Current Study and Method on Artificial Intelligent-based on Venture Capital Decision

Lanxi hu

lh6n22@soton.ac.uk

School of Mathematical Science, University of Southampton, Southampton, UK

Abstract. Venture capital is an important driver of innovation and economic growth, however, the risks faced by investors cannot be ignored. This study aims to utilise artificial intelligence techniques to aid venture capital decision-making, introduces the definition and characteristics of venture capital, and discusses the challenges and difficulties faced by venture capital decision-making. An overview of the application of AI in venture capital decision-making is provided, with a focus on its specific application in startup evaluation. The application includes data collection and pre-processing, feature selection and modelling, model evaluation and optimisation, and provides an outlook on future research directions and trends. The results of the study show that AI technology has an important application prospect in venture capital decision-making, which can help investors better identify and evaluate high-risk projects and optimise their investment portfolios to reduce uncertainty and risk. However, there are limitations and shortcomings in this study, and future research can further explore other application areas of AI in venture capital decision-making.

Keywords: Venture capital decision-making; artificial intelligence; evaluation of startups; optimization of investment portfolio

1 Introduction

In recent years, with the rapid development of the global economy and the rapid advancement of science and technology, venture capital has received widespread attention as an important way to promote innovation and economic growth. However, the attendant risks cannot be ignored. Against the backdrop of limited capital and resources and uncertainty, investors are faced with the challenge of how to correctly assess the potential and risk of a project and construct an optimised portfolio to reduce risk. Based on the characteristics of venture capital, researchers conduct in-depth study on the operation process of venture capital and its influencing factors, elaborate on the system of indicators for evaluating venture capital decisions, analyse the indicators affecting venture capital evaluation decisions, and put forward the methods of venture capital that should be adopted at different stages [1].

The traditional risk investment decision mainly relies on experience and intuition, and there are problems such as strong subjectivity, information asymmetry and low decision-making efficiency [2]. With the rapid development and wide application of artificial intelligence technology, massive financial and corporate data are analysed by using advanced data mining and machine learning algorithms [3]. Establishing an efficient and accurate risk investment decision-making model has become a new solution [4]. On the basis of summarising the existing

ICEMBDA 2023, October 27-29, Tianjin, People's Republic of China

DOI 10.4108/eai.27-10-2023.2341962

decision-making methods and the characteristics of venture capital, the researcher proposes a venture capital decision-making system based on the CBDT method, which is considered to have more theoretical and practical value in venture capital decision-making. It is more helpful for risk investment decision making [5] .

This study aims to use artificial intelligence technology to assist risk investment decision-making [6, 7]. Especially for the evaluation of startups and portfolio optimisation [8]. By combining the basic theory of AI decision support systems and practical application cases, this study constructs an AI model for startup evaluation and portfolio optimisation [9, 10]. By analysing and validating the results of the study, this paper aims to help investors better identify and evaluate high-risk projects, optimize investment portfolios, and reduce uncertainty and risk [11].

The significance of this study lies in the fact that venture capital is an important driver of innovation and economic growth, and the use of AI technology to assist venture capital decision-making not only improves the efficiency and accuracy of decision-making and reduces the investment risk, but also provides investors with an effective tool and methodology that enables them to achieve a higher success rate and rate of return in decision-making. In addition, this study also provides an idea and method of constructing a risk investment decision-making model based on artificial intelligence technology for related subject areas, which is of positive significance for promoting economic development and social progress.

2 Venture capital decision making

2.1 Definition and characteristics of venture investment

Venture capital is the behaviour of an investor who invests in an emerging or start-up business in order to obtain a higher return and bear the corresponding investment risk. Venture capital's support for startups is long-term. Compared with the investment of traditional financial institutions, venture capital focuses more on fostering the long-term development of startups. Venture investors not only provide financial support, but also help startups achieve sustainable growth through resource integration and strategic guidance.

Second, venture capital focuses on innovation and technology leadership. Venture investors tend to look for startups with innovation and technological leadership to invest in. This characteristic is not only reflected in the innovation of products or services, but also in business models, management concepts and other aspects of innovation. Venture investors believe that only through continuous innovation and technological leadership can companies succeed in the highly competitive market.

In addition, venture capital emphasises high risk and high return. Due to the high level of uncertainty associated with investing in start-ups, venture capital may be subject to higher investment risks. However, venture capital also implies higher return potential. Venture capitalists look for opportunities where the risks and rewards are relatively well-matched by conducting thorough due diligence and risk assessment of the project.

In the next section, we will further explore the challenges and difficulties faced by venture capital decision-making and examine the application of artificial intelligence in venture capital decision-making.

