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Impact of AI Tools on Retail Investors' Decision-Making in Uttar Pradesh

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Abstract

This study explores how Artificial Intelligence (AI) tools including robo-advisors, algorithmic trading platforms, and predictive analytics can impact the quality of retail investors' investment decision making in Uttar Pradesh, India. While AI technologies have become more accessible beyond institutional investors, it is essential to understand how they will format investment behavior The importance of this understanding is crucial for areas with large populations like Uttar Pradesh, where people come from various socio-economic backgrounds. A quantitative research design was employed, and data was collected from 144 retail investors utilizing structured questionnaires which assessed participants' awareness, perceptions, and confidence regarding AI tools. Descriptive statistics and one-sample t-tests showed moderate awareness and acceptance of AI's capabilities, specifically in market data analysis and trend prediction, while confidence in AI decision-making based and belief in better returns were still relatively low. As a result, this study reveals that while AI has the potential to improve stock trading decision making, barriers still exist in terms of digital literacy, trust, and experience among retail investors in Uttar Pradesh. In conclusion, the findings indicated the importance of financial literacy campaigns, user-friendly platforms and regulated information that informs potential investors and allows retail investors to consume these AI tools and products to increase financial inclusion and make better investment decisions.

Keywords: *Artificial Intelligence (AI), Retail Investors, Investment Decision-Making, Robo-Advisors, Algorithmic Trading, and Predictive Analytics.*

Introduction

Over the past decade, Artificial Intelligence (AI) has quickly become a significant force and transformative element in finance. Once primarily a sophisticated technology for large investors, consumers can now increasingly access AI to aid investment decision-making with the emergence of robo-advisors, algorithmic trading platforms, and predictive analytics. With AI tools, investors can sift through enormous data volumes quickly to assess available market data and make educated choices, which helps to reduce some of the informational advantage that larger capital players have with expert (analysis) and technical research and investment resources (MarketLens, n.d.; Lakhotia, 2025).

India's stock market is one of the fastest growing in Asia, with significant advancements in retail participation since the advent of digital trading platforms and innovations with financial technology (fintech). The benefits of digital/traditional advancements have also been bolstered by reforms that increased transparency and made access to the market more attractive for potential investors, in addition to a rise in financial literacy and mobile technology for managing finances (Mishra & Mohan, 2021; NSE Report, 2022). In populous states like Uttar Pradesh, despite the overall increase in retail participation, consumer adoption of AI-based trading stock apps and inclusion is more complex due to intermediate issues like lack of awareness about AI-based tools by many retail participants, uneven digital literacy, and to some extent a lack of trust and concerns regarding data and privacy, which act as barriers to speedy adoption (Gupta et al., 2025; Nandwani, 2025).

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This study is examining how AI tools impact retail investor decision making in Uttar Pradesh. Understanding interfering factors relating to investor characteristics, behavior, and confidence levels will help understand the potential real-world benefits and costs of these technologies. The findings hope to illuminate the complexities in these areas to advance greater knowledge, understanding, and achievement of financial inclusion and to develop AI tools which are accessible, transparent, and trustworthy for all investors, enabling people to make more informed decisions and participate in the growth of India's ever-expanding capital markets (Rao & Agarwal, 2020; Shanmugam & Sundaram, 2021).

Review of Literature

According to Hart (2018), a literature review is "the critical evaluation and summary of existing literature on a specific topic." The literature review is beneficial in establishing gaps in knowledge and position of knowledge to serve as both an empirical and theoretical rationale to this study (Hart, 2018).

Recent literature reveals the impact of the growing role of Artificial Intelligence (AI) on investment behavior of retail investors in India. Goswami, Joshi, and Sharma (2024) cited demographic characteristics including gender, education, savings patterns, and risk capacity influence the investment decisions in preference of AI models in stock recommendations and delivery. Furthermore, male investors are more likely to use AI tools for asset allocation. They further argued that financial literacy programs and advisory services might be useful in aligning an individual's capital allocation strategies with their personal long-term goals.

