

## Capstone Project: AI/ML End-to-End Application Development

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### Objective

Design, implement, evaluate, and deploy an AI/ML application using real-world data from a domain of your choice. The goal is to apply all core concepts from the course—from data preprocessing to model deployment—in a self-driven project.

### Project Workflow and Requirements

#### 1. Problem Definition & Dataset Selection

- Choose a domain of interest.
- Define a clear problem statement.
- Use a publicly available dataset or collect your own.

#### 2. Data Preprocessing

- Handle missing values and inconsistencies.
- Perform feature engineering.
- Identify and handle outliers.

#### 3. Exploratory Data Analysis (EDA)

- Generate visualizations to understand data distribution.
- Identify patterns, trends, or anomalies.

#### 4. Model Development

- Choose supervised learning models.
- Evaluate using metrics (accuracy, precision, recall, etc.).
- Compare at least two algorithms.

#### 5. Model Evaluation & Tuning

- Use cross-validation.
- Apply hyperparameter tuning.
- Analyze feature importance.

#### 6. Unsupervised Learning Component (Optional)

- Perform clustering.
- Use PCA/t-SNE for dimensionality reduction.

## 8. Model Deployment

- Save the model.
- Create a UI using Flask or Streamlit.

## 9. Documentation & Presentation

- Submit a concise report.
- Include screenshots of the app.
- Prepare a short presentation.

## Final Deliverables

- Source code (Jupyter Notebook or .py scripts)
- Web app (local or deployed)
- Final report
- README file

## Evaluation Criteria

Component	Weight
Problem definition & dataset	10%
Data preprocessing & EDA	20%
Modeling and evaluation	25%
Optional unsupervised/deep learning	15%
Deployment & UI	15%
Documentation & presentation	15%