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3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the last five years (10)

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal
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PERFORMANCE EVALUATION OF CLASSIFICATION ALGORITHMS THROUGH SENTIMENT ANALYSIS	Dr. Prajkta Warale	MBA	Puranam	2021-22	0555-7860	Print Only Journal
Transformation Through E-Governance – A Mahaonline Study For Maharashtra State	Dr. Prajkta Warale	MBA	INDIAN JOURNAL OF NATURAL SCIENCES	2021-22	0976 - 0997	http://www.tnsroindia.org.in/JOURNAL/issue73/ISSUE%2073%20-%20FULL%20TEXT%20PART%2002.pdf
FINANCIAL LITERACY OF GRADUATING STUDENTS	Dr. D. B. Bharati	MBA	Journal of the Maharaja Sayajirao University of Baroda ISSN	2021-22	0025-0422	Print Only Journal

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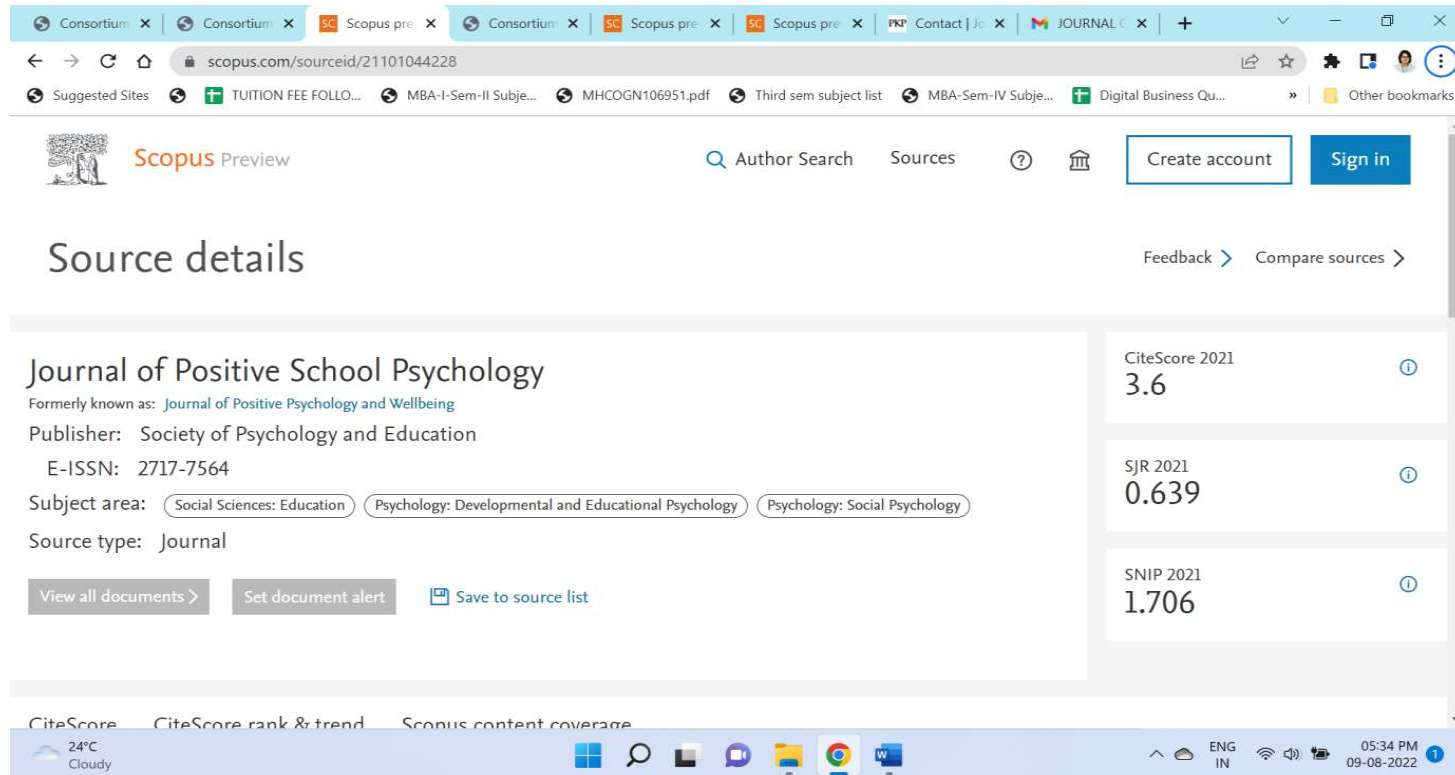
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Title of the paper: Cluster Analysis :Application of K means and Agglomerative clustering for customer segmentation.

Authors: Dr. Prajakta Warale, Dr. Huma Lone

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Cluster Analysis: Application of K-Means and Agglomerative Clustering for Customer Segmentation

PDF

Dr. Huma Lone, Dr. Prajakta Warale

Abstract

Customer segmentation is the division of a business customers into categories called customer segments such that each customer segment exhibits similar characteristics. This division of customers is built on factors that can directly or indirectly affect the market or business such as product preferences or expectations, locations, behaviours etc. Customer segmentation can be implemented through clustering, which is one of the highly recognized machine learning techniques. Cluster analysis is applied in many business applications, from customized marketing to industry analysis. It is an unsupervised learning technique that divides a dataset

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Cluster Analysis: Application of K-Means and Agglomerative Clustering for Customer Segmentation

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Abstract

Customer segmentation is the division of a business customers into categories called customer segments such that each customer segment exhibits similar characteristics. This division of customers is built on factors that can directly or indirectly affect the market or business such as product preferences or expectations, locations, behaviours etc. Customer segmentation can be implemented through clustering, which is one of the highly recognized machine learning techniques. Cluster analysis is applied in many business applications, from customized marketing to industry analysis. It is an unsupervised learning technique that divides a dataset into a set of meaningful sub-classes, called clusters. It helps to comprehend the natural grouping in a dataset and create clusters of similar records which depends on several measurements made in the form of attributes.

This research paper has focused on creating customer clusters by applying K-means and Agglomerative clustering algorithms on a dataset consisting of 200 customers. Various machine learning libraries were used in Python programming language to implement and visualize the results.

Keywords— Agglomerative clustering, Elbow method, Dendrogram, Clustering, Customer Segmentation, K-means Clustering

INTRODUCTION

Guided by the fact that customers are usually distinct, and this distinctiveness is characterised by their behaviour, customer segmentation is an essential aspect to be explored by organizations. It is the process of separating an organization's customer bases into distinct clusters or groups based on several customer dimensions or features. These dimensions or features can be their geographic info, their buying behaviour, their demographic information, their psychographic attributes etc. [1]. There are several reasons to go for customer segmentation [2], [3]. These reasons are elaborated below:

- **Customer Understanding:** For any business to be successful and profitable, the first and foremost task is to know their customers. It is important for an

organisation to understand its customers and know their needs and demands.

- **Target Marketing:** The capability to focus on marketing efforts well is the most compelling factor for customer segmentation. If a company recognizes the distinct groups of its customer then it can propose better marketing campaigns which can be intended differently for different segment.
- **Optimal Product Placement:** A well designed and useful customer segmentation approach can also help business companies with developing or offering new products.
- **Higher Revenue:** This is the surest and apparent requirement of any customer segmentation process. Customer segmentation can have an advantage to generate better revenue due to the collective



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effects of all the above mentioned advantages.

Customer segmentation can be implemented through one of the core Machine Learning tasks. The most obvious and widely used task to perform customer segmentation is clustering which is an unsupervised machine learning task that considers input vectors or features without referring to known, or labelled outcomes. Clustering categorizes objects into various strata built on similarity or distance measure [4], [5]. The main objective is to distinguish the clusters in ways that would be useful for giving useful insights. It is a procedure of segregating a set of instances into subsets. Each subset is a cluster. Data points present in a cluster are comparable to each other and contradictory to data points present in other clusters. There are many clustering methods in the literature. Partitioning and Hierarchical are two such methods [1], [6], [7].

PARTITIONING CLUSTERING METHOD

It constructs k partitions of the data, where each separation represents a cluster and $k \leq n$ where n represents the number of data points. Most partitioning methods are distance-based. This method generates an initial partitioning for given k and then uses an iterative relocation method that tries to improve the partitioning by changing data points from one cluster to another. K-means clustering is one of the partitioning algorithms based on centroid calculation [6], [7]. k-means algorithm is the most known and widely used partitioning methods. K-means algorithm takes the input parameter, k , and partitions a set of n data points into k clusters or groups such that the inter-cluster similarity is low and intra cluster similarity is high. Cluster similarity is measured to the mean value of the objects in a cluster, which can be viewed as the cluster's centroid or center of gravity [1], [8],[9], [10]. Figure 1 describes the steps involved in K-means algorithm.

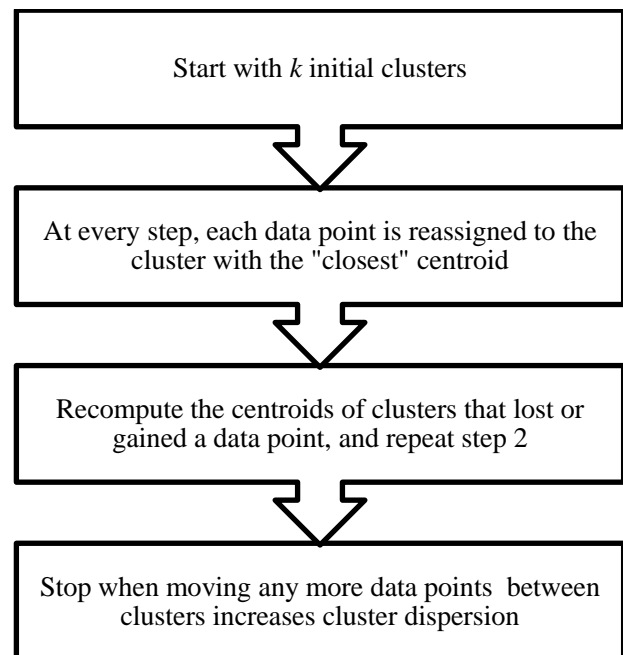


Figure 1: K-Means Clustering Algorithm

HIERARCHICAL CLUSTERING METHOD

It operates by grouping data points into a hierarchy or “tree” of clusters which results in summarization and visualization of data points. Hierarchical clustering method may be an agglomerative method or divisive method, differing on whether the breakdown is formed in a bottom-up (merging) or top-down (splitting) manner [7].

The agglomerative method is also called the bottom-up approach, begins with each data points making a separate group. It merges the data instances in succession close to one another, until all the groups become one group (the topmost level of the hierarchy), or certain termination conditions are fulfilled. A tree structure called a dendrogram is commonly used to represent the process of hierarchical clustering. It shows how data instances are grouped together into one. Data points are displayed at the bottom and similar data points are joined by lines whose vertical length reflects the distance between the data points [6], [7]. Figure 2 describes the steps involved in agglomerative clustering algorithm.

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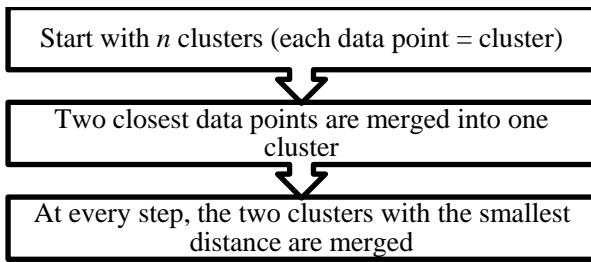


Figure 2: Agglomerative Clustering Algorithm

Many people are of the opinion that clustering, and customer segmentation can be used interchangeably. Even though, it is true that clustering is one of the highly appropriate and widely used methods for segmentation, it is not the only method. It is observed that a clustering-based segmentation will be better than other segmentation methods. This method involves collecting data about the customers in the form of attributes or features and then discovering different clusters from that data. Finally, label these clusters by analysing the characteristics of the clusters [11].

DATA COLLECTION AND RESEARCH METHODOLOGY

The data set named “Mall_customers.csv” was taken from Kaggle.com. Kaggle is an online platform of data scientists and machine learning experts[12]. It permits users to collect and publish datasets, explore, and construct models in a web-based data-science environment. The dataset contained basic information about customers of a supermarket mall like customer ID, age, gender, annual income, and spending score. There were five features (CustomerId, Gender, Age, Annual Income and Spending Score) with 200 customers. Two different clustering algorithms: K-means and Agglomerative clustering had been used for customer segmentation[7]. Since more than 2-dimensional data is difficult to visualize, only last two features (Annual Income and Spending Score) were considered as input to the two clustering algorithms. Python, is the most preferred and largely used programming language for machine learning applications had been used as a data analysis tool[11]. Execution of the code for both the clustering algorithms had been done in Jupiter

Lab, which is an IDE (Interactive Development Environment) for Python.

