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Research Paper

Artificial intelligence enabled loan processing – A boon for micro entrepreneurs

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ABSTRACT

Microbusiness entrepreneurs encounter substantial difficulties in obtaining timely and effective financing to grow their companies in the rapidly changing financial landscape. Traditional loan processes are frequently laborious and time-consuming, which limits small businesses' potential for expansion. This study explores how artificial intelligence (AI) has the potential to revolutionise the loan environment for microbusiness owners. AI streamlines loan processing to provide a quicker, more efficient, and fairer method, empowering entrepreneurs to take opportunities and succeed. The study shows how processing gets quicker, more accurate, and inclusive loan by using secondary data sources. Diverse pieces of literature highlight the benefits of AI for credit risk assessment and transparency. Despite difficulties like implementation expenses, AI provides unmatched advantages including less paperwork, greater access, and enhanced fraud detection. Human monitoring ensures moral AI implementation, finding a balance that changes the financial environment for micro entrepreneurs.

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1. INTRODUCTION

For entrepreneurs with micro enterprises anticipating to expand by access to money is essential in the rapidly shifting financial environment today. However, conventional lending procedures frequently prove to be difficult and time-consuming, leading to delays and missed chances to succeed. Artificial

intelligence (AI) is useful in this situation. The processing of loans may be revolutionised by utilising AI, making it quicker, more effective, and ultimately advantageous for entrepreneurs who own microbusiness. The study will concentrate on how AI-enabled loan processing benefits microbusinesses by streamlining the lending process and opening up access to more equitable financial services. The study will show how AI might enable micro entrepreneurs to obtain the financing they need to thrive through an evaluation of case studies, research findings, and real-world instances. It will also examine any difficulties and moral issues that can arise from AI-enabled loan processing.

Since smart phones and the internet have become more widely available than ever before, a number of online lending avenues have arisen up in India. Micro finance has become a rapidly expanding industry. According to a number of studies, India's microfinance industry has the potential to develop at a CAGR of 40% by 2025. Due to the government's encouragement of banking digitization, fintech companies sprang into action to fill the gaps, especially in the area of digital lending. Microloans are becoming more and more widespread among small firms and entrepreneurs as a convenient and quick source of capital. However, it can be challenging for banks to assess the creditworthiness of applicants for microloans, especially when doing so with limited financial information. Thankfully, a revolution in the micro loan scoring process used by the banking industry has been made possible by the development of artificial intelligence (AI). By utilising AI and machine learning, banks can now obtain more accurate and reliable insights, which helps them make better judgements.

2. RELATED WORK

Syahida Abdullah, Zakirah Othman and Roshayu Mohamad: The ability of machine learning algorithms to forecast the risk of SME loan repayment is discussed in this article. The study emphasises and demonstrates how to categorise recipients' levels of risk. The study emphasises the value of the examined parameters in determining the loan repayment risk. The results imply that artificial intelligence (AI) technology can increase the precision of risk assessment in SME finance [1].

Maha Abuhusain: The author investigated into how AI and big data affected lending decisions made by banks in Saudi Arabia. Data was acquired by distributing questionnaires to staff members of 14 banks in Saudi Arabia. The study found that big data and AI improve the accuracy, efficiency, and effectiveness of loan decisions. The expertise and educational background of bank workers, however, has an impact on how AI and big data are applied. The study also reaches the opinion that although Saudi Arabian banks can make better loan decisions with AI and big data, staff members still need to receive sufficient training. Big data and artificial intelligence (AI) lending decisions must also consider the ethical and legal considerations [2].

David Mhlanga: The effect of AI and ML on credit risk evaluation is examined by the author by using a literature review methodology. The results show that macroeconomic and firm-specific elements such as monetary results, managerial calibre, and sector of the industry, size, and other internal considerations are crucial for credit risk evaluation, and that artificial intelligence (AI) and machine learning can enhance financial inclusion. The study comes to the additional conclusion that the influence of AI and ML in credit risk analysis can aid in achieving financial inclusion for those who are less fortunate and offers insightful information about the function of AI and ML in evaluating credit risk and financial inclusion [3].

Erasmo Purificato, Flavio Lorenzo, Francesca Fallucchi and Ernesto William De Luca: The authors of the article present a system methodology for supporting the entire life cycle of an ML model in loan approval processes. To evaluate the Loan Approval System, the authors utilise an Explanation Goodness Checklist and a Trust & Reliance Scale. They also performed targeted interviews to determine the effectiveness of fairness utilisation. Authors argue that responsible AI solutions can improve the transparency and accountability of loan approval processes [4].

