

Application of Predictive Analytics in Agriculture

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Abstract

Predictive analytics is one of the most helpful techniques in business which provides the opportunity to forecast the upcoming risks and challenges in business. The assistance of predictive analytics provides the scope towards an enterprise to perform business with more effective strategies and decisions to avail higher success rate in business surroundings. As the competition in agriculture has been increasing day by day, business companies in the agricultural sector have started to implement predictive analytics in their operational area. It helps to identify upcoming issues and take steps to mitigate those risk factors in business. The study has been focused on analyzing the impact of predictive analytics in agriculture. Thus, various concepts and theories related with predictive analytics have been discussed in detailed manner within the entire study. An inductive approach has been taken while performing the entire task, cross sectional design has been used to perform the study effectively. On the other hand, qualitative data has been collected using secondary data collection methods within this particular study. The entire study has found that the application of predictive analytics mostly helps to prepare to face upcoming challenges and gain higher consumer satisfaction, competitive advantage and superior business growth in the agricultural industry throughout the global periphery.

Keywords

Agriculture, challenges, Predictive analytics, Risk factors.

INTRODUCTION

The entire practice and strategic operations in the agricultural sector have been witnessing critical changes all around the world through availing the assistance of various modern-day gadgets and technological equipment. The overall evolution in the business market periphery according to the arrival of globalization as well as the fourth industrial revolution has brought forth a huge number of up to the minute equipment in order to provide a critical business growth in the industrial surroundings. The agricultural sector as well as started the implication of various modern applications of various technologies and gadgets in order to cope up with the demand of the customers as well as to ensure a proper flow of essential food commodities all around the globe. In the modern era, the application of predictive analytics has provided a superior scope to the business institution in agricultural fields to improve their entire production rate and meet the needs of the consumers worldwide. The entire study in this particular context has kept its concentration on evaluating the role of predictive analytics in the business market area of the agricultural companies in the competitive market surroundings.

The entire contribution which has been provided through predictive analytics in agriculture mostly helps to analyze the most suited strategy of performing agricultural tasks, helps to increase the opportunity of fulfilling consumers demands as well as improving the performance of the farmers. The proper prediction of the future outcome can be easily made through using predictive analysis which helps to chalk out a suitable operational strategy for an agricultural institution to avoid unnecessary disruption in agriculture [1]. It has actually provided the scopes to agriculture to go with the most suited risk management plan and gain apex productivity from the

farmers in agricultural grounds all around the world. It is actually increasing the demand of the leading enterprises in the agricultural sector to utilize the assistance of predictive analytics within their business and agricultural tasks throughout the globe in recent days. The overall study has been going to make an empirical analysis of predictive analytics and its support to agriculture and the productivity and earning rate of a business enterprise in the agricultural industry in the international market periphery. A number of concepts and advantages which can be avail through predictive analytics in agriculture will be discussed with an in-depth process within the entire study.

MATERIALS AND METHODS

In order to perform a certain study, it is highly crucial to choose the overall materials and methods which have been going to be accessed while performing the overall study. The declaration and deciding the materials which are used within a certain study provide the assistance to perform the entire tasks with a systematic process and help to perform the entire tasks with errorless tactics. The selection of materials and methods within a certain study provides the key assistance to chalking out the entire process which is to be used within the entire study and enhance the scope to come forth with authentic results or output [2]. This particular study has kept its focus on application of predictive analytics in agriculture. The overall materials and methods which are going to be followed performing the entire study have been mentioned below.

In order to perform a study on a certain topic, it is essential to select the most suitable research design in order to perform the entire study with an effective process. This particular study mainly demands to gather a huge set of topic-oriented data and information in order to achieve suitable and

appropriate findings through performing the study. The application of inductive design within a study most significantly helps to gather a multiple number of topic-oriented data within a study [3]. Hence, an inductive design will be used within this particular as it will help to collect various topic-oriented data and helps to evaluate the assistance of predictive analytics in agriculture. On the other hand, a cross sectional approach as methods has been selected in order to perform this particular study effectively. The entire study needs to perform its operations while availing a large number of non-numeric data and findings. The use of qualitative types of data mostly provides the scope to evaluate a certain topic while accessing multiple numbers of non-numeric data and information [4]. Hence, a qualitative type of data will be used within this particular study.

A secondary data collection method will be used in order to perform this particular study. Secondary data collection method helps to avail various primary data sources available in various authentic online journals, articles, magazines and many other sources of data available in the internet [5]. The use of articles and journals published before 2019 and the application of primary data collection process has been kept in the exclusion category within this particular study while the peer reviewed journals and articles published in authentic sites onwards 2019 have been put within the inclusion category. It has provided a significant assistant to perform the entire study efficiently and effectively and helps to bring forth best suited results or output of the study.