PYTHON AS DATA ANALYSIS TOOL

Widely used open-source programming languages such as Python, and tools such as, Tableau, XLMiner, RapidMiner, MATLAB, SAS, Stata etc. are extensively used for data analysis, interactive computing, and data visualization. Python is a general-purpose programming language which is designed to be simple and easy to understand. Artificial learning, machine learning and deep learning applications are developed easily with Python’s libraries such as numpy, pandas, matplotlib and scikit-learn. These support libraries have made python as an incredible option as a primary language for data science application [11]. Figure 3 shows the essential python libraries for Machine Learning Applications [14].

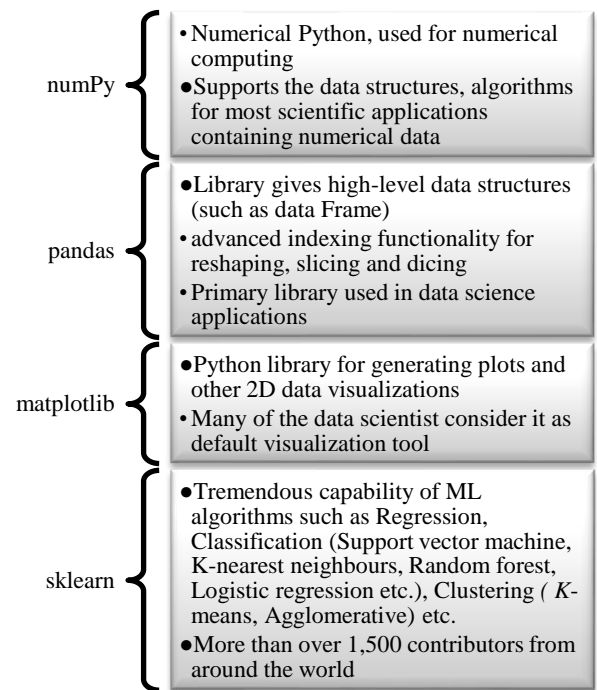


Figure 3: Essential Python Libraries for Machine Learning Applications

DATA ANALYSIS AND INTERPRETATION

Figure 4 demonstrates the process for implementing K-means and Agglomerative clustering on the selected dataset in python. Import libraries, import dataset, finding the optimal number of clusters, training the model



on dataset and cluster visualisations are the five essential steps for applying clustering algorithms for customer segmentation.

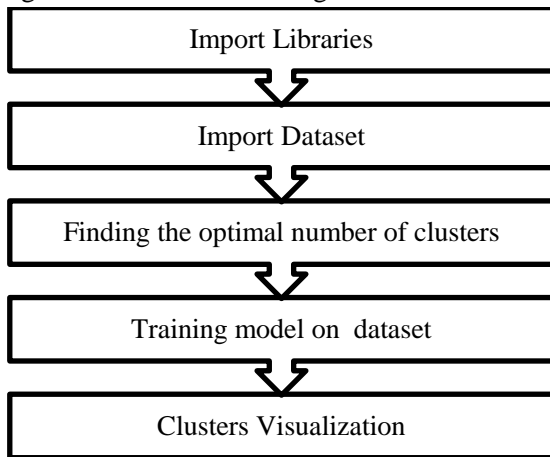


Figure 4: Process for implementing K-means and Agglomerative clustering on dataset

IMPORT LIBRARIES AND DATASET

Numpy, sciPy, matplotlib, pandas and scikit learn libraries were used for cluster analysis. The dataset named Mall_customers.csv was imported in Jupiter notebook using read.csv function. For each step mentioned in figure 4, the details of the libraries, their modules along with the function, class and attribute names are illustrated in Figure 5 and 6.

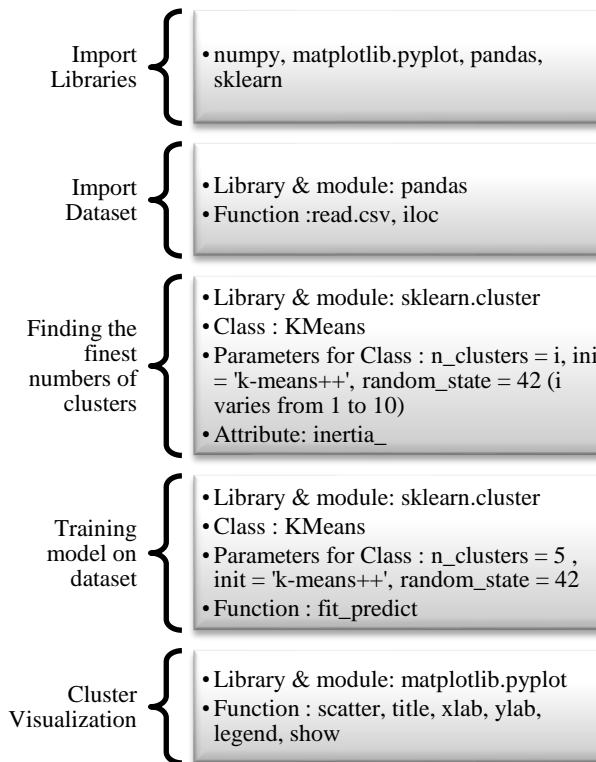


Figure 5: Python libraries for implementing K-means clustering

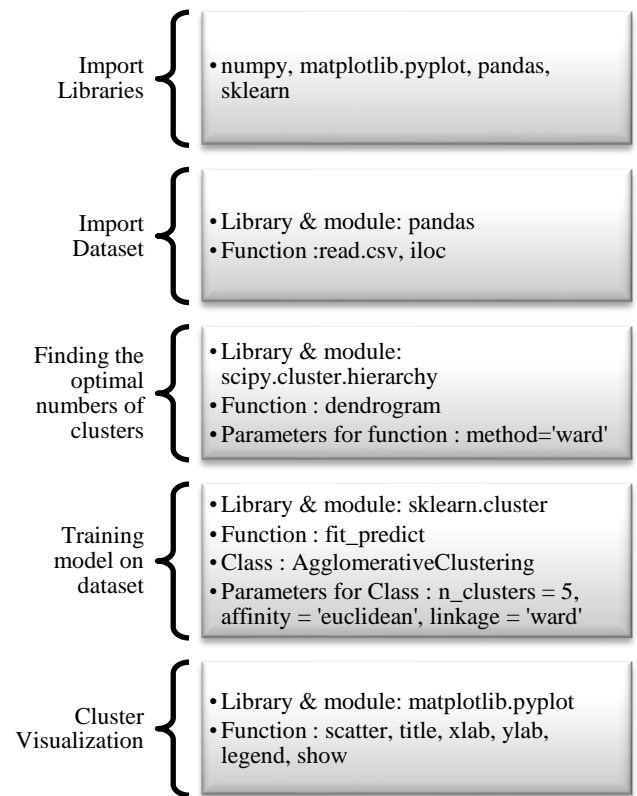


Figure 6: Python libraries for implementing Agglomerative clustering

DECIDING OPTIMAL NUMBERS OF CLUSTERS

One of the challenges in both the algorithms was to decide the number of clusters before implementing these algorithms. To find the best possible number of clusters in K-means Clustering, Elbow method was used [15],[16] and dendrogram was used in Agglomerative clustering.

The basic intention behind k-means clustering, is to define clusters such that total within-cluster sum of square (WCSS) is minimized. The total WCSS calculates the compactness of the clustering. The Elbow method considers the total WCSS that depends on the number of clusters and can be used to find the optimal number of clusters [15],[16]. A curve of WSS for different values of K was plotted using the selected dataset. The plotted curve looked like an elbow as shown in the figure 7. The location of a bend in the plot is normally counted as the optimal numbers of clusters



where adding another cluster does not further enhance the total WSS much. From the curve, the optimal number of clusters was chosen as five.

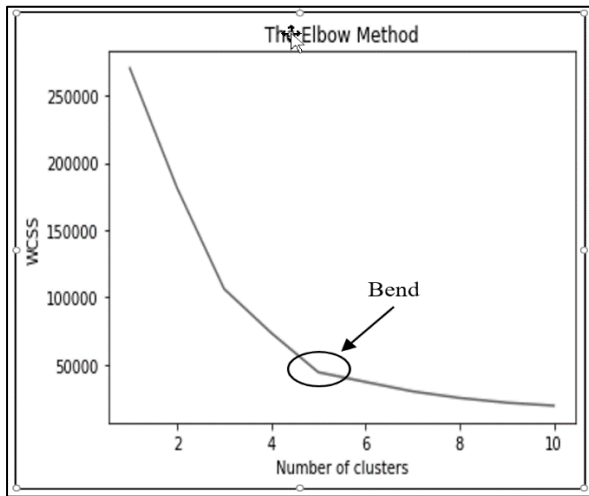


Figure 7: Elbow method for finding the optimal number of clusters for K-means clustering

Dendrogram is a treelike figure that summarizes the procedure of clustering. Data points are shown at the bottom. Similar data points are joined by lines whose vertical length reflects the distance between the data points[6]. If the dendrogram tree is cut with a horizontal line at a height where the line can traverse the maximum distance up and down without intersecting the merging point, appropriate number of clusters can be found [17] as shown in figure 8. From the dendrogram, the appropriate or optimal number of clusters was chosen as five, similar in elbow method.

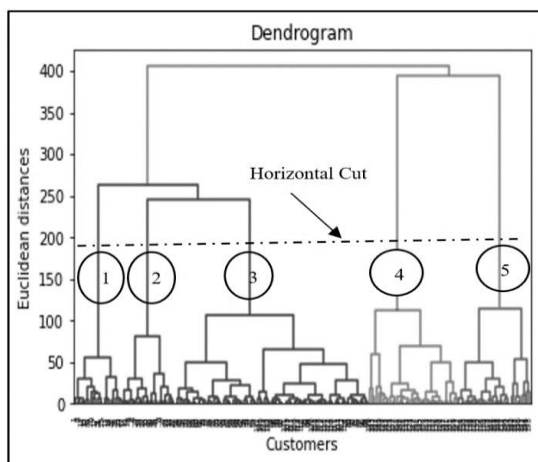


Figure 8: Dendrogram for deciding the number of clusters for agglomerative algorithm

TRAINING MODEL ON DATASET AND CLUSTER VISUALIZATION

Considering the best number of clusters as 5, the model was trained on selected dataset by using sklearn library. Matplotlib library was used for visualization. Figure 9 and 10 clearly shows five clusters as an output of K-means and Agglomerative clustering algorithm based on two features (Annual Income and Spending Score). Each small circle in figure 9 and 10 represents a customer in the dataset. The five bigger circles in figure 9 are the centroids of each cluster. Despite having their own advantages and disadvantages the output of both the algorithms were similar for selected dataset. Hence both the methods can be appropriately applied on the selected dataset.

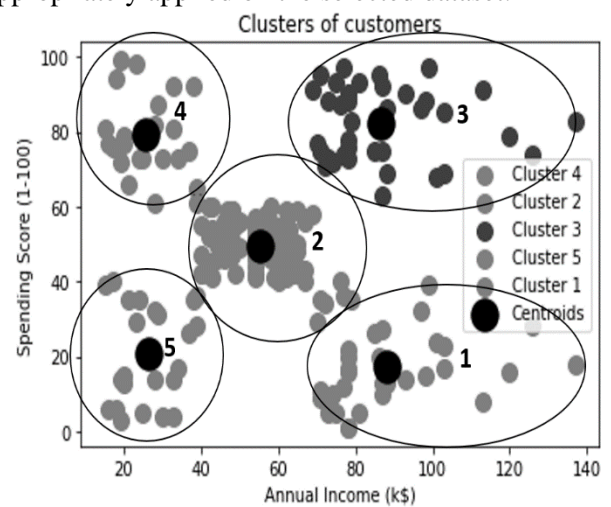


Figure 9: Cluster Analysis by K-means Algorithm

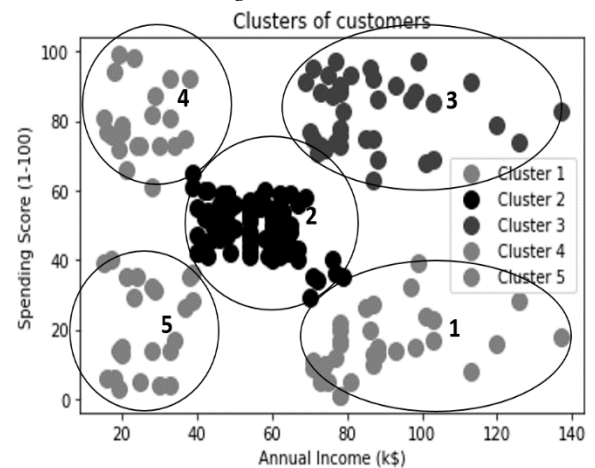


Figure 10: Cluster Analysis by Agglomerative Algorithm

This Clustering Analysis provided with a clear insight about the different segments of the customers in the Mall. These five segments of Customers were named as Saver, Vigilant,

Target, Extravagant and Impecunious based on their spending score and annual income. Figure 11 shows the cluster characteristics of five clusters.

