Project Definition Document

Document Authorship

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Team Members:

- Elif Beyza Turan
- Beyza Değirmenci
- Fatma Zehra Paksoy
- Kerem Elma
- Mehmet Eski

Contributors to this document:

- Elif Beyza Turan
- Kerem Elma
- Beyza Değirmenci
- Fatma Zehra Paksoy
- Mehmet Eski

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Introduction

This document defines the LifeSync project, an AI-supported personalized diet and exercise routine system. It outlines the project's objectives, scope, key features, target audience, deliverables, resource requirements, potential risks, and success criteria to guide the development team throughout the project lifecycle.

Document-Specific Task Matrix

Task	Responsible Person	Status / Date / Notes
Project name definition	Elif Beyza Turan Beyza Değirmenci Fatma Zehra Paksoy Kerem Elma Mehmet Eski	Completed
Problem statement writing	Elif Beyza Turan	Completed
Stakeholder analysis	Elif Beyza Turan	Completed
Scope & out-of-scope definition	Elif Beyza Turan Kerem Elma	Completed
Risk identification and mitigation strategies	Elif Beyza Turan	Completed
Project summary writing	Elif Beyza Turan	Completed
Objectives definition	Elif Beyza Turan Kerem Elma	Completed
Target audience analysis	Elif Beyza Turan	Completed
Key features specification	Elif Beyza Turan	Completed
Deliverables listing	Elif Beyza Turan	Completed
Budget and resources planning	Elif Beyza Turan Kerem Elma	Completed
Success criteria definition	Elif Beyza Turan	Completed
Document editing and formatting	Elif Beyza Turan	Completed
Table of Contents creation	Elif Beyza Turan	Completed

Project Name

LifeSync

Project Summary

LifeSync is an innovative digital health assistant designed to help individuals manage their personal health through personalized wellness planning. The system addresses the common challenge of individuals struggling to create and maintain personalized

fitness and nutrition plans that align with their specific fitness levels, goals, and dietary requirements.

Currently, many people face difficulty in developing effective health routines due to the one-size-fits-all approach of generic fitness programs, lack of professional guidance, and the high cost of personal trainers or nutritionists. This often leads to frustration and abandonment of health goals. LifeSync solves this problem by providing users with AI-generated, customized weekly diet and exercise routines based on comprehensive onboarding data.

The platform intelligently determines each user's fitness level (Beginner, Intermediate, or Advanced) through an automated classification system and generates tailored wellness plans that promote sustainable healthy habits. Through automated reminders and progress tracking, LifeSync ensures users receive professional-grade wellness guidance without the need for expensive personal trainers or nutritionists, making healthy living accessible and manageable for everyone.

Objectives

- Develop a fully functional web-based personalized wellness platform accessible from desktop browsers
- Implement secure user authentication and authorization system with registration, login, and session management
- Create a comprehensive user profiling module that collects detailed metrics including age, height, weight, BMI, activity levels, fitness goals, dietary preferences, and restrictions
- Integrate AI technology to generate custom weekly diet and exercise plans tailored to individual user profiles
- Implement automated fitness level classification system that assigns users to Beginner, Intermediate, or Advanced categories using the Strategy Pattern
- Develop intelligent notification system with scheduler-based automated reminders for workouts and meal times using the Observer Pattern
- Create an intuitive user dashboard interface for viewing personalized wellness plans and tracking completion status
- Implement progress tracking functionality allowing users to mark tasks as completed and monitor adherence to wellness plans
- Achieve system performance with AI-generated plans delivered within 30 seconds and dashboard loading time under 2 seconds
- Complete the entire development cycle within the 10-week academic timeline without requiring crunch periods

Scope

Included in Scope:

- User registration, login, logout, and session management with secure password encryption

- User profiling module with comprehensive onboarding survey collecting physical metrics, fitness goals, dietary preferences and restrictions, and lifestyle factors
- AI integration for generating custom weekly diet and exercise plans using advanced language model technology
- Automated level determination system using Strategy Pattern to classify users as Beginner, Intermediate, or Advanced based on survey responses
- Notification system with scheduler-based automated reminders for workouts and meal times implemented using Observer Pattern
- User dashboard with intuitive interface displaying personalized weekly plans in calendar format
- Progress tracking functionality with task completion marking and adherence monitoring
- Desktop browser support with responsive design for optimal user experience
- Comprehensive test cases and acceptance checks

Excluded from Scope:

- Mobile native applications (iOS/Android apps)
- Medical diagnoses, treatment recommendations, or professional health advice
- Real-time biometric integration with wearable devices or fitness trackers
- Social features including community forums, social sharing, or friend challenges
- Advanced analytics dashboards, body composition analysis, or long-term trend visualization beyond basic progress tracking
- Custom plan modifications allowing manual editing of AI-generated plans by users
- Professional consultation features or direct connection to fitness trainers, nutritionists, or healthcare providers
- Multi-language support (MVP will be developed in English only)
- Real-time push notifications via email or SMS

Target Audience

- General Users: Individuals with minimal technical knowledge who require a simple, intuitive interface to manage their wellness journey. These users value ease of use and clear guidance without complex features or technical jargon.
- Students: University and college students balancing academic responsibilities with personal health. This segment particularly benefits from structured routines and time management support that fits within their busy schedules and budget constraints.
- Employees/Professionals: Working professionals, particularly those in sedentary roles or desk jobs, who need consistent reminders and quick, effective exercise routines that can be integrated into their work-life balance. These users prioritize efficiency and consistency.