2.2 Challenges and difficulties of venture capital decision-making

Venture investment decision-making, as a high-risk and high-return investment method, faces many challenges and difficulties in practice. Firstly, information asymmetry prevails in the process of venture capital decision-making. Entrepreneurs have a fuller grasp of information about their own projects, while external investors can often only assess the risk and potential of a project through limited information. This information asymmetry leads to difficulties for investors to accurately assess the potential value of the project in the decision-making process, increasing the risk of decision-making.

Second, there is also the challenge of uncertainty and complexity. The future development of entrepreneurial projects is often full of uncertainty, the market environment, size, competitive situation, technological innovation, business model and other factors will affect the prospects of the project. The interplay and complexity of these factors make the decision-making process more difficult, with more elements to consider, and the accuracy and stability of the decision is challenged.

Venture capital decision-making also faces the difficulties of time pressure and resource constraints. In practice, decision makers need to make decisions within a limited time frame, and at the same time need to take into account the limited nature of resources. Since investment decisions involve a great deal of information collection, analysis and evaluation, time pressure often makes it difficult for decision makers to fully consider all factors, which can easily lead to biased decisions. At the same time, resource constraints can limit the ability of decision makers to collect and analyse information, increasing decision uncertainty.

In order to overcome these challenges and difficulties, the application of AI technology in venture capital decision-making has become an effective means. Artificial intelligence technology can assist investors in collecting and analysing huge amounts of data and identifying potential risks and opportunities. Through machine learning algorithms and data mining techniques, AI systems are able to discover hidden patterns and correlations from big data, improving the accuracy and efficiency of investment decisions. At the same time, AI technology can also use techniques such as natural language processing and sentiment analysis to analyse startup profiles and market dynamics, helping investors better understand the background of the project and the market situation, and reducing the risks associated with information asymmetry.

Venture investment decision-making faces the challenges and difficulties of information asymmetry, uncertainty, complexity, time pressure and resource constraints. By introducing artificial intelligence technology to assist decision-making, the accuracy and efficiency of decision-making can be effectively improved and the risk of decision-making can be reduced. With the further development and application of AI technology in the future, the challenges and difficulties of venture capital decision-making will be better solved, promoting the further development of the venture capital field.

2.3 Overview of the Application of Artificial Intelligence in Venture Capital Decision Making

In today's venture capital field, the application of artificial intelligence technology is gradually attracting widespread attention. As a complex computer technology, artificial intelligence has the ability to simulate humans and make autonomous decisions. In the process of risk investment decision-making, AI can be used for data analysis, risk assessment, and investment decision support and assistance to provide investors with a more effective basis for decision-making.

The application of artificial intelligence in venture capital decision-making is mainly reflected in data analysis. Venture capital decision needs a lot of data support and analysis, and traditional data processing methods are often cumbersome and time-consuming, and it is difficult to deal with large-scale data. Artificial intelligence technology can efficiently process and analyze a large amount of data through machine learning, data mining and natural language processing, and extract valuable information and associations. Through these data analysis techniques, investors can gain a more comprehensive understanding of market conditions, industry trends, and potential investment opportunities to make more informed decisions.

Secondly, AI also plays an important role in risk assessment. There are uncertainties and risks in the decision of venture capital, so it is particularly important to evaluate the risk of entrepreneurial enterprises. Traditional risk assessment methods often rely on artificial subjective judgment and experience, and are susceptible to personal factors and biases. Artificial intelligence technology can use a large amount of historical data and model training to build an effective evaluation model, and constantly improve the accuracy of prediction through learning and optimization. Through the risk assessment model of artificial intelligence, investors can assess the risk degree of entrepreneurial enterprises more objectively, identify potential investment risks, and provide a scientific basis for investment decisions.

In addition, AI can also play a role in supporting and assisting investment decisions. For example, an intelligent recommendation system based on artificial intelligence technology can provide personalized investment recommendations and project recommendations to investors according to their needs and preferences. In addition, AI can also help investors evaluate the potential impact and outcomes of different investment decisions through simulation and predictive analytics. Through these auxiliary functions, investors can more comprehensively understand the advantages and risks of potential investment projects, so as to make more informed investment decisions.

As an advanced technology, artificial intelligence provides a new idea and method for venture capital decision making. Its application in data analysis, risk assessment, and investment decision support and assistance provides investors with more powerful decision-making and forecasting capabilities. Now more and more applications of artificial intelligence, artificial intelligence in the modern technology accounts for an increasing proportion was shown in the Figure 1 [12]. However, it is worth noting that AI still faces some challenges and limitations in venture capital decisions, such as data privacy protection, model interpretability and other issues. Therefore, future research and practice need to be further improved and explored to achieve the best application effect of AI technology in venture capital decision making.

