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Work Breakdown Structure (WBS) for Career Path Prediction and Guidance System

Project Overview

The project aims to develop a predictive model for student placement and graduation year, utilizing machine learning techniques. The system will provide personalized career guidance based on students' skills, interests, and academic performance. The project will be executed using Jupyter Notebook with Python and libraries such as Pandas, NumPy, and Scikit-learn.

Work Breakdown Structure

1. **Project Initiation**
    - Define project scope and objectives
    - Identify stakeholders
    - Develop project charter
2. **Data Collection**
    - Identify data sources
        - Academic records
        - Course progress data
        - Extracurricular activities
        - Previous placement results
    - Data scraping and cleaning
        - Use Pandas for data manipulation
        - Handle missing values and outliers
3. **Data Exploration and Analysis**
    - Perform exploratory data analysis (EDA)
        - Visualize data distributions
        - Identify correlations among features
    - Feature selection
        - Determine essential features for prediction
4. **Model Development**
    - **Graduation Year Prediction**
        - Select appropriate machine learning algorithms (e.g., Linear Regression)

        - Train the model using historical data
        - Validate model performance using metrics (e.g., MAE, RMSE)
    - **Placement Prediction**
        - Choose machine learning algorithms (e.g., Decision Trees, Random Forest)
        - Train the model on relevant features
        - Evaluate model performance using classification metrics (e.g., accuracy, F1 score)
5. **Deep Learning Implementation (Optional)**
    - Explore deep learning frameworks (e.g., TensorFlow)
    - Implement ensemble methods (e.g., XGBoost, LightGBM)
    - Compare performance with traditional models
6. **System Development**
    - Design application interface using Streamlit
    - Implement backend logic for predictions
    - Ensure user-friendly experience
7. **Testing and Validation**
    - Conduct unit testing for individual components
    - Perform integration testing for the entire system
    - Gather user feedback and make necessary adjustments
8. **Deployment**
    - Deploy the application on a suitable platform
    - Ensure accessibility for students and advisors
9. **Documentation and Reporting**
    - Document the entire process and findings
    - Prepare a final report summarizing results and recommendations
    - Present findings to stakeholders
10. **Project Closure**
    - Review project outcomes against objectives
    - Gather feedback from stakeholders
    - Archive project documentation

Tools and Technologies

- **Programming Language**: Python
- **Development Environment**: Jupyter Notebook
- **Libraries**: Pandas, NumPy, Scikit-learn, TensorFlow (optional)
- **Web Framework**: Streamlit

This WBS provides a structured approach to developing the Career Path Prediction and Guidance System, ensuring all aspects of the project are covered effectively.