

Association for Information Systems

AIS Electronic Library (AISeL)

ICIS 2021 TREOs

TREO Papers

12-12-2021

Finding a Way to Address Historical Loan Inequalities with Better AI: Learning from Success and Failure

Wenwen Ding

University of Arkansas, wding@walton.uark.edu

Tracy Ann Sykes

University of Arkansas, TSykes@walton.uark.edu

Follow this and additional works at: https://aisel.aisnet.org/treos_icis2021

Recommended Citation

Ding, Wenwen and Sykes, Tracy Ann, "Finding a Way to Address Historical Loan Inequalities with Better AI: Learning from Success and Failure" (2021). *ICIS 2021 TREOs*. 72.

https://aisel.aisnet.org/treos_icis2021/72

This material is brought to you by the TREO Papers at AIS Electronic Library (AISeL). It has been accepted for inclusion in ICIS 2021 TREOs by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Finding a Way to Address Historical Loan Inequalities with Better AI: Learning from Success and Failure

Wenwen Ding, WDing@walton.uark.edu; Tracy Ann Sykes, TSykes@walton.uark.edu

According to the U.S. Small Business Administration [SBA] (n.d.), there are significant differences in loan approval rates between several demographic groups: 14% for female-owned vs. 72% for male-owned businesses, 15% for rural vs. 85% for urban businesses, and a significant under representation in minority owned businesses—minorities make up 40% of the population but only 20% of employer businesses.

Modern society recognizes the need to redress historical inequalities. Being approved for a loan when needed can be the difference between financial success or financial failure for small businesses (Acharya, Hasan, & Saunders, 2006). As we live in a world of limited resources, it is impossible to lend money to every applicant, and those who are chosen are vetted to minimize the risk of defaulting on the loan repayment (Liu, Dean, Rolf, Simchowit & Hardt, 2018). Financial institutions often use AI to initially screen applications. Unfortunately, the criteria the AI use are modeled only on prior successful loan applications. This means that it is unlikely that a financial institution will be willing/able to step outside of historical context when making loan decisions, which means that the population of successful loan applicants will remain as is, and the historically denied population will similarly remain unchanged.

Using the Reject Inference method (Ding & Wan, 2020) to teach AI to see unseen patterns can allow a more evenhanded distribution of loaned funds by allowing acceptance conditions to be more finely tuned to represent the population more fairly. Empirical experiments on the open public lending club dataset show us that a more holistically trained AI can allow us to break out of historically built prejudices in loan decisions. Encouraging organizations to apply Reject Inference methods can be a win-win situation for both loan lender and borrower by reducing Type I and Type II errors, helping us to take a first step out of our historical comfort zone.

References

- Acharya, V. V., Hasan, I., & Saunders, A. (2006). Should banks be diversified? Evidence from individual bank loan portfolios. *The Journal of Business*, 79(3), 1355-1412.
- Ding, W., & Wan, H. (2020, August). Ensemble Incremental Learning Iterative Mechanism on Reject Inference. In *2020 International Conference on Computing and Data Science (CDS)* (pp. 69-75). IEEE.
- Liu, L. T., Dean, S., Rolf, E., Simchowit, M., & Hardt, M. (2018, July). Delayed impact of fair machine learning. In *International Conference on Machine Learning* (pp. 3150-3158). PMLR.
- U.S. Small Business Administration. (n.d.). *2019 Weekly Lending Reports*. Retrieved February 01, 2019, from https://www.sba.gov/sites/default/files/aboutsbaarticle/WebsiteReport_asof_20190201.pdf