Cluster 1: Saver	•Low spending score and high annual income
Cluster 2: Vigilant	•Average spending score and Average annual income
Cluster 3: Target	•High spending score and high annual income
Cluster 4: Extravagant	•High spending score and low annual income
Cluster 5: Impecunious	•Low spending score and low annual income

Figure 11: Five Clusters with their characteristics

Saver (Cluster 1): The customers in this category have low spending score and high annual income. Despite having high income, this cluster of customers spend less. One of the reasons could be that these customers are unsatisfied or disappointed with the mall's services. The Mall marketing team should focus on this cluster as customers in this cluster have potential to spend.

Vigilant (Cluster 2): The customers in this category have average spending score and average annual income. This cluster of customers may not be the prime target of the mall, but marketing team should target their marketing efforts to retain them to increase their spending score.

Target (Cluster 3): The customers in this category have high spending score and high annual income. These customers can be considered as prime source of mall's profit. These customers are satisfied from mall's service and are regular customers. The marketing team should target them with attractive offers to gain more profits.

Extravagant (Cluster 4): The customers in this category have high spending score and low annual income. Despite having low income, they tend to buy products. This could be

because these customers are satisfied with mall's service. The marketing team may not want to focus on these customers as they have low income, so beyond certain limit they cannot be attracted to offers from the mall. The focus could be to that extent that the mall should not lose them.

Impecunious (Cluster 5): The customers in this category have low income and hence they prefer to spend less. The Mall marketing team will not be interesting to focus on this cluster of customers

DISCUSSION AND CONCLUSION

Understanding a business's customer base is extremely important for any business organisation. Customer segmentation is one of the ways to gain deeper understanding of customer behaviour. It is one of the important applications of cluster analysis amongst many applications spread across different domains. Sales and marketing efforts can be well designed for these clusters of customers to achieve high return on investment. Unsupervised machine learning algorithms such as K-means and Agglomerative clustering algorithms can be easily applied using python support libraries to summarize and visualize the clusters. The current research applied K-means and Agglomerative clustering algorithms on Mall_Customers dataset and discovered different clusters from that data. Finally, these clusters were labelled as Saver, Vigilant, Target, Extravagant and Impecunious by analysing the characteristics of the clusters. These clusters can help marketing team of the Mall to focus on these segments of customers differently and achieve maximum profit.

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PROOF OF JOURNAL INCLUDED IN UGC CARE LIST-1

Title of the paper: Performance Evaluation Of Classification Algorithms Through Sentiment Analysis

Authors: Dr. Prajakta Warale, Dr. Huma Lone

The screenshot shows a web browser window displaying the UGC-CARE List website. The browser's address bar shows the URL ugccare.unipune.ac.in/Apps1/User/WebA/SearchList. The website header includes the Savitribai Phule Pune University logo and the text "SAVITRIBAI PHULE PUNE UNIVERSITY". The main content area is titled "UGC-CARE List" and displays the search results for the query "purana". The search results show a total of 1 journal entry. The table below contains the details of the journal entry.

Sr.No.	Journal Title	Publisher	ISSN	E-ISSN	UGC-CARE coverage year	Details
1	Purana (print only)	All India Kashiraj Trust Fort	0555-7860	NA	from January - 2020 to Present	View

Showing 1 to 1 of 1 entries

Previous 1 Next

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UGC-CARE List

Journal Details

Journal Title (in English Language)	Purana (print only)
Journal Title (in Regional Language)	पुराणम् (print only)
Publication Language	English , Sanskrit
Publisher	All India Kashiraj Trust Fort
ISSN	0555-7860
E-ISSN	NA
Discipline	Arts and Humanities
Subject	Arts and Humanities (all)
Focus Subject	Literature and Literary Theory
UGC-CARE coverage year	from January-2020 to Present

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PERFORMANCE EVALUATION OF CLASSIFICATION ALGORITHMS THROUGH SENTIMENT ANALYSIS

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Abstract

Sentiments drive human decisions. Businesses that recognize their customers' sentiment have an edge over others in predicting and shaping purchasing decisions. Rapid growth in online content in the form of reviews has led to the growth of sentiment analysis. Sentiment analysis is broadly used, as a part of social media analytics to analyse recent movie reviews, customer feedbacks about various products and services. It is basically focused on computing the polarity of the reviews given by the customers and finds out whether the review expresses a positive, negative, or a neutral sentiment. This paper applied various classification algorithms like Logistics Regression, Naïve Bayes, K-Nearest Neighbour and Support Vector Machine on Restaurant Review dataset obtained from Kaggle. Restaurant review dataset contained 1000 reviews and their overall sentiments expressed as positive and negative. The performance of all the selected classification algorithms was compared using measures such as Accuracy, Error Rate, Sensitivity, Specificity, Precision, Recall and F1- Score. These measures were evaluated using the confusion matrix. Results showed that support vector machine performed well as compared to the rest of the algorithms.

Keywords: Classification Algorithms, K-Nearest Neighbour, Logistics Regression, Naïve Bayes, Sentiment Analysis, Support Vector Machine.

Introduction

Sentiment Analysis is often linked with emotional state of a person. The main aspect of sentiment analysis is to evaluate a body of text for understanding the opinion expressed by it and other factors like mood and modality [1]. It helps to identify whether the person is happy or sad, or content or discontent [2]. Social media, surveys, and feedback data are deeply opinionated and express the beliefs, judgement, emotion, and feelings of human beings [3]. Sentiment analysis, also widely known as opinion analysis/mining, is defined as the process of using techniques like Natural Language Processing (NLP), lexical resources, linguistics, and machine learning to extract subjective and opinion related information like emotions, attitude, mood, modality, and so on and try to use these to compute the polarity expressed by a text data. It aims to find out whether the text data expresses a positive, negative, or a neutral sentiment [1].

Since it is impractical to classify and recognise thousands of sentiments manually, automated sentiment analysis has become one of the most efficient way to identify the sentiments. An

automated sentiment detector will classify the review as negative or positive and helps the business to improve its services provided to its customers in future [2].

NLP has gained significant importance in the last decade with the advent of Machine Learning (ML) and has a wide variety of applications that try to infer the meaning and context behind text and use it to solve various problems [1]. One such application is predicting sentiments of reviews about restaurant services given by the customers. These reviews are helpful for the restaurant owners to make changes based on customers reviews and improve their business. Restaurant reviews are written in an unstructured form or textual form. For textual data processing ML supports Natural Language Processing capabilities. Textual data can be easily analysed using NLP methodologies [4].

Classification is the NLP technique of allocating one or more classes to text data. It is one of the supervised learning techniques that has a set of a target classes and training data. Each training data is labelled by a target class. The classification model is trained by training data and predicts the target class of test data. Classification algorithms are commonly used to build model for text classification and can be applied to perform sentiment analysis [5].

Related work

Numerous prior studies have been conducted to perform sentiment analysis on online customer reviews. P. Sasikala & L. M. I. Sheela[6] proposed a method which classified the online food reviews on a scale of 1 to 5 based on the sentiments in the words captured from the reviews. Words were grouped to rate the reviews. Y. Luo & X. Xu[5] extracted 294,034 reviews from Yelp.com using the Latent Dirichlet Allocation (LDA) and sentiment analysis was performed on the extracted reviews. This study revealed that Support Vector Machine (SVM) with a Fuzzy Domain Ontology (FDO) algorithm performed better as compared to other traditional classification algorithms such as Naïve Bayes and SVM ontology in predicting the reviews. M. Govindarajan [7] proposed a hybrid classification model for sentiment analysis of restaurant reviews. He recommended an ensemble classifier comprises of support vector machine, Naive Bayes, and Genetic Algorithm (GA). The study performed performance comparison of the effectiveness of ensemble classifier. A. Tutika & M. Y. V Nagesh[4] built a machine learning model using recommender systems with Natural Language Processing techniques that captured the customers' opinions from customers reviews. B. Yu et al. [8] applied support vector machine (SVM) model to interpret the sentiments from reviews. Word scores generated from the SVM models were managed into a polarity index. D. K. Kirange and R. R. Deshmukh[9] suggested the method for recognizing and evaluating the sentiments using SVM classifier for the restaurant and laptop review dataset. They compared the performance of SVM classifier with well-known K-nearest Neighbour classifier. T. Doan & J. Kalita[10] presented a variant of random forests to perform sentiment analysis on customers' reviews. V. Waikul et al. [11] conducted study for predicting the food preferred by the customers and information needed for the restaurant to expand business through customer reviews. The study applied SVM machine learning classifier for sentiment analysis. Z. Zhang et al. [12] implemented standard machine learning techniques such as Naive



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Bayes and SVM on online Cantonese-written restaurant reviews to automatically classify user reviews as positive or negative.

Classification algorithms for text data

One of the most important phases of the text classification is selecting an appropriate algorithm or classifier. A complete conceptual clarity of each classifier is necessary to determine the most efficient model for a text classification application. While building any model or classifier, a variable that is predicted is often called as y-variable or response variable. The variables that will be encoded in the model and used in predicting this response are called as x-variables or the independent variables [13]. Generally, 60% to 80% of the records present in the data set are used to build a model and is referred as training set. And remaining 40% to 20% of the records are used for testing the model and are referred as test set. The model uses the values of each observation in the test set to predict a value for the response variable [14]. Logistic Regression (LR), Naïve Bayes (NB), K-Nearest Neighbour (KNN) and Support Vector Machine (SVM) are very popular classification algorithms used for text classification [5][15][16][17]. A brief introduction of these classifiers or algorithms are illustrated below:

Logistic Regression: LR is considered as highly popular and powerful classification algorithm. It broadens the ideas of linear regression to the condition where the dependent variable, Y, is categorical. LR considers two important steps: the first step involves estimation of the probabilities of belonging to each class. In the next step a cut-off value on these probabilities is used to classify each case in one of the classes. For instance, in a binary case (class 1 and class 0), a cut-off of 0.5 means that cases with an estimated probability of $P(Y = 1) > 0.5$ are classified as class 1, whereas cases with $P(Y = 1) < 0.5$ are classified as class 0. Instead of using Y as the dependent variable, Logistic Regression uses a function of it, which is called the logit. The logit can be modelled as a linear function of the predictors. Once the logit has been predicted, it can be mapped back to a probability [14].

Naïve Bayes: NB algorithm discovers its roots in statistics and probability theory [18]. It is one of the most popular and simple classification algorithms that is computationally efficient [14]. It makes use of the Bayesian theorem to compute probabilities of class membership [19]. It provides a simple approach to modelling and can be easily used on large data sets [13]. Naïve Bayesian classifiers assume that the effect of an attribute value on a given class is independent of the values of the other attributes. This assumption is called class-conditional independence that makes the computations simple [18]. Using Bayes theorem, $P(C|X)$ can be calculated from $P(C)$, $P(X)$ and $P(X|C)$ [19]. $P(C|X)$ can be expressed as:

$$P(C|X) = (P(X|C) P(C))/P(X)$$


Where,

$P(C|X)$ = target class's posterior probability

$P(X|C)$ = predictor class's probability

$P(C)$ = class C's probability being true

$P(X)$ = predictor's prior probability


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K-Nearest Neighbour: KNN algorithm classifies a new record by finding "similar" records in the training data. These similar records are treated as neighbours. These "neighbours" are then used to obtain a classification for the new record by allocating the new record to the predominant class among these neighbours [20]. It is a non-parametric method as it does not make assumptions about the form of the relationship between the class membership and the predictors. The most popular measure of distance used by this algorithm is Euclidean to measure the distance between records [14]. This algorithm performs well on small sets of data, but when applied to large datasets, it results in slower performance. The algorithm is sensitive to the value of k and alters the performance of the classifier [21].

Support Vector Machine: SVM algorithms tries to identify a hyper-plane that splits the different classes being modelled. The observations on one side of the plane represent one of the classes being predicted, whereas the observations on the other side represent the other class [13]. SVM locates this hyperplane using supportvectors ("essential" training tuples) and margins (defined by the support vectors). For better generalization hyperplane should not lies closer to the data points belong to the other class. Hyperplane should be selected which is far from the data points from each category [19]. Although the training time of even the fastest SVMs can be extremely slow, they are highly accurate, due to their ability to model complex nonlinear decision boundaries [18].