Bhardwaj et al. (2024) suggested that AI models, such as Neural Networks (NN), Support Vector Machines (SVM), and Principal Component Analysis (PCA) enhances stock recommendation system, improved accuracy of prediction, and reduced human errors. Similarly, Davenport and Ronanki (2018) and Krauss et al., (2017) these authors argued that AI would allow for objective data-driven decision making available while mitigating behavioral biases, leading to better portfolio management.

Kumar & Paliwar (2025) said that while young and educated investors had moderate to high financial knowledge, several of the retail investors in areas such as Dhanbad do not understand the capacity of modern investment tools and remained with conventional options like bank deposits, mutual funds, and real estate. Their study pointed to a need for financial education that can aid in bridging the knowledge gap and ultimately enliven retail investor participation in financial markets.

Gupta et al. (2025) noted that there are multiple levels of barriers to AI-related investments surrounding digital literacy, trust, regulation being the major issues, however, there are now a multitude of web and mobile-based platforms offering different tools and capabilities to retail investors. Overall, the literature suggests that while AI has a potential to increase analytic capacity, leading to better decision-making, the ability of AI to produce different decision outputs, will ultimately depend on the knowledge, experiences mirroring investor practices within the retail market. For all the potential advantages of AI in investing, a significant amount of retail investing is still done through traditional means like bank deposits and mutual funds, particularly for risk-averse investors (Sharma et al., 2025; Kumar & Paliwar, 2025). Funding sources, digital literacy, level of comfort with technology, age, and income were the top factors when it comes to AI usage and adoption. As in a study evaluating Dhanbad and Uttar Pradesh, there are many household investors that may lack sufficient awareness or training to utilize investment tools of AI, raising further concerns that educational and training programs are too broad-correlated to behaviors shown in their setting.

Objectives of the Study

To examine the extent to which Artificial Intelligence (AI) tools such as robo-advisors, algorithmic trading platforms, and predictive analytics affect the quality of investment decision-making for retail investors in the Indian stock market, focusing in particular on Uttar Pradesh.

Hypotheses of the Study

(H_0): The use of AI tools, as in the case of robo-advisors, algorithmic trading systems, and predictive analytics, does not significantly influence the decision-making quality of retail investors in the Indian stock exchange, specifically in Uttar Pradesh.

(H_a): The use of AI tools, as in the case of robo-advisors, algorithmic trading systems, and predictive analytics has a positive significant influence on the decision-making quality of retail investors in the Indian stock exchange, specifically in Uttar Pradesh.

Research Methodology

This study is focused on investigating how the investment decision-making of retail investors − through AI tools such as robo-advisors, algorithmic trading platforms, and predictive analytics − is influenced, particularly in the state of Uttar Pradesh. A quantitative research design has been performed, using a structured survey to collect primary data from individual investors.

Sampling and Data Collection-

For this study, respondents were approached using purposive sampling in order to capture only active retail investors that were well certain of having some relation to AI-based investment platforms or at least an inclination to stock market investment. The sample consisted of 144 retail investors from a diverse set of socio-economic characteristics in Uttar Pradesh which was represented through markers such as gender, age, education, income level, type of occupation, investment preferences, and experience levels. Data was collected from a standard questionnaire asking demographic questions and measures of participant awareness, perception and confidence regarding the use of AI tools in their decision to invest. Participants rated their agreement about the statements on a five-point Likert scale (from â€˜Strongly Disagree' to â€˜Strongly Agree'), which allowed the study to measure the different levels of agreement about the role and extent of AI.

Data Analysis-

Descriptive statistics were also performed to present the socio-demographic and investment profiles of the participants, allowing for a description of the population and general trends in investment activities.Descriptive statistics were developed to calculate mean scores, modes, standard deviations, and ranges for each of the statements related to AI tools, to provide a better footing to assess the participants' familiarity, trust, and experience with these AI technologies.

To gain superior confirmatory confidence a set of inferential statistics were also conducted. Using one-sample t-tests, I assessed opinion differences, relative to a population mean, which was based on a Likert scale measurement value of 3 (neutral). One-sample t-tests also allowed me to test some formulated hypotheses related to the impact of AI tools on investment decision making, including participant's level of awareness, if AI tools increased their level of confidence, and participant assessments on AI tools improving investment returns, or reducing errors.

