E6893 Big Data Analytics Lecture 10:

**Big Data and AI Applications in Finance Industry - II**

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Outline

• What is Market Intelligence?
• Market Intelligence Platform Functions
• How Market Intelligence Platform Analyzes A Single News?
  • Bayesian Network
  • The Science Behind Reasoning
• Price Impact Prediction
  • How Market Intelligence Platform Aggregates Information?
  • Aggregate Information Analysis Framework
Thrust 1. Modeling Information Dissemination:
Task 1.1. Computational Modeling of User Dynamic Behavior
Task 1.2. Computational Models of Trust and Social Capital
Task 1.3. Information Morphing Modeling
Task 1.4. Persuasiveness of Memes
Task 1.5. The Observability of Social Systems
Task 1.6. Culture-Dependent Social Media Modeling
Task 1.7. Dynamics of Influence in Social Networks
Task 1.8. Understanding the Optimal Immunization Policy
Task 1.9. Modeling and Identification of Campaign Target Audience
Task 1.10. Modeling and Predicting Competing Memes

Thrust 2. Detecting and Tracking Information Dissemination:
Task 2.1. Real-Time and Large-Scale Social Media Mining
Task 2.2. Role and Function Discovery
Task 2.3. Detecting Malicious Users and Malware Propagation
Task 2.4. Emergent Topic Detection and Tracking
Task 2.5. Detecting Evolution History and Authenticity of Multimedia Memes
Task 2.6. Synchronistic Social Media Information and Social Proof Opinion Mining
Task 2.7. Community Detection and Tracking
Task 2.8. Interplay Across Multiple-Networks
Task 2.9: Assessing Affective Impact of Multi-Modal Social Media

Thrust 3. Affecting Information Dissemination:
Task 3.1. Crowd-sourcing Evidence Gathering to Formulate Counter-messaging Objectives
Task 3.2. Delivery and Evaluation of a Counter-messaging Campaign
Task 3.3. Optimal Target People Selection
Task 3.4. Automated Generation of Counter Messaging
Task 3.5. User Interfaces for Semi-Automatic Counter Messaging
Task 3.6. Controlling the Dynamics of Influence in Social Networks
Task 3.7. Influencing the Outcome of Competing Memes and Counter Messaging
What is Market Intelligence?

- Personal research analyst
- Provides real-time news information with relevance rankings according to your individual portfolios and watchlists
- Generates overall Price Impact Score from all monitored news sources
Market Intelligence Platform Functions

- Total impact: calculated from all monitored news source
- Single News Impact: calculated from selected news

Artificial intelligence and Bayesian network powered causality reasoning graph

What’s in your portfolio

Price Chart

Trending news that has impact on your portfolio

Personalization of news you care
Bayesian network is a probabilistic graphical model (a type of statistical model) that represents a set of variables and their conditional dependencies via a directed acyclic graph (DAG).

A simple Bayesian network. Rain influences whether the sprinkler is activated, and both rain and the sprinkler influence whether the grass is wet.

With observed probability, we can answer questions such as what is the probability of raining, given grass is wet.

Similar causality network can be applied to the market: Rain – Negative Economy Outlook; Sprinkler – Negative Company Management; Grass Wet – Stock Price Decrease.
### Influence Graph Example

<table>
<thead>
<tr>
<th>Ticker</th>
<th>Company</th>
<th>Industry</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>002178</td>
<td>延华智能</td>
<td>Information Technology</td>
<td>Tech</td>
</tr>
<tr>
<td>002230</td>
<td>科大讯飞</td>
<td>Information Technology</td>
<td>Tech</td>
</tr>
<tr>
<td>002232</td>
<td>启明信息</td>
<td>Information Technology</td>
<td>Tech</td>
</tr>
<tr>
<td>002439</td>
<td>启明星辰</td>
<td>Internet Service Provider</td>
<td>Tech</td>
</tr>
<tr>
<td>300297</td>
<td>蓝盾股份</td>
<td>Information Technology</td>
<td>Tech</td>
</tr>
<tr>
<td>JD</td>
<td>京东</td>
<td>Internet Service Provider</td>
<td>Tech</td>
</tr>
<tr>
<td>CHL</td>
<td>中国移动</td>
<td>Information Technology</td>
<td>Tech</td>
</tr>
</tbody>
</table>

