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PREDICTIVE ANALYTICS FOR CREDIT RISK MANAGEMENT AT IDFC FIRST BANK

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ABSTRACT: The purpose of this research is to look into how IDFC FIRST Bank uses predictive analytics to improve credit risk management. This study looks into how data-driven models might be able to improve the accuracy of loan approval decisions and predict when borrowers will not pay back their loans. By looking at past customer records, financial trends, and spending habits, the study shows how machine learning can be used to improve risk assessment. It shows how important it is to combine structured data, like account amounts, with unstructured data, like transaction notes, in order to make credit checks more accurate. The study also looks into how well these models work, how accurate their predictions are, and how well they can lower non-performing assets (NPAs). It's clear that automating credit checks not only makes operations more efficient but also speeds up the process. The results show that predictive analytics helps the bank make smarter decisions about loans and take security steps to avoid possible problems.

Index Terms: *Predictive Analytics, Credit Risk Management, Machine Learning, Credit Scoring, Loan Default Prediction, Non-Performing Assets (NPAs),*

1. INTRODUCTION

The purpose of credit risk management is to identify, assess, and mitigate any hazards to customers' loans. You can lessen customer payment defaults with its help.

Determining client creditworthiness is crucial to credit risk management. Your staff will vet each client's credit, income, and financial history, among other factors. Your analysts can utilize this data to evaluate a customer's ability to pay bills on time and make smart credit decisions.

Predictive analytics has revolutionized credit risk management, changing how banks evaluate, track, and handle defaults. Predictive analytics combines data mining, machine learning, and statistical algorithms to predict future events using huge amounts of current and historical data. These technologies can replace human-judgment-based risk assessment approaches with data-driven, dynamic, and accurate ones for banks and lending institutions. Predictive analytics can help companies evaluate borrowers' creditworthiness, identify default warning signs, and reduce losses. This method increases operational effectiveness and risk assessment to optimize loan portfolios and manage capital while complying with regulations.

Predictive analytics in credit risk management allows financial service customization and client satisfaction. Using transaction histories, behavioral patterns, and socioeconomic indicators, predictive models assist lenders determine the optimum credit packages for customers and predict repayment behaviors. AI and machine learning help organizations adapt to market, economic, and threat changes and update models. This proactive approach

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reduces non-performing assets and gives companies a competitive edge, allowing them to quickly change credit limits or restructure loans. In this age of digital banking, predictive analytics is crucial for financial stability, long-term growth, and data-driven credit risk management.

2. LITERATURE SURVEY

Patel, Anjali 2025 The use of AI-driven prediction models in financial risk management is examined in this research, with a focus on improving forecasting accuracy and creating effective mitigation plans before real losses occur. The study looks into a number of artificial intelligence (AI) methods, such as neural networks and machine learning algorithms, that are used to judge creditworthiness and predict possible defaults. It shows that AI can look at big data sets, find complicated trends, and give real-time information. There are also problems with using AI that are looked at in the study, like having to follow the rules and worries about keeping data safe. The end talks about how AI might change the way financial risk management is done.

Wilhelmina Afua Addy 2024 The broad topic of this in-depth study is the constantly changing field of predictive analytics in credit risk management in the banking industry. The study, which uses a qualitative research approach, uses real-life case studies and current literature to give a complete picture of the role of predictive analytics in modern banking. The study found several main themes, such as the opening up of predictive analytics tools to more people, the move to more complex machine learning algorithms, the use of predictive analytics in more banking processes, and the growing focus on following rules and being ethical. This article shows how predictive analytics can improve the general performance of the financial industry, the speed with which decisions are made, and the accuracy of risk assessments. Comparative reviews show how important it is to choose the right model for the job by showing how different predictive models work in different situations.

Christakis Droussiotis & Stuart Shelly 2023 Credit risk management is looked at in detail in this study, with a focus on predictive analytics and making decisions based on data. It looks into the ways that creditworthiness is judged in different types of financial instruments, like business loans, project finance, and asset-based lending. The writers look at the statistical models and machine learning techniques that are used in risk assessment right now. Case studies from real life show how predictive analytics can be used to make portfolios perform better and lower the risk of failure. The book is mostly about regulation issues, moral problems, and the best ways to use prediction tools. It is known that data integrity, control, and transparency are important parts of good risk management. It also talks about the strategic importance of predictive data to get the best capital allocation and loan pricing. The main idea of the text is that predictive analytics is important for proactive and successful credit risk management. In general, financial professionals who want to use analytics in their risk frameworks can turn to the work.

