**Department of Computer Science**



**School of Sciences**

**Project Proposal**

**(Session 2023-2024)**

**1. Project Title: Financial Fraud Detection System**

**2. Project Scope/Description:** (Max 500 words)

**Objective:** Develop an advanced machine learning-based system to detect and prevent financial fraud in transaction data, ensuring the security and integrity of financial systems.

**Components:**

1. **Data Collection and Preprocessing:**
   * Gather a diverse dataset containing legitimate and fraudulent transaction records.
   * Implement thorough data preprocessing techniques, handling outliers and missing values.
2. **Exploratory Data Analysis (EDA):**
   * Conduct EDA to uncover patterns and anomalies in the transaction data.
   * Visualize key features and their distributions to gain insights.
3. **Feature Engineering and Selection:**
   * Engineer relevant features such as transaction amount, frequency, and time.
   * Utilize feature selection techniques to enhance model performance.
4. **Model Selection and Training:**
   * Choose machine learning algorithms suitable for fraud detection, including Logistic Regression, Decision Trees, and ensemble methods.
   * Train the selected model(s) on a balanced dataset.
5. **Model Evaluation and Hyperparameter Tuning:**
   * Evaluate model performance using metrics like precision, recall, and F1-score.
   * Optimize hyperparameters to improve the model's accuracy and robustness.
6. **Real-time Monitoring System:**
   * Implement a real-time monitoring system for continuous analysis of incoming transactions.
   * Integrate the system with alert mechanisms for timely fraud detection.
7. **Deployment and User Interface:**
   * Deploy the model as part of a web application or API for seamless integration with financial systems.
   * Optionally, create a user interface for analysts to visualize and investigate flagged transactions.

**3. Requirements:**

* Python (Pandas, NumPy, Scikit-learn, TensorFlow/PyTorch)
* Flask or Django for web development
* SQLite, MySQL, or PostgreSQL for data storage
* Matplotlib and Seaborn for data visualization

**4. Project Team Detail:**

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| **Name of Team Members** | **Admission No.**  **/Roll No. /Enrol. No.** | **Course Name**  **(MSc/MCA/BCA/BSc)** | **Signature** |
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**5. Approval and Authority to Proceed**

We approve the project as described above and authorize the team to proceed.

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| **Name of Project Supervisor** | **Designation** | **Signature** |
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**(Dr. Gagan Tiwari) (Dr. Sandeep Mathur)**

**Project Coordinator Professor & Head**

**Professor (SOS-CS) SOS-CS**