RESULTS

Concepts of Predictive Analytics

Predictive analytics is one of the greatest boons of modern science which have provided the scope to run a business in a more composite way through taking the most suited decision through predicting the upcoming challenges and interest of the customers in global business market periphery. The overall predictions of the risk factors mostly enhance the decision and strategy making operations of an enterprise and help to mitigate upcoming stumble blocks in business and help to enhance the competitive advantage of a company in the global periphery [6]. Predictive analytics is actually a branch of an advanced analytics process which helps to make predictions about the upcoming outcomes and conditions through utilizing various statistical models, techniques of data mining and machine learning in business.

The support of predictive analytics most significantly supports to gain a desired business growth for an enterprise through analyzing and predicting the data about the phenomenon of a company. In one word it can be claimed that predictive analytics is one of the most helpful data analysis techniques which helps to assume the upcoming scenarios in the business and chalk out most united planning to mitigate futuristic risk factors. The implication of data analytics provides the key assistance to address and identify upcoming risks and opportunities in business and provides the scope to take up best suited operational strategies to avail

a higher business growth [7]. Hence, it provides the scope to avail a desired competitive advantage through accessing the assistance of predictive analytics in business.

The entire concept of predictive analysis has involved itself with various modern technologies and techniques which help an organization to step forward with suitable strategies and decisions in the business. Predictive analytics use statistical algorithms, modern days IoT, AI, highly effective machinery and techniques in order to evaluate the likelihood of the outcomes through analysing the historical data [8]. The basic objective of predictive analytics is to analyse the past occurrences or what has already happened and to assume the best assessment of the phenomenon and scenarios that will occur in the upcoming future while performing a certain business in the worldwide market. The entire decision-making process of an institution becomes easier through utilizing the assistance of predictive analytics in business. The forecasting of the inventories, resource management, supply chain operations, marketing strategy making can be performed significantly through using predictive analytics in business. A business company can be able to gain a superior business advantage and could be able to meet their futuristic goals through mitigating upcoming issues using the support of predictive analytics [9]. Hence, a huge number of business organizations all around the globe have adopted predictive analytics in order to ensure proper decision making and strategic development to gain higher advantages in the competitive business periphery. In the fiscal year of 2019 the market size of predictive analytics was six billion U.S. dollars; in 2022 it has been expected to reach up to 11 billion dollars [10]. It showcased the increasing demand of implicating predictive analytics in business throughout the global periphery.

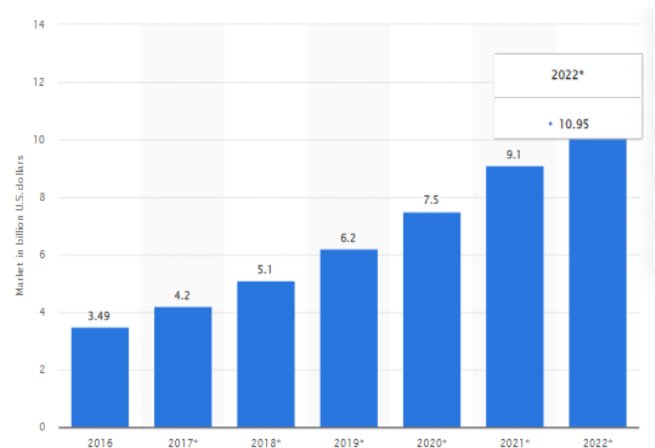


Figure 1: Market size of predictive analytics

Types of Predictive analytics

There are basically three types of predictive analytics which are respectively “predictive models”, “descriptive models”, and “decision models”. The definition and concepts of each type of predictive analytics has been discussed below.

Predictive Model: It is one of the key techniques which have helped to develop and assume upcoming risks and

opportunities of a company. Predictive model of making predictive analysis mostly helps to obtain future prediction through analysing various statistical data [13]. It helps to identify the overall long-term scenarios which have to come in front of the part while performing a business.

Descriptive Models: Descriptive models are one of the significant components of predictive analytics. The use of descriptive analytics assists to describe a certain system or entity and its role upon its surroundings or environment [15]. It actually helps to find spatial or geometric relations among external factors in the business.

Decision models: The support of the decision models provides the key assistance to take most suited through predicting the futuristic factors and their impacts on business. Predictive model is a process of developing strategy and decision through addressing latest trends and long-term envisioning results [15]. The entire decision-making process of an institution becomes less complicated through accessing the assistance of a decision model in predictive analytics.