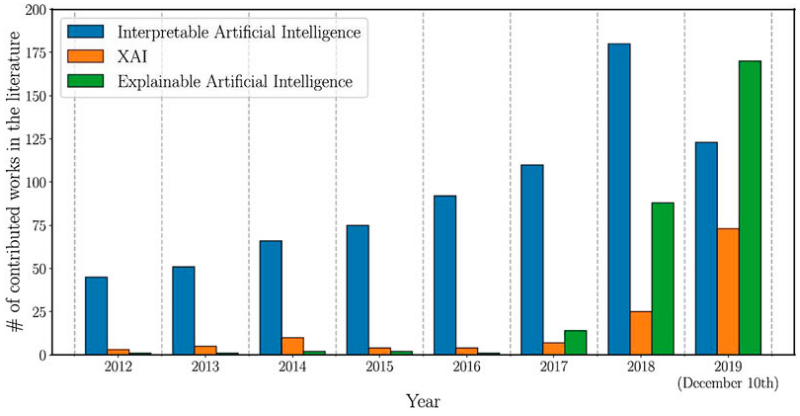

Figure 1. Total number of publications related to the terms "interpretable artificial intelligence", "XAI" and "interpretable artificial intelligence" between 2012 and 2019 [12]

2.4 Artificial intelligence in startup assessment

2.4.1 Data collection and pre-processing

Data collection and pre-processing is a crucial step in the venture capital decision-making process in the Figure2. By leveraging specific AI techniques, we can describe the methods of data collection and preprocessing in more detail and apply them to venture capital decision making.

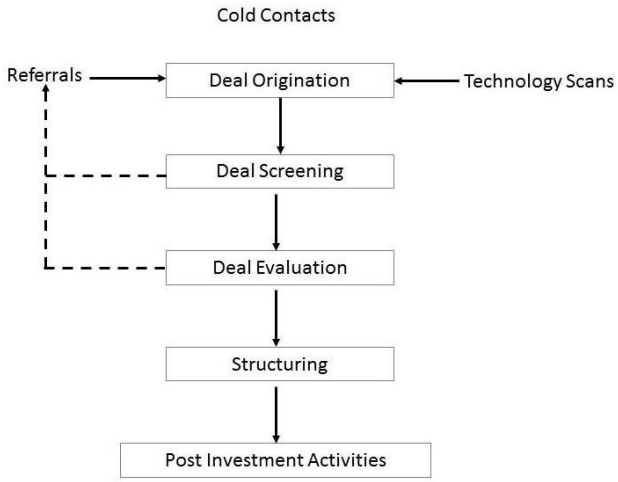

Figure 2. A model of the investment decision-making process for venture capitalists

Firstly, the work use AI techniques for data collection. Unlike traditional data collection methods, we can use machine learning algorithms or predictive modelling methods to collect large amounts of data from different data sources (e.g. the internet, social media, financial statements, etc.) to quickly and accurately obtain information relevant to the startup. By using

financial market data, company financial data, industry reports, and web crawler technology, we are able to automatically crawl news, user reviews, and other information related to startups. In addition, with natural language processing technology, we can extract key information from large amounts of text and perform semantic analysis to gain deeper insights.

Second, data preprocessing is a key part of ensuring data quality and usability. In order to address possible noise, missing values, outliers, etc. in the data, we can take a series of steps for preprocessing. Common preprocessing steps include data cleansing, missing value processing, outlier processing and data normalisation. These steps can improve the quality and consistency of data and provide a reliable data base for subsequent feature selection and model building. In addition, in the data preprocessing process, we can also use machine learning algorithms to analyse the degree of influence of each feature in the dataset on the decision-making results, and select those features that are important for decision-making. This reduces redundant information and improves the explanatory and generalisation capabilities of the model.

Finally, data preprocessing also includes steps such as data standardisation and normalisation. By normalising the data, we are able to eliminate the differences in magnitude between different features to better compare the importance of different features. In addition, data normalisation transforms the data into values between 0 and 1, making different features comparable to each other. These steps can help us better understand and utilise data to improve the accuracy and reliability of risk investment decisions.

Data collection and preprocessing is one of the important application areas of AI in venture capital decision making. By leveraging AI technology, we can quickly and accurately collect and process a large amount of startup data to provide strong support for investment decisions. However, it is important to note that when conducting data collection and pre-processing, we should also consider the privacy protection and security of the data so as not to adversely affect the startups.