Hongchang Wang, Chunxiao Li, Bin Gu and Wei Min: The authors have look into the effect of artificial intelligence-based credit scoring algorithms on financial inclusion. The authors gathered information from two online lenders and performed preliminary analyses such as model-free analysis, basic empirical analysis, and causal identification. They discovered that AI-based models can increase approval rates and decrease the number of defaults, but more data is required to ascribe these differences fully to AI. More data will be collected, new identification algorithms will be used, and extra robustness checks will be performed, according to the authors. Overall, the study demonstrates the ability of AI-based credit assessment algorithms to enhance financial inclusion [5].

Prince Ogbonna: The utilization of AI and ML in the lending and debt management process is examined in this paper by the author. In the paper, it is discussed how AI may aid with credit scoring, fraud detection, and operational cost reduction. According to the research, machine learning is the future of alternative financing, and businesses who fully utilise it will ultimately succeed. The study also highlights that AI and ML are revolutionising the lending sector, raising customer satisfaction levels and enhancing loan monitoring and debt collection [6].

2.1. Statement of the Problem

The present study looks at how artificial intelligence is used to process loans for entrepreneurs who own small businesses. It looks at how well AI could be able to speed up and increase the effectiveness of loan approval procedures, which would eventually help entrepreneurs. There is a need to explore whether lowering credit access restrictions for microbusiness owners can improve financial inclusion.

2.2. Objectives of the Study

- To assess the effects and advantages of adopting artificial intelligence in the processing of micro entrepreneur loans, including improvements in effectiveness, accuracy, and bias reduction.
- To examine at the viability and difficulties of incorporating AI into the system that processes loans for micro entrepreneurs while taking security, privacy, and technological readiness into account.

3. METHODOLOGY

Current research is based on secondary data sources and its analysis. To be able to draw diverse conclusions about artificial intelligence in loan processing, many sources of data collections, such as publications, journals, news sources, websites, etc. were thoroughly analysed. Concerned banking websites were also used to evaluate devoted case studies of various banks and their financial products [2].

3.1. Artificial Intelligence and its Role in Loan Processing

"AI refers to the machine's ability to conduct cognitive processes similar to those of human brains, such as thinking, detecting, interacting, learning with an surrounding, solving problems, and even getting creativity to a certain level .Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind." (IBM Cloud Education, 2020) [3].

50% of all first-time credit/loan applications are rejected by banks and financial institutions. This may change when AI technology is increasingly used in loan appraisal. While traditional lending systems have mostly relied on credit scores, legacy processes, and time-consuming paperwork, artificial intelligence (AI) is already affecting a paradigm shift in how retail borrowers are evaluated for the best Personal Loans. According to National Business Research Institute and Narrative Science research, "Around 32% of the country's financial service companies have already begun to deploy AI technology. Though fintech firms were the first to use artificial intelligence (AI) in lending, traditional banks and Non-Banking Financial Companies (NBFCs) are not far behind in using this new technology to meet the needs of new-age customers." [7].

