First idea

Faculty Management System

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1. Abstract

Educational institutions use the Faculty Management System as their web application to manage teaching activities and administrative procedures. The system lets staff manage all user information with faculty members having access to scheduling tools and grade updates plus publication tracking. Students connect with their educational resources through a system that shows class times for each subject and faculty member status plus their grades. The team built the application under Python Django and MySQL technology to help stakeholders access simple tools while working through efficient processes.

2. Objectives

- To provide a centralized platform for managing faculty and student data efficiently.
- To enable faculty to manage teaching schedules, publications, and engagements seamlessly.
- To allow students easy access to academic reports, schedules, and faculty activities.
- To enhance institutional transparency and streamline administrative processes.
- To reduce manual intervention and improve operational efficiency through automation.

3. Dataset Description and Link

Dataset Description: The system holds multiple tables that house information about students, professors, class timetables, student records, printed materials and event activities. Every table holds three core pieces of data including user profiles, upload times, and file locations.

4. Models / Algorithms

This project builds a web portal where faculty and students can conduct their work online.

Web Framework: the system adopts Django MVC as its foundational design structure utilizing Model-View-Controller methods (Bajao *et al.* 2022).

Database: MySQL stores and controls data that follows a particular structure.

Authentication: it created different user roles to manage who can do what between admin staff, faculty, and students.

File Management: the system enables safe storage and retrieval of publications and marksheets for users.

5. Expected Outcomes

- It creates a complete web system for handling academic tasks at one central location.
- The system allows transparent monitoring of instructor and student performance (Rumetna *et al.* 2021).
- The system lets students view their schedules and marksheets quickly and download all necessary publications.

References

Rumetna, M., Lina, T., Pakpahan, R., Ferdinandus, Y., Pormes, F. and Lopulalan, J., 2021, March. Implementing Knowledge Management System to Improve Effectiveness of Faculty Activities. In *Proceedings of the 2nd EAI Bukittinggi International Conference on Education, BICED 2020, 14 September, 2020, Bukititinggi, West Sumatera, Indonesia*.

Bajao, N.A., Nuñez, G.P., Bontia, S.M.M. and Montecillo, K.V.C., 2022. Web-based Faculty Development Management System. *American Journal of Geospatial Technology*, *1*(2), pp.10-15.

Second idea

Future of Loan Approvals with Explainable AI

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Abstract

This project explores the future of loan approvals using Explainable Artificial Intelligence (XAI) to enhance transparency in decision-making. The "Previous_Application.csv" dataset feeds a Random Forest algorithm which predicts loan status and reveals related conditions. SHAP enables the system to explain which loan features led to prediction outcomes. The project uses artificial intelligence to help financial institutions make better loan decisions while showing applicants clear reasons behind their loan outcomes.

Objectives

- To design an AI platform that identifies with confidence how to accept or decline loan applications.
- To implements SHAP explainability to reveal which features affect each prediction outcome.
- To look into the loan rejection causes to spot trends that help applicants understand important loan requirements.
- To create AI solutions that explain their predictions to gain public acceptance.
- To create a system where users can enter data sets and get test results with supporting details displayed in real-time.

Dataset Description and Link

The project uses historical loan application data from Kaggle's Previous_Application.csv file which shows how each loan was handled through approval or rejection plus details about rejection. The dataset consists of numerical values and categories which need processing before analysis.

Models / Algorithms

Random Forest Classifier: It builds an ensemble learning model that evaluates loan applications and their rejection patterns for improved predictions.

SHAP Module: Shows how each model input influences loan decisions by highlighting features that drive approval or rejection ratings (Purificato *et al*. 2023).

Data Preprocessing: It uses label encoding and normalization to ready our data for modeling.

Expected Outcomes

- The artificial intelligence model successfully determines loan status through accurate predictions above 90%.
- The analysis identifies key components that determine loan acceptance outcomes.
- It shows straight away what prevents applicants from qualifying which lets them update their applications.

- The system lets users add datasets, run training sessions, and examine predictions through an accessible platform (Gramespacher and Posth, 2021).
- By using actual data, it creates a loan evaluation system that helps customers understand and trust the decision-making process.

References

Purificato, E., Lorenzo, F., Fallucchi, F. and De Luca, E.W., 2023. The use of responsible artificial intelligence techniques in the context of loan approval processes. *International Journal of Human–Computer Interaction*, *39*(7), pp.1543-1562.

Gramespacher, T. and Posth, J.A., 2021. Employing explainable AI to optimize the return target function of a loan portfolio. *Frontiers in Artificial Intelligence*, *4*, p.693022.

Third idea

Monkeypox Diagnosis With Interpretable Deep Learning

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Abstract

Monkeypox Virus (MPXV) disease, a growing public health concern post-COVID-19, is caused by infection with the MPXV virus. The research develops a deep learning approach to identify Monkeypox from skin lesion pictures by adapting ResNet50 VGG19 and MobileNetV2 networks with Dense Dropout and Global Average Pooling modifications. The Kaggle dataset served as our source which we expanded to strengthen our training procedure. It evaluates the model by tracking its accuracy, precision, recall and F1-score results.

Objectives

- To apply deep learning algorithms that help to predict Monkeypox using skin lesion photos correctly.
- To perform better through the inclusion of Dropout layers and Global Average Pooling techniques.
- To use feature interpretability tools LIME and SHAP to understand what model predictions reveal about important features.
- To build a next-level diagnostic system by merging MobileNetV2 and Random Forest techniques to achieve better prediction outcomes.

Dataset Description and Link

Source: Kaggle Monkeypox Dataset

Description: It started with 200 raw images that expanded to 1000 images through image augmentation for our training and testing phases. It consists of two classes: Monkeypox and Non-Monkeypox.

Models/Algorithms

Pre-trained Models: It selected pre-trained models of ResNet50, VGG16, VGG19, InceptionV3, and MobileNetV2 for our research.

Modified Features: It used Dense layers and Dropout layers plus Global Average Pooling for my model (Ahmed and Ahmad, 2024).

Hybrid Model: it develops a hybrid system by merging optimized MobileNetV2 elements with Random Forest operations.

Expected Outcomes

- The goal is to build a precise and easy-to-understand method to detect Monkeypox outbreaks.
- It used SHAP and LIME methods to discover which features directly affected our prediction outcomes.

- The hybrid model matched MobileNetV2's accuracy at 99.5% but surpassed it by delivering 100% accuracy (Ahsan *et al*. 2024).
- It aims to improve feature importance analysis for better medical use and scientific study of monkeypox.

References

Ahmed, I. and Ahmad, M., 2024, October. Interpretable Deep Learning for Monkeypox Lesion Classification: A Study Using Model-Agnostic Explainability Techniques. In *2024 IEEE 15th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON)* (pp. 0202-0209). IEEE.

Ahsan, M.M., Alam, T.E., Haque, M.A., Ali, M.S., Rifat, R.H., Nafi, A.A.N., Hossain, M.M. and Islam, M.K., 2024. Enhancing monkeypox diagnosis and explanation through modified transfer learning, vision transformers, and federated learning. *Informatics in Medicine Unlocked*, *45*, p.101449.