2.4.2 Feature selection and modelling

Artificial intelligence techniques play a crucial role in feature selection and modelling in venture capital decision making. Feature selection is the process of selecting the most representative and valid features from a large amount of startup data, which are used to build evaluation and prediction models. Modelling, on the other hand, combines the selected features with other relevant information to build a model that accurately describes and predicts the risk of a startup. (see Figure 3) [13].

The diagram below outlines a simplified flowchart of the model development, application and validation cycle. We use credit scoring as an example, but the process steps can be applied to other types of AI model development [13].

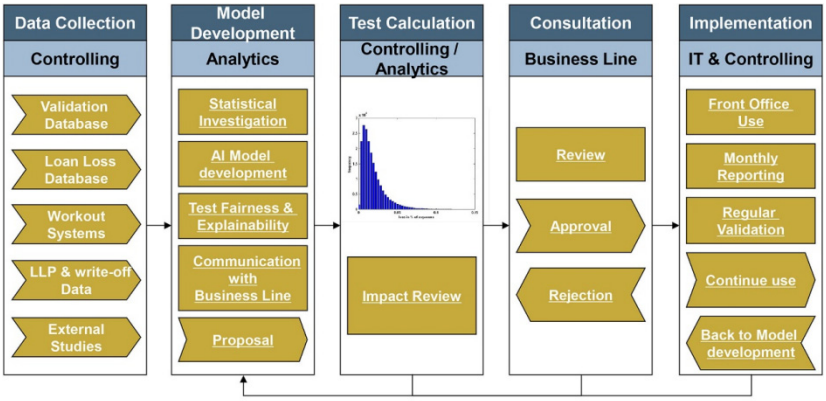

Figure 3. Regular review process of all parameters and model assumptions [13]

Feature selection is the process of selecting key features with predictive power from a large number of features. First, data analysis and mining is required to find important features relevant to venture capital decisions using methods such as data visualisation, statistical analysis and machine learning algorithms. Data visualisation helps us to visualise the distribution and relevance of the data, leading to better feature selection. Statistical analyses are performed by calculating metrics such as correlation coefficients, variances, and covariances to measure the relationship between features and venture investments. Using machine learning algorithms to learn a large number of data samples, features are sorted and screened to select features that have a high impact on venture capital decisions.

Once feature selection is complete, the next step is to build models for evaluation and prediction. Commonly used modelling methods include logistic regression, support vector machine, decision tree in the Figure 4, random forest and neural network.

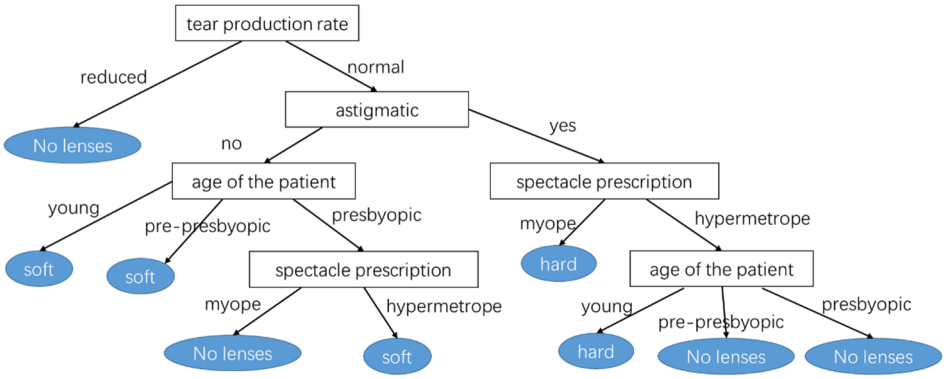

Figure 4. Machine Learning Series Decision Trees and Random Forests

These methods, combined with the features after feature selection, can build a model that can accurately predict the risk of a startup. At the same time, model evaluation and optimisation is an essential step in order to improve the performance and generalisation of the model. Evaluation can be done through metrics such as cross-validation, ROC curves and accuracy,

while optimisation can be done using parameter tuning, feature incorporation, etc., to improve the model's performance.

Feature selection and modelling with AI technology is a critical aspect of venture capital decision making. By accurately selecting and modelling features and models, it can provide investors with a strong basis for decision-making. However, we also need to consider the limitations and considerations of AI technology in venture capital decision making in order to continuously optimise and improve the methodology to better assist in the implementation of venture capital decision making.

2.4.3 Model evaluation and optimisation

The application of artificial intelligence technology in risk investment decision-making has been widely noticed and explored. Among them, portfolio optimisation is one of the important aspects of risk investment decision-making using machine learning algorithms and predictive modelling methods.

