Leveraging Machine Learning for Enhanced Business Performance – A Case Study of IBM Corporation

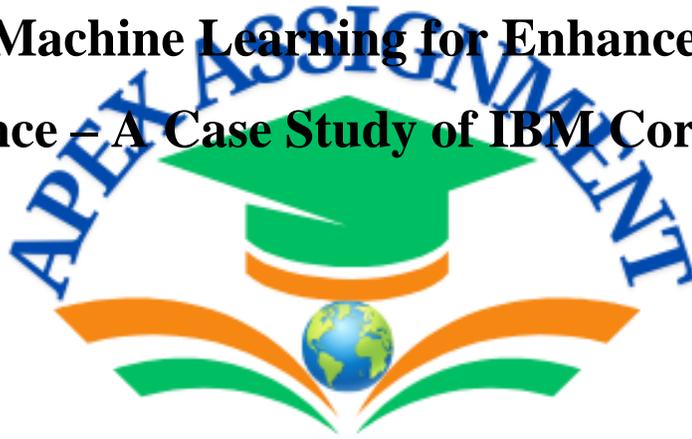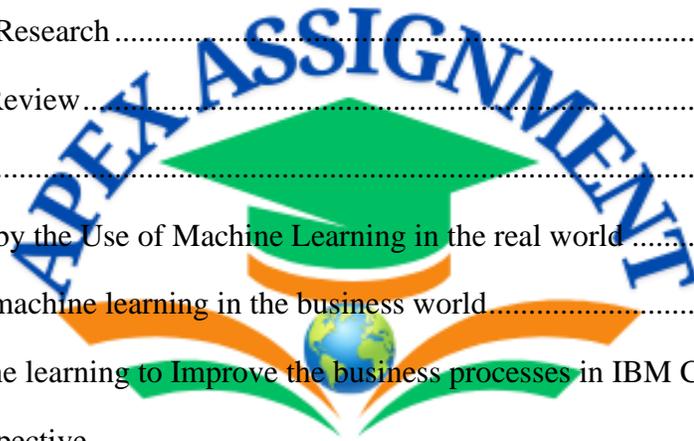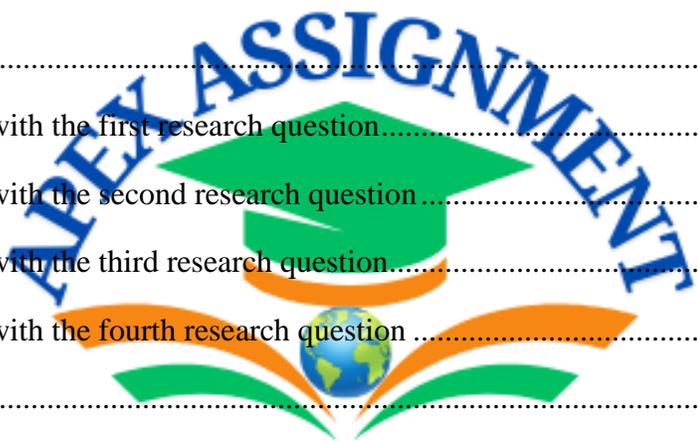# Table of Contents

Chapter 1: Introduction

1.1 Background

Organisations are increasingly more relying on device studying strategies to collect useful insights from huge volumes of statistics, automate procedures, and make facts-driven picks as they are trying to remain in advance in the ever-evolving virtual landscape. The 1911-based IBM Corporation has continually remained at the vanguard of technical advancement (Finlay, 2021). As a result of its sizable experience in hardware, software program, and offerings, IBM has constantly changed to accept new technology and take benefit of them for business advantage. As an end result of realising the innovative potential of AI and device getting to know, the employer has these days made large investments in those fields.

1.2 Research Questions

❖ What role does machine learning play in business, and how has it changed different sectors?

❖ How has IBM Corporation used machine learning to enhance performance and improve business processes?

