**Predict Credit Card Approval**

**Introduction:**

A bank's credit card department is one of the top adopters of data science. A top focus for the bank has always been acquiring new credit card customers. Giving out credit cards without doing proper research or evaluating applicants' creditworthiness is quite risky. The credit card department has been using a data-driven system for credit assessment called Credit Scoring for many years, and the model is known as an application scorecard. A credit card application's cutoff value is determined using the application scorecard, which also aids in estimating the applicant's level of risk. This decision is made based on strategic priority at a given time.

Customers must fill out a form, either physically or online, to apply for a credit card. The application data is used to evaluate the applicant's creditworthiness. The decision is made using the application data in addition to the Credit Bureau Score, such as the FICO Score in the US or the CIBIL Score in India, and other internal information on the applicants. Additionally, the banks are rapidly taking a lot of outside data into account to enhance the calibre of credit judgements.

**Attribute Description:**

Ind\_ID: Client ID

Gender: Gender information

Car\_owner: Having car or not

Propert\_owner: Having property or not

Children: Count of children

Annual\_income: Annual income

Type\_Income: Income type

Education: Education level

Marital\_status: Marital\_status

Housing\_type: Living style

Birthday\_count: Use backward count from current day (0), -1 means yesterday.

Employed\_days: Start date of employment. Use backward count from current day (0). Positive value means, individual is currently unemployed.

Mobile\_phone: Any mobile phone

Work\_phone: Any work phone

Phone: Any phone number

EMAIL\_ID: Any email ID

Type\_Occupation: Occupation

Family\_Members: Family size

Another data set (Credit\_card\_label.csv) contains two key pieces of information

ID: The joining key between application data and credit status data, same is Ind\_ID

Label: 0 is application approved and 1 is application rejected.

**Section 1: Questions to Answer**

**Q1. Why is your proposal important in today’s world? How predicting a good client is worthy for a bank?**

A) The proposal to predict credit card approval is highly relevant in today's world due to the increasing use of credit cards as a financial tool. With the rise in e-commerce and online transactions, credit cards have become a primary payment method for many individuals, making it essential for banks to efficiently process credit card applications and improve the approval rate. Predicting a good client is essential for a bank because it helps to minimize the risk of credit default and reduce the cost of managing credit card accounts. Banks can use machine learning algorithms to analyse various factors such as income level, employment status etc. By accurately predicting, banks can offer credit cards to clients with lower risk profiles, which can ultimately lead to better profitability and improved customer satisfaction.

**Q2. How is it going to impact the banking sector?**

A) Implementing machine learning for credit card approval will significantly the impact on the banking sector includes operational efficiency, risk mitigation, cost-effectiveness, and the ability to offer more personalized and inclusive financial services to a wider customer base.

**1.Efficiency and Speed:**

Streamlining the credit approval process using machine learning enhances efficiency, enabling banks to process applications faster and provide quicker responses to customers.

**2.Risk Management:**

Improved risk assessment through predictive models helps banks identify and manage potential defaulters, reducing financial risks associated with credit card issuance.

**3.Cost Reduction:**

Automation reduces the need for manual intervention in the approval process, leading to cost savings for banks in terms of manpower and resources.

**4.Customer Experience:**

Faster and more accurate credit decisions contribute to an improved customer experience, increasing overall satisfaction and loyalty.

**5.Optimized Marketing Strategies:**

Predictive models help banks tailor marketing strategies based on customer creditworthiness, ensuring targeted promotions and improving conversion rates.

**Q3. If any, what is the gap in the knowledge or how your proposed method can be helpful if required in future for any bank in India.**

A)The proposed method can help Indian banks by tailoring credit predictions to India's unique characteristics. It ensures accurate credit risk assessments, considering factors like cultural diversity and regulatory specifics. This customization allows banks to offer credit to a broader population, fostering financial inclusion. However, it's essential to address issues like data privacy and fairness in credit assessments. Collaborative efforts between data scientists, banking experts, and regulators will be crucial to optimize and ensure the ethical use of machine learning models in the evolving landscape of Indian banking.

**Section 3: Data analysis approach**

* Initial hypothesis: There is no significant association between each categorical feature and the target variable ('Label').
* I have used chi2 test for my analysis.
* Hence, I have observed that 'Annual\_income', 'Employed\_Exp', and 'Type\_Income' are potentially significant features in relation to the target variable based on the chi-squared test.
* Done all the data processing and removed unused columns.
* Done all the EDA steps needed and plotted various graphs to determine the relationship between the independent and dependent variable.
* Feature Engineering techniques: Converted categorical variables to numerical variables using Label Encoder method.
* Feature scaling is done using MinMaxScaler.
* After done feature selection, used Machine modelling techniques.

**Section 4: Machine learning approach**

* For machine learning- based predictions for credit card approval, Used Logistic Regression, Random Forest, KNN, Decision Tree and Xgboost algorithms.
* Used most appropriate model i.e., Random Forest which gives the 93% of accuracy for predicting the credit card approval.
* To improve the accuracy for all the models done the cross-validation technique.

**Conclusion:**

* 1) Logistic Regression got accuracy of 90%
* 2)Random Forest got accuracy of 93%
* 3)KNN got accuracy of 88%
* 4)Decision tree got accuracy of 89%
* 5)XGboost got accuracy of 91%

In conclusion, applying machine learning to predict credit card approval based on customer information is a promising approach that can significantly impact the banking sector. By analysing historical data and employing advanced algorithms, banks can make more accurate and timely credit decisions. This not only improves operational efficiency but also enhances customer experience. The adaptability of machine learning models to local dynamics, coupled with ongoing collaboration between data scientists, banking experts, and regulatory authorities, can address specific challenges in the Indian banking landscape.