In the past, traditional risk investment decision-making models are usually based on statistical methods and empirical judgements, which often suffer from problems such as high subjectivity and unstable results. And portfolio optimisation using machine learning algorithms and predictive modelling methods can effectively overcome these problems in the Figure 5.

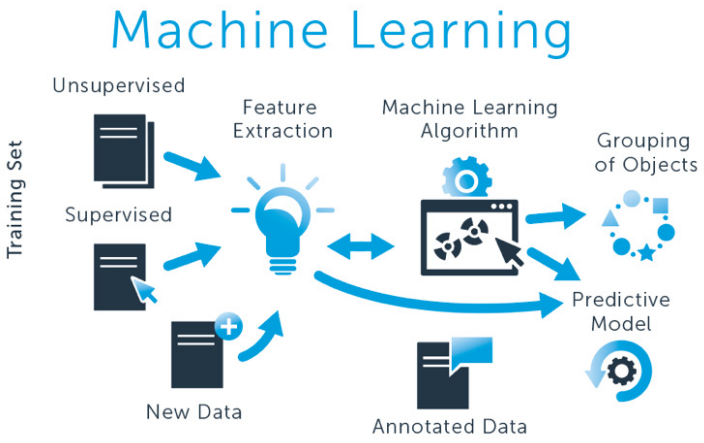

Figure 5. Machine learning algorithms for predictive modelling

Specifically, AI technology can use big data and machine learning algorithms for startup evaluation. By analysing multi-dimensional information such as company financial data, market dynamics, and industry trends, AI models can accurately assess the value and risk of startups. Various metrics can be used to assess the performance of the model, such as accuracy, recall, precision, F1 value, etc. These metrics can help us understand the predictive ability and stability of the model. At the same time, the AI model can also use natural language processing technology to conduct a comprehensive analysis of the company's management, team members, and market competition, so as to provide strong decision support for the construction of investment portfolios.

In addition, artificial intelligence technology can also be applied to the construction of portfolio optimisation models. Traditional portfolio optimisation models tend to consider only the two dimensions of return and risk, while the methods of AI technology optimisation models include adjusting model parameters, increasing the amount of training data, and improving feature selection. By constantly optimising the model, the predictive accuracy and stability of the model can be improved, thus improving the effectiveness of risk investment decision-making. Such as adaptive models, genetic algorithms, etc. In this way, the decision-making results of portfolio optimisation will be more scientific and reasonable, and various investment opportunities can be fully explored to achieve a better risk-return balance.

Artificial intelligence technology using machine learning and predictive modelling methods for risk investment decision-making also faces some challenges in the Figure 5. First, data quality and data security issues are a key challenge. In the application of AI techniques, the accuracy and reliability of models are affected by data quality. If the data quality is poor or noisy, it may lead to inaccurate prediction results of the model. During data collection and processing, there is a need to ensure data privacy and security, comply with relevant laws and regulations, and protect users' personal information and business secrets. Certain artificial intelligence techniques, such as deep learning models, may have strong predictive capabilities, but their models are less explanatory. In venture capital decision-making, the explanatory nature of the model is very important to the decision maker, and therefore the predictive ability and explanatory nature of the model need to be weighed. Risk investment decision-making involves future prediction and judgement, and there is a certain degree of uncertainty. Although artificial intelligence technology can provide predictive models, it cannot completely eliminate uncertainty, and decision makers need to comprehensively consider multiple factors to make decisions. In addition, as the venture capital market becomes progressively more complex, AI models need to be refined and updated to address emerging risks and changing market demands.

To address these challenges, there are a number of countermeasures we can take. First, strengthen the quality control of data collection and processing to ensure the accuracy and completeness of data. Second, establish a comprehensive data security system to protect the confidential information of investors and startups. In addition, cooperation with industry bodies and experts can be strengthened to leverage their experience and expertise for model optimisation and updating.

The use of artificial intelligence technology with machine learning and predictive modelling methods to improve the science and accuracy of venture capital decision-making is a hot research direction in the current venture capital field. By giving full play to the advantages of artificial intelligence technology, it can effectively improve the scientificity and accuracy of investment decisions and provide investors with more choices and opportunities. However, it is also necessary to pay attention to data quality and security issues in the application process, and to cooperate closely with industry institutions and experts in order to continuously improve and enhance the accuracy and adaptability of decision-making models.

3 Relevant results

3.1 Risk assessment models using AI techniques

In response to the risk assessment aspect of the venture capital decision-making process, researchers have begun to develop various risk assessment models using artificial intelligence techniques. One of the commonly used methods is the risk assessment model based on machine learning algorithms. By collecting a large amount of data from past venture capital cases and using machine learning algorithms for training and learning, the model can learn the characteristics of different investment projects and their relationship with success or failure. Then, based on the current investment projects to be assessed, the model can predict their possible risk levels. This type of risk assessment model using AI technology has high accuracy and reliability, and is highly automated and intelligent.