❖ What were the main problems that IBM faced when implementing machine learning, and how were they resolved?

❖ What tactics has IBM used to improve its operational efficiency by leveraging machine learning technology?

1.3 Research Aim

The aim of this research study is to investigate the utilization of machine learning for enhanced business performance through a case study of IBM Corporation.

1.4 Research Objectives

❖ To understand the Significance of machine learning in the business world

❖ To comprehend the Usage of machine learning to improve the business processes in IBM Corporation

❖ To analyse the Issues that have been arrived in IBM in the implementation of proper machine learning

❖ To explore the Strategies adopted by IBM to enhance business performance through machine learning

1.5 Research Rationale

The desire to fill a gap in the literature about in-depth case studies that concentrate on the practical deployment and results of machine learning in major organisations like IBM is what motivated the conduct of this research study. As mentioned by Lee and Shin, (2020) even while there is a growing corpus of research on the potential advantages of machine learning for company performance, in-depth studies that examine the particular tactics, difficulties, and results of its adoption in a real-world organisational environment are still lacking. This study attempts to close this gap and offer useful insights into the application of machine learning for improved company performance by conducting a case study on IBM Corporation, a worldwide leader in technology and consulting services.

1.6 Structure of the Research

Chapter 1 - Introduction

Chapter 2 - Literature Review

Chapter 3 - Methodology

Chapter 4 - Findings and Analysis

Chapter 5 - Conclusion and recommendations
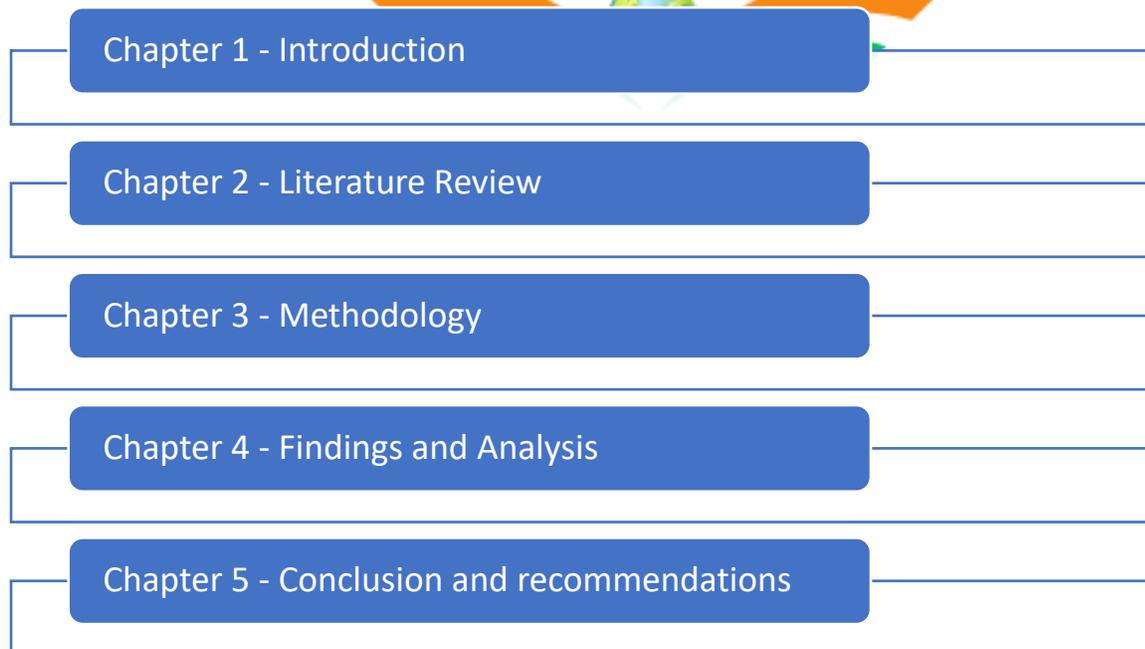
Chapter 2: Literature Review

2.1 Introduction

Machine learning nowadays is one of the most effective and crucial technologies that has been adopted by business organisations. It is one of the automated processes which provide the appropriate and better decisions to the organisation to develop their Strategies and also provide the effectiveness to the company. The implementation of the Planning as well as analysis is required to properly maintain the various industries in the leveraging of the machine learning process. By that the companies can be capable of properly improving efficiency, cost-effectiveness and also the achievement of growth.