Application of predictive analytics in different operations in business

Resourcing materials:

A number of business companies all around the globe have been facing a critical resource scarcity issue due to a multiple number of unexpected disruptions. The application of predictive analytics mostly helps to identify the upcoming risks in future and the suturing troubles come forth in time of availing raw materials or resources in business. The process of predicting the risk and challenging factors ahead of time helps to take up most suited strategic decisions to mitigate the issues and helps to avail the resourcing materials effectively within business.

Supply chain operation:

Since the arrival of the global pandemic and its succeeding war situation in between Russia and Ukraine has been creating serious supply chain description issues in the global business market surroundings. The help through implicating the predictive analytics in business helps to take suitable SCM strategies for an enterprise in the international market through assuming the upcoming issues in managing supply chain operation of an organization in the global market. The entire SCM operations of a company most significantly improved through application of predictive analytics in the business.

Product designing and manufacturing area:

The application of predictive analytics helps an enterprise to improve the product designing and manufacturing tasks of a company in the international market. The entire assistance of predictive analytics helps to understand the overall product choice, and purchase making decisions of the customers in the global market which helps to take most suited decisions in the area of product designing and manufacturing. It mostly helps to make plans in product designing and manufacturing areas of a company mostly associated with the demand and

interest of the consumers and helps to gain a higher business growth.

Marketing and promotional applications:

Marketing and promotional operations of a company provides the scope towards an enterprise to improve its brand-oriented knowledge as well as helps to share various product or service-oriented information towards the consumers. The use of predictive analytics in business provides a key assistant towards an organization in the global market to know the behaviour and trait of interests of the consumers throughout the globe. The overall operation of marketing can be performed more effectively through analysing the probes of the consumers through using predictive analytics in business. It helps to enlarge the consumer base of a company and helps to improve sales rate as well as revenue earning of the company in competitive business market surroundings.

Advantage of using predictive analytics

Reduce risks:

The main feature of predictive analytics is to make assumptions of the upcoming risks in business. The technical assistance using modern day AI, machine learning, graphical and statistical representations in predictive analytics mostly helps to predict the risk factors which are going to affect the performance and earnings of the company in the global periphery. Hence, it provides a key assistance to avoid and mitigate the futuristic risks and challenges in business as well as provide the opportunity to perform business while facing fewer disruptions.

Improve quality of production:

The issues in the manufacturing area of the company can also be identified through using predictive analytics within the strategic operations and decision-making area of business in the worldwide business periphery. The entire decision-making process of an enterprise in the international market can be improved through the superior support of predictive analytics. It also helps to identify the choice and purchase making criteria of consumers which helps to develop consumer centric decisions in the manufacturing and product designing of a company in the competitive market. Hence, the entire quality of product becomes improved and error free through the support of predictive analytics in business.

Find new Revenue opportunity:

The application of predictive analytics in business helps an enterprise not only to identify risk factors but also helps to address a multiple number of scopes and opportunities coming forth towards business. The implication of predictive analytics provides a helping hand towards a company to find new opportunities in business and increase the revenue earnings of the company in a worldwide business market atmosphere [16]. Business companies can be able to open up the gateway for new revenue earning scope through

accessing predictive analytics in business.

Improve utilization of assets:

The overall application of predictive analytics helps business organizations to address the overall opportunity and upcoming treats in business. The identification of resources becomes mostly enhanced through the support which has been gained through predictive analytics in business surroundings. The utilization of assets becomes more effective through the support gained through predictive analytics in the business periphery.

Gain higher consumers satisfaction:

The application of predictive data analytics helps to address the overall interests and tendency of purchasing products for the customers in the worldwide market. Business companies are able to go with the most suited product and services according to the taste and demand of the customers through accessing predictive analytics. It helps to increase the satisfaction rate of the customers and increase the overall growth of the company throughout the globe.

Avail competitive advantages:

The support which can be avail through using predictive analytics mostly helps an enterprise to mitigate upcoming risks, avail new opportunity, increase the consumer's satisfaction rate as well as improve the quality of production in the global market. Hence, it helps a company to avail a higher business growth and competitive advantage in the business.

Impact of predictive analytics in agricultural industry

The increasing rate of environmental and political factors has brought forth a critical challenge in the agricultural industry. The increasing issues of climate changes and natural calamities most significantly impose a serious threat towards the entire activities and tasks in agriculture. The influence of predictive analytics in business provides a scope towards agricultural areas to predict upcoming threats and the way out to mitigate those challenges in business. The entire decision making as well as strategic development in agriculture become more facile through assuming the upcoming risks through the assistance of predictive analytics in business. The entire manufacturing, managing human resources or farmers, relation and communication with the suppliers become more effective through using predictive analytics in the agriculture sector all around the globe [17]. It exhibits the superior impact of predictive analytics in agriculture.