Data collection and research methodology

The data set named "Restaurant_Reviews.tsv" was taken from Kaggle.com. Kaggle is an online community of data scientists and ML experts [27]. It permits users to discover and publish data sets, explore, and build models in a web-based data-science ecosystem. The dataset contained 1000 reviews about the restaurant service in text form along with the sentiments about reviews as positive and negative. The dataset was presented in tsv format i.e. tab separated value. There were two columns named Review and Liked. The review column contained the reviews in text form and Liked column contains numerical value as 1 or 0 (500 reviews had 1 and 500 reviews had 0). 1 indicates positive and 0 indicates negative. This dataset was split in to training (80%) and test (20%) set. Logistic Regression, Naïve Bayes, K-Nearest Neighbour and Support Vector Machine classification algorithms were applied on the training set to train these classifiers. The performance of these classifiers was measured using Accuracy, Error Rate, Sensitivity, Specificity, Precision, Recall and F₁-Score. The selected algorithm was applied to classify the sentiments as positive or negative and predict the sentiment for few unseen reviews. Python, which is the one of the most extensively used programming language for ML applications had been used as a data analysis tool. The programming code for all the classification algorithms had been executed in Jupyter Notebook, which is one of the Interactive Development Environment (IDE) for Python. It is an open-source web application that permits to create and share documents that contain live code, equations, visualizations, and narrative text. Table 1 shows the sample data for ten reviews. It can be observed that the word "loved" is considered as positive (1) in the first review and "Not tasty" is considered as negative (0).



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Table 1: Sample data for five reviews from Restaurant Reviews dataset

Sr. No	Review	Liked
1	Wow... Loved this place.	1
2	Crust is not good.	0
3	Not tasty and the texture was just nasty.	0
4	Stopped by during the late May bank holiday off Rick Steve recommendation and loved it.	1
5	The selection on the menu was great and so were the prices.	1

Python as data analysis tool

Python is a general-purpose programming language that is designed to be simple and easy to understand. It is one of the most popular interpreted programming languages and currently among the fastest growing programming languages in the world. Machine learning and deep learning applications are developed easily with Python's support for libraries such as NumPy, pandas and scikit-learn. These support libraries have made Python, a first-rate option for data science applications [22] [23]. Table 2 shows the necessary python libraries for performing sentiment analysis through classification algorithms.

Table 2: Python libraries for performing sentiment analysis through classification algorithms

Sr. No	Python Library	Description
1	numPy	<ul style="list-style-type: none"> • NumPy is Numerical Python, used for numerical computing • Contains data structures & algorithms for most scientific applications encompassing numerical data • Highly efficient than the other built-in data structures in Python[23]
2	re	<ul style="list-style-type: none"> • Supports regular expression matching operations [26]
3	nltk	<ul style="list-style-type: none"> • Termed as Natural Language Toolkit • Helps building Python programs that work with human language data • Provides suite of text processing libraries for classification, tokenization, stemming, tagging etc. [25]
4	pandas	<ul style="list-style-type: none"> • Name derived from panel data, an econometrics term • Supports high-level data structures (such as data Frame) • Functionality to reshape, slice and dice, perform aggregations, and select subsets of data[23]

5	sklearn	<ul style="list-style-type: none"> • Highly capable of performing ML algorithms such as Classification (Logistic Regression, Naïve Bayes, K- Nearest Neighbours, Support Vector Machine etc.), Regression, Clustering (<i>k</i>-Means, Agglomerative), Dimensionality Reduction (Principal Component Analysis, Feature Selection etc.) etc.
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Process for performing sentiment analysis

Figure 1 demonstrates the process for performing sentiment analysis by the selected classification algorithms on the selected dataset in python. Import libraries, import dataset, cleaning text, creating bag of words model, splitting the dataset in to training and test set, training the model on training set and predicting test set results are the required steps for applying classification algorithms on restaurant review dataset. Once the necessary python libraries and dataset is imported into python IDE, the text data must be cleaned. Cleaning the text involves converting text to lower case, removing all the stop words, and removing all punctuations. This is followed by creating bag of words model. Bag of words model is one of the commonly used NLP technique of text modelling. Whenever any algorithm is applied on a dataset, it operates on numbers. Text data cannot be directly fed into the algorithm. Hence, Bag of words model is applied to pre-process the text by converting it into a bag of words, which keeps a count of the total occurrences of most frequently used words[24]. It represents arbitrary text into fixed-length vectors by counting how many times each word appears. This process is often called as vectorization. After vectorization, the algorithm can be easily applied by splitting the dataset in to Training and Test set. The model is trained on training set and test data is used to predict the results.



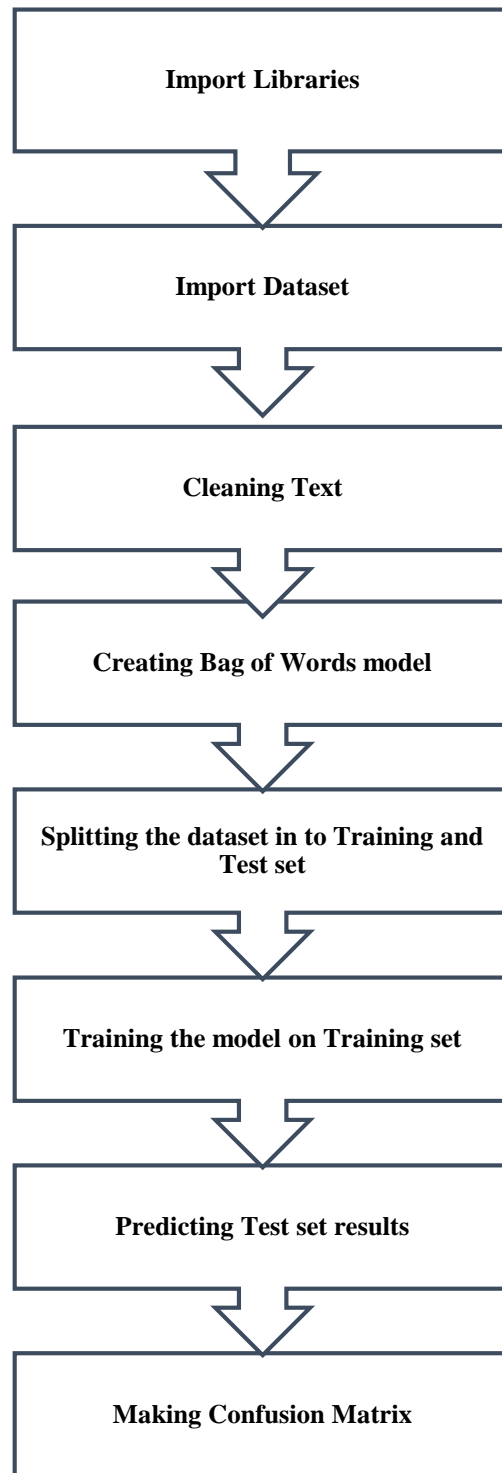
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Figure 1: Process for implementing classification algorithms on selected dataset



NumPy, re, nltk, pandas and scikit learn libraries were used for performing sentiment analysis. For each step mentioned above, the details of the libraries with their usage in selected algorithms, their modules along with class referred from the modules are illustrated in table 3.

Table 3: Python libraries with their modules and classes for performing sentiment analysis

Description	Applied on algorithms	Python Libraries with module	Class
Import Libraries	LR, NB, KNN and SVM	numPy, pandas	
Import Dataset	LR, NB, KNN and SVM	pandas	
Cleaning Text	LR, NB, KNN and SVM	Re, nltk.corpous, nltk.stem.porter	Porter Stemmer
Creating Bag of Words model	LR, NB, KNN and SVM	sklearn.feature_extraction.text	Count Vectorizer
Splitting the dataset into Training and Test set	LR, NB, KNN and SVM	sklearn.model_selection	
Training the model on Training set	LR	sklearn.linear_model	Logistic Regression
	NB	sklearn.naive_bayes	Gaussian NB
	KNN	sklearn.neighbors	K Neighbors Classifier
	SVM	sklearn.svm	SVC
Predicting Test set results	LR, NB, KNN and SVM	numPy	
Making Confusion Matrix	LR, NB, KNN and SVM	sklearn.metrics	

Figure 2 shows snapshot of ten reviews converted in tabular structure using pandas library. The output displayed two columns consisting of ten reviews along with its sentiments expressed as

1(positive) and 0 (negative). It displayed first five reviews numbered from 0 to 4 and last five reviews numbered from 995 to 999.

Figure 2: Reviews in tabular structure using pandas library

	Review	Liked
0	Wow... Loved this place.	1
1	Crust is not good.	0
2	Not tasty and the texture was just nasty.	0
3	Stopped by during the late May bank holiday of...	1
4	The selection on the menu was great and so wer...	1
..
995	I think food should have flavor and texture an...	0
996	Appetite instantly gone.	0
997	Overall I was not impressed and would not go b...	0
998	The whole experience was underwhelming, and I ...	0
999	Then, as if I hadn't wasted enough of my life ...	0

[1000 rows x 2 columns]

Figure 3 shows ten reviews after text cleaning. Text cleaning process removed the stop words (such as by, is, this, was, on etc.). CountVectorizer class from `klarn.feature_extraction.text` module was applied for tokenizing the collection of reviews and build a vocabulary of known words. 80% of the records in dataset were considered for training the classification algorithms and rest 20% of the records were used for testing the classifier's performance.

Figure 3: Sample of ten reviews after applying text cleaning

```
Reviews
['wow love place',
'crust not good',
'not tasti textur nasti',
'stop late may bank holiday rick steve recommend love',
'select menu great price',
'get angri want damn pho',
'honeslti tast fresh',
'potato like rubber could tell made ahead time kept warmer',
'fri great', 'great touch',
'servic prompt']
```

Measures for evaluating classifier performance

It is crucial to measure the performance of classifier due to availability of wide variety of classifiers. It is not only classifiers but even with one classifier there are usually many options that can lead to completely different results [14]. For instance, results may vary depending on the value of K chosen in KNN classifier. Also estimating performance using training data can result in misleading over-optimistic estimates due to over-specialization of the learning algorithm to the data. It is better and recommended to measure the classifier's performance on the test set that were not used to train the classifier or model [18].

The most popular and important criteria for determining the performance of a classifier are evaluating its accuracy and misclassification rate or error rate. The accuracy of a classifier implies the percentage of records that are correctly classified by the classifier. Misclassification implies that the record belongs to one class, but the classifier classifies it as a member of a different class. To obtain an honest estimate of accuracy and misclassification error, classification matrix (also called the confusion matrix) is used and it is computed from the test data. The confusion matrix gives estimates of the true classification and misclassification rates. It shows the correct and incorrect classifications that a classifier made for a certain dataset as shown in table 4. Rows and columns of the classification matrix correspond to the true (actual) and predicted classes, respectively [14].

The two diagonal cells (upper left, lower right) provide the number of correct classifications, where the predicted class coincides with the actual class of the record. The off-diagonal cells give counts of misclassification. The top right cell gives the number of class 1 members that were misclassified as 0's. Similarly, the lower left cell provides the number of class 0 members that were misclassified as 1's [14].

Table 4: Confusion Matrix

	Predicted Class		
Actual class	1	0	Total
1	TP	FN	P
0	FP	TN	N

Table 4 shows classification matrix where

- P is the number of positive records (class 1)
- N is the number of negative records (class 0)
- **True positives (TP)**: Positive records that were correctly labelled by the classifier.
- **True negatives (TN)**: Negative records that were correctly labelled by the classifier.
- **False positives (FP)**: Negative records that were incorrectly labelled as positive
- **False negatives (FN)**: Positive records that were mislabelled as negative

For each record classifier's class label prediction is compared with the record's known class label. Confusion matrix is a useful instrument for evaluating how well a classifier can identify records

of different classes. TP and TN will give indication of correct identification of class while FP and FN will identify mislabelling.

The **accuracy** of a classifier on a given test set is the percentage of test set records that are correctly classified by the classifier [13], [14]. **The error rate** or misclassification rate of a *classifier can then be measured as 1-Accuracy*. These measures are defined as follows in figure 4:

Figure 4: Accuracy and Misclassification Rate

$\text{Accuracy} = \frac{TP+TN}{P+N}$	$\text{Misclassification Rate} = \frac{FP+FN}{P+N}$
---------------------------------------	---

Along with accuracy and misclassification rate discussed above, other measures such as sensitivity, specificity, precision, recall and F-score are also widely used measures for evaluating the classifiers' performance. Sensitivity is also termed as the true positive (recognition) rate (i.e., the proportion of positive records that are correctly identified), while specificity is the true negative rate (i.e., the proportion of negative records that are correctly identified)[18]. These measures are defined as follows in figure 5:

Figure 5: Sensitivity and Specificity

$\text{Sensitivity} = \frac{TP}{P}$	$\text{Recall} = \frac{TP}{TP+FN} = \frac{TP}{P}$
-------------------------------------	---

Precision can be considered as a measure of exactness (i.e., what percentage of records labelled as positive are actually such), whereas recall is a measure of completeness (what percentage of positive records are labelled as such). We can observe that recall and sensitivity are similar [18]. These measures are defined as follows in figure 6.