2.2 Transformation by the Use of Machine Learning in the real world

Discussing the transformation that has been conducted by the use of machine learning in the real world but then has been founded is one of the techniques which already change different kinds of perspectives of the organisation. In this way it has been identified that the transformation within the organisations as well as the overall services of the company has been found to properly analyse the information as well as to understand the customers of the organisation. At the previous time the customers as well as the organisation cannot be capable to properly understand each other cannot properly make the transparency. It on the other hand is also working to properly transform the data into the appropriate decision of the organisation. For this, the machine learning tool has been utilised within the business organisation by means that the companies can easily use the proper gain inside and also maintain the automated processes.

2.3 Significance of machine learning in the business world

According to the latest research, it has been identified that in the year 2020 to 2024 almost 11.15 billion-dollar growth has been found within the market of machine learning. In this way, it has been explored that the machine learning application is one of the basic organisations which are now different kinds of businesses (Artrith *et al*., 2021). The top Artificial Intelligence and the different machine learning applications have been identified to be in the frequency range in the year 2021. It has been found that almost 57% of the improvement has been found within the customer experiences by the use of the machine learning process. The reason behind that most organisations now develop overall organisational growth and value with a large amount of raw data (Carleo*et al.*, 2019). Therefore the machine learning process provides the appropriate help to maintain a successful plan for the business organisations.

2.4 Usage of machine learning to Improve the business processes in IBM Corporation

Nowadays quantum machine learning is also one of the integrated techniques which provide quantum algorithms within the machine learning programs. That is also so effective for organisations to develop their businesses by the use of the appropriate machine learning process (Mensa *et al.,* 2023). Discussing the IBM organisation then it has been found that the organisation is getting appropriate benefits from the use of the machine learning process and also does not get any type of difficulties or struggle at the time of compliance as well as developed business. By the use of the machine learning process, IBM can be capable of properly serving the appropriate foundation of the application which is much more effective for the organisation (Ibm.com, 2023). For example, the ML-powered application could be capable of properly tracking the changing Global regulatory obligations. On the other hand, it also provides the proper expectation and control requirements to the organisation across the business. It supports appropriate complexities as well as compliances that can be easily worked on with unpredicted speed and accuracy.

2.5 Theoretical Perspective

Without understanding the theoretical perspective behind leveraging ML in business performance cannot be understood. The first motto would understand the business improvement theories and how this can encourage organisational management to implement ML in a modern business context.

2.5.1 Administrative Management Theory

This theory is highly effective in the current research context as the study is focused on leveraging ML in order to conduct smooth business performance. Nonetheless, it is crucial to analyse that in any organisation, effective management can administer certain situations and the business outcome is dependent on the same. As opined by Zabala, Rizalyn and Cabico (2019), it is seen that in an organisation the management or the leader decides on five factors that are forecasting, planning, coordinating, commanding and controlling.

2.5.2 Machine Learning Theory

This is another theoretical context that should be elaborated to understand the present business situation. From the research of Wu *et al.* (2021), it is revealed that machine learning theory is basically learning in a computational process. The use of machine learning needs precise mathematical capabilities and the basic algorithmic principle is designed to develop the data. The

performance is being improved with the help of feedback and establishes an automated process of learning. Therefore, it can be stated that in order to understand machine learning properly, it is needed to understand mathematical modelling and analyse the inherent problems from the learning context. The working model of the machine learning concept should be understood as well where supervised and unsupervised learning perception is explained (Donta *et al.,* 2022).

