (RBAC)**.

- **GDPR and HIPAA compliance** for user data protection.

3.3 Usability Requirements

- Designed for **ease of use with minimal learning curve**.

- Compliant with **WCAG 2.1 accessibility standards**.

3.4 Scalability & Maintainability

- **Modular architecture** for future enhancements.

- Support for **cloud-based scaling (AWS, Google Cloud, Azure)**.

3.5 Availability & Reliability

- **99.9% uptime SLA** with backup redundancy.

- **Automated failover systems** for continuous service availability.

4. System Architecture & Technology Stack

4.1 Frontend

- **React.js / Next.js** for responsive web UI.

- **Vue.js / Angular.js** (alternative choices).

- **Tailwind CSS / Bootstrap** for UI styling.

4.2 Backend

- **Node.js with Express.js** (for real-time API handling).

- **Django / FastAPI** (alternative options for AI-heavy processing).

4.3 Database

- **PostgreSQL / MySQL** for structured data.

- **MongoDB / Firebase** for real-time user interactions.

4.4 AI/NLP & Speech Processing

- **Google Cloud Speech-to-Text & TTS APIs**.

- **OpenAI GPT for writing assistance**.

- **Microsoft Azure Cognitive Services** for advanced NLP.

4.5 Hosting & Deployment

- **AWS / Google Cloud / Azure** for cloud hosting.

- **Vercel / Netlify** (for frontend deployment).

- **Docker + Kubernetes** for scalable containerization.

5. Development Roadmap

Phase 1: Research & Planning (0-2 months)

- ✓ Feasibility study & market research.
- ✓ Finalization of feature set & UI wireframes.

Phase 2: MVP Development (3-6 months)

- ✓ Develop core AI-driven modules (TTS, STT, NLP).
- ✓ Build user authentication, profile management, and dashboards.
- ✓ Implement accessibility features.
- ✓ Deploy MVP for user testing.

Phase 3: Beta Testing & Enhancements (6-9 months)

- ✓ User feedback integration.
- ✓ Bug fixes, optimizations, and UI refinements.
- ✓ Pilot rollout with educators and dyslexic communities.

Phase 4: Full Release & Scaling (9-12 months)

- ✓ Cloud scaling & full production launch.
- ✓ Marketing and outreach campaigns.
- ✓ Continuous monitoring and feature expansion.

6. Conclusion

This document outlines a comprehensive plan for developing the **Dyslexia Web Portal**, which aims to provide AI-driven **reading, writing, and speech assistance** for dyslexic individuals. By integrating **advanced AI, NLP, and assistive technology**, this platform will **empower dyslexic users with accessible and effective learning tools**. The development roadmap ensures a structured approach to delivering a scalable and impactful solution.