3.2 Market trend prediction based on big data analysis

Understanding market trends is crucial for decision makers in the risk investment decision-making process. With the rapid development of big data technology, researchers have begun to use big data analytics to predict market trends. By collecting and analysing a large amount of market data, such as industry data, consumer behaviour data, etc., and using data mining and machine learning algorithms, potential patterns and trends in the market can be identified, providing an important decision-making basis for venture capital decision-makers. For example, by analysing the development of different industries and changes in consumer preferences in the market, investment areas with high growth potential can be identified, thus guiding decision makers to make investment decisions.

3.3 Practical cases: Successful experiences in using artificial intelligence to assist venture investment decision making

In practical applications, AI decision support systems have achieved some impressive results. The following section will introduce some practical application cases about AI decision support systems in venture capital decision making.

Firstly, AI technology plays an important role in startup evaluation. Traditional startup evaluation methods mainly rely on manual judgement and experience, which are easily affected by subjective factors. With the help of AI technology, on the other hand, key indicators and data of startups can be analysed to help investors more accurately assess the potential and risks of a business. For example, an AI-based startup evaluation model can combine a large amount of corporate data and industry information, and automatically perform analysis and forecasts through machine learning algorithms, thus providing decision support for investors.

AI technology can also be applied to portfolio optimisation. Portfolio optimisation refers to the selection of a group of investment targets based on investors' risk preferences and needs, in order to achieve the optimal risk-return balance. Artificial intelligence decision support systems can help investors use intelligent algorithms for portfolio construction and optimisation based on a large amount of historical data and market information. For example, machine learning algorithms can be used to analyse and forecast a variety of investment targets, thereby providing a reasonable allocation plan for the portfolio, helping investors to reduce risk and increase returns.

In addition to the above two aspects, there are some other practical applications of AI decision support systems in risk investment decision-making. For example, in the investment decision-making process, AI technology can help investors uncover more potential investment opportunities or reduce potential risks through automated data analysis and model building. In addition, AI technology can provide real-time decision support and decision analysis to help investors better grasp market changes and investment opportunities.

However, AI decision support systems still face some challenges in practical application. Firstly, the quality and credibility of data have an important impact on the construction of AI models and the reliability of decision-making results. Second, for some complex investment decision problems, the interpretability and transparency of AI techniques are also a challenge. In addition, the effectiveness and efficiency of AI decision support systems require continuous optimisation and improvement.

To address these challenges, there are a number of countermeasures we can take. First, focusing on the quality and credibility of data is key to improving the effectiveness of AI decision support systems. Investors should optimise the methods of data collection and processing to ensure the accuracy and completeness of the data. Second, focus on the interpretability and transparency of AI technology. Although AI algorithms and models may be complex, there are ways to increase the interpretability of models, such as feature selection and model interpretation techniques. Finally, the AI decision support system is constantly iterated and improved, and the algorithms and models are continuously optimised to increase the effectiveness and efficiency of the system.

The practical application of artificial intelligence decision support systems in venture capital decision-making has achieved some results and has a broad development prospect. By using AI technology for startup evaluation and portfolio optimisation, it can help investors more accurately assess risks and potentials and achieve better investment decisions. However, there are still some challenges that need to be overcome, such as data quality, model interpretability, etc., in order to further enhance the effectiveness of AI decision support systems and provide more effective support for venture capital decisions.

4 Discussion

4.1 Limitations and shortcomings of the study

In this study, although we have achieved some positive results by using artificial intelligence technology to assist risk investment decision-making, we have to admit that there are some limitations and shortcomings in the study.

Firstly, our study only focuses on the method of using AI technology to assist risk investment decision-making, while ignoring other possible decision-making factors. After all, venture capital decision-making often requires a combination of several factors, including market environment, industry outlook, entrepreneurial team, and market competition. Therefore, further research should integrate AI technology with other factors and explore its application in multi-factor decision making.

Second, the application of AI technology requires a large amount of data support. Although we have used a variety of data sources and algorithmic models in our research, we still have to face the incompleteness and uncertainty of data. For startup evaluation and portfolio optimisation, a large amount of relevant data needs to be collected and analysed, including corporate historical data, financial indicators, market trends, etc. However, for startups, there is often a lack of sufficient historical data and stable financial indicators, which makes it difficult to build evaluation models using AI techniques. For example, the historical data we used may have some errors, and there may be a lack of accurate and reliable data support for some companies that are still in the development stage. In future research, the methods of data collection and processing should be further improved to enhance the accuracy and reliability of the decision-making model. In addition, privacy and security issues need to be addressed when utilising AI technology for venture capital decision-making. The evaluation of startups and optimisation of investment portfolios rely on a large amount of sensitive data, such as a company's financial status and business strategy. How to protect the security of these data and prevent them from being maliciously utilised or leaked is an important issue that needs to be addressed.