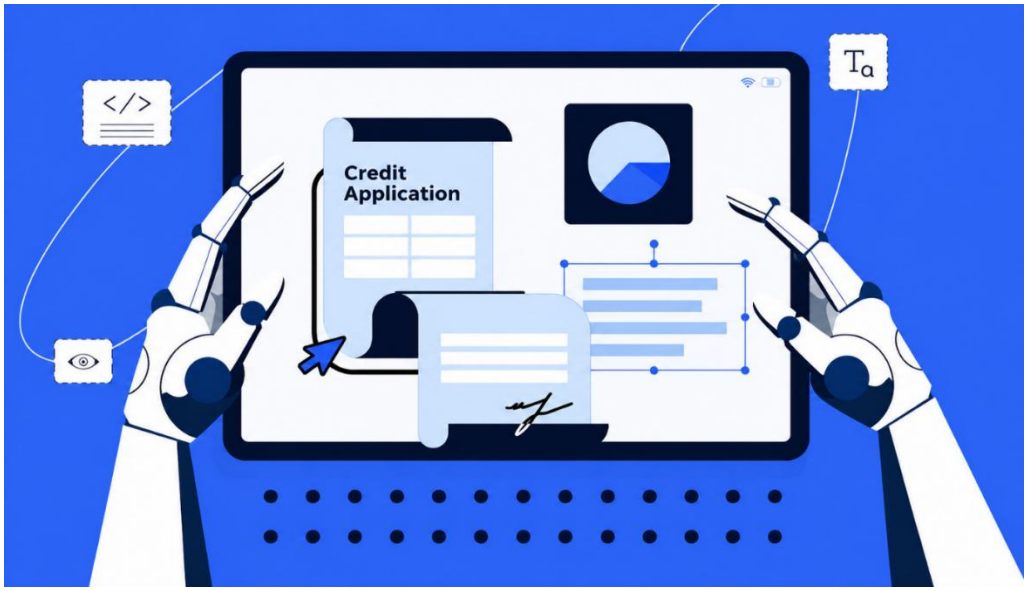


Figure 1. AI-Assisted Credit Application Processing Interface

3.2. Importance of Loan Processing for Micro Entrepreneurs

Loans provide funding to small, medium, and micro enterprises, allowing them to grow faster. Small business loans can be used for a variety of purposes, including the purchase of equipment, payment of operational expenses, infrastructure upgrades, R&D, and so on. With the help of AI enabled loan processing the entrepreneurs can benefit from various advantages such as improved accessibility, lower collateral and interest rates [5].

3.3. Challenges Faced by Micro Entrepreneurs in Traditional Loan Processing

Entrepreneurs driving the "Micro, Small, and Medium Enterprises" (MSME) sector are critical to GDP and employing millions that stables economic growth. There are many challenges faced by entrepreneurs in industries to get financial assistance out of which some of the challenges include:

3.4. Limited Trust and Confidence by Financial Institutions

A lack of trust from lenders is one of the most significant barriers to company loan acquisition. Financial institutions usually assume that these businesses as high-risk due to their reduced capital needs and poor credit history. As a result of this mistrust, loan approval standards tighten, making it even harder for start-up and small enterprises to receive funding [6].

3.5. Collateral Conditions

Many Entrepreneurs lack adequate collateral to meet traditional lenders stringent standards. Loans are secured by collateral, marking it as difficult for Entrepreneurs without proper assets to receive the necessary capital [7].

3.6. Insufficient Financial Education

Knowing about and handling finances is critical for any business's success, but Micro Entrepreneurs frequently lack behind financial competence. This shortage of information can result in poor financial planning, ineffective implementation, and increased operating cost [8].

3.7. Obsolete Technology

Many Micro Entrepreneurs, particularly those located in rural areas, are hampered by obsolete technological advancements and a less of digital competence. It limits the capacity to offer a compelling argument for getting financing and slows their business's general growth [9].

3.8. Strict Regulatory Standards

Micro Entrepreneurs may find it difficult to navigate lengthy and complex regulatory processes. Obtaining licences, insurance, certificates, and tax assessments can all complicate access to timely finance. (IIFL, n.d.)

Table 1. Key Challenges Faced by Small Businesses in Accessing Finance

Challenge	Description
Limited Trust and Confidence	Financial institutions often view small businesses as high-risk due to limited capital and credit history.
Collateral Requirements	Many entrepreneurs lack sufficient collateral to meet traditional lending standards.
Insufficient Financial Education	Lack of financial literacy hinders effective financial planning and loan application processes.
Obsolete Technology	Limited access to modern technology affects the ability to present a strong case for funding.
Strict Regulatory Standards	Navigating complex regulations and obtaining necessary certifications can delay access to finance.

3.9. Artificial Intelligence Enabled Solutions to Improve the Loan Processing

"80% of Indians have no credit history. Artificial intelligence, on the other hand, can generate a credit score for them. Consider the immense economic prospects that banks would have if the unreached 80% of the population had access to credit. Because the majority of internet transactions are now done by smartphone, lenders can easily track a prospective customer's online habits. Rather of relying on a credit score and credit history, fintech firms are now using a "social loan quotient" to determine a loan applicant's trustworthiness." [7].

Financial institutions have struggled to gauge a borrower's creditworthiness in the absence of a credit score. This issue keeps many qualified consumers out of the lending market, while lenders lose a large amount of business. As many as 50% of first-time loan applications are refused only because lending organisations place too much emphasis on credit scores and credit history. "AI and Machine Learning (ML) offer a solution to this problem through predictive analytics, digital footprints, and other complex algorithms and data sets. Financial institutions can now assess a loan applicant's creditworthiness based on their internet shopping habits, utility and phone bill payment histories, and even social media accounts." "CASHe," a short-term credit lending company based in Mumbai, Maharashtra, uses its proprietary AI-based alternate credit scoring tool, the Social Loan Quotient (SLQ), to assess borrowers creditworthiness and extend credit to them because many small businesses and individuals lack a documented financial history. CASHe has been able to entice millions of Indian borrowers into the formal financial ecosystem by utilising only alternate datasets (mobile/behavioral/social) of people while adhering to data privacy regulations. With over 6 million app users and about INR 100 crores in loans given each month, CASHe has become the go-to credit provider for an increasing proportion of millenials [8]. "The Social Loan Quotient (SLQ) is CASHe's proprietary alternate credit score. The SLQ uses a range of alternate datasets (alternate to someone's financial history), obtained via mobile/social data streams and/or geographic indicators" [8].

