

Projects proposed by the program

- Transfer learning and portfolio management
 - Main approach: transfer learning
 - Primary reference: “Transfer learning and portfolio management”, Xin Guo et al
- Transaction cost analysis for corporate bonds
 - Main approach: Lasso and penalized regressions
 - Primary reference: Transaction costs analysis for corporate bonds”, Xin Guo et al

Projects proposed by the program

- Optimal placement execution with reinforcement learning
 - Main approach: RL
 - Primary reference:
 - "Optimal Placement in a Limit Order Book", Xin Guo et. al.
 - "Risk-Sensitive Compact Decision Trees for Autonomous Execution in Presence of Simulated Market Response" by S. Vyetrenko, K Xu
- Data:
 - NASDAQ data (<https://bcourses.berkeley.edu/courses/1518016/files/folder/LOB%20data>) with no market impact assumption (need to parse)
 - ABIDES (including ABIDES-gym)

Projects proposed by the program

- Multi-agent market simulation - realistic configuration construction/calibration
 - Main approach: multi-agent simulation
 - Primary reference:
 - “Get Real: Realism Metrics for Robust Limit Order Book Market Simulations”, Svitlana Vyetrenko et al.
- Data:
 - NASDAQ data (<https://bcourses.berkeley.edu/courses/1518016/files/folder/LOB%20data>) with no market impact assumption (need to parse)
 - ABIDES (including ABIDES-gym)

Projects proposed by the program

- Reinforcement learning for trading
 - Main approach: reinforcement learning
 - Primary reference:
 - "Multi-Agent Reinforcement Learning in a Realistic Limit Order Book Market Simulation", Karpe et al
 - "Risk-Sensitive Compact Decision Trees for Autonomous Execution in Presence of Simulated Market Response" by S. Vyetrenko, K Xu
- Data:
 - NASDAQ data (<https://bcourses.berkeley.edu/courses/1518016/files/folder/LOB%20data>) with no market impact assumption (need to parse)
 - ABIDES (including ABIDES-gym)

Projects proposed by the program

- Reinforcement learning for market making
 - Main approach: reinforcement learning
 - Primary reference: "Market Making via Reinforcement Learning" by T.Spooner et al.
- Data:
 - NASDAQ data (<https://bcourses.berkeley.edu/courses/1518016/files/folder/LOB%20data>) with no market impact assumption (need to parse)
 - ABIDES (including ABIDES-gym)

Projects proposed by the program

- Synthetic market time series generation
 - Main approach:
 - GANs
 - Primary reference:
 - "Time-series Generative Adversarial Networks" by Jinsung Yoon et al.
- Possible data sources:
 - **Equites end-of-day**: Yahoo finance
 - **Equites intraday**: NASDAQ data (<https://bcourses.berkeley.edu/courses/1518016/files/folder/LOB%20data>) - need to parse
 - **Rates**: U.S. Department of the Treasury. [n. d.] U.S. Treasury rates. <https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldAll>

Projects proposed by the program

- Improving forecast of a time series model with synthetic time series augmentation
 - Main approach:
 - Neural networks, GANs
 - Primary reference:
 - "[Evaluating data augmentation for financial time series classification](#)". by Elizabeth Fons et al.
 - Other papers:
 - https://openreview.net/forum?id=bITJpx_NVA
 - <https://arxiv.org/abs/2209.11306>
- Possible data sources:
 - **Equites end-of-day**: Yahoo finance
 - **Equites intraday**: NASDAQ data (<https://bcourses.berkeley.edu/courses/1518016/files/folder/LOB%20data>) - need to parse
 - **Rates**: U.S. Department of the Treasury. [n. d.] U.S. Treasury rates. <https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldAll>

Project Idea - Name

- Author(s):
- Project Goal:
- Data:
- Proposed Outcomes:
- Details (if any):

Proposal for part g: Improving forecast of a time series model with synthetic time series augmentation

CHENYAN YANG

PINSONG QIAN

IDEA

- Compare different time series augmentation in a different portfolio from a wider angle, which contains not only the portfolio in traditional markets like the stock market but also in the crypto markets like NFT and tokens.
- Apply different methods to address data and test their performance in GAN, figure out the best solution of them.

Dataset Proposal

Mostly for crypto assets as the traditional ones could be found in yahoo finance:

Etherscan [Ethereum \(ETH\) Blockchain Explorer \(etherscan.io\)](https://etherscan.io)

Token terminal [Token Terminal | Fundamentals for crypto](#)

Nansen [Nansen](#)

Dune Analytics [Dashboards \(dune.com\)](https://dune.com)

Context [Top sales | Context](#)



The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect.

Improving Forecast of a time series model with synthetic time series augmentation

Siyu Gao

Capstone Project

- ▶ At the beginning, we need to set up a initial linear regression as the foundation for discriminator and generator
- ▶ Utilize a regular formula range to differentiate the noise data and real data in discriminator
- ▶ If enough large amount of noise data appearing in the analysis process. Then, we should take steps on the update on the generator.
- ▶ With a great deal of simulation. From my perspective, we will get a complete generator and discriminator.
- ▶ By utilizing both of them, the prediction will be effective.

Capstone proposal structure

- Introduction and motivation (why?)
- Related work
- Exact goals of your work
 - Data
 - Baselines
 - Proposed techniques
- Metrics of success (e.g., design a prediction algorithm that outperforms a benchmark)