Key Features

- **Secure User Authentication System:** Robust authentication featuring encrypted user registration and login functionality, secure password storage with hashing, session management for persistent login, and protection of sensitive health and personal data. The system ensures user privacy and data security while providing seamless access to personalized wellness features.
- **Intelligent User Profiling System:** Comprehensive onboarding survey that collects detailed user information including physical metrics (age, height, weight, BMI), current activity levels, fitness goals (weight loss, muscle gain, general fitness, endurance), dietary preferences and restrictions (vegetarian, vegan, gluten-free, allergies), and lifestyle factors. The system uses this data to create a detailed user profile that forms the foundation for personalized plan generation.
- **Automated Fitness Level Classification:** Advanced algorithm utilizing the Strategy Pattern to analyze user survey responses and automatically assign fitness levels (Beginner, Intermediate, or Advanced). This classification ensures that generated exercise routines are appropriately challenging and safe for the user's current fitness capacity, preventing injury and promoting sustainable progress.
- **AI-Powered Personalized Plan Generation:** Integration with advanced language model technology to generate custom weekly diet and exercise plans. The system employs the Facade Pattern to simplify AI API interactions and includes strict prompt engineering to ensure accurate, safe, and contextually appropriate wellness recommendations. Plans include detailed daily workout schedules with exercise descriptions and meal plans with nutritional guidance.
- **Smart Notification and Reminder System:** Scheduler-based notification engine implemented using the Observer Pattern that sends automated reminders for scheduled workouts and meal times. Users can customize notification preferences, timing, and frequency to align with their daily routines. This feature significantly improves adherence to wellness plans by providing timely prompts that help users maintain consistency.
- **Comprehensive User Dashboard:** Intuitive, responsive web interface that serves as the central hub for user interaction. The dashboard displays personalized weekly plans in an easy-to-read calendar format, shows current progress and completion status, provides quick access to daily workout and meal details, and loads in under 2 seconds for optimal user experience. The interface is designed to be accessible across mobile, tablet, and desktop devices.
- **Progress Tracking and Completion Monitoring:** Functionality allowing users to mark individual workout sessions and meals as completed, view their completion rates over time, and monitor adherence to their wellness plans. This feature provides users with a sense of accomplishment and helps identify patterns in their behavior that may require adjustments to improve consistency.

Deliverables

- Fully functional web application accessible via desktop browsers
- Complete source code repository on GitHub with clear commit history showing individual contributions
- Project Definition Document (this document)
- Software Requirements Specification (SRS) detailing functional and non-functional requirements
- Project Plan Document with timeline, milestones, and resource allocation
- System architecture and design documentation including use case diagrams and design pattern implementation
- Database schema and data model documentation
- User interface mockups and design specifications
- AI integration documentation including algorithm explanation and validation results
- Test cases, acceptance criteria, and testing documentation
- Deployment guide and release checklist
- User manual and help documentation
- Final project presentation

Budget and Resources

Human Resources:

The team consists of 5 members with clearly defined roles:

Team Member	Role	Estimated Effort (hours)
Elif Beyza Turan	Project Manager & Coordinator	30
Kerem Elma	Project Coordinator & Documentation	25
Mehmet Eski	Backend & Database Development	45
Beyza Değirmenci	UI/UX & Frontend Development	40
Fatma Zehra Paksoy	Requirements Analysis & Testing	30
Total		**170**

Effort Distribution by Phase:

Phase	Estimated Effort (hours)
Discovery & Planning	15
Design	15
Core Development	35
AI Integration	25
Frontend Development	25
Testing & QA	20
Deployment	5
Documentation & Closure	5
Total	**170**

Software and Tools:

- Frontend: React, HTML5, CSS3, JavaScript (free, open-source)
- Backend: Node.js, Express.js (free, open-source)
- Database: PostgreSQL (free, open-source)
- AI/ML: Language model API integration (free tier available)
- Version Control: GitHub (free for students)
- Development Environment: VS Code (free)
- Design Tools:
- Testing Framework: Jest, React Testing Library (free, open-source)

Infrastructure:

