Final Project Requirements

Course: Intelligent Data Analysis (with focus on Machine Learning)

Level: 3rd Year – Bachelor's Degree

Project Title:

"Data-Driven Insights and Intelligent Decision-Making for Real Problems in Kyrgyzstan"

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1. Project Overview

In this final project, students will apply the techniques and methods learned in the **Intelligent Data Analysis** course to explore and solve a **real-world problem relevant to Kyrgyzstan** using **data and machine learning tools in Python**.

The goal is not only to build a predictive or analytical model but also to **derive insights** that can help make **intelligent, data-driven decisions** for individuals, businesses, or government in the Kyrgyz context.

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2. Project Objectives

By completing this project, students will learn to:

- Identify a **realistic, data-driven problem** related to Kyrgyzstan.
- **Collect, clean, and analyze** relevant datasets.
- Apply **basic to intermediate machine learning algorithms** using Python.
- Evaluate model results and interpret findings.
- Communicate insights that support **practical decision-making**.

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3. Example Project Themes

Students are encouraged to choose a topic that genuinely interests them and has a clear connection to Kyrgyzstan's context. Possible areas include:

Domain	Example Topics
Agriculture	Predict crop yields; classify fruit quality; analyze weather effects on farming.
Environment	Predict air pollution levels in Bishkek; analyze water quality or climate patterns.
Economy / Business	Predict small business sales; analyze inflation or exchange rate trends.
Education	Predict student exam performance; identify factors influencing academic success.

Domain	Example Topics
Health	Analyze local health data to predict disease risk or healthcare demand.
Transportation	Predict taxi demand; analyze public bus travel patterns.
Tourism	Forecast tourist arrivals; recommend popular destinations.
Social Issues	Analyze unemployment trends or social media sentiment on public issues.

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4. Technical Requirements

- **Language:** Python
- **Recommended Tools and Libraries:**
  - Data handling: `pandas`, `numpy`
  - Visualization: `matplotlib`, `seaborn`
  - Machine Learning: `scikit-learn` (basic regression, classification, or clustering models)
- **Data:** Must use **real or open data** relevant to Kyrgyzstan.
  - Suggested sources: openbudget.kg, stat.kg, data.gov.kg, or relevant Kaggle datasets.

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5. Project Deliverables

A. Report (4–6 pages)

Structure your report as follows:

1. **Title Page** – Project title, student name(s), course, instructor, date.
2. **Introduction & Problem Definition** – Describe the real-world issue and why it matters.
3. **Data Description** – Source, features, size, and preprocessing steps.
4. **Analysis & Modeling** – Machine learning approach used, explanation of algorithm(s), and process.
5. **Results & Discussion** – Model performance, key findings, visualizations.
6. **Intelligent Decision / Insight** – How the analysis can help decision-making.
7. **Conclusion & Future Work**
8. **References**

B. Python Notebook

- Well-documented Jupyter Notebook (`.ipynb`) showing all steps:
  - Data cleaning
  - Exploratory data analysis

- Model training and evaluation
- Visualizations and insights

C. Short Presentation

- Duration: 7–10 minutes
- Content:
  - Problem background
  - Dataset overview
  - Approach and findings
  - Decision or insight derived from the results

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6. Evaluation Criteria

Criterion	Weight
Relevance of Problem (connected to Kyrgyzstan)	10%
Data Preparation & Analysis	20%
Methodology & Model Application	25%
Interpretation & Decision Insight	25%
Report & Presentation Quality	20%
Total	**100%**

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7. Timeline

Week	Task
1	Choose topic and dataset; submit project proposal
2–3	Data cleaning and exploration
4–5	Model development and evaluation
6	Final report and presentation submission

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8. Learning Outcomes

By the end of the project, students will be able to:

- Apply data analysis and machine learning to real-world data.
- Extract actionable insights from complex datasets.
- Communicate analytical findings clearly and effectively.
- Understand how intelligent systems can support decision-making in Kyrgyzstan’s context.