- **延华智能**: 高端咨询，智能建筑，智慧医疗，智慧节能，智慧环保，数据中心。
- **科大讯飞**: 智能语音及语言技术、人工智能技术研究
- **启明信息**: 管理软件、汽车电子产品、集成服务、数据中心
- **启明星辰**: 安全网关、安全检测、数据安全与平台、安全服务与工具、硬件及其他
- **蓝盾股份**: 高端咨询，智能建筑，智慧医疗，智慧节能，智慧环保，数据中心
- **中国移动**: 移动语音、数据、IP电话和多媒体业务，还提供传真、数据IP电话等增值服务
- **京东**: 大型综合型电商平台，出售家电、数码通讯、电脑、家居百货、服饰服饰、母婴、图书、食品等商品。
Bayesian Network Industry Example
How Market Intelligence Platform Analyze A Single News?

- Impact score of news on each stock
- News to be analyzed

Impact score:
- T-mobile Inc: 70%
- Apple Inc: 10%
- Sprint: 79%

News Analysis:

Apple Beats Sales Estimates; Shares Rise

Apple Earnings Show Growing Immunity to Smartphone Market

T-Mobile and Sprint CEOs State Case for Merger at FCC

Sprint, T-Mobile Three Big Takeaways

Should T-Mobile and Sprint Be Allowed to Merge? Not If Not...

Bloomberg LP [US]

The leaders of T-Mobile US Inc. and Sprint Corp. appeared at the Federal Communications Commission on Tuesday to begin laying the groundwork for their proposed $26.5 billion merger, according to an agency official who spoke on condition of anonymity because the meeting wasn't public.

T-Mobile's John Legere and Sprint's Marcelo Claure met with FCC officials and laid out much the same case that the companies have presented in public since announcing T-Mobile's proposed purchase of its smaller rival on April 29, said the official.

Meetings had been scheduled with Commissioner Michael O’Rielly, a Republican, and Commissioner Jessica
Security offering as acquisition form, antitrust investigation, and unfavorable market reaction leads short-term merger participants price goes down.

Target Stock Price Decrease

Acquirer Stock Price Decrease
Event analysis module for each type of events

- Event analysis module example: M&A analysis framework
- Collect corresponding information for each module from news and collect historical data
- Estimate probability of how a factor of events causes changes in other factors
- Use Bayesian Network to estimate the stock future outlook
Price Impact Prediction

Market News

User Portfolio

Company
Industry
Competitors
Macroeconomic
Geopolitical

Market Intelligence Impact Prediction
How Market Intelligence Platform Aggregate Information?

Assess aggregate information of Apple Inc. stock

- Stock price predicted to be increase by aggregate all monitored news from four major areas.
- Detailed news reasoning graph of recommended news from left column.
After earnings release, Apple's revenue growth, optimistic financing status and promising industry outlook drive stock price increase. Major factors include sales increase from products, services and wearable, optimistic financing by dividend increase and share repurchase.
Aggregate Information Analysis Framework

• Corporate
  • Investing: external investing, internal investing
  • Operating: revenue, cost, management, product
  • Financing: capital structure, distribution, debt

• Industry
  • Lifecycle
  • Demand Supply
  • Future expectation

• Competition
  • Market share
  • Product differentiation

• Macroeconomic
  • Indicators such as GDP, GNI, Retail Sales, Unemployment Rates, CCI and etc.
  • Trade Balance
  • Monetary Policy: Inflation, Interest Rate, and etc.
  • Fiscal Policy: Taxation, Government budgeting

• Geopolitical
  • Market type: Emerging, Developed
  • Nature disaster, extreme weather, catastrophic event
  • Political instability: war, strike, civil unrest
Aggregate Information Analysis Framework
Overview of AI for Robo-Advisory
## Robo-Advisory Examples

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Example</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robo Advisors</td>
<td>Digitalized automatic wealth management platform</td>
<td>nutmeg</td>
<td>4Q2015: Top 5 Robo Advisors have combined AUM being $44.2B.</td>
</tr>
<tr>
<td>advisors</td>
<td></td>
<td>Betterment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>personal capital</td>
<td></td>
</tr>
<tr>
<td>Retail Investment</td>
<td>New type of digital transaction and investment platform, such as theme</td>
<td>motif</td>
<td>Robinhood boasts a sign-up time of 4 minutes and free trading</td>
</tr>
<tr>
<td></td>
<td>investment or combined transactions</td>
<td>robinhood</td>
<td></td>
</tr>
</tbody>
</table>