- Hosting: Vercel or Netlify free tier for frontend, Heroku or Railway for backend
- Database hosting: PostgreSQL free tier options (ElephantSQL, Supabase)
- Domain (optional): Estimated $10-15 per year if custom domain required

Learning Resources:

- Official documentation for React, Node.js, Express.js, and PostgreSQL
- AI/ML integration tutorials and API documentation
- Online courses and tutorials on full-stack web development
- Design pattern implementation guides and best practices

Total Estimated Budget: $0-15 (minimal to zero cost, leveraging free tiers and open-source tools)

Risks and Mitigation Strategies

Risk	Impact	Probability	Mitigation Strategy
AI accuracy limitations and inappropriate recommendations	High	Medium	Implement strict prompt engineering and validation layers, conduct thorough AI output testing, gather user feedback for continuous improvement, include disclaimers about consulting healthcare professionals
Time constraints due to academic workload and competing deadlines	High	High	Create realistic 10-week timeline with buffer time, prioritize core features for MVP, use bi-weekly sprints for iterative development, conduct regular progress reviews
Technical skill gaps in AI integration and design pattern implementation	Medium	Medium	Allocate dedicated learning time in project schedule, use well-documented libraries and APIs, implement pair programming for knowledge transfer, seek instructor guidance early, have fallback to simpler implementations
Database performance issues with query optimization	Medium	Low	Implement database indexing on frequently queried fields, use pagination for all list views, conduct load testing early, optimize queries during development
Security vulnerabilities in authentication and user data protection	High	Low	Use established authentication libraries (Passport.js, bcrypt), implement input validation and sanitization, follow OWASP security best practices, conduct security code review, use HTTPS for all communications
Low user adoption and engagement after deployment	Medium	Medium	Design intuitive UI/UX with user testing, create comprehensive user guide and onboarding flow, conduct usability testing with

			target users, gather and act on user feedback
Scope creep affecting timeline and deliverables	High	Medium	Clearly define and document scope in this document, use strict change control process with written requests and impact analysis, prioritize features and defer non-critical items to future versions, maintain feature freeze before testing
Integration challenges between frontend, backend, and AI components	Medium	Medium	Define clear API contracts early, use modular architecture with well-defined interfaces using Facade Pattern, conduct integration testing throughout development, maintain comprehensive API documentation, hold regular team sync meetings
Free tier limitations on cloud services and AI API affecting functionality	Low	Low	Monitor usage carefully, implement caching mechanisms for AI responses, optimize resource usage (efficient queries, minimal API calls), have backup providers identified, request student credits from providers

Project Success Criteria

- **Functional Completeness:** All functional requirements (FR-01 through FR-06 from SRS Document) are successfully implemented and operational. This includes authentication, user profiling, level determination, AI routine generation, dashboard, and notification system.
- **Performance Standards:** System achieves sub-30-second response time for AI-generated wellness plan delivery and sub-2-second dashboard loading time for 95% of user operations during testing period.
- **Usability Achievement:** At least 80% of test users (minimum 10 users) successfully complete the entire workflow (registration, profile creation, plan generation, and basic navigation) without requiring external assistance on first attempt.
- **AI Quality and Accuracy:** The system correctly identifies user fitness levels in 95% of test cases and generates appropriate exercise and diet recommendations that align with stated goals and restrictions. AI responses contain no unsafe recommendations or medical misinformation.

- **Design Pattern Implementation:** Successful implementation of Strategy Pattern for level determination, Observer Pattern for notifications, and Facade Pattern for AI integration, with clear documentation of pattern usage.
- **Code Quality:** All code follows team coding standards, has meaningful comments, passes linting checks, and receives approval in code review. Critical functionality has zero critical bugs.
- **Testing Coverage:** All acceptance criteria defined in the Project Plan Document are validated. Critical user flows (registration, profiling, plan generation, dashboard access) pass all test cases.
- **Documentation Completeness:** All required deliverables (PDD, SRS, Project Plan, architecture diagrams, user guide, testing reports) are submitted on time with comprehensive documentation meeting course requirements.
- **User Satisfaction:** Test users rate the platform at least 4 out of 5 stars for ease of use, usefulness, and AI-generated plan quality based on post-usage surveys.
- **GitHub Repository Quality:** Project maintains clear commit history with meaningful messages, shows individual contributions per team member, follows branching strategy, includes README with setup instructions.
- **Deployment Success:** Application is successfully deployed to production environment, accessible via public URL, with all features working as expected.
- **Project Timeline:** Project is completed within the allocated 10-week timeline as outlined in the Project Plan Document with all major milestones met on schedule without requiring significant crunch periods.
- **Security and Data Protection:** Authentication system successfully protects user accounts with no security vulnerabilities identified during testing. User passwords are properly hashed and encrypted, sessions are securely managed, and personal health data is stored in compliance with data protection best practices.