Onyeka Chrisanctus Ofodile 2022 This in-depth examination looks into how predictive analytics are being used and improved in credit risk management within banking companies. It shows how data-driven methods and machine learning algorithms are being used more and more to correctly judge creditworthiness. The study shows how important it is to combine

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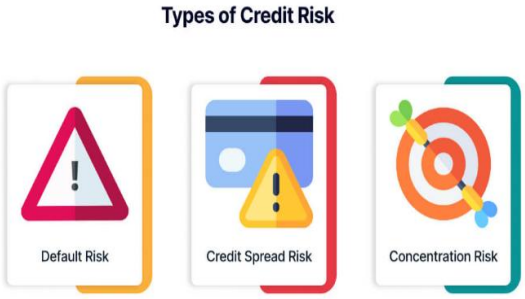
real-time behavioral and financial data to make forecasts more accurate. It includes an in-depth look at the main issues, such as ethical compliance, algorithmic bias, and data security. The paper looks at case studies from both established and new markets to show how the ideas can be used and what the results are. It shows how predictive analytics could help handle loan portfolios better and lower the number of loans that aren't being paid back. The study also talks about how AI and big data could be used together in risk assessment in the future. The study takes all the information that is out there and puts it all together in a way that banks can follow to successfully use predictive analytics. The results show how important it is to make decisions based on technology when managing financial risk.

Bonini, S., & Caivano, G. 2021 The purpose of this research is to look into how predictive analytics and machine learning might help financial institutions better handle credit risk. The writers look into how AI-powered algorithms might be able to look through huge amounts of transactional and customer data to find patterns that are linked to trustworthiness. Traditional risk assessment methods are put next to predictive models to show how they are faster and more accurate. According to the study, adding these tools can make the loan approval process better and lower the number of people who don't pay back their loans. The study also stresses how important it is to follow social and legal rules. Case studies of banking institutions show how to adopt strategies that work. Concerns about algorithm bias, operational scalability, and data security are taken care of. The main idea of the study is that predictive analytics is a completely new way to handle risks. Overall, the results show that the banking industry is moving toward making decisions with the help of AI.

3. TYPES OF CREDIT RISK



Default Risk

The danger that a borrower would fail to make the agreed-upon installments as agreed upon in the loan agreement is known as default risk, default probability, or default hazard. When borrowers fail or refuse to repay their loans, it results in financial losses for financiers and loan providers. An issue like this can arise. Many factors influence default risk, such as shifts in market dynamics, insolvent borrowers, and unfavorable economic circumstances.

Credit Spread Risk

Credit spread risk, also known as credit spread volatility, is the possibility that the yield differential between safe assets (such as government bonds) and risky ones (such as corporate bonds and credit default swaps) could narrow. Credit product value fluctuations due to shifts in market perceptions of creditworthiness, changes in the accessibility of funds, and other

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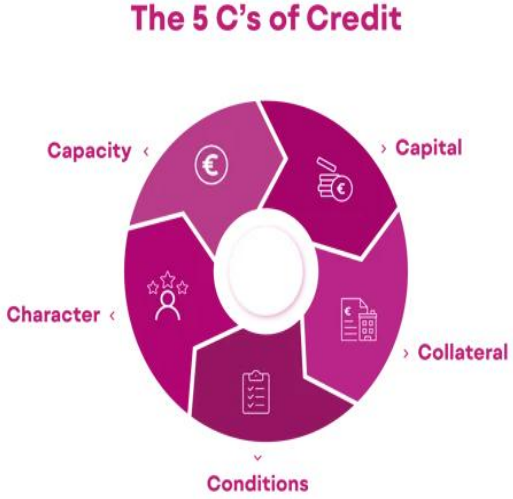
macroeconomic variables constitute this risk. Particularly for fixed-income portfolios holding credit-sensitive assets, credit spread risk has the potential to alter ROI and portfolio value.

