

A Study on Investment Strategy of Artificial Intelligence Industry Based on PCA

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Abstract: Recently, the AI industry has attracted a lot of attention and has good development potential, so we analyze the investment strategy of the A industry sector based on the principal component analysis method. The team's large-market timing mainly analyzes the fundamentals of the stock, and then values the stock according to indicators such as price-earnings ratio and price-to-book ratio to determine the safety of the current market capitalization. Then, select small caps from current hot spots, use active management strategies to select stocks in the AI industry, and use principal component analysis to formulate the optimal risk stock selection portfolio.

Keywords: AI Active Management Strategy; Principal Component Analysis; Market Timing

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I. Industry Background

According to the team's research and analysis of the stock market, the team predicts that in the second half of 2023, the hot spots of China's stock market will be concentrated in the infrastructure sector, technology sector, emerging consumer sector, agriculture sector, large financial sector, biomedical sector and military sector.

AI is an intelligent machine based on computer science, cross-integrating multiple disciplines, and realizing non-linear, unstructured, and high-dimensional analysis and processing of different data through deep learning such as CNN, RNN, GAN and other neural network models, and can make corresponding responses in different scenarios. AI Artificial intelligence can also be subdivided, divided into strong AI and weak AI. The research objects in this field include language recognition, robotics, expert systems, natural language processing, and so on.

AI integrates multi-industry technologies and has been widely used in industries such as education, healthcare, entertainment, manufacturing, and finance. The continuous innovation and development of AI has gradually replaced some repetitive and low-skilled jobs with technology, resulting in an increase in social unemployment. At the same time, the development of AI has also created new space and opportunities for employment, especially in the fields related to the development, innovation, and maintenance of AI.

II. Literature Review

In 1901, physiologist Pearson proposed the concept of principal component analysis in theoretical research and applied it to the research of non-random change problems; in 1933, Hotel ling applied it in psychological research and then extended it to the level of random vector (Lin and Zhang, 2005)^[1]. In domestic research, Sun(2012)combined principal component analysis with multiple regression to determine comparable companies, so as to establish the revised market method evaluation model.^[3] Principal component analysis method has also been applied in other evaluation fields. Su and Yan(2012)applied principal component analysis method to the segmentation evaluation of portfolio intangible assets to determine the weight of each single intangible asset in the portfolio intangible assets, and then correctly define its value.^[2] To sum up, it is a new attempt and exploration to analyze the investment price of stocks.

III. Strategy Basis

3.1 Active Management Strategy

Active management strategy is to systematically calculate the return of the portfolio by reasonably and actively selecting stocks and timely adjusting the portfolio, so as to achieve the minimum risk and the largest return and avoid the tail risk. Relying on the existing statistical rules and the existing investment experience, investors quickly build a quantitative model suitable for themselves. Through the judgment of the market and individual stocks, they use the data for stock selection and portfolio construction. On this basis, the team decided to adopt the quantitative investment method for stock selection, in order to obtain the maximum return.

3.2 Principal Component Analysis

The basic principle of PCA is to transform its own multiple variables into a few comprehensive indicators. From a mathematical point of view, this belongs to a data dimension reduction processing technology. Let the study of something involves m factors, which are expressed by X_1, X_2, \dots, X_m . Then these m factors constitute m dimensional random vector and form a new comprehensive variable through linear change. The new comprehensive variables are represented as Y_1, Y_2, \dots, Y_m .

3.3 Market Timing

Stock selection and timing, the two cannot be separated, is an organic one. For example, in the bull market of stocks, they will allocate more funds to stocks. In a bear market, be careful to hold more cash or allocate to bonds. Therefore, it is extremely important for investors to choose the right time to enter and leave. Therefore, in the process of stock trading, the team will always pay attention to the trend of stock changes and timely trading to reduce the trading risk.

IV. Strategy Construction

4.1 Overall Thinking

The team's strategy to build the general idea is first from the current hot spots, choose the hot plate, namely, the semiconductor industry, after the screening industry data for principal component analysis, factor analysis, get a few principal component factors, then use the comprehensive score ranking, according to the analysis results, combined with the weighted principal component analysis, finally with variance contribution rate as the weight score of the top twenty stocks, and verify the market yields such as market data.