Results and Interpretation

The table below clearly illustrates the socio socio-economic and investment background of the respondents. It presents their distribution by gender, age, marital status, education, income, occupation, investment preferences, and investment experience. The purpose of this classification is to illustrate the diversity of the sample, as well as to analyze how these differ characteristics relates to respondent investment behaviour.

The socio-demographic profile of the respondents can provide meaningful insight into the types of investors involved in the study.

A very high percentage of respondents were male (84%) and a small percentage of respondents were female (16%), indicating that male investors still dominate in financial investment and financial decision-making.

A large proportion of the investors were in the 25-35 years (30.3%) and the 35-45 years (28.2%) categories providing evidence that a significant number of younger and middle-aged investors are involved in investments. Interestingly, only 9.2% of respondents were 55 years and older indicating that comparatively little investment activity is undertaken by older individuals.

The data shows that a majority of respondents were married (79.8%), a small number were unmarried (15.3)(, and the remainder (4.9%) were made up of other categories encompassing divorced, single, or separated. It is possible that married individuals engage in investment activities slightly more than the non-married individuals who might regard these activities merely as short-term incidental cash deposits while married individuals are more rooted into their investment as part of planning for financial obligations for children and possibly for future retirement needs.

Education is an important factor in investment decisions. Over half the sample respondents (52.1%) had a graduate degree, while there were 20.8% with postgraduate degrees. Around 14.6% had an education level below graduation and 12.5% were in other categories of education. This shows that most of the investors in the sample had a reasonable education level, leading to an improved level of awareness about investment choices.

It is true that a big proportion of the respondents (43.1%) reported an annual income of more than ₹15 lakhs while 26.4% fell in the ₹5-10 lakh category. Investors in the low-income group (0-5 lakhs) made up only 11.7%. This gives quite good support for the suggestions that some investors (who have comparatively a higher income) were more active in financial markets as they had more surpluses to invest in assets.

Government employees (41.7%) and self-employed employees (28.5%) comprise the biggest segments and are more likely to regularly invest as stable income providers than private job holders (20.8%). There is a small proportion (9%) of people classified as other occupations.

The traditional choices of bank deposits, post office schemes, and insurance investment were clearly the choice (42.3%). Mutual funds/ETFs are also a reasonably good choice (30.6%); direct investment in stocks accounted for 16%. There was a small allocation (11.1%) for other instruments. This generally shows that while traditional investment choices still appear to dominate, there is increasing interest in newer financial products.

Half of the respondents (50.7%) had between 1–3 years of investment experience, while 21.5% were relatively new with less than a year of experience. Around 27.8% had more than 3 years of

experience. This indicates that most investors are still in the early to mid stages of their investment journey.

The profile of respondents suggests that investors are predominantly male, young to middle-aged, married, and fairly well-educated with moderate to high income levels. Government employees and self-employed individuals form the majority of investors. Traditional options such as banks and insurance continue to dominate, but mutual funds and stock investments are gradually gaining traction. Most investors are relatively new in the market, which shows that financial participation is increasing in recent years.

Table 1: Demographic and Investment-related Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	121	84%
	Female	23	16%
	Total	**144**	**100%**
Age Group	<25 years	20	14.00%
	25-35 years	43	30.30%
	35-45 years	40	28.20%
	45-55 years	26	18.30%
	> 55 years	13	9.20%
	Total	**144**	**100%**
Marital Status	Married	115	79.80%
	Unmarried	22	15.30%
	Others (Divorced etc.)	7	4.90%
	Total	**144**	**100%**
Educational Qualification	Below Graduation	21	14.60%
	Graduation (UG)	75	52.10%
	Post-Graduation (PG)	30	20.80%
	Others	18	12.50%
	Total	**144**	**100%**
Annual Income (in Lakhs)	0 - 5	17	11.70%
	5 - 10	38	26.40%
	10 - 15	27	18.80%
	Above 15	62	43.10%
	Total	**144**	**100%**
Occupation	Government Job	60	41.70%
	Self-Employed	41	28.50%
	Private Job	30	20.80%
	Others	13	9.00%
	Total	**144**	**100%**
Investment Option	Bank/Post Office/Insurance	61	42.30%
	Mutual Funds/ETFs	44	30.60%
	Stocks	23	16.00%
	Others	16	11.10%
	Total	**144**	**100%**
Investment Experience	Less than 1 year	31	21.50%
	1 - 3 years	73	50.70%
	More than 3 years	40.	27.80%
	Total	**144**	**100%**

The descriptive statistics presented in the table 2 provide useful insights into how investors perceive the role of Artificial Intelligence (AI) tools in their investment decisions.