Concentration Risk

Portfolio concentration risk, exposure risk, or reliance on a single borrower, company, area, or asset class is the danger that an investment portfolio can become overly concentrated. A portfolio's exposure to risk increases when a small number of companies or industries account for a disproportionate share of assets. The reason behind this is that negative events are more likely to occur and bring harm to that company or organization. Investor strategy decisions, market performance, or insufficient diversification can all lead to concentration risk.

4. 5 Cs OF CREDIT



Capacity: This is the maximum amount of loans that the client is able to obtain and repay, considering their income, expenses, savings, debt, and job security.

Capital: Financial resources refer to an individual's capital, whereas a company's wealth consists of its assets and revenue. Cash is another possible application for collateral.

Character: The evaluation of a person's credit risk is substantially impacted by their credit history, poor habits, reputation, and credit score.

Conditions: Everything here is related to the client's money, the loan, and its intended use. The type of loan determines the specific conditions. Considerations for, and approaches to, financing a car purchase vs. operating capital for a corporation are vastly different.

Collateral: A lender's promise of cash or other assets as security for a loan is known as collateral. Lenders face less danger of losing money because they are less likely to default on the loan. Collateral is typically required for accounts that have a higher credit risk. Consider the asset's location, the expense to relocate it, and its monetary value when assessing collateral. If the collateral is tangible, such as an item, its location is crucial.

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5. DATA ANALYSIS AND INTERPRETATION

PREDICTIVE ANALYTICS FRAMEWORK OF IDFC FIRST BANK

Component	Description
Data Sources	Bank statements, GST records, credit bureau data
Internal Credit Ratings	Developed using predictive models to assess creditworthiness
Analytics Tools	AI/ML algorithms for scoring, risk prediction, and decisioning
Customer Profiling	Creation of "Customer DNA" to analyze behavior, preferences, and risk factors
Unified Data Lake	Centralized platform to store and process all relevant customer and transactional data
Intelligent Orchestration	Recommends credit products, communication channels based on predictive insights

BALANCE SHEET OF IDFC FIRST BANK (IN RS. CR.)

Balance Sheet of IDFC First Bank (in Rs. Cr.)	25-Mar	24-Mar	23-Mar	22-Mar	21-Mar
EQUITIES AND LIABILITIES					
SHAREHOLDER'S FUNDS					
Equity Share Capital	7,322.11	7,069.92	6,618.12	6,217.71	5,675.85
Total Share Capital	7,322.11	7,069.92	6,618.12	6,217.71	5,675.85
Revaluation Reserve	0	0	0	0	0
Reserves and Surplus	30,607.17	25,032.46	19,065.93	14,769.65	12,131.95
Total Reserves and Surplus	30,607.17	25,032.46	19,065.93	14,769.65	12,131.95
Total ShareHolders Funds	38,077.99	32,161.31	25,721.16	21,003.48	17,807.89
Deposits	252,065.25	200,576.31	144,637.31	105,634.36	88,688.42
Borrowings	38,974.84	50,935.57	57,212.09	52,962.60	45,786.09
Other Liabilities and Provisions	14,700.58	12,441.91	12,371.10	10,581.16	10,861.48
Total Capital and Liabilities	343,818.65	296,115.10	239,941.66	190,181.61	163,143.88
ASSETS					
Cash and Balances with Reserve Bank of India	14,023.50	11,075.02	10,739.74	5,772.92	4,745.93
Balances with Banks Money at Call and Short Notice	1,073.86	1,405.19	3,158.22	9,984.99	1,081.93
Investments	80,715.52	74,710.39	61,123.55	46,144.84	45,411.74
Advances	233,112.53	194,592.37	151,794.53	117,857.80	100,550.13
Fixed Assets	2,662.65	2,619.43	2,090.13	1,361.22	1,266.42
Other Assets	12,230.60	11,712.70	11,035.49	9,059.84	10,087.74
Total Assets	343,818.65	296,115.10	239,941.66	190,181.61	163,143.88

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CASH FLOW

Cash Flow	---------- in Rs. Cr. ----------				
	Mar '25	Mar '24	Mar '23	Mar '22	Mar '21
Net Profit Before Tax	1900.12	2956.51	2437.13	145.49	452.28
Net Cash From Operating Activities	14394.54	11327.97	3599.65	2603.92	14061.47
Net Cash (used in)/from Investing Activities	-3399.22	-9791.79	-11968.64	-2884.46	-2826.22
Net Cash (used in)/from Financing Activities	-8682.05	-2953.92	6509.04	10210.59	-9598.18
Net (decrease)/increase In Cash and Cash Equivalents	**2617.14**	**-1417.74**	**-1859.95**	**9930.05**	**1637.07**
Opening Cash & Cash Equivalents	12480.21	13897.95	15757.91	5827.86	4190.79
Closing Cash & Cash Equivalents	15097.35	12480.21	13897.95	15757.91	5827.86

