Machine Learning

In my role focused on trading-related machine learning (ML)-based signals, I have contributed significantly to the development and enhancement of various models, particularly in the High Yield (HY) and Investment Grade (IG) domains. Here's an overview of my contributions in this regard:

High Yield (HY):

1. HY Latent Factor Implied Performance Model: I have actively worked on a suite of models that are currently in production. These models are instrumental in estimating the HY market beta and predicting macro-implied T+1 price changes. They serve a crucial role in demand prediction, liquidity taking edge estimation, and ETF basket optimization.
2. HY Inquiry Modeling: I developed a suite of models for predicting forward request for quotes activity and distribution for high yield corporate bonds, currently under testing and undergoing productization planning.

3. HY Demand Model: My contributions in this area include performing a code review and conducting extensive experimentation. This process aimed to refine the response variable (a proxy for quantifying excess return or alpha) and assess the effectiveness of novel features.

4. Expected Response Intensity Model: I have developed models for predicting both the number of responses and the distance to cover on liquidity-taking lists that we distribute. This work is still under development.

Investment Grade (IG):

1. IG Inquiry Modeling: I have developed a suite of models for predicting forward request for quotes activity and distribution for investment-grade corporate bonds.

2. IG Latent Factor Discovery: In this area, I have initialed the development of a suite of models designed to leverage latent structure discovery and estimate market exposures and implied (or imputed) spread for non-trading bonds, which is critical for investment-grade markets. This work is currently under development.

3. IG Demand Model: My involvement in IG demand modeling includes conducting a code review and extensive experimentation. These efforts aimed to evaluate novel features for further enhancement especially from dealer runz and

Foundational Machine Learning:

1. Contributions to Jefml: I have actively contributed to Jefml, a centralized machine learning repository that offers utilities commonly used across high yield ML-based signals. This has streamlined the development process and improved the efficiency of our models.
2. Creation of Jefdl: I've played a key role in creating Jefdl, a centralized deep learning repository. This repository contains illustrative and sample code that aids in building modern deep learning models, particularly relevant for text analytics, which is crucial for alpha capture.
3. Creation of Jefrl: My contributions extend to the creation of Jefrl, a centralized reinforcement learning repository. This repository serves as a valuable resource for understanding the fundamentals of Markov decision processes and dynamic programming, which are particularly relevant in inventory optimization and holding cost minimization problems.

ML Pipeline:

I've taken an active role in researching and evaluating various options and tools to define the essential components of a robust machine learning pipeline with top-tier MLOps capabilities. I've guided the team to consider the merits of SageMaker while simultaneously exploring alternative platform-agnostic tools like MLFlow for effective model registry management.

In addition, I've suggested the development of an in-house analytical layer to handle the computational demands of frequently used features. This analytical layer can be efficiently managed by a feature store tool, streamlining feature management and enhancing our overall machine learning infrastructure.

Systematic Trading, Quantitative Research & Alt-data

I collaborated closely with senior traders to transform trading and business questions related to (semi) automatic decision-making into well-defined data and analytics problems that could be addressed using statistical machine learning techniques. The primary objective was to ensure an impartial pursuit of optimality in our decision-making processes.

I also diligently monitored the latest research literature in quantitative finance and machine learning within the trading domain. This involved critically assessing the applicability and relevance of published algorithms and proposed feature ideas to our specific context and operational needs.

Furthermore, I actively participated in and encouraged my colleagues to attend conferences and seminars related to machine learning in quantitative finance and the utilization of alternative data sources. This proactive involvement helped keep our team abreast of the most recent developments in this rapidly evolving space.

Mentorship

I have collaborated closely with colleagues at both the associate and VP levels, offering valuable insights and guidance on matters related to machine learning and quantitative research. I've been proactive in providing comprehensive, step-by-step methodological recommendations, and I've directed them to pertinent literature that bridges the gap between machine learning and quantitative finance.

Furthermore, I took the lead in conducting a rigorous, six-month-long advanced deep learning seminar. During this program, we delved into an extensive deep learning textbook spanning over 800 pages. I was responsible for preparing weekly presentation slides that aimed to simplify and demystify intricate concepts and topics, ensuring that participants could grasp even the most complex aspects of deep learning.

To optimize my performance, I have devised a multifaceted strategy, which includes the following key initiatives:

1. Semi-Systematic Approach: I will intensify collaboration with traders to leverage predictive signals for generating profit and further enrich our comprehension of the credit micro-structure.

2. Fully Systematic Approach: In a fully systematic environment, I plan to explore advanced algorithmic decision-making techniques to refine and augment our automatic market-making protocol.

3. Holistic Approach to trading: I will think of the feasibility of a (semi) systematic holistic perspective, encompassing:

a. Market Making

b. ETF Arbitrage

c. Portfolio Trading

d. Liquidity Taking

This comprehensive strategy will allow us to capitalize on diverse opportunities and strengthen our overall performance.

4. MLOps Focus: I will allocate additional time and effort to the enhancement of MLOps, aiming to consolidate and fortify our Machine Learning pipeline for greater efficiency and reliability.