3.10. Ai Technologies Used in Loan Processing

Artificial intelligence (AI), optical character recognition (OCR), machine learning (ML) and data analysis are all examples of advances in technology that allow lenders to handle loan applications and other financial services faster and more precisely than people. Most automation systems on the market today are powered by the combination of these technologies. For example, OCR, that can read any document like a human, leads the way. When combined with AI, however, OCR can extract details to create useful data and even train to process it significantly more efficiently and precisely than humans [10].

OCR is widely used in association with other automation technologies, such as robotic process automation (RPA), which automates repetitive human-computer activities. When integrated with AI, this

enables intelligent document processing (IDP) capabilities that mimic how humans understand information and make decisions. Furthermore, the availability of cloud-based software solutions and Application Programming Interfaces (API) enables lenders to integrate their loan processing systems with other digital platforms and services, such as online banking and mobile apps, resulting in a more seamless and efficient lending experience for borrowers [11].

Table 2. Key Technologies Used in Digital Loan Processing Systems

Technology	Description
Artificial Intelligence (AI)	Simulates human cognitive functions such as learning and problem-solving.
Optical Character Recognition (OCR)	Converts different types of documents into editable and searchable data.
Machine Learning (ML)	Uses algorithms to learn from and make predictions based on data.
Robotic Process Automation (RPA)	Automates repetitive tasks, reducing manual intervention.
Intelligent Document Processing (IDP)	Combines OCR and AI to understand and process documents efficiently.
Application Programming Interfaces (API)	Enables integration of loan processing systems with other digital platforms.

3.11. Benefits of AI Enabled Loan Processing for Micro Entrepreneurs

AI offers various advantages to lenders in terms of digital loan management, appraisal, and distribution. However, its importance do not stop with credit evaluation; it also provides extra benefits that are given below:

a) AI Allows for faster loan acceptance and processing.
b) Helping first-time loan applicants establish a credit profile.
c) Helping banks attract more borrowers and ensure corporate success.
d) Bank servicing costs are decreasing.
e) Increasing security while adhering to regulatory requirements.
f) The management of data and risks is being improved.
g) Reduced paperwork, and improved access to credit
h) Capabilities for detecting fraud
i) Decision Making Based on Advanced Data processing

AI and ML technology enables banks to reject prospective defaulters by detecting mistakes in loan applicant information and documents more quickly. Predictive analytics is 90% accurate in predicting a prospective customer's repayment habits, which helps to reduce delinquencies. AI will provide banks and NBFCs with an extra source of data to cater to India's growing millennial population and open up new lending opportunities. On the other hand, simply making loans available to millions of households will boost consumption and the economy. According to a Boston Consulting Group report, the use of artificial intelligence in loan evaluation might assist digital lending or online loans reach Rs 10 lakh crore business entrepreneurs [7].

3.12. Potential Concerns and Drawbacks of AI in Loan Processing

Artificial Intelligence is prone to various drawbacks and concerns apart from having innumerable advantages and benefits. Some of the major drawbacks and concerns are mentioned below:

Involves High Cost and Budget: AI is a highly expensive technology to implement. It must be understood that the stage of this revolution is still in its beginnings. As an outcome, it is considered a rare commodity in the technological space. However, among the sellers, only a handful are capable of carrying out large-scale modifications. Because technology is now futuristic, the items and persons associated with it are expensive. Banks that have attempted to incorporate AI were required to invest millions of US dollars up

front. Because individuals capable of developing and maintaining these systems are in limited numbers, banks must pay exorbitant wages to attract them. As a result, banks that use artificial intelligence are losing money in the short term. Because of the significant costs, artificial intelligence is now unviable for smaller commercial banks. They will have to wait a few more years for the technology to become more commoditized and, as a result, more inexpensive to them [11].