### Robo Advisor Fundraising

<table>
<thead>
<tr>
<th>Year</th>
<th>Deal Value (M)</th>
<th>Number of Deals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>44.3</td>
<td>6</td>
</tr>
<tr>
<td>2012</td>
<td>36.7</td>
<td>14</td>
</tr>
<tr>
<td>2013</td>
<td>98.5</td>
<td>16</td>
</tr>
<tr>
<td>2014</td>
<td>287.1</td>
<td>25</td>
</tr>
<tr>
<td>2015</td>
<td>246.6</td>
<td>30</td>
</tr>
</tbody>
</table>

Sources: Investmentnews.com,
What is Robo-Advisor?

Robo-Advisor is a new type of wealth management service. Based on the risk level and investment goals provided by the investor, and it uses a series of ‘smart algorithm’ to calculate the optimal investment suggestions.

Features:
- Strongly depend on technology, algorithm and financial theory
- Distributed investment, maximum long-term return
- Personalized portfolio allocation.

Robo-advisors directly managed about $19 billion as of December 2014. By 2020 the global assets under management of robo-advisers is forecast to grow to an estimated US$255B.

Harry Markowitz

Non-biased
- Low investment threshold
- Low starting entry money
- Low agent fee
Example: Wealthfront——low entry requirement, low fee

- On Sept 2015, the total asset is $2.6B.
- The estimated value of the company is $1B as in 2015.

- **Low entry requirement**: min investment value USD $500.
- **Low fee**:
  - Zero annual fee, if account is lower than $10K.
  - 0.25% fee is charged for the part of asset amount that is larger than $10K.
  - No agent fee
  - Based on Wealthfront, in average, each user only needs to pay 0.12% fee.
Timeline of Emerging Rob-Advisory Companies

2009
1. Personal Capital
2010
1. FutureAdvisor
2. SIGFIG
2011
2012
2013
2014
1. MARIE QUANTIER
Inspiration depuis 1907
2. Betterment
3. Wealthfront
4. Stockspot
2015
1. InvestGlass
the best way to invest
Typical Steps of Robo-Advisory

Most of the robo-advisor platform is built based on the modern investment portfolio theory, using Exchange Trade Funds (ETFs) to build portfolio.

- design questionnaire;
- Score Risk Capacity and Risk Willingness based on the answers of the questionnaire.

- portfolio strategy;
- type analysis;
- optimum allocation;

- Monte Carlo Simulation
- Judge whether the goal is achieved
- Suggest adjustments;

- Saving tax through the loss to compensate the gains;
- outcome is highly related to the income;
- Investment income tax (not applicable in China)

- set tolerance level to avoid over adjustment

Based on a survey of Wells Fargo, in US, there is only 16% of population in their 20s and 30s are willing to interact with investment consultants. The remaining people prefer to use these types of AI consultant.
Robo Advisor Customer Analysis

- High End Customers (Private Bank / Special Investment Services)
- Targeted Customers (Consumer Bank Services): $15K - $1M
- General Public (Consumer Bank Services)
## Four Steps to use Big Data Cognitive Analysis for Robo-Advisor

<table>
<thead>
<tr>
<th>Investment Market Analysis</th>
<th>Dynamically Know Your Customer</th>
<th>Optimized Personalized Investment Strategy</th>
<th>Precise Bank-Customer Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Analyze the market performance of various kinds of funds</td>
<td>• Customer Profiling, e.g., based on IPQ (Individual Profile Questionnaire), Feedback, Risk Capacity and Risk Willingness</td>
<td>• Strategy computation and optimization based on personal history</td>
<td>• Create and predict customer interaction strategy, including when, method, content to interact with customer – to achieve max customer and bank benefit.</td>
</tr>
<tr>
<td>• Analyze domestic and international financial and economic changes and how they may impact CPI, PPI, or GDP.</td>
<td>• Understand what the customer really wants based on their past behaviors interacting with bank</td>
<td>• Demonstrate / Simulate ‘what ifs’ when the portfolio has different allocation.</td>
<td></td>
</tr>
<tr>
<td>• Use Machine Learning and Deep Learning, based on historical economic numbers, find out how factors impact financial markets.</td>
<td></td>
<td>• Explainability of ‘what ifs’ to customer to the customer.</td>
<td></td>
</tr>
</tbody>
</table>

**Data**

- Product Data
- Market Data
- Historical Economic Data
- Industry-related Data

- Customer Data
- Behavior Data / Interaction Data

**Data**

- Customer Data
- Market Data

**Data**

- Customer Data
- Interaction Data
- Else?
Example: Major Wealth Management

Hundreds of products/campaigns
Combinations with incompatibilities
How much of each product/campaign?

