UMD DATA605 - Big Data Systems

Sorrentum Tutorial

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Overview

- www.sorrentum.org/
- GitHub repo
  - Please star and fork the repo!
- DeFi protocol to build advanced financial applications
- Open-source project backed by a non-profit foundation
- Two companies built on top of Sorrentum
  - Kaizen
  - DaoSwap
- Research project at UMD to foster entrepreneurship of students and faculty
  - We give you a product idea
  - Students implement with us
  - Fundraise
  - Create a company
- To contribute
  - Your class project will be part of the project
  - You can keep contribute to Sorrentum
  - Research office hours every week
  - 50 students interested, 20 already contributing
  - Sign up here

Sorrentum Primitives

- Smart contracts
  - Staking, escrow, vesting
  - P2P transactions
  - Off-chain secure computation
  - DaoSwap, DaoETF
- Data pipeline
  - Standardized flow to on-board, clean, normalize, serve market data and alternative data
- Data flow
  - A machine learning framework for describing, simulating, and deploying financial models
- Risk models
  - Portfolio optimization
- Market execution
  - Connect to centralized and decentralized exchanges
  - Manage orders and portfolios using algorithmic trading

Blockchain

- Replicated, shared, synchronized digital data based on consensus
  - Intuition: like a distributed database
- Consensus algorithm
  - Multiple peer nodes replicate and update a copy of the data independently
  - Lack of central authority
  - No single point of failure
  - Proof-of-work or proof-of-stake
- Permission-less or permissioned (private)

Smart Contract

- A computer program (aka protocol) that automatically executes, controls, documents events and actions according to the terms of a contract
- Example:
  - A vending machine (can you trust it?)
  - An escrow company (can you trust it)
  - Bitcoin protocol (you can trust it)
  - Ethereum smart contracts (you can trust it)
- Nodes maintain / update state on a blockchain
- Pros:
  - Reduce need for trusted intermediaries
  - Reduce malicious and accidental exceptions

Decentralized Applications

- DApp, dApp, Dapp, dapp
- DApps
  - Operate autonomously (without human intervention) using smart contracts running on blockchain
  - Are not owned by any one entity
  - Use tokens to represent ownership and incentivize behaviors (aka tokenomics or cryptonomics)
  - Typically open-source
  - You can do an (hostile) fork (in the old meaning of create a competing project)

DeFi

- Decentralized finance
- Offer financial instruments without relying on intermediaries (e.g., brokerage, exchanges, banks)
  - Replaced by dApps and smart contracts running on blockchain

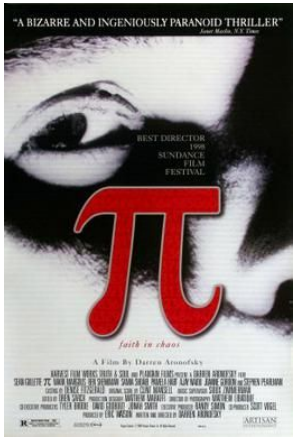
Machine Learning Research

- Arbitrage
  - = take advantage of discrepancy of prices in time or space to make a profit
  - Key to a well-functioning markets
    - Capitalism at its best
  - Mechanical (or risk-less) vs statistical arbitrage
  - Cross-exchange
  - Single-exchange
- Natural Language Processing (NLP) and markets
  - Understand news and social media and predict effect on markets
- Model research
  - Predicting noisy financial quantities (e.g., price, volatility, volume, bid-ask spread)

DeFi / Web3 Research

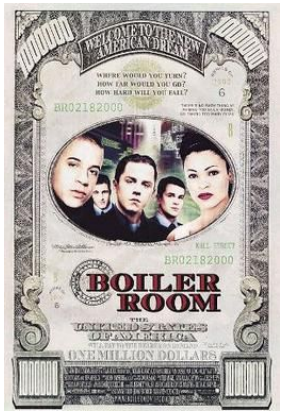
- Tokens
  - SORRE - Utility token
  - NTUM - Governance token
- DApps
  - DaoSwap
    - Lit liquidity pool
    - Crossing network
  - DaoETF
    - Build investment tokens
    - Passive and active strategies

Additional Resources



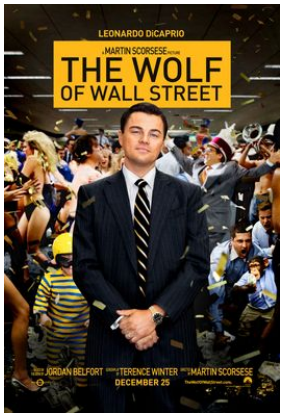
[Pi, 1998]

[The Big Short, 2015]

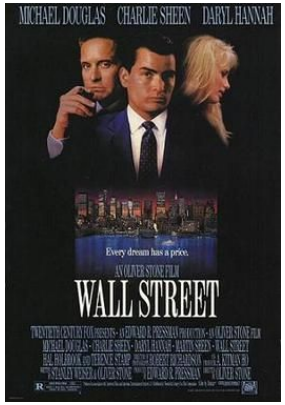


[Boiler room, 2000]

[Margin call, 2011]



[The Wolf of Wall Street, 2013]



[Wall Street, 1987]

Sorrentum Sandbox

- Tutorial
- Two data node examples
  - Binance
  - Reddit