Figure 6: Precision and Recall

$\text{Precision} = \frac{TP}{TP+FP}$	$\text{Recall} = \frac{TP}{TP+FN} = \frac{TP}{P}$
---------------------------------------	---

A possible way to utilize precision and recall is to combine them into a single measure. This is the approach of the F measure (also known as the F_1 score or F-score) and the F_β measure [18]. They can be expressed as follows in Figure 7a and 7 b.

Figure 7a: F1-Score

$F_1 = \frac{2 \times \text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$



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Figure 7b: F β -Score

$$F_{\beta} = \frac{(1 + \beta)^2 \times \text{Precision} \times \text{Recall}}{\beta^2 \times \text{Precision} + \text{Recall}}$$

Results

After training all the selected models on the dataset using python libraries mentioned above, test set classes were predicted and compared with actual classes. 20% of the data was considered as test set, 200 records out of 1000 were randomly chosen for computing confusion matrix. Table 5 shows TP, FN, TN, FP for all the selected algorithms generated through python library.

Table 5: TP, FN, TN, FP for selected Classifiers

Classifier	TP	FN	TN	FP
Logistic Regression	80	17	75	28
Naïve Bayes	55	42	91	12
K-Nearest Neighbour	74	23	58	45
Support Vector Machine	79	18	79	24

Table 6 shows the performance measures for the selected classifiers.

Table 6: Performance measures for selected classifiers

Measures	LR	NB	KNN	SVM
Accuracy	77.5	73	66	79
Error Rate	22.5	27	34	21
Sensitivity	82.5	56.7	76.3	81.4
Specificity	72.8	88.3	56.3	76.7
Precision	74.1	82.1	62.2	76.7
Recall	82.5	56.7	76.3	81.4
F ₁ Score	78.1	68.1	68.5	79.0



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Figure 8: Performance Measures Comparison

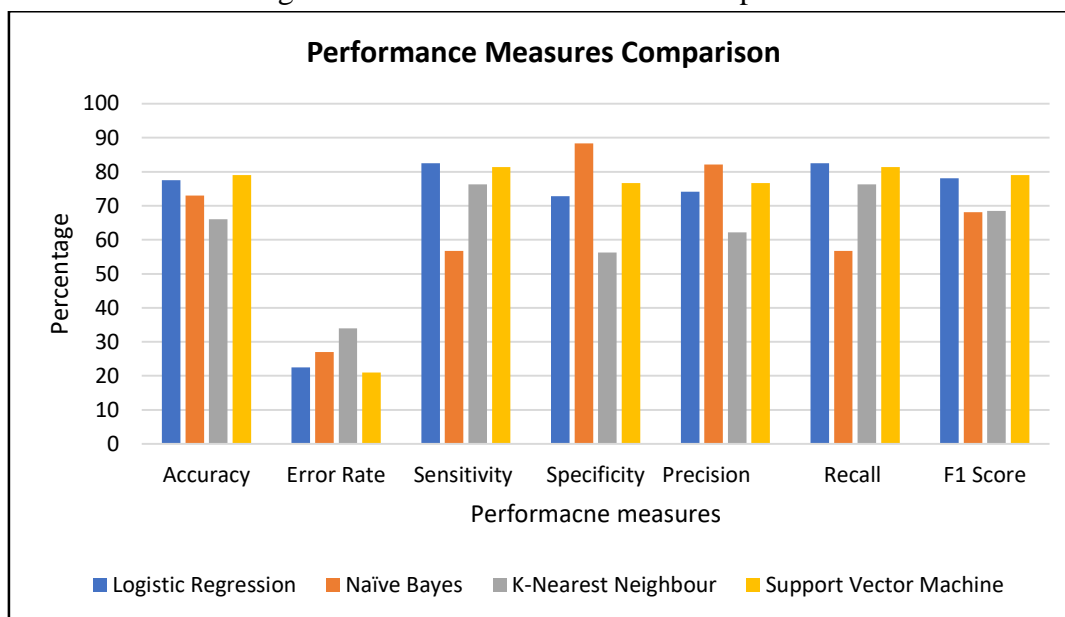


Figure 8 shows the comparison of performance measures for all the selected classification algorithms. Following observations were made from each measure which is discussed below:

Accuracy: Support Vector Machine classifier gave the highest accuracy (79%) as compared to other classification algorithms. This indicates that 79% of the test set records were correctly classified by SVM classifier.

Error Rate: Support Vector Machine classifier had the lowest (21%) error or misclassification rate. This indicates that 21% of the test set records were incorrectly classified by SVM classifier.

Sensitivity: Logistics Regression outperformed other classifiers with 82.5% sensitivity. Support vector machine classifier was very near to logistic regression classifier with 81.4% sensitivity. This indicates that performance of Logistic Regression and Support vector machine were very close in identifying the proportion of positive records. Hence these classifiers were able to correctly identify the positive reviews about the restaurant.

Specificity: Naïve Bayes classifier outperformed other classifiers with 88.3% specificity. Support vector machine classifier was near to Naïve Bayes classifier with 76.7% specificity. This indicates that performance of Naïve Bayes and Support vector machine were very close in identifying the proportion of negative records. Hence these classifiers were able to correctly identify the negative reviews about the restaurant.

Precision: Naïve Bayes classifier outperformed other classifiers with 82.1% precision. Support vector machine classifier was near to Naïve Bayes classifier with 76.7% precision.

Recall: Logistics Regression outperformed other classifiers with 82.5% Recall. Support vector machine classifier was very near to logistic regression classifier with 81.4% Recall.

F1 Score: Equal weightage for precision and Recall (weightage=1) was considered and both measures were evaluated together with help of F₁-score. It was observed that Support Vector

Machine outperformed other classifiers with 79% F_1 -score. Logistics Regression classifier was very near to Support Vector Machine classifier with 78.1% F_1 -score.

Considering the performance of all the measures, it can be concluded that Support Vector Machine algorithm was considered as the best supervised machine learning method for the Restaurant reviews dataset. The selected classifier (SVM) was then applied on new and unseen reviews to predict their sentiments. Table 6 shows ten reviews on which the classifier was applied.

Table 6: Unseen reviews and predicted sentiments

Sr. No	Review	Sentiment (1 or 0)
1	I love this restaurant very much	1
2	I hate this place	0
3	I do not like the service offered by this restaurant	0
4	I do not like ambience	0
5	Potatoes fried were amazing	1
6	Quick Service	1
7	Awesome place	1
8	Service too slow	0
9	Never go to this place. It is pathetic	0
10	Salad was too spicy	1

Conclusion

Sentiment analysis plays a significant role in understanding a customer's experience with a product or service. It is a popular technique for summarizing and analysing consumers' textual reviews about products and services. Classification algorithms such as Logistic regression (LR), Naïve Bayes Classifier (NBC), K-Nearest Neighbour (KNN) and Support Vector Machine (SVM) can be used to build sophisticated models to classify a consumer's opinion as positive or negative. Performance of these classifiers can be evaluated and compared using various measure such as Accuracy, Error Rate, Sensitivity, Specificity, Precision, Recall and F_1 Score. The classifier with the best performance can be used to predict the sentiments for the unseen reviews and help business to analyse the sentiments. This research has tried to apply various machine learning classification algorithms on Restaurant review dataset obtained from Kaggle. It was concluded that SVM classifier outperformed other algorithms.

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Transformation through E-Governance – A Maha Online Study for Maharashtra State

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ABSTRACT

Information communication and technology have been paving new ways for information transfer between various government agencies of national, state, local importance. [1]. One of the remarkable application of ICT is e-governance. In India all states have introduced various citizen oriented e-gov projects for the citizens. The state of Maharashtra in India is leading ahead in introducing various citizen oriented e-governance projects for the utility of its users. It is a well known that such initiatives are designed for citizens and are critical in implementation but if implemented properly may result into improving state of art e-governance for the state. Hence, a critical look at these initiatives will help in assessing true resulting benefits to citizens and employees as well. In line with this a prominent e-governance initiative, Maha Online that covers the whole Maharashtra state, with as much as 389 services across 37 departments was studied. The descriptive study was conducted to gauge the service quality of Maha Online and citizens satisfaction was derived. Data was collected from five districts namely Ahmednagar, Pune, Satara, Sangli and Kolhapur consisting of sample of 750 respondents. The analysis showed that the citizens are partially satisfied with quality of e-governance service. The Flaws in the system are also presented. Paper is concluded with remedial measures to improve service quality and overall performance of MahaOnline.

Keywords: E-governement, MahaOnline, aaplesarkar, , Maharashtra, service quality



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INTRODUCTION

Electronic government is no longer just an option but an essential requirement for every country and every citizen. Successful role played by each stakeholder in rolling out the initiative and policies are at the core in making e-government a success [2]. Some countries who have realized the importance of e-government initiatives have managed to successfully roll out their services. Such country includes United States, Republic of Korea, Singapore, France and Sweden etc. More than 200 countries are using websites to deliver e services to the citizens [3]. E-Government is an important avenue for developing countries like India to leap forward in their government's operations, provide infiltrate performance and reduce existing gaps in the system [4]. As far as India is concerned, after comparing various e-gov projects implemented in India it is evident that the country is consistently progressing and implementing various e-government projects [3]. Government of Maharashtra has also come up with certificate program in e-governance for all its employees and CSC operators so that e-gov projects can be executed successfully. Some successful initiatives implemented includes Mahabhulekh, SARITA and Maha Rojgar to name a few. Given below is the brief background of Maha Online initiative.

MahaOnline

MahaOnline Ltd. is a joint venture between Government of Maharashtra and TATA Consultancy Services Ltd (TCS) formed in 2010. MahaOnline is now an apex body in implementing of e-Governance in Maharashtra. It provides support to various government departments in Maharashtra [2015, October] Retrieved through <https://www.mahaonline.gov.in/Molweb/1100/aboutus>. At present the functioning of all Maha e-Seva Kendra is monitored by MahaOnline. It is also worth to mention that Maharashtra Government has passed the Maharashtra Right to Public Services Act 2015, on 21st August 2015. 37 different category of services are provided such as Panchayat Raj, Revenue, Forest, Rural development etc. are provided online through portal www.aapalesarkar.mahaonline.gov.in. Government of Maharashtra has implemented "Maharashtra Right to Public Services Act 2015" to deliver e-services in transparent, efficient and timely manner to public. A Citizen has to make online application and submit all the required documents. Citizen then has to pay online fees through various payment gateways option enabled by the portal. An applicant after submitting the online application can also track the status of the application. The new act would upshot an action against the operator who will be penalized for delays in providing the services [MRPSA, 2015]. Now the system is 11 years old and has been matured. Since inception of the initiative, it took considerable time for the system to get established. The researcher wanted to perform midcourse evaluation highlighting the gaps. The researcher has also done certain noteworthy suggestions. Next section presents diagram for MahaOnline operations.

Time sequence diagram for application process flow for MahaOnline portal

The time sequence Fig.No. 1 illustrates sequence from the start of creation of a login through registration process to certificate delivery to citizen. This process is followed for almost 11 years. Citizen approach MahaOnline web portal with service request. First step is registration. A citizen has to register online on MahaOnline website. A citizen can register using either verifying UID option or uploading all proofs on the portal. Once the login is created then user can select the department, Agriculture, Home Department, Industries Energy and Labour Department, on selection of department user will get list of services of respective department for application. After selecting department, the list of certificates under it will be displayed. A citizen can select the required certificate and upload the necessary proofs to avail the benefit of online service delivery. Once the application is submitted and necessary proofs are attached then user can track the status of their application. A further fee is collected from applicant and token with expected date of delivery of certificate is communicated to the citizen. Citizen then is intimated through message and email regarding delivery of the e-certificate. Aapalesarkar portal also provides the facility to check and authenticate the e-certificate. As per "Maharashtra Right to Public Services Act 2015" lead time for certificate delivery is generally 7 days to 30 days. After 7 days when citizen can raise online appeal for non receipt of e-certificate. Thus system has now become more mature robust and time efficient.