2.6 Literature Gap

The study was conducted with utmost diligence. However, certain literature gap was difficult to remove. In this current research context, the importance of ML in order to accentuate the business is discussed. Though the use of theories has been shown here, the study did not highlight the revenue details of the organisational context before or after the implementation of ML. The study also did not provide the details of accountability these organisations hold due to the lack of business performance. However, these gaps were minuscule and the findings chapter highlighted certain points. Nonetheless, the study was continued as these gaps were minor.

2.7 Conceptual Framework
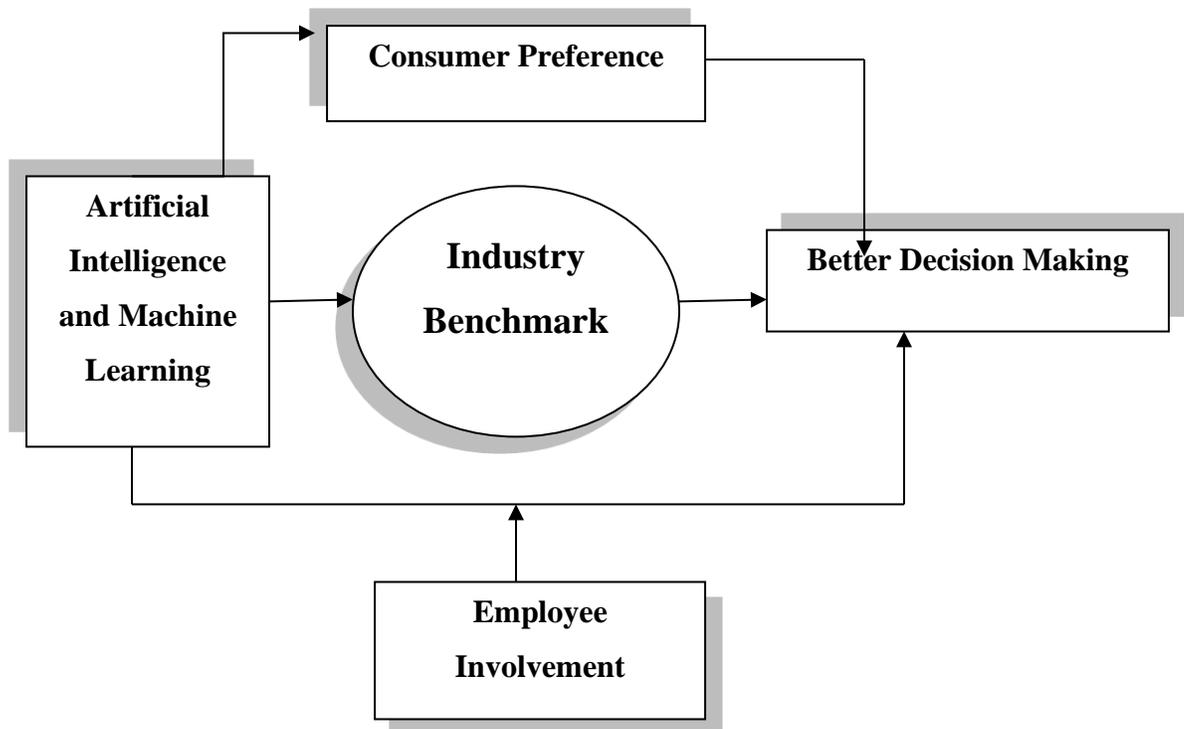
Figure 2.9: Conceptual Framework

Source: (Author)