Understanding of AI Tools: The mean of (2.78) in understanding suggests the respondents indicated they only have a mediocre understanding of AI technology in ordering for example robo-advisors and algorithmic trading. The mode of (3), reflects we can still consider how neutral most investors were.

Effectiveness in Analyzing Market data: The mean value of (3.19) indicates the respondents as a whole some-what agree unequivocally in that AI offers a better way of enhancing market data analysis than other methods. The respondents as a whole accept the usefulness of these investment platforms utilizing an AI technology to handle more elaborate financial information.

Ability to Predict Market trends: The respondents scored predictive market trends as one of the "most useful" tools with one of the highest mean scores (3.22). The respondents commonly agree AI is a usefulness option when it comes to forecasting. The close standard deviation (0.893) indicates that there are varied thought process surrounding how respondents feel towards AI platforms and predictive analytics because while many of the investing population have some level of established trust in these platforms the rest of the investing sector still tend to be more reserved.

Stock selection Insights: The mean rating of (2.96), indicates respondents remain somewhat neutral in whether AI provides better insight into stock selection. While some respondents clearly see AI as useful, the mixed mean score demonstrates uncertainty or low experienced with AI or robo-investing.

Decision-Making Confidence: The average score of 2.69 indicates that AI tools did not significantly increase investors' confidence levels. Given that the mode was 2, a large share of respondents disagreed with the premise on reliance on AI in terms of factors to consider in making a final investment decision.

Degree of Returns Improvement: The average score of 2.78 indicates respondents were not strongly convinced that AI had a direct degree of return improvement. With larger standard deviation (1.069), it suggests widely varied experiences that can lead to claims some benefitted using AI, while others saw little impact.

Error and Bias Reduction: The average value of 2.83 indicates that investor respondents had a neutral position between whether AI helps to reduce errors by humans, or individuals biases. Some investors admitted that AI has these advantages, while others had a conviction regarding the subjective reliance on AI.

Table 2: Descriptive Statistics on the Influence of AI Tools in Investment Decision-Making

Statements	Mean	Mode	Std. Dev.	Range
Awareness about AI tools such as robo-advisors and algorithmic trading platforms	2.781	3	0.82	4
AI tools assist in analyzing stock market data more effectively than traditional approaches	3.187	3	0.951	4
AI enhances the ability to predict market trends	3.222	3	0.893	3
AI-based platforms offer better insights for stock selection	2.959	3	0.965	4
Use of AI tools boosts confidence in making investment decisions	2.697	2	0.906	4
AI has contributed to improving returns from stock market investments	2.784	3	1.069	4
AI minimizes the likelihood of errors or personal biases in investment decisions	2.828	2	0.911	3

Source: Primary Data

In Table 3, the study assessed the perceptions and use of AI tools by retail investors in Uttar Pradesh using a population mean of 3 (neutral on a 5-point scale) to conduct a selected sample t-test to determine if the sample population means were statistically significantly different from a neutral perception of AI tool perceptions and uses.

Awareness of AI Tools: The mean score of 2.78 is just below neutral, and this difference is statistically significant. This indicates that while investors are aware that these AI tools are available and exist, their understanding and familiarity with AI tools are more limited and are still below an average level of acceptance. Many investors may know the nomenclature of these and other technologies but aren't yet comfortable using AI technology and may not be fully versed in what it means to use AI technology.

Effectiveness in Analyzing Market Data: Respondents agreed moderately (mean score of 3.19) that AI tools are better for analyzing stock market data than traditional methods, and this difference in agreement is also statistically significant. This suggests that investors recognize that AI is useful in helping them address unreasonable amounts of complex market data, thereby making sense of and better analyzing the market's behavior.

