**4. UI/UX Design & Prototyping**

**4.1 Wireframes & Mockups**

These represent the visual structure of the user interface, showing screen layouts, navigation, and interactions.

**Key Screens & Components:**

1. **Home Screen** – Provides an overview of the system with an upload button for CSV files.
2. **File Upload Screen** – Allows users to browse and upload CSV files, displaying supported formats and validation messages.
3. **Preprocessing Status Screen** – Shows progress on data cleaning and transformation.
4. **Prediction Results Screen** – Displays model output in text, charts, and multimedia formats (text-to-speech/video).
5. **Settings & Preferences Screen** – Allows customization of output format, API settings, and user preferences.
6. **Error Handling Screen** – Shows validation errors, missing data alerts, and troubleshooting tips.

**4.2 UI/UX Guidelines**

**Design Principles:**

* **Clarity & Simplicity** – Minimalist design focusing on intuitive user interactions.
* **Consistency** – Uniform typography, spacing, and UI components across all screens.
* **Responsiveness** – Ensuring seamless performance across desktop and mobile devices.
* **Feedback & Interactivity** – Progress indicators, tooltips, and real-time validation for better user engagement.

**Color Scheme:**

* **Primary Color:** Blue (#007BFF) – Represents trust and technology.
* **Secondary Colors:**
  + Light Gray (#F8F9FA) – Clean background for readability.
  + Dark Gray (#343A40) – For contrast in text and UI elements.
  + Green (#28A745) – Indicates success states.
  + Red (#DC3545) – Used for error messages and alerts.

**Typography:**

* **Primary Font:** Roboto (Sans-serif) – Modern, clean, and highly readable.
* **Font Sizes:**
  + Headings: 24px – 32px (Bold)
  + Body Text: 16px – 18px (Regular)
  + Buttons & Labels: 14px – 16px (Medium)

**Accessibility Considerations:**

* **Contrast Ratios** – Ensuring WCAG-compliant color contrast for readability.
* **Keyboard Navigation** – Users should navigate without a mouse.
* **ARIA Labels & Screen Reader Support** – Enhancing accessibility for visually impaired users.
* **Error Handling & Feedback** – Clear, descriptive messages instead of vague error codes.