**USER ACTIVITY TRACKING CHROME EXTENSION**

# 1. INTRODUCTION

The User Activity Tracking Chrome Extension is a comprehensive digital wellness tool designed to help users manage their screen time and develop healthier browsing habits. Built as a Chrome browser extension with a Spring Boot backend, this application provides real-time tracking of website usage, intelligent analysis of browsing patterns, and personalized recommendations for better time management.

The application was developed to address the growing concern of excessive screen time and digital addiction, offering users insights into their online behavior while encouraging mindful internet usage through automated break reminders and detailed analytics.

# 2. APPLICATION OVERVIEW

The application consists of two main components:

Frontend (Chrome Extension):

- Built using vanilla JavaScript, HTML, and CSS

- Runs as a browser extension with popup interface

- Tracks user activity in real-time across all websites

- Provides visual analytics and user interface

Backend (Spring Boot Application):

- RESTful API built with Spring Boot 3.5.0

- PostgreSQL database for data persistence

- Google Gemini AI integration for intelligent analysis

- Secure authentication and data management

# 3. FEATURES AND FUNCTIONALITIES

## 3.1 Core Tracking Features

- Real-time website activity monitoring

- Automatic time tracking for each visited domain

- Session-based activity recording

- Cross-tab activity synchronization

## 3.2 Analytics and Reporting

- Daily, weekly, and monthly usage statistics

- Interactive charts powered by Chart.js

- Website categorization and time distribution

- Historical data visualization

## 3.3 AI-Powered Analysis

- Google Gemini AI integration for intelligent insights

- Automatic website categorization (Productivity, Entertainment, Social Media, etc.)

- Personalized usage recommendations

- "Brain Rot Time" analysis for addictive content detection

## 3.4 Wellness Features

- Automated break reminders

- Screen time awareness notifications

- Focus-friendly minimal UI design

- Digital wellness insights

## 3.5 Data Management

- Local storage for immediate access

- Backend synchronization for persistent data

- Device-specific tracking

- Secure data handling

# 4. TECHNICAL ARCHITECTURE

## 4.1 Frontend Architecture

The Chrome extension follows Manifest V3 standards with the following components:

- manifest.json: Extension configuration and permissions

- background.js: Service worker for background processing

- popup.html/js: User interface for statistics and controls

- contentScript.js: Content script for webpage interaction

- style.css: Styling for the popup interface

## 4.2 Backend Architecture

The Spring Boot application uses a layered architecture:

- Controllers: REST API endpoints for data operations

- Services: Business logic and AI integration

- Repositories: Data access layer with JPA

- Models: Entity classes for database mapping

- DTOs: Data transfer objects for API communication

- Configuration: Security and application settings

## 4.3 Database Schema

The application uses PostgreSQL with tables for:

- User activity records

- Website tracking data

- Session information

- Device identification

## 4.4 AI Integration

Google Gemini AI is integrated for:

- Website categorization analysis

- Usage pattern recognition

- Personalized recommendations

- Content type identification

# 5. INSTALLATION AND SETUP

## 5.1 Prerequisites

- Google Chrome browser

- Java 21 or higher

- Maven build tool

- PostgreSQL database

- Google Gemini API key

## 5.2 Backend Setup

1. Clone the repository

2. Configure PostgreSQL database connection

3. Add Gemini API key to application.properties

4. Run: mvn clean install

5. Start: mvn spring-boot:run

## 5.3 Chrome Extension Setup

1. Open Chrome and navigate to chrome://extensions/

2. Enable Developer mode

3. Click "Load unpacked" and select the extension directory

4. Verify the extension appears in the toolbar

## 5.4 Configuration

- Backend URL: Default http://localhost:8080

- Database: Configure in application.properties

- API Keys: Set Gemini API key for AI features

# 6. USAGE GUIDE

## 6.1 Basic Usage

- Click the extension icon to open the popup

- View current session statistics

- Access daily, weekly, and monthly reports

- Configure break reminder settings

## 6.2 Advanced Features

- Use "Analyze My Usage" for AI-powered insights

- Review categorized website usage

- Follow personalized recommendations

- Monitor "Brain Rot Time" for addictive content

## 6.3 Data Interpretation

- Green indicators: Healthy usage patterns

- Yellow indicators: Moderate usage

- Red indicators: Excessive usage requiring attention

- AI recommendations: Personalized improvement suggestions

# 7. API INTEGRATION

## 7.1 REST Endpoints

- GET /api/tracking/analyze/{timeFrame}: AI analysis

- POST /api/tracking/data: Store tracking data

- GET /api/tracking/statistics: Retrieve usage statistics

- POST /api/tracking/analyze: Custom analysis requests

## 7.2 Data Format

The API accepts and returns JSON data with:

- Website domain information

- Time spent in seconds

- Device identification

- Session metadata

## 7.3 Authentication

- Spring Security implementation

- CORS configuration for cross-origin requests

- Secure data transmission

# 8. TROUBLESHOOTING

## 8.1 Common Issues

- Extension not loading: Check manifest.json and permissions

- Backend connection errors: Verify server status and URL

- AI analysis failures: Check Gemini API key and quota

- Database connection issues: Verify PostgreSQL configuration

## 8.2 Performance Optimization

- Regular database cleanup for old records

- Monitor API usage quotas

- Optimize chart rendering for large datasets

- Implement caching for frequently accessed data

# 9. CONCLUSION

The User Activity Tracking Chrome Extension represents a modern approach to digital wellness, combining real-time monitoring with intelligent analysis to help users develop healthier online habits. The application's dual architecture ensures both immediate local functionality and comprehensive cloud-based analytics.

Key benefits include:

- Increased awareness of digital habits

- Data-driven insights for behavior change

- Automated wellness reminders

- Privacy-focused design

- Scalable architecture for future enhancements

The integration of AI technology provides personalized recommendations, making this more than just a tracking tool but a comprehensive digital wellness companion. The application's modular design allows for easy maintenance and future feature additions while maintaining high performance and user experience standards.

This documentation provides a comprehensive overview of the application's capabilities and implementation details, serving as a reference for users, developers, and administrators working with the system.