2.8 Summary

From the discussion of the entire literature review segment, it can be revealed that the business performance of leading software corporations like IBM has an immense influence on ML. With the induction of ML, the organisation can not only enrich its own business performance but also being a software company can help its clients as well. There is immense importance of ML as it can provide accurate information regarding business intelligence.
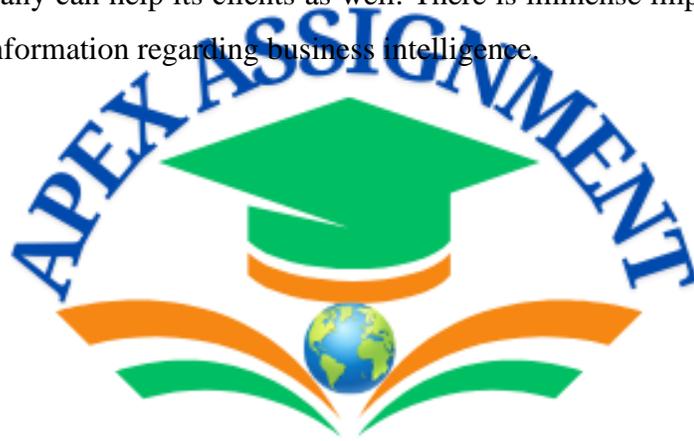
Chapter 3: Research Methodology

3.1 Research Onion
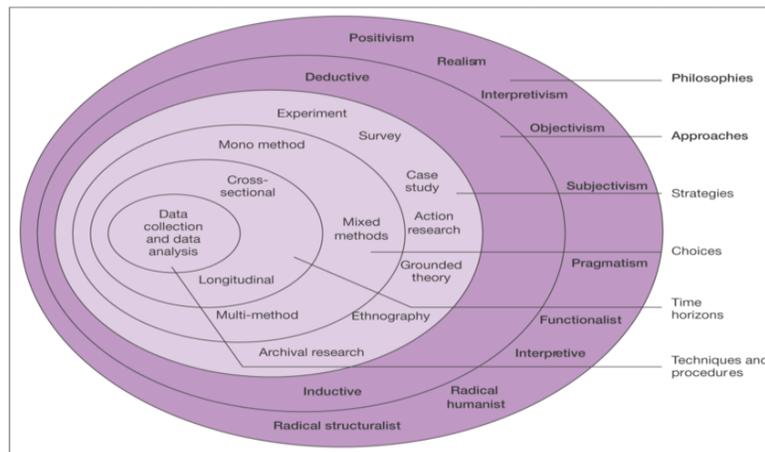
Figure 3.2: Research Onion

Source: (Saunders *et al.,* 2009)

From the research of Saunders *et al.,* (2009), it is understood that the research methodology is a complicated subject and any kind of overlapping between two layers can cause confusion of accurate interpretation. Therefore, to bring an easy solution the pictorial illustration was adopted in the form of research onion where stages like research philosophy, design, approach, development of theory, data collection, analysis and time horizons are present.

3.2 Research Philosophy

The use of the realism technique bars the author from inducting any artificial information and the pragmatism method can contribute to a proper understanding of social complexities (Mishra and Alok, 2022). In the current situation, the author used the interpretivism method of research philosophy where the author interpreted the leveraging of ML to enhance the business performance after analysing the theoretical context. The issue faced by IBM was elaborated and the contribution of ML was discussed in detail. Therefore, this study was crucial to be prepared with the framework of the interpretivism method.

3.3 Research Approach

In the current research pretext, the use of the deductive method would be crucial as the literature review segment provided the theoretical background and these theories were explained to

understand the importance of ML in the modern business context from the organisational view of IBM (Tamminen and Poucher 2020). Thus the author used the deductive approach instead of the inductive method.

3.4 Research Design

This study can be performed appropriately with the induction of the descriptive research design as there are significant resources that can explain the study accordingly. The explanation of leveraging ML and its connection with business performance would be done here and this context would provide a deep insight into the activity of IBM (Firdaus, Zulfadilla and Caniago, 2021). Therefore, this study would reject the exploratory research design while developing the descriptive study.