Ability to Predict Market Trends: The response to perceive AI helping predicting market trends scored the highest mean score (3.22). Investors exhibit moderately strong certainty that through AI analytics, they are gaining foresight into market trends or investing where other methods may be deceiving or inadequate, suggesting a growing level of confidence about AI's effectiveness in forecasting trends and predicting market activity.

Insights for Stock Picking: There were mixed views on whether AI gives better insights for stock picking. The mean score was slightly below neutral (2.96), which shows that investors are unsure or may have had differing experiences.

Some investors think AI is providing worthwhile insights while other investors may not be able to see any clear practical benefits, or are skeptical of AI in general.

Confidence in Investment Decision: The average response (2.70) was below neutral showing that using the tools does not improve the confidence of many investors in their investing decisions. Certainly, while most investors felt that AI does good analytical work, many investors still are not committed to solely relying on tools like AI when it comes to their final decision making.

Improving Returns: Investors were not convinced that AI is contributing directly to improving investment returns, as the processed mean score (2.78) was below neutral. It indicates that most AI tools the investors used, have provided limited or even inconsistent experiences where the AI tools are providing direct financial benefits so far.

Reduction of Errors and Biases: In regards to AI minimizing human errors or personal biases, investors were mostly neutral (mean 2.83). Some investors believe AI tools can help reduce subjective faults, while others doubt their practical effect on decision quality.

In general, the results show that retail investors in Uttar Pradesh are starting to become aware of the potential of AI-based tools especially related to data analysis and forecasting the overall market. However, awareness is still average, confidence levels are still cautious, and overall financial benefit is not yet clearly evident. The research results reflect an early stage of the adoption process for which education, experience and trust are foundational to widespread and proper use of AI for investment decisions.

Table 3: One-Sample t-Test Results on Influence of AI Tools in Investment Decision-Making (Population Mean = 3, N = 144)

Investment Statement	Mean	t-stat (2-tailed)	P-value	Null Hypothesis	Interpretation
Awareness about AI tools such as robo-advisors and algorithmic trading platforms	2.781	-4.780	< .001	Statistically significant	Awareness exists but below moderate level
AI tools assist in analyzing stock market data more effectively than traditional approaches	3.187	4.143	< .001	Statistically significant	Investors acknowledge some usefulness
AI enhances the ability to predict market trends	3.222	5.321	< .001	Statistically significant	Moderate support for predictive power
AI-based platforms offer better insights for stock selection	2.959	-2.030	0.008	Statistically significant	Mixed views, leaning towards neutral
Use of AI tools boosts confidence in making investment decisions	2.697	-8.650	< .001	Statistically significant	Confidence level remains low
AI has contributed to improving returns from stock market investments	2.784	-4.927	< .001	Statistically significant	Limited evidence of impact on returns
AI minimizes the likelihood of errors or personal biases in investment decisions	2.828	-1.397	0.012	Statistically significant	Minimal practical effect observed