Telesales, Mail, email, Office, etc…
Done through which channel?

Nightly batch run, select over 1.2M

Experts doing what-if to improve process

To which customers?
Several millions of customers

When?
Select actions for the next days
Task 1. Market Data Analysis and Investment Targets
Data Analysis of Funds

全面的基金品种，深度的数据分析

Investment Portfolio Platform

组合管理与风险分析的专业平台

Source: Wind.com.cn
News and Research Report Analysis

实时跟踪180+个财经媒体、200+个行业网站，7x24小时更新
中国近五十家证券或行业研究机构的研报发布平台
Procedures

Use relationships for iteration

Prediction based on Time Series
Task 2. Advanced Dynamic ‘Know Your Customer’
Advanced KYC

- Using customer past investment transactions under different market conditions, determine customer risk taking sentiment in real time on daily basis. Is customer panicking type or double down?
- Assess customer financial strength in taking aggressive investment position.
- Suggest portfolio adjustment at a rate that matches customer investment change rate
Enhanced customer view

Recommendation

item

user

Graph Visualizations

Communities
Centralities
Ego Net Features
Graph Search
Graph Query
Graph Matching
Graph Sampling
Network Info Flow
Shortest Paths
Bayesian Networks
Latent Net
Markov Networks
Middleware and Database
Customer Behavior Sequence Analysis

- Behavior Pattern Detection
- Help Needed Detection
Deriving Personality

Big5 Personality (OCEAN)

- Openness vs. Conscientiousness
- Extraversion vs. Agreeableness
- Neuroticism vs. Conscientiousness
- Inventive/curious vs. consistent/cautious
- Outgoing/energetic vs. solitary/reserved
- Sensitive/nervous vs. secure/confident
- Friendly/compassionate vs. cold/unkind
- Efficient/organized vs. easy-going/careless
What do we model
  – 12-dimension needs

[Ford, 2005]
Deriving Value

- Why model value
  - Values motivate people and guide their actions
  - Values transcend specific actions and situations

[Schwartz 2006]

Organized by motivational similarities and dissimilarities
Recommendation Driven by Influence Flow

Innovator

Early adopter

Early majority

Late majority

Laggard

People with similar tastes

Influence is not symmetric!


Task 3. Optimized Personalized Investment Strategy
Optimized Personal Investment Strategy

- Project customer existing portfolio performance over a time period vs. suggested adjustment projected performance over the same period.
  - Show past historical similarity and simulated projection.
- Portfolio adjustment should include both conservative and aggressive bias and let the customer choose change or no change to his portfolio.
- Give customer the decision making power to make portfolio adjustment using our personalized recommendation.
Robo-Advisory Techniques suggests better combination

Constrained optimized model

Model Analysis → Risk Analysis → Set Constraints → Optimization

Risk-Profit chart

Optimized outcome

Risk-adjusted value vs Total Cost

Value-maximizing portfolio (same cost, more value)

Current portfolio

Cost-minimizing portfolio (same value, less cost)
Optimization is about
Resource efficiency/utilization and allocation

<table>
<thead>
<tr>
<th>Resources</th>
<th>Choices to make</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital</td>
<td>Invest, allocate</td>
</tr>
<tr>
<td>People</td>
<td>Hire, assign, schedule</td>
</tr>
<tr>
<td>Equipment</td>
<td>Acquire, schedule, locate</td>
</tr>
<tr>
<td>Facilities</td>
<td>Locate, size, schedule, maintain</td>
</tr>
<tr>
<td>Vehicles</td>
<td>Acquire, route, schedule, deliver, maintain</td>
</tr>
<tr>
<td>Material/Product</td>
<td>Acquire, allocate, produce, deliver, maintain</td>
</tr>
</tbody>
</table>

- Planning and scheduling activities
  - Which are subject to complex operating constraints (e.g. limited resources, large volume of data, complex manufacturing or design processes)
  - With multiple business objectives to reduce time, cost, or increase KPI’s such as productivity

- While enabling
  - Adjustment of changes in operating environment
  - What-if analysis

Keywords:
- minimize, maximize,
- how many/how much, which, when/where
- decide/choose, plan, schedule, assign, route, source, maintain, locate, trade-off
Portfolio Optimization

• **Issue**: Portfolio holders and managers seek maximum return from assets while limiting risks of adverse outcomes.
  • Classical formulation by Markowitz has become enriched by several factors.
  • Competitive advantage and client preferences lead fund managers to tailor portfolios to specific regional, sectoral, and other diverse preferences.
  • Novel assets have risk characteristics very different from standard stocks and bonds.