3.5 Research Strategy

In this particular research work, the author is going to work with the secondary research strategy as both the literature review and the case study on IBM would be discussed here with (Matović and Ovesni 2021).

3.6 Inclusion and Exclusion Criterion

The researcher also focuses on the inclusion criteria to understand the data source it has been used for the selection and the process of obtaining the result (Pabón *et al*., 2022). In this way this particular research study used secondary data collection therefore they have taken different kinds of information and knowledge from different sources such as different kinds of books and journals as well as the articles which will be published after 2019. In this way, it has been identified that the particular article is completely based upon the English language which provides an opportunity to understand the research topic easily.

3.7 Data Collection Method

As a case study, the researchers individually select their Data Collection method to gather all the knowledge relevant to the research topic. However, the primary data collection method has been conducted with the help of observation and interviews whereas the secondary data collection method has been conducted by gathering all the information from different sources such as articles, books, journals and so on (Cho and Lochmiller, 2020).

3.8 Data Analysis Techniques

It is also one of the most significant parts of studying the different topics and articles for providing appropriate knowledge about the topic and what the different factors will be affected upon that (Raskind *et al.,* 2019). In this way, there are two kinds of techniques that have been adopted by the socials such as polluted and quantitative data analysis techniques. Both of the techniques are completely different to each other where quantitative is completely based upon the quantity or the numerical assumptions whereas qualitative focuses on the quality of the research topic.

3.9 Reliability and validity

The research easily developed the process of reliability and focus towards validity as well (HR and Aithal, 2022). On the other hand, the process of validation is also placed in significant part by the researchers while developing the high quality of knowledge from the different resources. In this way, the effective strategy requires appropriate check formation of validation as well as inclusion.

3.10 Time plan

Sl. No.	Task	Sub-Task	Duration					
			Week 1-3	Week 4-6	Week 7-10	Week 11-15	Week 16-18	Week 19-20
1	Introduction	Selection of problem statement						
		Background scanning						
		Selection of aims and objectives						
2	Literature Review							
3	Research Methodology	Selection of philosophy, approach, and design						
		Selection of Data collection and analysis techniques						
		Sample Selection						
4	Data Collection Analysis of Data							
5	Discussion of Findings							
6	Drawing recommendations and submission							

Figure 3.15: Time Plan

(Source: Created by author)

Chapter 4: Findings and Discussion

4.1 Introduction

To make the concerning research highly authentic and resilient, relevant data and information are collected. Further, the data property has been analysed with the involvement of a deeper understanding and the logical interpretation of the current or real-time scenarios.

4.3 Discussion

In the discussion, the objectives of the research are to be aligned with the data and the information that is gathered in the findings part of the research. In the following context, to lead to the optimal research outcome, compare and contrast process has been developed between the information of the literature review and the data gathered in the finding part of the research. The discussion part has further helped in leading to the optimal research conclusion with the alignment of the productive justification concerning leveraged machine learning operations in IBM.

4.3.1 Discussion with the first research question

The **first** research question deals with the importance of machine learning in the business world. From the literature review, it is gathered that a subset of artificial intelligence is machine learning which enables AI to learn and complete tasks more quickly and intelligently. Because it gives businesses a clear picture of consumer behaviour trends and business operational patterns, machine learning is important. In addition, machine learning aids in the creation of new products.

4.3.2 Discussion with the second research question

The **second** research question deals with the usage of machine learning to enhance the processes of businesses in the IBM Corporation. From the literature review, it is derived that AI is a significant part of the rising field of data science. Algorithms are specifically trained to make various classifications or predictions by employing statistical techniques. These bits of knowledge help to uncover huge experiences in the information mining processes. IBM Enterprise has huge experience and rich history to work with AI.

4.3.3 Discussion with the third research question

The **third** research question asks for the crucial issues that have been experienced by IBM in the way of the adoption of the operation of machine learning within the concerned region. From the

literature review, it has been examined that, a machine learning operation includes the upkeep of the business market competitive operations, ethical considerations, and the technology and efforts to make the business highly relevant.

