

APPLICATION OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN CONSUMER LENDING

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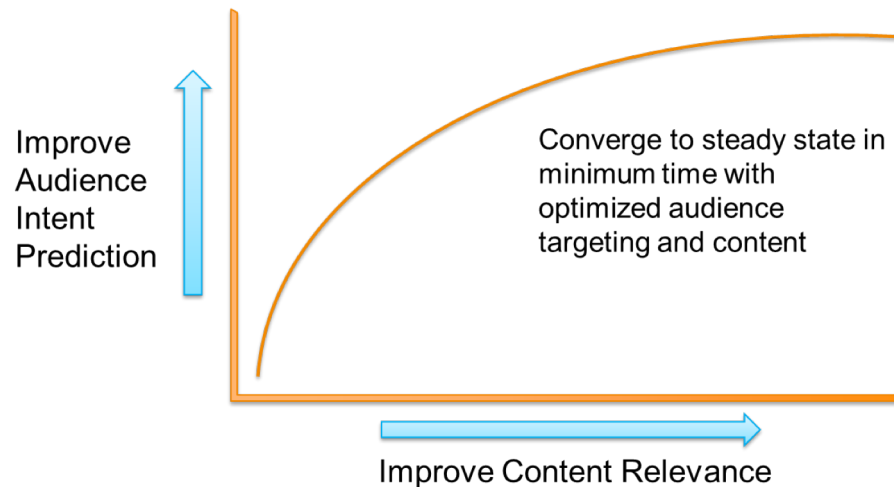
Opportunities to Consider

- Significant growth in **Data capture** and availability of **high speed computing** at lower price points created opportunities for superior **Decision making**.
- Machine Learning can help to **enhance customer experience** and **strategic decisions** throughout the **stages of customer life cycle** :
 - Digital Marketing, Targeting and Personalization
 - Underwriting Models
 - Fraud mitigation
 - Credit Limit assignment
 - CCAR / DFAST/ CECL / Loss Forecasting Models
 - Customer Service
 - Collections
- Why Machine Learning
 - Better models – Non-linearity and outliers are better captured
 - Speed to Market - Efficiency gains in faster development and deployment
 - Stability – To be established
 - Decision Reasoning – Result justification and back tracking is underdeveloped
- **Adaption** is required for whole of **Modeling Eco-system**

* CCAR – Comprehensive Capital Analysis and Review; DFAST – Dodd Frank Act Stress Test; CECL – Current Expected Credit Loss

Digital Marketing, Targeting and Personalization

- Digital marketing has facilitated optimizing customer acquisition costs and over the years created significant amount of data to improve upon customer experience
- Personalization of Web Pages and messaging has evolved significantly in the retail space; Consumer Lending yet to leverage it
 - Customers expect it.
- Take away from Retail
 - Real time customer intent augmentation based on Digital foot print, real time activity and traditional data
 - Multi-armed Bandit algorithm to optimize messaging and developing optimal personalization



Underwriting

- Traditional Credit Scorecard models developed using Logistics technique and Credit Bureau data has prevailed in the industry for multiple decades
- Availability of Alternative Sources of data and enhanced Machine Learning Techniques like Gradient Boosting (GBM) models and other boosting techniques (LogitBoost, AdaBoost etc.) has created the opportunity to improve Good-Bad separation.
- Defining homogenous segments and feature engineering also have a big potential application of supervised or unsupervised learning
- Key Considerations
 - **Transparency** to provide Adverse action reasoning to the Customer...maintain monotonicity of features
 - Usage of **FCRA* compliant** attributes
 - Avoid any accidental association with Disparate Treatment
 - Test the **Stability** of models developed

* FCRA – Fair Credit Reporting Act

Fraud Detection

- Most popular and successful area of ML application
- The constant threat of **changing patterns** of Fraud has made it an easy place to apply pattern recognition techniques
- The need to faster development and deployment has generated additional efficiency gains from ML application

Credit Limit Assignment

- Many lenders are using sensitivity based approach to assign Credit Limits
- Traditional linear regression models fails to capture the non-linearity involved between features and target and hence optimization routine gets constrained to boundary conditions
- Machine learning techniques can provide better estimates of credit line sensitivity and use of algorithms to capture global maxima

Summary

- Use of AI and ML can significantly aid Consumer Lending businesses through:
 - Enhanced customer experience through out the life-cycle of Customer
 - Reducing costs of acquisition, on-boarding costs, credit costs and Agency costs
 - Improving the Revenue model
- In order to get the best benefit from these options, every entity within **Modelling - Ecosystem**, starting from management, developers, validators, model governance, audit function, regulators and others would **need to adapt** to these newer methodologies.
- Other uses
 - Loss Forecasting: Point estimates and Macro sensitivities can be improved using ML applications like GBM models etc.
 - Customer Service: Audio and Text mining software have evolved to cull out significant information from these files to not only enhance customer experience but also improve strategic decisions
 - Collections: Better fit models and its faster deployment can improve collection efficiency and reduce collection cost.

Thank You