

## BIL 481 - Project Definition Document:



# TOBB ETÜ

University of Economics & Technology

2 Mar 2025

## TASK MATRIX

Section	Description	Contributor
<b>1. Project Scope</b>	AI app detects ingredients in PNG images with YOLO; uses OpenAI API for recipe suggestions.	Efe GÖrkem Akkanat
<b>2. Project Organization – People (Roles &amp; Responsibilities)</b>	Project managed by all; YOLO training, API/backend, UI, deployment and testing assigned to specific members.	Efe GÖrkem Akkanat
<b>3. Objectives</b>	Ingredient detection, recipe generation, user-friendly design, team collaboration via GitHub.	Efe GÖrkem Akkanat
<b>4. Key Phases and Timeline</b>	7-week schedule from data collection to evaluation with clear deliverables each phase.	Kaan Arslan
<b>5. Resource Planning</b>	Python, OpenCV, PyTorch/TensorFlow, YOLOv8, Flask/Django, Vue.js, GitHub, OpenAI API, AWS/GCP.	Kaan Arslan
<b>6. Risk Management</b>	Covers model accuracy, API limits, availability and deployment; mitigation strategies defined.	Efe GÖrkem Akkanat
<b>7. Communication Plan</b>	Weekly meetings, WhatsApp, GitHub Issues, regular instructor updates.	Efe GÖrkem Akkanat
<b>8. Change Management Plan</b>	Changes discussed via GitHub Issues and meetings, with impact assessments.	Kaan Arslan
<b>9. Budget Plan</b>	Estimated monthly costs: Cloud \$20, API \$15, Misc \$30; tools are open-source.	Kaan Arslan

# Project Plan Document

## 1. Project Scope

### *Included in Scope:*

- Development of an AI-powered suggestion application that processes PNG images to detect food ingredients. 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 be 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)