4.3.4 Discussion with the fourth research question

The **fourth** research question asks for the exploration of effective business market strategies concerning the adoption of the machine learning operation within IBM. From the finding of the research, it has been evaluated that, the machine learning operation is regarded as a key branch of artificial intelligence (AI) and a specific operation of computer science.

4.4 Summary

Algorithms of machine learning are provided by natural language to process language-based inputs, particularly from humans, such as text-based messaging over an organization's website. Images can be identified and classified into a variety of categories using machine learning algorithms. The process of data mining is also aided by machine learning in the global business community.
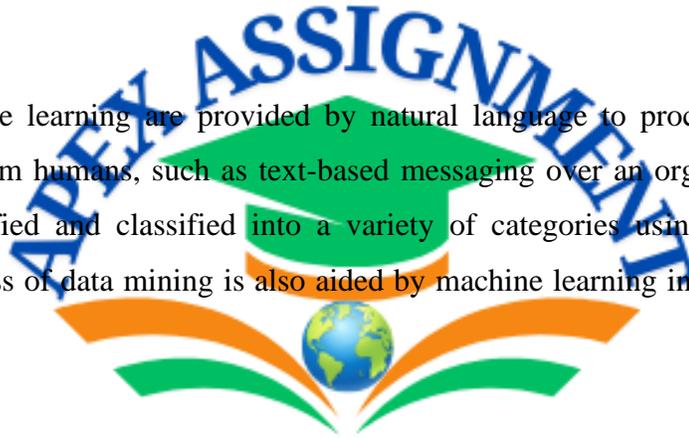
Chapter 5: Conclusion and Recommendations

5.1 Linking Objectives with the Findings

Linking with the objective 1, The literature review and data analysis made clear how crucial machine learning is for many commercial fields. Businesses may uncover operational patterns, learn about consumer behaviour, and create new products thanks to machine learning. The results demonstrated how machine learning has changed various industries and presented examples of its practical use in fraud detection, precise prediction, and speech recognition.

Linking with the Objective 2, The study's conclusions showed that IBM Corporation made substantial use of machine learning to improve its operational procedures. Techniques for machine learning were used for reporting, performance analysis, and risk management. The results demonstrated how IBM used machine learning to enhance operational efficiency, increase accuracy, and improve decision-making processes.

Linking with the Objective 3, The study's conclusions revealed a number of difficulties IBM encountered while putting machine learning into practise. Key worries included the lack of a technological singularity and consequent employment losses. But the research also showed that IBM was aware of these problems and dealt with them through responsible implementation and resiliency. The conclusions made clear how crucial it is to minimise dangers and ensure ethical concerns while implementing machine learning.

Linking with the Objective 4, The results illustrated the precise methods IBM used to improve corporate performance using machine learning. With an emphasis on algorithmic development and data analysis for accuracy improvement, IBM deployed supervised and unsupervised learning approaches, applied machine learning for fraud detection, and identified suspicious behaviour.

5.2 Recommendations

- ❖ To stay at the forefront of machine learning developments, IBM should actively seek out collaboration with external partners, subject matter experts, and academia. Collaboration on research projects and initiatives can lead to insightful discoveries, promote creativity, and support IBM's efforts to discover new uses for machine learning across a range of industries.

❖ Machine learning has become more prevalent, which has enhanced the demand for secure data governance and privacy protections. IBM needs to give the creation of effective data governance frameworks first priority and make sure that it complies with all applicable laws and standards. They should also use strict data anonymization and encryption methods to safeguard client privacy and win over stakeholders.

❖ Collaboration between data scientists, subject matter experts, and business stakeholders is necessary for machine learning initiatives. IBM needs to promote interdisciplinary cooperation by easing communication and information exchange between these various departments.

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