• **Scope**: Thousands of assets, hundreds of sectors, hundreds of regions. Rebalancing frequency (daily, weekly,...)

• **Decisions**: Amount of fund allocated to each asset

• **Objectives**: Minimize risk as measured by variance of portfolio return, etc

• **Requirements**:
  • Expected return at least achieves target
  • Total funds invested does not exceed amount available
  • Total funds invested per sector and/or region does not exceed limit
  • Limits on leverage
Portfolio Management

• Business Problem
  • Comply with Federal stress test requirements and gain Federal approval to increase dividends
  • Find the most appropriate asset allocation according to investment goals, market history and forecasts
  • Analyze risks of investment portfolio from various perspectives
  • Arrive at rebalancing strategy to minimize transaction costs
  • Investment returns have a high chance of a small return with a small chance of a large loss, so the standard Markovitz model doesn't apply

• Solution
  • Linear programming formulation
  • Optimization model maximizes expected return while constraining the average of the worst scenario returns (CVAR)
  • Uses simulation to model investment risk
  • Enforces other constraints
Portfolio Optimization

• **Business Problem**
  - Customize active tax management for each managed account
  - Automate tradeoff between risk, return and taxes for each investor

• **Solution**
  - Use programming optimization to model risk, return, taxes and transaction costs
  - The optimizer evaluates and rebalances portfolios
  - Making the problem especially difficult are uncertain and fluctuating markets, changing tax laws, compliance regulations.
Trade Matching

- **Issue**: Portfolio managers engage in trading activity to invest new money and to rebalance asset allocations to achieve investment goals.
  - Many firms manage multiple portfolios.
  - Trade matching enables executing trades among multiple portfolios within a firm to avoid transactions costs of going to the markets
- **Scope**: Hundreds of funds, thousands of assets, hundreds of transactions per week
- **Decisions**: Amount of each security to buy or sell from/to each fund
- **Objectives**: Minimize net cost to move the assets
Trade Matching

• Problem
  • Optimize portfolio management applications to help the firm create competitive advantage and provide substantial savings to clients

• Solution
  • Trade Crossing:
    • match thousands of assets in buy and sell orders,
    • avoiding market trades and related transaction costs
  • Optimized In-kinding:
    • transfer a large majority of portfolio assets directly ("in-kind") into targeted funds, saving clients hundreds of millions in transaction costs
  • Fund Rebalancing:
    • create optimal holdings of fund assets through appropriate trades,
    • allowing fund managers to perform accurate index tracking, while minimizing transaction costs
Task 4. Bank-Customer Interaction Strategy
Bank-Customer Interaction Strategy

- Customers may not immediately accept a personalized investment strategy.
  - Customers profile may contain insufficient data (e.g. new customers) to fully capture their risk profile.
  - Customers may have their own investment strategy ideas they want to pursue.
  - Customers desired investment characteristics may be impossible to achieve.
  - Customers may be willing to accept higher risk strategies than they believe.
- A personalized investment strategy may involve a number of investment stages.
  - What order should these stages be presented?
  - Can this order influence a customers risk profile?
- How can we model interaction with customers? As a multi-agent decision process, analyzed using game theory.
• Game theory is a system to model behavior of those in conflict, or with different goals.

• Creates predictions about individuals using assumptions of rationality (I will make the decision that is best for me).

• We can use an influence diagram to describe a game or decision process and solve it (e.g. using game theory).

• Here we have an influence diagram representing the ultimatum game between the Proposer (i.e. a bank) and a Responder (i.e. a customer).
Customer and Bank Interaction Modeling

• Using influence diagrams, we can model the process of suggesting investment strategies to customers. This involves decision processes with potentially multiple interactions between a bank and each client.
• We assume that the bank and the customer each have their own financial investment characteristics that they find desirable.
• Game theoretic decision processes to settle on an investment strategy that both find acceptable, involving offers and counter offers.

