# Chapter 2: System Requirement Study

## 2.1 Hardware and Software Characteristics

### 2.1.1 Development Environment Requirements

The development of the Pro Mood Tracker application requires the following hardware and software specifications to ensure optimal performance during the development process:

#### Hardware Requirements for Development

| Component | Minimum Specification | Recommended Specification |
| --- | --- | --- |
| Processor | Intel Core i5 (8th Gen) or equivalent | Intel Core i7 (10th Gen) or equivalent |
| RAM | 8 GB | 16 GB or higher |
| Storage | 256 GB SSD | 512 GB SSD or higher |
| Display | 1080p resolution | 1440p or higher resolution |
| Internet Connection | Broadband (10 Mbps) | High-speed broadband (50+ Mbps) |
| Graphics | Integrated graphics | Dedicated graphics card (for UI development) |

#### Software Requirements for Development

| Software | Minimum Version | Purpose |
| --- | --- | --- |
| Operating System | Windows 10, macOS Catalina, or Ubuntu 18.04 | Development platform |
| Node.js | v14.0.0 | JavaScript runtime environment |
| npm | v6.14.0 | Package manager for JavaScript |
| Git | v2.25.0 | Version control system |
| Visual Studio Code | v1.45.0 | Code editor |
| Chrome/Firefox | Latest version | Browser for testing and debugging |
| React Developer Tools | Latest version | Browser extension for React debugging |
| Redux DevTools | Latest version | Browser extension for state management debugging |

### 2.1.2 User Environment Requirements

The Pro Mood Tracker application is designed to be accessible to users with a wide range of devices and system specifications. The following are the minimum and recommended requirements for users to access and effectively use the application:

#### Hardware Requirements for Users

| Component | Minimum Specification | Recommended Specification |
| --- | --- | --- |
| Processor | Dual-core processor (1.8 GHz) | Quad-core processor (2.0 GHz) or higher |
| RAM | 2 GB | 4 GB or higher |
| Storage | 100 MB of available storage | 200 MB of available storage |
| Display | 720p resolution | 1080p or higher resolution |
| Internet Connection | Basic broadband (5 Mbps) | Standard broadband (10+ Mbps) |
| Input Devices | Keyboard and mouse/touchpad | Keyboard, mouse/touchpad, and touchscreen |

#### Software Requirements for Users

| Software | Minimum Version | Recommended Version |
| --- | --- | --- |
| Web Browser | Chrome 80, Firefox 75, Safari 13, Edge 80 | Latest version of any modern browser |
| Operating System | Windows 8, macOS Mojave, iOS 12, Android 9 | Windows 10/11, macOS Catalina or newer, iOS 14+, Android 10+ |
| JavaScript | Enabled | Enabled with ES6 support |
| Local Storage | Enabled | Enabled with at least 5 MB allocation |
| Cookies | Enabled | Enabled |

### 2.1.3 Technical Requirements

#### Frontend Technology Stack

The Pro Mood Tracker application is built using the following frontend technologies:

| Technology | Version | Purpose |
| --- | --- | --- |
| React | 18.2.0 | JavaScript library for building user interfaces |
| TypeScript | 4.9.5 | Typed superset of JavaScript for improved development |
| Material-UI (MUI) | 6.4.11 | React UI component library for design |
| React Router | 7.2.0 | Library for routing and navigation within the application |
| Chart.js | 4.4.8 | JavaScript charting library for data visualization |
| Recharts | 2.15.1 | Composable charting library built on React components |
| date-fns | 2.30.0 | JavaScript date utility library |
| jsPDF | 3.0.0 | Client-side JavaScript PDF generation |
| UUID | 11.1.0 | Library for generating unique identifiers |
| Framer Motion | 12.7.3 | Animation library for React |
| React Joyride | 2.9.3 | Create guided tours for your applications |
| Canvas Confetti | 1.9.3 | Particle effects for rewards and achievements |

#### Storage and Data Management

The application uses the following approaches for data storage and management:

1. **Local Storage**: Browser’s localStorage API for persistent data storage on the client-side
2. **Session Storage**: For temporary data that should persist only for the duration of the session
3. **IndexedDB**: For larger dataset storage when needed (potential future implementation)

#### API Dependencies

While the Pro Mood Tracker is primarily a client-side application, it may interact with the following external APIs:

1. **Weather API** (optional): For retrieving weather data based on user location
2. **Email Service API** (optional): For sending exported mood data via email

### 2.1.4 Non-Functional Requirements

#### Performance Requirements

| Requirement | Description | Target |
| --- | --- | --- |
| Load Time | Initial application load time | Less than 3 seconds on standard broadband |
| Responsiveness | Time to respond to user interactions | Less than 100ms for UI updates |
| Animation Smoothness | Frame rate for animations | 60 frames per second |
| Data Processing | Time to process and display mood analytics | Less than 1 second for up to 365 days of data |
| Memory Usage | Browser memory consumption | Less than 200MB of RAM |
| Storage Efficiency | Local storage usage | Less than 5MB for a year of daily mood entries |

#### Security Requirements

| Requirement | Description |
| --- | --- |
| Data Privacy | All user data stored locally, no server-side storage without explicit consent |
| Authentication | Basic user authentication for multi-user devices (optional) |
| Data Encryption | Encryption of sensitive data in local storage |
| Input Validation | Validation of all user inputs to prevent injection attacks |
| CORS Compliance | Proper cross-origin resource sharing policies for any API interactions |

#### Usability Requirements

| Requirement | Description |
| --- | --- |
| Accessibility | WCAG 2.1 AA compliance for accessibility |
| Responsiveness | Fully responsive design for mobile, tablet, and desktop |
| Offline Functionality | Core features available without internet connection |
| Error Handling | User-friendly error messages and recovery options |
| Onboarding | Interactive tutorial for first-time users |
| Language Support | English language with potential for localization |

### 2.1.5 Development Methodology

The Pro Mood Tracker application is developed using the following methodology and practices:

1. **Agile Development**: Iterative development with regular updates and feature additions
2. **Component-Based Architecture**: Modular development using React components
3. **Test-Driven Development**: Implementation of unit and integration tests for critical functionality
4. **Version Control**: Git-based version control with feature branching
5. **Code Quality Assurance**: Linting, code reviews, and adherence to best practices
6. **Documentation**: Comprehensive code documentation and user guides

### 2.1.6 Deployment Requirements

| Requirement | Description |
| --- | --- |
| Hosting | Static web hosting service (GitHub Pages, Netlify, Vercel, etc.) |
| SSL Certificate | HTTPS encryption for secure data transmission |
| Content Delivery | CDN for serving static assets |
| Caching Policy | Appropriate cache headers for optimal performance |
| Build Process | NPM build scripts for production deployment |