

Zaalima Development Internship Project

AI-Powered Task Management System

Submitted by

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Objective

The main goal of this project is to design an intelligent system that can:

- Automatically classify tasks based on their content.
- Predict task priority levels (High, Medium, Low).
- Assign tasks to the right person considering workload and deadlines.

This automation helps teams save time, stay organized, and work more efficiently.

Dataset and Preprocessing

We used a **synthetic dataset** designed to simulate real-world task management data from tools like Jira or Trello.

The dataset contained columns such as Task ID, Title, Description, CreatedAt, DueDate, Assignee, Priority, and Label.

Preprocessing steps included:

- Removing missing or irrelevant data.
- Applying NLP techniques such as tokenization, stopword removal, and lemmatization.
- Combining Title and Description fields for text analysis.
- Generating clean and structured data for further modeling.

Methodology

The project was developed in four main phases:

Phase 1: Data Cleaning and NLP

- Cleaned text data using **NLTK**.
- Tokenized and lemmatized words.
- Created a cleaned dataset ready for model input.

Phase 2: Feature Extraction

- Used **SentenceTransformer (MiniLM model)** to convert textual data into embeddings.
- Represented task descriptions and titles numerically for ML processing.

Phase 3: Task Classification and Priority Prediction

- Implemented classification models (Naive Bayes, SVM) to categorize tasks.
- Built a **Random Forest** model to predict task priority.
- Tuned model performance using **GridSearchCV** to achieve higher accuracy.

Phase 4: Workload Balancing

- Developed logic to assign tasks to team members based on workload and due dates.
- Ensured fair distribution and reduced bottlenecks in task allocation.

Technologies Used

- **Python** – Main programming language
- **Pandas, NumPy** – Data manipulation and analysis
- **Matplotlib, Seaborn** – Visualization
- **scikit-learn** – ML model implementation and evaluation
- **SentenceTransformers** – Text embedding generation
- **NLTK** – NLP preprocessing

Results

- The Random Forest model achieved good performance in classifying task priorities.
- Tasks were successfully assigned to appropriate team members based on workload.
- Visualizations helped display task distribution and workload balance.

Conclusion

The AI-powered task management system automates task classification, prioritization, and assignment. By combining **NLP and ML**, it can interpret task details and make intelligent decisions to assign work efficiently. The project proves that artificial intelligence can simplify everyday management processes, reduce manual work, and improve team productivity.