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- It may be noted that though MahaOnline started in 2010, and scale up to the expectations. The system is adding moiré services from various departments and plans to cover all services from various government departments under MahaOnline. In addition, no study has been conducted by the government or individuals to analyse if the existing system has matured and progressed successfully or are there any pitfalls exist in the current system so that rectifications can be done.
- Keeping this in mind, a pilot study in Ahmednagar district was carried out, to find out the progress of the MahaOnline, loopholes in the process (if any).
- It was revealed that problems exist in online service delivery where the targets are not met in terms of delivery time. Sometimes a certificate is not delivered in time and also has corrections in the certificate which further increases the lead time for service delivery. Staff at the backend are trained properly to execute online transaction. Also latest technologies such as internet and mobile systems are included in the existing system to bring in more ease of use and to study technology aspect. Therefore, a detailed study using a descriptive research based method is conducted. The next section discusses objectives and research methodology.

OBJECTIVES OF THE STUDY AND RESEARCH METHODOLOGY

Objectives

The main objective of research was to evaluate citizens satisfaction towards e-government project MahaOnline in five districts of Maharashtra. Secondary goal was to identify the loopholes in the current system.

Hypothesis

There is positive association between service quality and users satisfaction

H0: There is no positive association between service quality and users' satisfaction.

H1: There is positive association between service quality and users' satisfaction.

Service quality was defined by eight parameters. They are time bounded service, ease of use, performance and speed, connectivity, accuracy and service costs, transparency in service deliverance[7]. The loop holes in the system were found from primary data collected from the citizens.

Research Design

a) Sampling Method

A study is based on descriptive research which includes surveys and various data collection techniques. Sampling design used was Multistage Sampling method due to involvement of several districts and sub district and at E-Seva Kendra. At first stage, five districts within Maharashtra was screened namely Ahmednagar, Pune, Satara, Sangli and Kolhapur. At subsequent stage, two sub districts were selected from every district. At third stage, the citizens applying for e-service through Maha e-Seva Kendra were selected randomly. In all a sample of 750 was selected from all five districts. Table 1 shows districts and sub districts along with sample sizes.

Data Collection

Primary data was collected through two well-structured questionnaire. The questionnaire was designed for citizens. It consists of total 20 questions. Questions were used to judge services quality dimensions like timeliness, cost, transparency, ease of service delivery online, privacy, performance of the website, no. of days required to get the certificate etc. 5 questions were used to collect basic information of citizen like name, educational qualification and age etc whereas rest of the questions were targeted to collect information on overall online service delivery mechanism, complaints if any etc. Along with primary data secondary data was also gathered from various websites at international, national and state level governments' website, e-government research papers, e-governance policy. After data collection reliability of data was tested.

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Statistical tools used

Statistical software SPSS 20.0 was used for analysis and interpretation, Chi square test and factor analysis techniques were applied on data.

Reliability analysis

The reliability of the data was calculated through SPSS. For reliability analysis, cronbach's Alpha was calculated. Since value of alpha is greater than 0.70, the sample is said to be reliable.

ANALYSIS

A) Descriptive statistics

Following table provides descriptive statistics for the sets of variable in the study. Table 3.0 shows 68.4% of male mail citizens apply online through MahaOnline webportal whereas female percentage was 31.6%. Data related to age group shows that users of age 18 to 25 are 40 %. Respondents in the age group 18 to 25 require nationality, income, domicile, non-creamy layer and caste certificate and rahivasi dakhala. As far as educational qualification is concerned it was found that 32 % respondents are HSC & graduates, 16 % respondents are below 10th, approx. 26 % respondents are post graduates. Users with PG and UG degree are large in number because they require different certificate like caste, nationality/domicile, on creamy layer etc to take benefit in the fees by government scholarship.

B) Analysis of citizens' satisfaction

Organizations are required to be built on three main pillars viz., processes, people and technology as shown in Fig. 2. In designing service delivery these three elements must be aligned to the society and citizens in it. System should start with processes of organizations (systems) then consider people who will operate it whether they have desired skills, knowledge, and attitude. The third element to consider is the technology, which support the processes and people. Citizen interact with people at Maha- e-Seva Kendra and apply online for certificate through use of technology for availing e-service. On the basis of this the study has highlighted the attributes of quality which are as follows:

- **Timeliness:** Timeliness time refers to the number of days required to deliver e- certificate
- **Cooperation:** Cooperation means assistance from employees of Maha e-seva Kendra.
- **Ease of Use:** Easiness refers to easiness of use of aaple sarkar portal in availing certificate.
- **Performance & Speed:** Speed refers to the performance of the website and ability to process request quickly.
- **Accuracy:** Accuracy is nothing but correctness of certificate.
- **Connectivity:** Connectivity refers to ability to connect to network or backend MahaOnline server.
- **Service Cost:** Service cost is nothing but the charges paid by user for online transaction to avail certificate.
- **Transparency:** Transparency refers to clearness of the procedure. Awareness of status of applications

Fig.3 shows level of satisfaction on 5 point likert scale for all quality parameters. It has been observed that majority of respondents are satisfied with services quality of SETU however they are dissatisfied about timeliness of services.

Timeliness

Citizens have reported that they get certificate on time. However it is significant to note that 40% respondents are satisfied with the timeliness of the service and 30% respondents are dissatisfied about the delays in getting the certificate.

Cooperation

53% citizens are satisfied with cooperation of staff at Mahae-Seva Kendra where citizen visit and make online application. whereas 34% citizens are dissatisfied.

Ease of Use

Many citizens also directly apply online for service delivery. Almost 59 % respondents feel that webportal Aaple sarkar is easy to use and navigate. Demo videos are displayed on the website regarding how to register and apply for certificate thus make their task of application easy. However 25 % respondents also feel that it is difficult to use the web portal.

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Performance & Speed

Along with ease of using the website it is also important to be fast and meet consumer expectations. As per 55% or the respondents performance and speed of the website is extremely good.

Accuracy

Percentage of satisfied users for accuracy is more. Certificates delivered to citizens are accurate however 28% respondents also complains about errors in the certificate which takes time for further correction.

Connectivity

Connectivity to the server is extremely important factor for speeding up of delivery of services. It is also significant to note that 55% respondents are satisfied with network connectivity, 13% are neutral and 32 % report about connectivity issues which need to be looked upon and rectified.

Service Cost

MahaOnline charges minimal fees than prescribed by government .

Transparency

As far as transparency is concerned 57 % respondents are satisfied with transparency maintained by MahaOnline which shows that respondents get information about what is the status of their application.

Citizen Satisfaction study

In general majority of respondents are pleased with online service delivery mechanism and this percentage is 57 % which is quite significant. Percentage of respondents who are neither satisfied nor dissatisfied is 12.8 and 27% are dissatisfied about the service delivery.

C) Hypothesis testing

Cross tabulation Test

Chi square test was used along with cross tab feature to figure out association between service quality and citizen satisfaction. The level of significance used was 5%. Timeliness, Ease of Use, Performance & Speed, cooperation, accuracy, connectivity, service cost and transparency are evaluated to measure citizen satisfaction. Table no.4 depicts chi square significance is 0.000 at 5% level. Hence, the null hypothesis is rejected (H0) and alternative hypothesis is accepted (H1). It must be remember here that values 1 to 5 are given to "highly dissatisfied, dissatisfied, neither satisfied nor satisfied, satisfied and highly satisfied" using the software SPSS.

D) Factor Analysis

This technique is used when database had multiple factors. It is used predominently used to eliminate and reduce number of factors. Stage1 is to verify if the data is proper and correct for technique of factor analysis. Kaiser Meyer Olkin Test (KMO) and Bartlett's Test resulted into value of 0.840 and 0.000 respectively indicated importance.

Total Variance Explained

The technique of principal component analysis was also used. Table No.5 shows rotated component matrix for factors. It is much evident from the following table that 1st component relates for 44.02% of the variance, then 2nd component relates to 18.47% of the variance whereas 3rd factor related to 17.12 % of the variance. It is relveled that the cumulative % of variance explained by the first 3 factors is 75%.

Component Matrix

The component matrix shows the association of each factor with every other factor. Factor loadings basically measure the key determinant. Factors can be clustered together as follows.

Factor 1- Ease of Use, Performance & Speed, Connectivity (Technology attributes)

Factor 2- Service Cost , Transparency, Accuracy (Quality attributes)

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Factor 3- Timeliness & Cooperation (staff attributes)

It is clear that components Ease of Use, Performance & Speed, Connectivity are heavily loaded on factor 1. Service Cost, Transparency; Accuracy is loaded on factor 2, whereas component Timeliness & cooperation is loaded on factor 3. It is significant to mention here those same outcomes are also revealed from Diagram 3 for level of satisfaction where Ease of Use, Performance & Speed, Connectivity are viewed as three satisfactory factors which can be further improved. It also shows that users are satisfied with Service Cost, Transparency, Accuracy which is loaded on factor 2. In nutshell we can say that Technology attributes and quality attributes are influencing users' satisfaction. Thus all three factors shall be enhanced for better service delivery. And further to ensure more citizen satisfaction.

SUMMARY OF FINDINGS

The objective of the paper was to evaluate quality of services and citizen satisfaction and identify any loopholes in the system. Even though the system is operational and mature there exist certain loopholes in the system. Our Descriptive study gives guidelines for mid course evaluation of MahaOnline. It also offers noteworthy insights into how service quality is reflected in the minds of citizens. Findings from the study (section 4.2) revealed that the in general citizens are satisfied with services, online delivery of the services and overall operational aspects of website. Results of chi square test reflects that p value for all factors was <0.05 thus H1 hypothesis is accepted i.e. There is significant positive association between service quality and customer satisfaction. Findings of factor analysis can be summarised as given below.

- KMO and Bartlett's test was significant with a value of 0.840 and 0.000 respectively.
- Three extracted components accounts for 80.52% of total variance.
- Exploratory factor analysis with varimax rotation yielded 3 factors based on eigen value cut off of 1.

SUGGESTIONS

- Technical problems need to be addressed on priority:- The problems related to technology can solved by ensuring proper connectivity so that user from not only urban but rural area also should be able to use portal smoothly.
- System should be robust and must reduce the downtime of the server and thus speeding up the delivery of the services.
- Training must be given to staff for back end processing of applications which causes unnecessary delays in service delivery.
- Though aaplesarkar mobile app has been launched by government it is not functional and frequently gives errors. Thus it is necessary to develop fully functional mobile app for online services delivery
- Their quality control department must be try to improve accuracy of the service as it introduces unnecessary delays.
- Since MahaOnline is spanning over full state and also has much larger functional scope so more and more services from all government departments must be integrated in the current system.

CONCLUSION

In this research paper, MahaOnline which is one of the mature and important schemes of e-Government project implemented across all states in Maharashtra is studied extensively. An in depth analytical study of the system from the questionnaire data was carried out using SPSS. The findings and the remedial measures to revamp them are also suggested. Suggestions given in study can be useful for government employees, centre operators for improving e service delivery.

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Table 1: Districts with sample sizes

District	Sub-District	Sample size	Total sample size per district
Pune	Haveli	78	150
	Baramati	72	
Satara	Satara	82	150
	Karad	68	
Sangli	Tasgaon	80	150
	Vita	70	
Ahmednagar	Rahuri	95	150
	Nagar	55	
Kolhapur	Karveer	75	150
	Ajara	75	
	Total	750	750


Table 2: Reliability Analysis

District	Sample Size	No of Items	Chronbach's Alpha
Pune	150	20	0.950
Satara	150	20	0.887
Sangli	150	20	0.809
Ahmednagar	150	20	0.786
Kolhapur	150	20	0.912

(Source: Data Analysis performed with IBM SPSS 20.0)

Table 3: Demographic Characteristics Of Citizens

No.	Name	Type	Frequency	Percentage
1	Gender	Male	513	68.4
		Female	237	31.6
2	Age group	18-25	300	40.0
		26-35	163	21.7
		36-45	168	22.4
		46-55	68	9.1
		More than 55	51	6.8
3	Education	Up to 10 th	119	15.9
		HSC & Graduation	240	32.0


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	Post graduation	196	26.1
	Don't know read write	95	12.7

(Source: Primary Data from Questionnaire 1)

Table 4: Cross Tab with Chi square values for service quality attributes

No	Cross Tab Parameters	Chi-Square Value	Df	Sig	Remark
1	Timeliness	323.805	16	0.000	P value < 0.05
2	Cooperation	265.160	16	0.000	P value < 0.05
3	Ease of Use	341.570	16	0.000	P value < 0.05
4	Performance & Speed	290.812	16	0.000	P value < 0.05
5	Accuracy	316.618	16	0.000	P value < 0.05
6	Connectivity	364.286	16	0.000	P value < 0.05
7	Service Cost	308.224	16	0.000	P value < 0.05
8	Transparency	325.111	16	0.000	P value < 0.05


(Source: Data Analysis with SPSS 20.0)

Table 5: Component Matrix

Rotated Component Matrix ^a			
	Component		
	1	2	3
Timeliness		.656	
Cooperation		.609	
Ease of Use	.843		
Performance & Speed	.724	.631	
Accuracy		.688	.600
Connectivity	.825		
Service Cost		.752	
Transparency	.625	.703	
Citizen satisfaction	.657		

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 6 iterations.