The overall competition level of the agricultural industry is significantly high and has been increasing due to increasing opportunity within the industry through the assistance of globalization and industry 4.0. Hence, it becomes really essential to evaluate the upcoming risks in business as well as to identify the opportunity or scopes in order to avail a higher business advantage. The assistance of predictive analytics mostly helps to evaluate upcoming risk factors in business

and helps to take up proper strategy to fight back against the futuristic challenges in the agricultural area. In agriculture the support of predictive analytics helps to explore new markets and assists to enlarge business new potential territories which help to avail higher revenue earning for a company [18]. These entire activities in agriculture such as farming, storing finished products, and taking risk management strategies become more delicate through the assistance of predictive analytics.

DISCUSSION

Predictive analytics is one of the most useful equipment which helps business enterprises through performing business more efficiently and avoiding challenges in competitive business periphery. The overall performance of the agricultural industry has faced a number of critical issues and challenges in the last few years due to increasing rate of environmental threats, climate changes, supply chain issues, political instabilities and many other factors all around the globe. It has been made highly essential for the business institution in the agricultural sector to go with most effective strategic decisions in order to make proper preparations before fighting back against the issues and challenges in the global periphery. Hence, a huge number of business companies all around the globe have started to adopt the implication of predictive analytics in their overall business area in the agricultural industry. This particular study has kept its focus on evaluating the impact of predictive analytics in agriculture.

The entire study has been engaged itself to evaluate the assistance of predictive analytics in business. The entire study has been found that the use of predictive analytics helps an enterprise to assume and address the upcoming challenges in their business performance earlier which mostly helps them to take up necessary steps and strategies forward in order to mitigate the issues. It has found that the support provided through predictive analytics most significantly helps an enterprise to improve its performance and take most suited decisions to gain a higher business growth. The study has also come forth with the decisions that the help of predictive analytics not only helps to forecast upcoming risk factors but also helps to find out the way to mitigate those challenges as well as helps to identify the scope and opportunity for the company in business periphery. In agriculture the assistance of the predictive analytics a business company can mitigate various issues in producing agricultural products as well as provide the opportunity to explore new business territory and avail higher business growth and economic earning rate. The overall strategic planning of the agricultural companies become more fragile through analysis of the data about the phenomenon and take most suited decisions which could provide the chance to achieve the futuristic objectives of the company in the international market.

The study has also found that the overall application of predictive analytics has involved itself with much other

modern tech equipment such as AI, advanced machinery, statistical presentation and many others. It mostly helps to evaluate the performance of the company in a competitive market and helps to go with most preferable strategies in business. It also provides the assistance to understand the trends and interest of the consumers through analyzing their purchase making decisions in the worldwide periphery. The overall product designing process becomes more consumers centric through the assistance of predictive analytics and helps to gain a superior consumer satisfaction rate in the global market. The entire study has been come forth with the decisions that the implication of predictive analytics provides the opportunity towards a company to avail higher business growth, reduce error in business and mitigate unnecessary disturbance and disruption in business in the agricultural sector.

CONCLUSION

The entire study has kept its concentration on developing a proper idea application of predictive analytics in agriculture. A number of concepts and theories related to predictive analytics have been discussed within the entire study. The overall advantages and assistance which can be avail by an enterprise in has also analyzed with an in-detailed manner within their discussion. It actually provides a key assistance to understand how predictive analytics provides help and support to improve agricultural performance in the worldwide business market surroundings. The overall support of predictive analytics in the sector of marketing, supply chain, manufacturing, designing and many other areas have been discussed in a detailed manner within the overall context. The entire study has used an inductive approach as it provides the support to gather a number of topic-oriented data and information about the topic. On the other hand, the use of qualitative data has provided the opportunity to meet the demand of non-numeric and textual data about the topic. It also has been used as a secondary data collection process to bring forth suitable results of the study. The entire study has found the application of predictive analytics mostly helps to improve performance and mitigate challenges of the agricultural industry in the global periphery. The overall assistance provided by predictive analytics increase the scope for talking most suited strategic decision in the trait of agriculture and helps to avoid disruptions in production in global market. It mostly enhances the performance of a company in the business market surroundings of the agricultural industry and it provides the boost to acquire the futuristic target of the company in the competitive business periphery throughout the globe. The entire study helps to gain the insight of predictive analysts' and support to apply the features in business of a company to gain a higher business growth in agricultural industry.

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