4.2 Specific Process

For the market timing strategy, the team judges the stock market trend of the AI industry by selecting the large and relatively liquid stocks of the AI industry in the market, and then combining with the current domestic and international market conditions. Continue to pay attention to the trend of the selected stock for a period of time, judge the market fell into a certain lower limit to buy, or sell at the upper limit point, strive for the maximum profit.

For the investment strategies in the AI industry, the team believes that AI is still the most promising area. Since 2023, the technology sector has been strong performance. A InTechnology is expected to empower industries to improve productivity and personal productivity. The team's investment in the technology sector will take AI as the main line, make a layout around computing power, algorithm and application, and undergo qualitative changes. The global and domestic leading companies in the AI industry will continue to enter the upward track, and the team maintains the buy rating of the AI industry.

V. Stock Portfolio

5.1 Factor Selection

Before the model construction, this report selected 26 stocks in the AI industry in 2023 and 5 leading stocks that flush is concerned about. Seven companies were excluded due to incomplete data for individual stocks. Then the 24 stocks were analyzed by six characteristic factors, including valuation factors, growth factors and profitability factors. Through the subsequent principal component analysis, it is known that the cumulative contribution rate of the 5 main factors, including market value factor, enterprise size factor, profit and loss level factor, growth capacity factor and income fluctuation factor, meet the principal component extraction standard.

5.2 Combination Construction

Based on the five sets of principal component formulas, the comprehensive score formula is as follows:

$$F = 0.320F_1 + 0.217F_2 + 0.216F_3 + 0.138F_4 + 0.109F_5$$

The scores of 24 semiconductor companies were calculated, and 20 companies were selected and sorted, and the return rate of these stocks in 2022 was found and tested. It was found that the return rate of the selected stocks in 2022 was positive, proving the rationality of the model. Based on this, it can be judged that the principal component analysis method can better reflect the situation of the stock market, and it also shows that the five main factors can reflect the advantages and disadvantages of the stock more accurately, and the combination is reasonable.

VI. Conclusion

Combining the relevant literature and the investment strategy, the following conclusions:

According to the comprehensive score formula, in 2022, Foxconn Industrial Internet, Hikvision, East Money, BOE A, Great Wall Motor, ZTE Corporation, IFlytek, RoyalFlush, Goneo Group, and Zhaoyi Innovation have high comprehensive scores, which is suitable for the team to choose investment.

According to the return rate of stock income in 2022, Goneo Group, Covos, RoyalFlush, Shiyuan

Electronic, Hikvision, Hundsun Technology, Glodon Software, Foxconn Industrial Internet, ZTE Corporation, Leit Systems have higher return rate, which is suitable for the team to choose investment.

It can be seen that Foxconn Industrial Internet, Hikvision and ZTE Corporation are in line with the investment direction of the team. The team will focus on the above several stocks, and will also focus on other stocks that meet the standards, observe the market trends, timely adjust the investment portfolio, try to reduce the investment risk, and improve the yield.

Here is a summary of the team's transactions:

Table 1 Summary of transactions

Number of stocks traded	4	Number of profitable stocks	1		Number of stocks lost	3	
Serial number	Stock code	Stock name	Profit and loss amount	Number of days held	Reason to buy	Reason to sell	Yield rate
1	000063	ZTE Corporation	72976	46	Steady trend, there seems to be the main intervention	Short-term go down, it seems to want to pull back	0.75%
2	002415	Hikvision	-51218	46	Early K line trend is good	The stock price falls, the risk is greater, and the stop loss is stopped in time	-2.03%
3	601138	Foxconn Industrial Internet	-7300	3	The K-line trend is good, and the country supports strongly	The team predicts a correction in the stock price	-0.030%
4	002230	IFlytek	-16729	43	The AI market continues to strengthen	There is a continuation of the pullback Trend.	-2.26%
Total return on account							-3.570%

References

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