BrainGPT

An AI Co-Pilot for Alpha Construction

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Developed during International Quant Championship (2024)
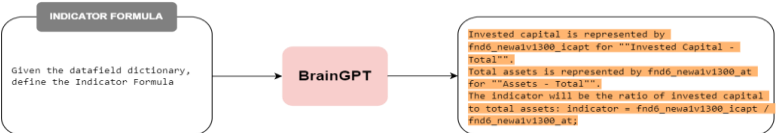
Minimum Viable Product

Proposed Method

Step 1: Decompose the Alpha Ideas

Long stocks with relatively high invested capital, short vice versa. → **BrainGPT** →

Indicator: The ratio of invested capital to total assets.
Signal: Long stocks with higher invested capital-to-total-assets ratio.
Condition: Trade only when the volume is relatively high.

Step 2: Define the Formula of Each Component

INDICATOR FORMULA

Given the datafield dictionary, define the Indicator Formula → **BrainGPT** →

Invested capital is represented by fnd6_newa1v1300_icapt for "Invested Capital - Total".
Total assets is represented by fnd6_newa1v1300_at for "Assets - Total".
The indicator will be the ratio of invested capital to total assets: indicator = fnd6_newa1v1300_icapt / fnd6_newa1v1300_at;

SIGNAL FORMULA

Define the Signal Formula → **BrainGPT** →

Since the alpha involves longing stocks with high invested capital relative to total assets, we will rank the indicator using rank() and smooth fluctuations with ts_zscore(). Given the fundamental datafields, we use a 90-day lookback: signal = ts_zscore(rank(indicator), 90);

CONDITION FORMULA

Define the Condition Formula → **BrainGPT** →

The condition specifies that we trade when volume is high. To quantify this, we rank the volume over a 30-day period using ts_rank(), and we will only trade when the volume ranks in the top 50% of the dataset.
condition = ts_rank(volume, 30) > 0.5;

Step 3: Combine into an alpha expression

Combine everything "alpha" in the bottom line to execute the code, this is a complete code of alpha, it must have the "alpha": → **BrainGPT** →

```
indicator = fnd6_newa1v1300_icapt / fnd6_newa1v1300_at;
signal = ts_zscore(rank(indicator), 90);
condition = ts_rank(volume, 30) > 0.5;
alpha = trade_when(condition, signal, -1);
alpha
```
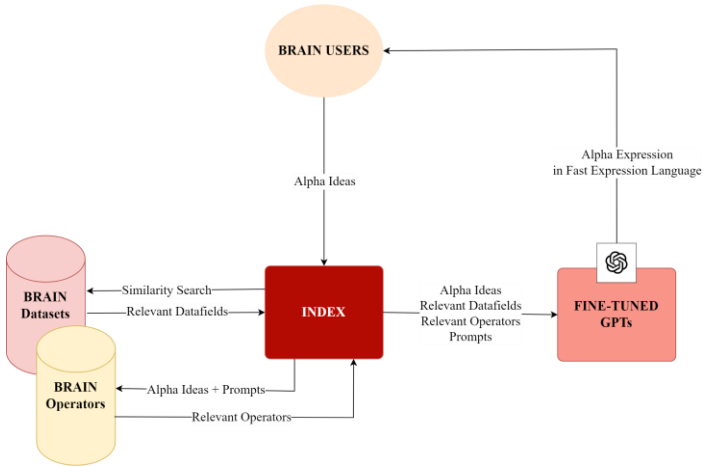

Conclusion

- Proposed a RAG pipeline which extracts relevant data fields and operators

- Proposed a COT template for alpha construction using Fast Expression Language

- Successfully leveraged all Brain datasets and groups of operators that capture full meaning of the original alpha ideas

- Developed an MVP for Brain users

Motivation

Alpha idea sourcing and construction, two crucial components of our current alpha creation process, are both time-consuming and labor-intensive. This has inspired us to develop an AI Co-Pilot to more effectively support Brain Users in these tasks.

	Idea Sourcing	Alpha Construction
HUMAN	Reads **a few** research papers at a **slow** pace to extract hypotheses.	**Slowly** identifies and organizes **a limited number** of relevant data fields and operators for alpha ideas.
BRAINGPT	**Rapidly** reviews **numerous** research papers to extract **multiple** hypotheses.	**Quickly** suggests **a wide range** of suitable data fields and operators for the given alpha ideas.