BIL 481 - Project Definition Document:

TOBB ETÜ

University of Economics & Technology

2 Mar 2025

Project Plan Document

1. Project Scope

Included in Scope:

- Development of an AI-powered suggestion application that processes PNG images to detect food ingredie- Implementation of a YOLO-based object detection model to recognize food ingredients from images.
- Integration of OpenAI API for generating recipe suggestions based on detected ingredients.
- Development of a user-friendly interface using Python for uploading images and receiving recipe recommendations.
- Deployment of the application as a web-based platform. (Second priority scope)

Excluded from Scope:

- Handling non-PNG image formats.
- Advanced natural language processing beyond API-generated results.
- Manual curation of recipe suggestions.
- User authentication and account management.

2. Project Organization - People (Roles & Responsibilities)

Project Manager (All team members): Overseeing project execution, setting deadlines and overall project management will made by all team together.
AI/ML Engineer (Ali Şahin): Training and fine-tuning the YOLO model for food ingredient detection.
Backend Developer (Kaan Arslan, Ali Şahin, Ege Rasim): Implementing API integrations and managing data sets.
Frontend Developer (Efe Görkem, Ege Rasim): Designing and developing the UI for image uploads and recipe display.
DevOps Engineer (Kaan Arslan, Ali Şahin): Handling deployment, server setup.
QA Engineer (Efe Görkem, Ege Rasim): Testing the system for bugs, performance issues, and usability.

3. Objectives

- Successfully detect food ingredients in images with a high accuracy rate.
- Generate relevant and diverse recipe suggestions using AI.
- Create a user-friendly interface for seamless interaction.
- Maintain good collaboration and version control using GitHub.

4. Key Phases and Timeline

Timing:	*Deliverables:*
Data Collection & Preprocessing: Week 1 - Week 2	Labeled dataset for training
YOLO Model Fine-Tuning: Week 2 - Week 3	Trained model
API Integration & Recipe Generation: Week 2,3 - Week 4	OpenAI API integration
UI/UX Development: Week 4 - Week 5	Frontend prototype
Testing & Debugging: Week 4,5 - Week 6	Finalized application
Project Closure & Evaluation: Week 5,6 - Week 7	Final feedback from instructor.

5. Resource Planning

Required Software & Tools:

- Programming Language: Python
- Libraries: OpenCV, TensorFlow/PyTorch, YOLOv8, Flask/Django (backend), Vue.js/PySimpleGUI (frontend)
- Cloud Services: AWS/GCP for deployment (if applicable)
- Version Control: GitHub
- API: OpenAI API

6. Risk Management

Model accuracy issues: Continuous training and hyperparameter tuning

API request limits: Optimize queries and implement caching

Team availability: Assign backup responsibilities to other members

Deployment issues: Test deployments on local servers before full launch

7. Communication Plan

- Weekly Meetings: Every Monday for progress updates.
- Online Communication: GitHub Issues and whatsapp.
- Documentation: All technical decisions will be documented in commit descriptions.
- Stakeholder Communication: 1-2 weekly reports to the lecture instructor.

8. Change Management Plan

- Any changes to project scope must be documented and discussed among team members.
- Changes must be submitted via GitHub Issues and discussed in online meetings.
- All major changes must include an impact assessment before implementation.

9. Budget Plan

Cloud Computing (AWS/GCP): $20/month (if deployed)
API Costs (OpenAI): $15/month (token by pricing)
Development Tools: Free/Open-source
Miscellaneous (e.g., domain, hosting): $30/month (if deployed online)