Significant at 5% level

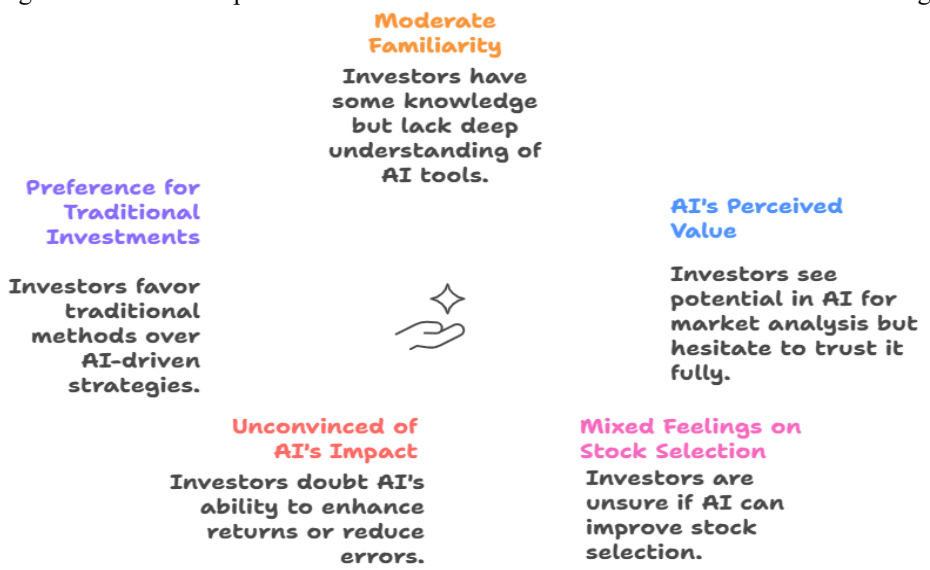
Findings

The research study also uncovers several insights about retail investors' use of Artificial Intelligence (AI) tools in Uttar Pradesh. Most investors are moderately familiar with AI-based platforms including robo-advisors and algorithmic trading platforms, indicating that their familiarity is still below an average acceptance level. Investors understand that AI can be "valuable" with respect to analyzing complex market data and predicting future trends, but they are still not very confident in entrusting it to make final investment decisions on their behalf even if the investors are still somewhat favorable towards AI's ability to improve predictive ability in the market. They also seemed to have mixed feelings about AI's capability to provide better insights about stock selection. Many investors simply have not been convinced that AI tools (as they currently exist) have made considerable impacts on their own returns or have effectively reduced their human errors and biases in thought processes. The investor profile indicates a dominance of male investors, mostly young to middle-aged, of moderate education, investors who continue to have a preference for traditional investments such as bank deposits and mutual funds. Most investors are in the early or mid-stages of their investment journeys, which might impact

their exposure and attitudes toward newer AI technologies.

These insights, highlighting moderate familiarity, perceived value, skepticism, and continued reliance on traditional investments, are summarized in Figure 1 below.

Figure1: Investor Perspectives on the Role of AI in Retail Investment Decision-Making



Conclusion

The findings indicate that AI is beginning to influence investment decision-making among retail investors in Uttar Pradesh, primarily in terms of enhancing data analysis and forecasting capabilities. That said, the adoption of AI is still at an early stage, with many investors only moderately aware of AI capabilities and even more reluctant to incorporate AI-related tools into their process. The slight degree of increase in investor confidence and returns suggests that while AI has a large upside, there are significant limitations that prevent wholesale acceptance.

For AI tools to transform retail investing in Uttar Pradesh, attention must be focused on awareness, trust, and demonstrating clear financial benefits in the easiest way possible. Improved education and user-focused platforms that suit retail investors' different needs could help to address the current gap and fuel adoption.

Limitations and future research scope

The limitations of the study need to be stated. The researchers collected data from 144 investors, this is a limited sample size, and while it represents the retail investor community within Uttar Pradesh, it does not necessarily reflect the retail investors throughout India. Secondly, the data is based on self-reported responses and is subject to people's biases and judgements based on what they believe rather than what the outcome through their actions was, that could create difference on the perception of the content. Third, the researchers limitation is the data is quantitative form and can covet the qualitative along with quantitative and this method does not explain qualitative issues that can help investigators deeper understanding of specific personal experiences and difficulties investors endure. Finally, the study was conducted for a limited time in a restricted time frame that limited any extended length of time, sample size, longitudinal design, or space for breadth on geography. Limitations identified by the researchers demonstrate the intentions of the study should be viewed with separate caution, encourages future research is needed.

Recommendations

Based on the findings, several practical recommendations emerge:

i. Financial Literacy: Specifically target delivery of financial literacy programs using tools based on AI to help educate investors about the nature and uses, benefits and risks of AI tools.
ii. User Acceptance: Develop self-explanatory user interfaced AI-based investment platforms that attempt to address complex elements and provide understandable outputs.
iii. Trust: Regulators and market participants should offer strong data privacy protections and emphasize transparency to foster investor confidence in AI-based technologies.
iv. Exemplar Case Evidence: Providing examples of actual success and proof of improved investment results from the use of AI will promote more willingness to adopt AI-based causes.
v. Demographically Relevant Messaging: Delivery and outreach and educational materials should be reflective of demographics,

including age, income position, education level and educational background, and regional/cultural variations.

Following these recommendations, it is possible to accelerate democratization of AI in retail investing to enable many more citizens of Uttar Pradesh to make better, evidence-based financial decisions, as visualized in Figure 2 below.

Figure 2. Recommendations for retail investors

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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