Again, our study does not give sufficient consideration to venture capital decisions in different contexts. The characteristics of different industries, different stages of business development, and different investors may have different impacts on venture capital decisions. Therefore, we need to further study in depth the feasibility and effectiveness of using AI technology to assist venture capital decision-making in different contexts.

Finally, our study is subject to further validation and empirical evidence. Although we used empirical analyses and simulation experiments in our study, due to time and resource constraints, we were unable to conduct a comprehensive assessment of all venture capital cases. Therefore, in future studies, the sample size should be increased and the sample coverage should be expanded to more fully validate and substantiate the effectiveness of AI technology-assisted venture capital decision-making.

Although we have made some progress in the use of AI technology to assist venture capital decision-making, we should also be well aware of the limitations and shortcomings of the study. Future research should further integrate multiple factors to improve the accuracy and reliability of data, while focusing on application and validation in different contexts. Only in this way can we make better use of AI technology to assist risk investment decision-making and provide more effective and feasible decision support for risk investment decisions.

4.2 Future research direction and development trend

In the context of the widespread application of artificial intelligence technology, risk investment decision-making can also be further assisted and enhanced with the help of this technology. However, there are still some limitations and deficiencies in the current research.

The current risk investment decision-making model is still mainly based on traditional statistical methods and empirical judgement, and the application of artificial intelligence technology is still relatively limited. In future research, we can further explore in depth how to combine artificial intelligence technology with risk investment decision-making to develop more accurate and reliable decision-making models. Explore hybrid decision-making models that combine AI technology and expert judgement, taking into account the advantages of intelligence and human factors. The risk control strategy of AI technology in risk investment decision-

making can also be studied in depth to further enhance the stability and risk-return ratio of investment portfolios.

When facing the challenges in risk investment decision-making, we need to formulate appropriate countermeasures to minimise risk and increase the success rate of investment. Firstly, one of the challenges is the problem of incomplete data and data quality. When evaluating startups, the data we rely on often comes from different sources and can be inconsistent, inaccurate and missing. To overcome this challenge, we can employ data cleansing and calibration methods, and use artificial intelligence techniques to process and integrate data, thereby improving its credibility and quality.

Second, another challenge is the uncertainty in the model building and training process. When building startup valuation models and portfolio optimisation models, we often have to deal with the choice of model parameters and model uncertainty, which can lead to increased risk in decision making. To address this challenge, we can adopt a multi-model fusion approach that combines the strengths and characteristics of different models, and use artificial intelligence techniques for model integration and training to improve the accuracy and stability of the models.

Current research lacks exploration of the integrated consideration of multiple factors. In addition to technical factors, market, industry, policy and other factors all play an important role in venture capital decision-making. Future research can consider various factors from a broader dimension and explore how to integrate them into decision-making models to further improve the accuracy and effectiveness of decision-making.

In addition, AI technology faces privacy and security issues in venture capital decision-making. In the process of evaluating startups and optimising portfolios, we need to deal with a large amount of sensitive data, which may involve trade secrets and personal privacy. To address this challenge, we can employ data encryption and secure computing to ensure security and privacy protection during data transmission and processing, while complying with relevant laws and regulations. The application of AI technology in decision support systems also involves human-computer interaction. Decision makers may differ in their understanding and acceptance of the results and recommendation strategies of AI models, which may lead to bias in the decision-making process. To overcome this challenge, we can enhance the communication and exchange between the decision maker and the AI system, improve the decision maker's understanding and trust of the model, and combine the decision maker's experience and intuition to make comprehensive decisions

Interpretability of venture capital decisions is also an important research direction. Although AI technology can provide powerful assistive functions in venture capital decision-making, its black-box nature also poses challenges to the interpretability of decisions. Future research could explore how to design a venture capital decision-making model that is highly interpretable and at the same time can effectively utilise AI.

Venture investment decision-making based on blockchain technology is also a promising research direction. Features such as the decentralised nature and traceability of blockchain technology can improve the transparency and security of risk investment decisions. Future research can explore how to use blockchain technology to build an efficient and trustworthy platform for risk investment decision-making.