Banks model of customer:
• Graph similarity to other customers based on past transactions and actions.
• Similar to neighbours in the graph.
• Assume level of game theoretic rationality.
• Update based on counter offers.
Customer and Bank Interaction Modeling

• But customers may not be completely rational, or our we may not be sure which model of customer behavior best represents their desires and future actions.

• Using networks of influence diagrams (effectively a graph of graphs), we can model that customers may occasionally choose to make irrational demands.

• Can also explicitly model how the bank and the customer reason about each other e.g.
  • A bank has a belief about a customer
  • A bank has a belief about a belief that the customer has of the bank
  • A bank has a belief about a belief that the customer has of how the bank believes the customer will act.
  • Etc.

• With lots of potential negotiating decisions to be made, potential customer models, depth of reasoning, and length of negotiation… very large graph problem!
Example Customer Negotiations

4-step single customer investment negotiation.

4-step multiple customer investment negotiation.
AI Trader
Personal AI Traders

Anita avatars are earning: $1,501.65

<table>
<thead>
<tr>
<th>Avatar ID</th>
<th>Name</th>
<th>Earnings per $1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANITA-324658</td>
<td></td>
<td>$82.24</td>
</tr>
<tr>
<td>ANITA-253758</td>
<td></td>
<td>$27.04</td>
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<td>ANITA-247917</td>
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<tr>
<td>ANITA-267139</td>
<td></td>
<td>$456.80</td>
</tr>
</tbody>
</table>
Personality driven AI Trader

Anita 267139

-- an Adventurous AI Trader

Specialized at: EUR-USD

Knowledgable of: Oil, Gold and Twitter

Strategy Learning Frequency at: 2.0 hours

Original: $1,000.00, Current: $1,404.50, Performance: Gain $404.50

Activities

<table>
<thead>
<tr>
<th>Time</th>
<th>Action</th>
<th>Cash</th>
<th>Unit</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017-10-12 13:45:05</td>
<td>Sell 50,000</td>
<td>$1,404.50</td>
<td>0</td>
<td>$1,404.50</td>
</tr>
<tr>
<td>2017-10-12 12:57:25</td>
<td>Buy 100,000</td>
<td>$-57,792.00</td>
<td>50,000</td>
<td>$1,388.50</td>
</tr>
<tr>
<td>2017-10-12 11:19:10</td>
<td>Sell 100,000</td>
<td>$60,577.00</td>
<td>-50,000</td>
<td>$1,372.00</td>
</tr>
<tr>
<td>2017-10-12 11:11:55</td>
<td>Buy 100,000</td>
<td>$-57,822.00</td>
<td>50,000</td>
<td>$1,366.00</td>
</tr>
<tr>
<td>2017-10-12 09:08:05</td>
<td>Sell 100,000</td>
<td>$60,566.00</td>
<td>-50,000</td>
<td>$1,310.00</td>
</tr>
<tr>
<td>2017-10-12 08:34:40</td>
<td>Buy 100,000</td>
<td>$-57,935.00</td>
<td>50,000</td>
<td>$1,287.50</td>
</tr>
</tbody>
</table>
Personality driven AI Trader

Anita 247502

-- an Independent AI Trader

Specialized at: EUR-USD

Knowledgeable of: FX, Gold and Twitter

Strategy Learning Frequency at: 100.0 days

Original: $1,000.00, Current: $1,119.50, Performance: Gain $119.50

Activities

<table>
<thead>
<tr>
<th>Time</th>
<th>Action</th>
<th>Cash</th>
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Personality Investing

• Goal
  • Typical portfolio allocation focuses on risk tolerance of investors which measures their ability to take risk. While investors CAN take risk, they may not be WILLING to do so. One’s persona better reflects their willingness to bear risk.

• Features
  • OCEAN Personality Inference and Stock recommendation from portfolio and trading history
  • Portfolio and trading history rated in 6 quantifiable aspects by Market Intelligence
  • Personality driven trading style classification and suggestion

• OCEAN Personality
  • Openness
  • Conscientiousness
  • Extraversion
  • Agreeableness
  • Neuroticism

• Trader Type
  • Careful Investor - John Bogle
  • Patient Investor - Warren Buffett
  • Value Investor - Benjamin Graham
  • Etc.
Deriving Personality

Big5 Personality (OCEAN)
Open Discussion:
How will AI impact the Wealth Management and Investments?