Source: Data Analysis with SPSS 20.0)


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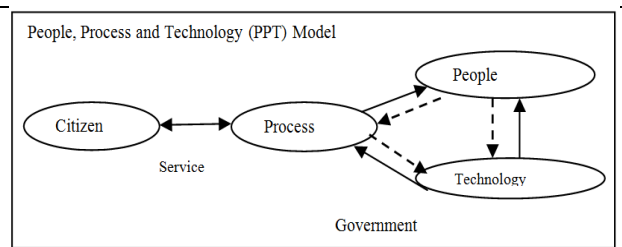
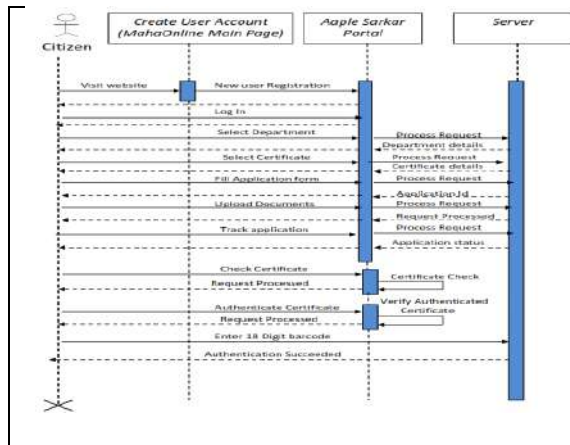


Figure 1: Time Sequence Diagram for operations flow for MahaOnline portal (Source: Primary & Secondary Data)

Figure 2 :PPT Model (Source:Peppard and Rowland Philip,2002)

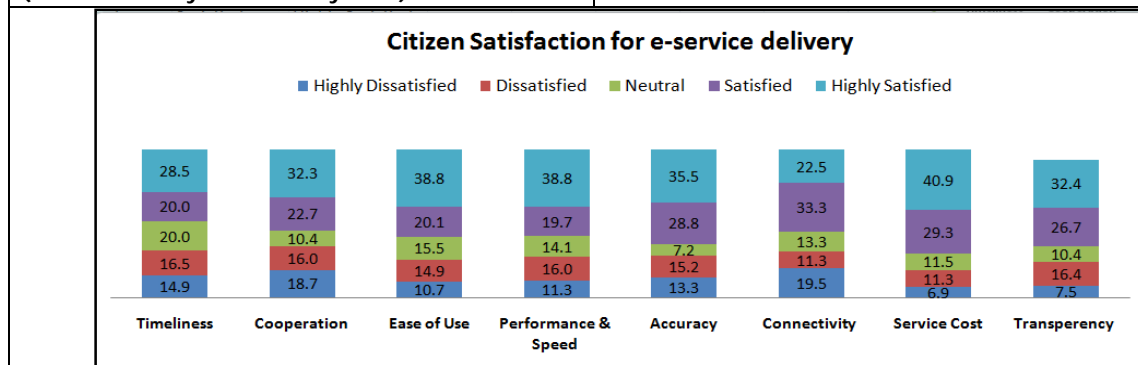


Figure 3: Citizen Satisfaction for e-service delivery (Source: Primary Data from survey)

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FINANCIAL LITERACY OF GRADUATING STUDENTS.

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Abstract - Financial literacy is essential life skill. One can just get retired early with only this essential skill. This paper has assess the financial literacy of graduating students. This paper is trying to analyze the financial knowledge and real life scenarios of how graduating students will react. For any country the youth of that country is the future. Financial independence, financial well being is utmost important. This paper will give their level of financial literacy, there socio economic relationships. Economic status of any country enhances by the amount of the investment made in the share market. The investments come from savings.

Savings comes from accurate financial decision making skills. This financial decisions will make any individual save more. A well planned future and long life can be perfect outcome of the financial literacy.

Key words- Financial literacy, Financial knowledge, Financial decision, Financial well being.

Introduction – Last one decade had witness the financial literacy has gained importance in globally. Many agencies at international level are conducting assessment of various class to check the level of financial literacy. The world has recognized that financial knowledge is essential life to survive and grow. The increase in the financial services, financial literacy seminars and initiatives by the government and other private institutions to educate the investors and sell the product.

Developing economies have become more concerned about the level of financial literacy f there citizens. Financial well being is one of the way to increase the standard of living and life expectancy in the country. Although India has good life expectancy, a more life expectancy can be increase with financial well being. Financial knowledge can complement the protection from fraud. It is proved from research that financial well being can increase the financial health of people and people with health can live more good life. Increase standard of living, good financial health, and effective financial decision is out come of efficient financial literacy in the country.

Developed countries have national strategies for financial education specifically for improving the knowledge among the youth, as they are future of the country. Most of the countries like Autralia,

Belgium , Brazil, Canada, Italy, China, Russia, Spain and United States have introduced the financial topics in the curriculum. In India NISM , BSE, NSE also takes initiatives to increase the financial knowledge of the country.

PISA is an organization who has conducted financial literacy of youth in more than fifteen countries. This survey was conducted in 2012 and 2015 consistently and it was found in two countries the level of financial literacy have improved. This is should be national strategy of the every country to improve the financial knowledge. This survey has correlate the knowledge in other subjects with financial literacy. This survey includes students performance in mathematics and reading ability.

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Objective – To assess the financial literacy of graduating students.

Research Methodology – This research is descriptive and exploratory in the nature. This study is an assessment of financial literacy of graduating students. In order to conduct this study, a well drafted questionnaire were used to collect the data.

METHODS OF DATA COLLECTION

This data is collected form survey questionnaire methods from graduating students is first source of information. The data is primary in nature which is used for assessment.

DEMOGRAPHIC DETAILS OF THE RESPONDENTS (IN PERCENTAGE)


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Age

Basis	Respondents	Percentage
Female	70	43 %
Male	93	57 %
	162	100 %

Graduation Stream

Basis	Number	Percentage
High School	16	10 %
Graduation	99	61%
Post Graduation	48	29 %
	163	



Finding

1. Majority of the students have score more than 60 % in financial literacy assessment. The questions were asked based on their ability to take decision on financial knowledge.
2. One of the question was based on money management skills in day to day life and many of them were clear enough of how good they are at money management skills.
3. Students are aware of the assets which have the ability to give good returns in the market with risk they carry with them.
4. 32 % of the students aware of the how the credit rating will be impacted by the paying debts on time
5. Some of the basic questions also included like the concept of net worth and how the credit rating is done in the market. How one has to take care paying the debts in the market.
6. Some of the questions were based on the ability to calculate the returns in the market , when you make investments. And majority of the answers were correct, it seems this young generation is really aware of the things happening in the market.
7. Questions were asked on insurance coverage and 40 % students have answered it correctly.


This research will give additional new insight on how the education sector should make financial literacy mandatory as it is one of the essential life skills. Everyone should have passive source of income and increasing the financial investment knowledge can give them one such way. Making students global citizen and competent enough. Earning a university degree is like making good investment for future. This attempts shows that students were aware of basic financial knowledge. This research can be extended further with more complex questions and more sample size. More financially literate students will be more competent in life and can increase the standard of living in the country. This relationship of financial knowledge and graduation degree is concluding that students are reading more and are aware of basic life skills. Some of the students are highly motivated in life , and will seek a financially stable life.



Students those who have performed well in financial literacy test are directly associated with expectations of good life and indirectly or directly is correlated with the performance in mathematics and reading performance. Those who have performed exceptionally well in financial literacy are expected to become good investors and traders.

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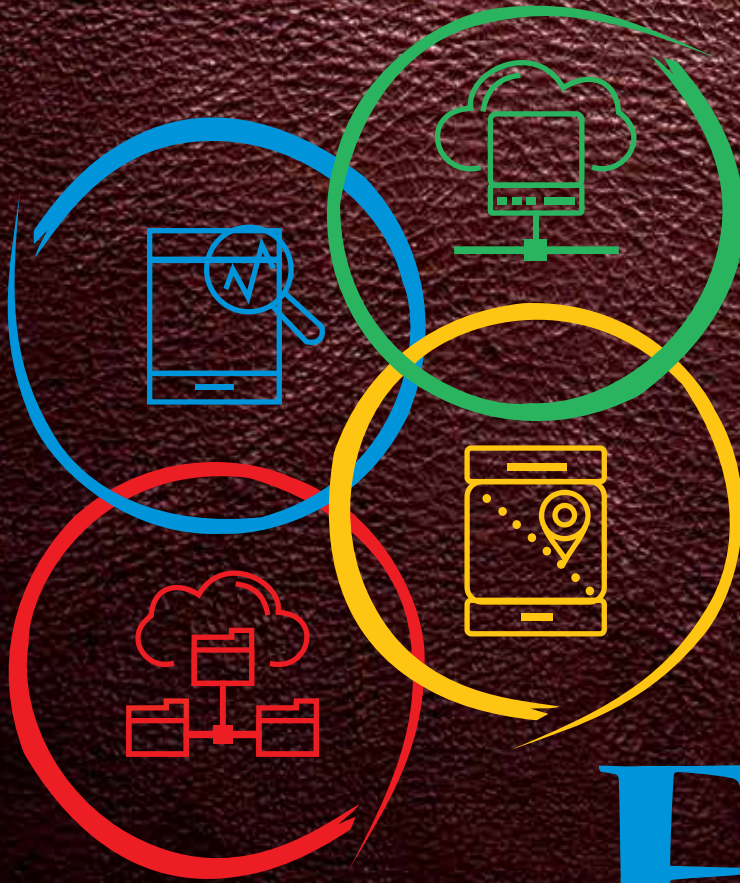
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EBM...

IS IT STILL RIGID TO APPLY?



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INTRODUCTION

Managers in the business environment have to take many speedy and yet effective decisions in daily their routines. Generally, the decision-making process is based on various parameters like already available information, past experiences of managers, forecasted and expected results after decisions and so on. Managers may rely on available theories and theoretical framework models for getting an expected solution as an outcome of an issue.

As the business world is leveraging its path towards a customization approach, 'one size fits all' strategy is proving to be ineffective for many sectors, especially in services. Many manufacturing sectors are trying to be innovative in terms of providing customized products as unique solutions to satisfy one's desire. The same thing is applicable to the decision-making process. Every issue in any business is having a unique blend of several inherent characteristics. These characteristics are inclusive of the uniqueness of its business environment, operating sector, channel partners, business cycle, industry life cycle, supply-demand equations, etc. Thus each and every issue will be perfectly addressed if the manager applies a set of actions based on the 'evidence' which previously occurred within the same or similar business environment.

Abstract

Evidence based management (EBM) is said to be one of the quicker and cost effective ways of decision-making for managers. Evidence can be said to be those few key facts coming as inherent solutions for the existing unsolved management issues/problems. Managers need to effectively utilize such evidence by proper identification, classification, dissemination, and application process. In few cases, EBM may be found as a miracle solution for critical, complex, and unsolved management issues. EBM is not just imitation of evidence but it is an evolution process to be adopted by a company.

FIGURE 1
SOURCES FOR 'SUITABLE EVIDENCE'



Before applying EBM to any organization, managers must think of the best suitable evidence that truly 'fits' as a solution to any business issue and will address the management dilemma.

- i. Managers can get plentiful of published research articles and case studies in reputed and reliable journals along with the theses published after the conduct of research. Managers can search initially with desired keywords and then sort out required materials for further reading as 'external search'.
- ii. Managers can even recall their personal experiences or predictive judgments regarding similar issues they have faced or overcome in the past, which are termed as 'internal search'.
- iii. Managers must keep the vision and preferences of

their organization in their mind so as to identify the best suitable evidence towards the projected outcome.

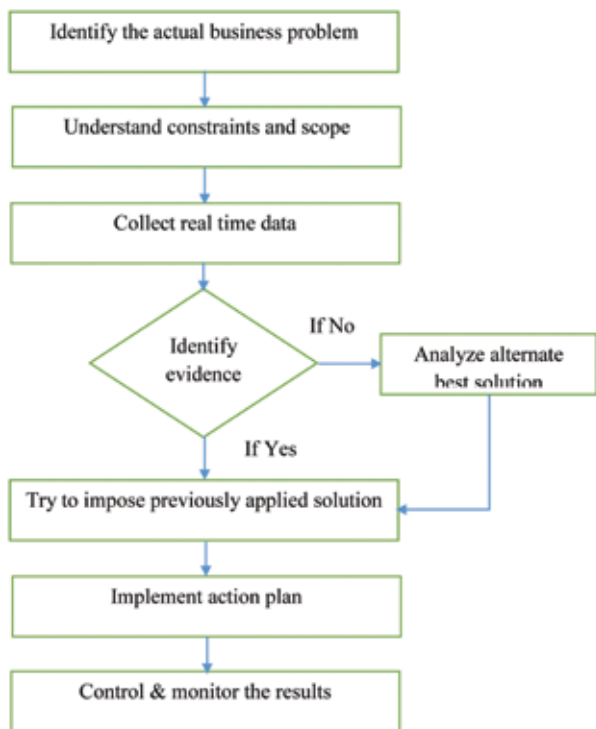
- iv. All evidence or selective evidence from all these available evidence should be matched with the existing ‘organizational behavior’.