The application of AI technology in risk investment decision-making faces challenges in data quality, model uncertainty, privacy and security, and human-computer interaction. Future research directions and trends include combining AI technology with risk investment decision-making, comprehensive consideration of multiple factors, improving the interpretability of decisions, and exploring risk investment decision-making based on blockchain technology. By adopting countermeasures such as data cleaning and calibration, multi-model fusion, data encryption and secure computing, as well as enhancing human-computer interaction, we can better utilise AI technology to assist risk investment decision-making and improve risk control and investment returns. These studies will further promote the accuracy and efficiency of risk investment decisions and provide better decision support for investors.

5 Conclusion

The purpose of this study is to explore the feasibility and effect of using artificial intelligence technology to assist venture capital decision-making. We found that the adoption of AI technology can provide more accurate data analysis and predictive capabilities in venture capital decisions. Ai algorithms can quickly process huge data sets, extract key information from them, and apply statistical and machine learning methods for training and prediction. Compared with traditional subjective judgment and rule of thumb, it can provide more objective and accurate investment decision basis, reduce the influence of human factors on decision results, and improve the efficiency of investment decision. Traditional processes require significant time and human resources to collect, collate, and analyze data. With the help of artificial intelligence technology, data collection, analysis and prediction can be automated, which greatly shortens the decision-making cycle and reduces the cost of decision-making.

Through a number of empirical case studies, we observe that portfolios that adopt AI technologies have significant advantages in long-term performance. The ability to more accurately capture market fluctuations and trends, providing investment opportunities with greater return potential, thereby helping investors achieve better returns. But we also realize that there are some limitations and shortcomings in the study. Ai technology also requires investors to have relevant domain knowledge and experience to properly apply and interpret the results of AI. The training and prediction of artificial intelligence algorithms are based on historical data, and for emerging markets and industries, data incompleteness and inaccuracy may affect the reliability of decisions.

Artificial intelligence technology to assist venture capital decision has a good application prospect and potential. By providing more accurate and efficient data analysis and forecasting capabilities, it is expected to help investors improve the accuracy and effectiveness of investment decisions and achieve better investment returns. However, we should also be fully aware of the limitations and shortcomings of artificial intelligence technology, and conduct further research and exploration in a targeted manner to further promote the intelligent development of venture capital decisions.

References

[1] Zhenzhen Li. A preliminary study on the decision-making method of risk investment evaluation [J]. Business Watch, 2021:3.

[2] YongJiang Su, Zhan Li. A systematic analysis of venture capital decision-making problems. Academic Research 2001:4.

[3] Honggen Zheng. Research on enterprise using big data and artificial intelligence technology to improve the quality of investment project evaluation [J]. Enterprise Reform and Management, 2018.

[4] Cunhong An. Case study on the use of risk investment decision-making model based on cumulative prospect theory - IDG Capital Enterprises as an example [J]. China CPA, 2020:4.

[5] Xinyu Peng, Zirui Huo, Shiye Hu. Research on Venture Investment Decision Making Methods Based on CBDT [J]. Friends of Accounting, 2020: 37-42.

[6] Honggen Zheng . Research on enterprise using big data and artificial intelligence technology to improve the quality of investment project evaluation[J]. Enterprise Reform and Management, 2018.

[7] Lei Shi. The use of big data and artificial intelligence technology on investment project evaluation [J]. China Science and Technology Investment, 2022.

[8] Xin Jin; Min Zhang; Guanghua Sun; Hu Yang. Research on the co-operation strategy and investment decision of crowdspring space, startups and venture capital [J]. Journal of Management Engineering, 2022:14.

[9] Chunyan Liu. Research on the development strategy of information technology of NBP company under the perspective of intelligent manufacturing[J]. Journal of Information Technology, 2020: 14.

[10] Tongxie Yao. Optimisation of Investment Decision Making Methods for Carrefour Shanghai Gubei Store Renovation Project [J]. 2020: 001512.

[11] Yue QI, Jian JIN, Tianyuan ZHANG." Research on the evaluation of private equity investment projects under the background of "artificial intelligence"[J]. Business Accounting, 2018.

[12] Arya, V., Bellamy, R. K. E., Chen, P-Y., Amit, D., Hind, M., Hoffman, S. C., et al. (2019). One Explanation Does Not Fit All: A Toolkit and Taxonomy of AI Explain ability Techniques. arXiv:1909.03012, September Available at: http://arxiv.org /abs/1909.03012 (Accessed November 25, 2021).

[13] Sebastian Fritz-Morgenthal1 Bernhard Hein2 Jochen Papenbrock3* Financial Risk Management and Explainable, Trustworthy, Responsible AI. PERSPECTIVE article Volume 5 - 2022.