GENERATIVE AI IN CREDIT RISK: THE NEW FRONTIER OF FINANCIAL ANALYSIS

Gen AI Applications

GENERATIVE AI FOR ALL

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INTRODUCTION

- Generative AI, which includes models like Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), has the potential to revolutionize various aspects of credit risk management.

- By creating synthetic data, predicting future scenarios, and generating new insights from existing data, generative AI can enhance traditional credit risk models.

- This Document Covers some Key Applications.
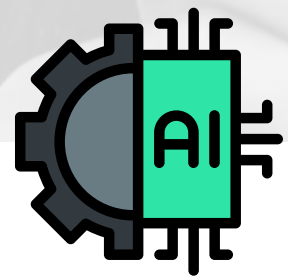
DATA AUGMENTATION

>>> **Problem to be Solved:**

- Limited Data: Financial institutions often face challenges with limited data, especially when dealing with new types of loans or customer segments.

>>> **How it is Solved:**

- Generative AI can create synthetic data that resembles the real data, augmenting the existing datasets. This synthetic data can be used to train and validate credit risk models, improving their robustness and accuracy.
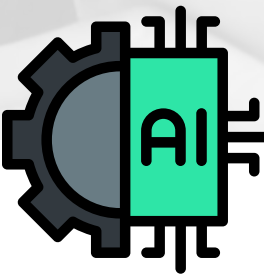
DATA AUGMENTATION

Key Techniques Used:

- Generative Adversarial Networks (GANs): Consist of a generator that creates synthetic data and a discriminator that evaluates its realism. Through iterative training, GANs can produce high-quality synthetic data.

- Variational Autoencoders (VAEs): Encode input data into a latent space and then decode it back, generating new data points that resemble the original data.

SCENARIO ANALYSIS AND STRESS TESTING

Problem to be Solved:

- Unpredictable Economic Conditions: Financial institutions need to understand how different economic scenarios can impact credit risk.

How it is Solved:

- Generative AI can simulate various economic scenarios and predict their impact on loan defaults, credit scores, and overall portfolio performance. This helps in stress testing and preparing for adverse conditions.

SCENARIO ANALYSIS AND STRESS TESTING

Key Techniques Used:

- GANs for Scenario Generation: Generate plausible economic scenarios based on historical data.
- Recurrent Neural Networks (RNNs): Model temporal dependencies and simulate the evolution of economic indicators over time.

ANOMALY DETECTION AND FRAUD PREVENTION

Problem to be Solved:

- Detecting Fraud: Identifying fraudulent activities and anomalies in credit applications and transactions.

How it is Solved:

- Generative AI models can learn the normal patterns of data and identify deviations that might indicate fraud. By generating normal transaction patterns, these models can better detect outliers.

ANOMALY DETECTION AND FRAUD PREVENTION

Key Techniques Used:

- Autoencoders: Train on normal data to learn its structure, and then detect anomalies by measuring reconstruction errors on new data.
- GAN-based Anomaly Detection: Use the discriminator in GANs to identify whether new data points are real or fake, effectively detecting anomalies.

ENHANCED CREDIT SCORING MODELS

Problem to be Solved:

- Improving Accuracy: Traditional credit scoring models may miss subtle patterns in the data.

How it is Solved:

- Generative AI can enhance credit scoring by identifying and learning complex patterns in the data. These models can generate features that improve the predictive power of credit scores.

ENHANCED CREDIT SCORING MODELS

Key Techniques Used:

- GANs and VAEs for Feature Generation: Generate new features that capture hidden patterns and correlations in the data.
- Deep Learning Models: Incorporate generative AI features into deep learning models for more accurate credit scoring.

RISK ASSESSMENT FOR NEW PRODUCTS
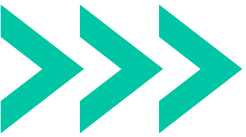
Problem to be Solved:

- Assessing Risk for New Loan Products: New types of loans may lack historical data for accurate risk assessment.

How it is Solved:

- Generative AI can simulate potential performance data for new loan products based on similar existing products, providing insights into their risk profiles.

RISK ASSESSMENT FOR NEW PRODUCTS

Key Techniques Used:

- Transfer Learning with GANs: Adapt generative models trained on similar products to generate data for new products.
- Synthetic Data Generation: Create synthetic datasets that resemble the expected characteristics of new loan products.

PERSONALIZED CREDIT RISK MANAGEMENT

Problem to be Solved:

- Tailoring Risk Management: Each borrower has unique risk factors that need personalized management strategies.

How it is Solved:

- Generative AI can create personalized risk profiles by generating data that reflects individual borrower behaviors and scenarios. This helps in customizing credit terms and conditions.

PERSONALIZED CREDIT RISK MANAGEMENT

Key Techniques Used:

- GANs for Individual Simulation: Generate synthetic data for individual borrowers based on their specific characteristics.
- Deep Reinforcement Learning: Develop personalized credit risk management strategies that adapt to the unique risk profiles generated by GANs.

Thank You

Special Thanks to ChatGPT and Copilot for content support