STANDALONE PROFIT & LOSS ACCOUNT

Standalone Profit & Loss account	---------- in Rs. Cr. ----------				
	Mar '25	Mar '24	Mar '23	Mar '22	Mar '21
Income					
Interest Earned	36,501.49	30,322.50	22,727.54	17,172.68	15,967.86
Other Income	7,021.72	6,001.99	4,466.97	3,222.04	2,253.70
Total Income	43,523.21	36,324.49	27,194.51	20,394.72	18,221.56
Expenditure					
Interest expended	17,209.52	13,871.75	10,092.21	7,466.52	8,587.60
Employee Cost	5,709.90	4,892.53	3,742.23	2,696.54	1,976.98
Selling, Admin & Misc Expenses	23,773.25	16,367.04	12,163.07	12,821.49	8,940.23
Depreciation	820.41	618.32	424.68	373.26	329.38
Operating Expenses	24,413.56	18,597.43	13,835.16	12,753.03	9,158.19
Provisions & Contingencies	5,890.00	3,280.46	2,494.82	3,138.26	2,088.40
Total Expenses	47,513.08	35,749.64	26,422.19	23,357.81	19,834.19

STRATEGIC OUTCOMES OF PREDICTIVE ANALYTICS

Outcome	Description	Impact Level
Enhanced Credit Risk Assessment	More accurate evaluation of borrowers' creditworthiness	High
Operational Efficiency	Streamlined loan approval and monitoring processes	Medium
Customer-Centric Offerings	Tailored financial products to match individual risk and preference profiles	High
Risk Mitigation	Reduction in non-performing assets through better predictive scoring	High
Recognition	Awarded 'Best use of AI for Credit Decisioning' in India Banking Summit & Awards 2022	Medium

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Key Metrics & Analytics Use Cases at IDFC First bank

Metric/Use Case	Description	Benefit
Credit Scoring Models	Predict probability of default (PD) for individual borrowers	Reduces NPA and improves loan approval quality
Customer Segmentation	Grouping customers based on risk and behavioral patterns	Enables personalized product offers
Early Warning Signals (EWS)	Detect potential default risk before it materializes	Proactive risk management
Loan Monitoring	Continuous analysis of active loan portfolio	Timely intervention and recovery
Predictive Cross-Selling	Recommend suitable credit or banking products to existing customers	Increased revenue & customer engagement

- The bank can reduce the possibility of non-performing assets (NPAs) and improve the overall quality of its loan portfolio by identifying high-risk borrowers early on by forecasting the probability of default (PD).
- It's possible for IDFC First Bank to make customers happier and more engaged by giving them customized goods and services based on their risk and behavior.
- Analytics are used to find warning signs of possible default before they happen, so the bank can quickly take steps to fix the problem.
- Active loan monitoring makes sure that any changes in the borrower's behavior or risk profile are quickly noticed.
- This makes it easier to reduce risk and follow up on time. The bank could boost sales, improve customer relationships, and get more people to use its products by using predictive data to suggest the best financial goods to its current customers.

6. CONCLUSION

In conclusion, predictive analytics has become an essential tool for the effective management of credit risk, enabling financial institutions to make more informed and data-driven decisions. It assists in the prediction of potential defaults and the more accurate assessment of consumer risk by analyzing historical credit behavior and identifying trends. This has led to improved lending practices and a reduction in the number of non-performing assets.

Predictive models enable continuous, real-time monitoring by providing proactive solutions rather than reactive ones. By integrating sophisticated algorithms with machine learning, predictive accuracy is enhanced beyond that of conventional methods. It is a significant advantage in reducing credit losses, despite the challenges of data quality and model complexity. Furthermore, it facilitates regulatory compliance and enhanced portfolio management. Predictive analytics contributes to the financial sector by fostering efficiency and resilience. The implementation of this approach signifies a substantial improvement in the field of credit risk management in the present day.

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