More prominent Cost of Error: Artificial intelligence is not only expensive to build, but the cost of errors made by it can be very high. This is especially true in the commercial banking industry. Commercial banking loans are frequently in the millions of dollars. Humans carefully analyse these loans in the current procedure, with systems serving as an auxiliary tool. As a result, if the system makes any mistake such as disbursing a loan to a non-creditworthy counterparty, the costs must be paid by banks [12].

Unemployment: Commercial banking will make extensive use of artificial intelligence. This suggests that a lot of the work currently performed by humans will likely be automated. Banks would hence need a far less human workforce. Banks won't hire anyone to replace retiring employees as a result, and they'll have fewer hiring drives. This suggests that many workers may have to consider early retirement or even layoffs. Major commercial banks may have worker unhappiness as a result, which could lower productivity and lessen the positive effects of technological innovation.

Non-transparent: Systems based on artificial intelligence are constructed using deep neural networks. They gather information from many different sources. A lay person may not fully understand the sources of their data or the procedure they use to reach a judgement because it can be rather complicated. As a result, some of the system's decisions are ultimately inexplicable to humans. For instance, the system might refuse a loan to a trustworthy customers (Entrepreneur) of a commercial bank for unclear reasons. The lack of transparency could cause issues with the commercial bank's daily operations and their relationship with customers and entrepreneurs [13].

3.13. Role of Human Intervention and Oversight in AI Enabled Loan Processing

AI can detect and reduce biases and identification concerns that may be present in loan decisions by utilising machine learning algorithms and sophisticated data analysis methods. As a result, credit decisions will be based on factors that are impartial and non-discriminatory, which can result in lending outcomes that are more egalitarian. By relying on data-driven insights and neutral evaluation standards, AI can help eliminate biases linked to race, gender, age, or ethnicity. Even though AI has many benefits, it must be implemented with justice, neutrality with regard to ethics, and human oversight.

AI systems should be created and trained to provide accountability and transparency. To avoid unintentional biases or mistakes, human oversight of the decision-making process is crucial. When human assistance is used, AI can produce results that are compliant with ethical standards and legal and regulatory criteria. A balanced strategy that fosters trust and confidence in the lending process can be achieved by fusing the advantages of AI technology with human expertise [14].

Table 3. Role of Human Intervention in AI-Driven Loan Processing Systems

Role of Human Intervention	Description
Ensuring Accountability	Human oversight ensures that AI decisions are transparent and accountable.
Ethical Compliance	Humans can monitor AI processes to ensure they adhere to ethical standards.
Bias Prevention	Regular checks by humans can prevent and correct unintended biases in AI decisions.
Legal and Regulatory Adherence	Humans ensure that AI processes comply with legal and regulatory requirements.
Trust Building	Human involvement in the decision-making process helps build trust among borrowers.

3.14. Findings

The implementation of AI in loan processing significantly enhances efficiency and speed for micro-entrepreneurs, reducing approval times and streamlining operations. AI algorithms provide more accurate credit risk evaluations by analyzing a diverse range of data points, including digital footprints and payment histories. This increased accuracy facilitates greater financial inclusion by enabling access to credit for individuals with limited or non-traditional credit histories. Moreover, AI helps minimize biases in lending decisions, promoting fairer outcomes through neutral, data-driven insights. The use of AI also reduces operational costs for financial institutions by automating processes and improving accuracy, thereby decreasing the need for extensive human intervention. Additionally, AI enhances fraud detection capabilities by identifying patterns and anomalies, leading to better risk management. Despite its numerous benefits, the importance of human oversight remains crucial to ensure transparency, accountability, and ethical compliance, preventing unintended biases and errors [15].

4. RESULTS AND DISCUSSION

The integration of AI into loan processing systems has led to substantial improvements in efficiency and accessibility, particularly benefiting micro-entrepreneurs. AI algorithms facilitate quicker loan approvals by automating data analysis, which reduces the time taken for credit assessments. The enhanced accuracy of these AI-driven assessments has also lowered the risk of default by providing more precise creditworthiness evaluations. Furthermore, AI has minimized human biases in decision-making, promoting greater fairness. However, the reliance on AI necessitates continuous oversight to address potential biases embedded in the training data. Despite these challenges, the adoption of AI in banking has significantly contributed to financial inclusion, allowing underserved populations to access credit more easily and fostering economic growth [16].

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Mr. Syed Salman	✓	✓	✓	✓		✓		✓	✓	✓	✓			
Dr. Chaya. R		✓	✓	✓		✓	✓	✓		✓	✓	✓		✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study and their voluntary consent was obtained prior to data collection.

Ethical Approval

Not applicable.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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