This is the critical task of the manager to analyze all the resources and select the best suitable evidence for their organization.

SUGGESTED PROCESS FLOW CHART

FLOW CHART 1:

PROCESS FLOW: EBM IMPLEMENTATION



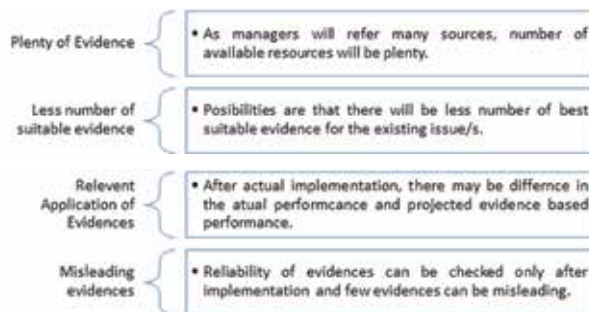
The above is the suggested flow chart for the implementation of EBM in any organization. First the managers need to understand the actual issues or problems by carefully understanding management dilemmas. This first step is essential and crucial for the successful implementation of EBM. Then managers need to understand the in-depth scope and constraints associated with the issues to be handled.

Real-time and relevant data/information collection should be done prior to the identification of evidence. This identification should be done by carefully matching the specifications of the issues. Previous research, managers’ experiences and judgments, companies’ preferences, etc. must be taken into consideration (as shown in Figure 1).

If the best suited evidence is available or found, then try to apply the solution and implement the action plan accordingly. If the best suitable evidence could not be

found, then try to find alternate solutions.

POSSIBLE HURDLES IN EBM IMPLEMENTATION



CAN EVIDENCE BE USED AS BENCHMARKING?

This question can raise a debate in the minds of many managers. Benchmarking looks like a cost-effective tool that is very easy to implement without much efforts. Benchmarking can lead to an actual comparison between the performances. These performances can be between employees, products, action plans, projects, departments, etc. Though benchmarking looks essential to set up a target for visualizing or achieving the best performance as an output, it may turn into a hazardous activity. The reason is comparison is not always done in the exactly same environment. The dynamic nature of the environment logically creates different opportunities and characteristics for the performances. On these changing background, the evidence seems to be different in each circumstance.

For example, the performance of a particular stock in a particular sector in a particular year and just a few days before the election may differ in another year in a similar situation. Here we cannot treat that performance as a benchmark as there are many other factors that can affect the performance of that stock.

CORRELATION: SWOT AND EVIDENCE



Each organization is having its own strengths and weaknesses. Business leaders and decision makers must thoroughly understand the inherent characteristics of their own organization. This knowledge is essential as a building platform for an effective decision making. Evidence must be matched with the existing strengths, that can give a

winning edge over the competition battle in the market. Thus managers can identify the opportunities and forecast the threats from the business environment. There must be updating in the business and technical knowledge, precise information collection process and required key skills.

Thus capitalization of own strengths is essential for identification of right evidence and this should be done specially by the experts.

EBM: EXPECTED GAINS

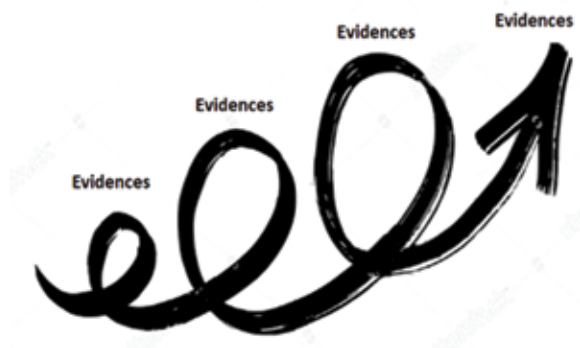


Successful implementation of EBM process and effective control activities certainly enhance the performance of the organization. Wrong decision-making has an adverse and direct impact on the performance. EBM tries to reduce this effect by suggesting better decisions based on evidence.

If the decision-making process is judgmental and is done only on the basis of 'gut feelings' or 'latent preconceptions' then it will certainly lead to error generation. The decision-making process should be based on the rational thinking of the decision-makers and not on the current popular decision-making trends. After going through several similar cases, managers can aggregate the probable results and then come out with their own thinking based on the facts in that circumstances.

EBM: IMITATING OR EVOLVING?

Instead of "evidences" correct as "evidence" at all the four places in the figure



The dynamic nature of the environment logically creates different opportunities and characteristics for the performances

EBM can be simply thought of as an implementation process of previously identified evidence-based solutions. But this idea may be found to be hazardous.

- ⊙ Imagine an HR manager found a remedial action plan as evidence for an issue of 'attrition rate reduction' in an IT sector. If he/she tries to implement the same action plan in the manufacturing sector, the results could be different.
- ⊙ Similarly, if a marketing manager tries to adopt effective advertisement strategies for a particular product in Japan and he/she tries to implement the same advertisement strategies for the same product in another country say in South Africa, then results can be successful or adverse.

It would be a myth to think that, if the decision-makers have identified the best evidence, then they will reach the perfect results within a shorter time period. Rather the actual practice of the evidence and evaluating the performances of the results to the expected benchmarks should be appreciated. This will encourage constant learnings of the managers through 'trial and error' approaches, experimentation with the available resources, and conduction of the pilot studies etc.

Thus, EBM is not about imitation of the previously matched evidence but it is an evolving process of identification of the best suited evidence and thus creating an organization's own database of the evidence. MA

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AN EMPIRICAL STUDY OF THE PRE-COVID 19 TO POST-COVID 19 PANDEMIC EFFECT ON THE BUSINESS PERFORMANCE OF THE INSURANCE SECTOR IN INDIA

Abstract

India witnessed a double-digit growth in the life and non-life insurance sector after the breaking of monopoly and deregulation in the sector. Covid-19 pandemic and lockdowns have had a far-reaching and adverse effect on the insurance sector as well. There is a need to see the effect on a few key variables during pre-Covid 19 to post-Covid 19 duration. The researcher has selected dependent variables under study such as first-year premium, number of policies, number of lives covered under group schemes, and total sum assured. This is an empirical study with a quantitative research approach and the analysis is based on secondary data collection. The key results reveal that there was an adverse effect of the pandemic on the growth of the insurance sector during the year 2020. From April 2021 onwards the insurance sector is witnessing positive growth and will continue at the same pace.

THE INDIAN INSURANCE SECTOR

There are at present 57 insurance companies in India of which 24 are life insurance and 34 are non-life insurance companies. LIC is the sole public sector company in the life insurance segment. In 2020 the overall market size of the insurance sector in India was estimated to be US\$ 280 billion. During the five-year period 2019 - 2023, the life insurance sector is expected to grow at a CAGR (Compound annual growth rate) of 5.3 per cent.

Though India is the second largest populated country in



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the world, its insurance sector penetration was pegged at 4.2 per cent during the financial year 2021 and India's overall insurance density was US\$ 78 billion. There is an increase in the total market share of private sector companies in the general and health insurance market from 47.97 per cent (during the financial year 2019) to 48.03 per cent (during the financial year 2020).

The market share of life insurances companies in India is presented in the following Table 1:

TABLE 1

SN	Name of the Insurer	First Year Premium (Market Share)	Number of Policies/ Schemes (Market Share)	Number of lives covered under Group Schemes (Market Share)	Sum Assured (Market Share)
1	Aditya Birla Sun Life	1.25	0.96	0.95	3.26
2	Aegae Federal Life	0.23	0.17	0.01	0.18
3	Aegon Life	0.01	0.07	0.06	0.86
4	Aviva Life	0.09	0.08	0.23	0.45
5	Bajaj Allianz Life	2.41	1.83	14.63	7.18
6	Bharti Axa Life	0.29	0.50	0.36	0.66
7	Canara HSBC OBC Life	1.08	0.61	5.90	4.22
8	Edelweiss Tokio Life	0.13	0.26	0.16	0.28
9	Exide Life	0.33	0.53	0.78	2.19
10	Future Generali Life	0.15	0.13	0.06	0.51
11	HDFC Standard Life	7.58	4.18	24.20	11.68
12	ICICI Prudential Life	4.94	2.84	11.85	13.53
13	India First Life	0.87	0.96	2.81	5.88
14	Kotak Mahindra Life	1.53	1.11	9.87	3.27
15	Max Life	2.40	2.60	2.47	4.66
16	PNB Met Life	0.65	1.03	1.77	7.24
17	Pramerica Life	0.10	0.12	0.67	1.02
18	Reliance Nippon Life	0.38	0.74	0.03	0.41
19	Sahara Life	0.00	0.00	0.00	0.00
20	SBI Life	7.31	7.41	3.81	7.85
21	Shriram Life	0.28	1.04	1.83	1.26
22	Star Union Dai-ichi Life	0.61	0.46	1.76	1.90
23	Tata AIA Life	1.41	2.01	0.32	4.58
	Private Total	34.05	29.63	84.53	83.07
24	LIC of India	65.95	70.37	15.47	16.93
	Grand Total	100.00	100.00	100.00	100.00

(Source: www.irda.gov.in)

(Note: As regards the first year premium of life insurers for the period ended 31st August, 2021)

Note: As regards the first year premium of life insurance for the period ending on 31 August 2021, the total market share of all the private life insurance companies was 34.05 per cent for the first-year premium and 83.07 per cent for the total sum assured.

OBJECTIVES OF THE STUDY

1. To study the pre-Covid 19 to

post-Covid 19 pandemic effect on the business performance of the insurance sector in India.

2. To understand the current scenario of the Indian insurance sector.

PROBLEM STATEMENT

The Indian insurance sector along with the banking sector contributes 7 per cent of the total GDP. The insurance sector provides huge employment and also gives risk protection against life and non-life threats to the Indian citizens. The

insurance sector provides various benefits such as health and non-health risks, savings, investment opportunities etc. Insurance penetration in the country is still low in spite of being the second-largest populated country in the world. Covid-19 pandemic had an adverse effect on the insurance sector in India as, during the first and second waves of the pandemic the Indian insurance sector witnessed significant losses in their business. There is a need to see the effect on a few key variables during pre-Covid 19 to post-Covid

19 duration. These dependent variables under study are first-year premium, number of policies, number of lives covered under group schemes and total sum assured.

RESEARCH METHODOLOGY

The researcher has used an exploratory research design for this study. The research approach is quantitative in nature. This research paper is purely based on secondary data and secondary data was collected from various official websites, IRDA’s annual and other reports. The analysis here is restricted for the months March to August of the years 2019 to 2021. The Variables under the study are as follows:



DATA ANALYSIS & DATA INTERPRETATION

I. The study is on the basis of data pertaining to the

period of the years 2019,2020 and 2021.

- II. The researcher collected data for the six months (March to August) for each of the years mentioned above.
- III. Comparison between the growth in percentage during the year 2019-20 and 2020-21 is done based on the secondary data collected for the period March to August.
 - ⊙ The period March to August of the year 2019 is considered to be pre-Covid 19 period.
 - ⊙ The period March to August of the year 2020 is considered to be peak Covid 19 period.
 - ⊙ The period March to August of 2021 is considered to be post-Covid 19 period.
- IV. The researcher has listed the business performance of life insurance sector during pre-Covid to post-Covid period from March to August of 2019 to 2021
- V. The key dimensions under study are first-year premium, number of policies, number of lives covered under group schemes and sum assured for the insurance sector in India.

Business Performance of Life Insurance

The Business performance of life insurance during the pre-Covid to post-Covid period from March to August of 2019 to 2020 is presented in the following Table 2.

TABLE 2

<i>Month & Year</i>	<i>First Year Premium</i>	<i>Number of Policies / Schemes</i>	<i>Number of lives covered under Group Schemes</i>	<i>Sum Assured</i>
Mar-21	278277.98	28167513	179797825	4940821.46
Mar-20	258896.48	28886569	227867194	4825723.36
Mar-19	214672.86	28687812	224653013	4333541.41
Apr-21	9738.79	996933	13005050	357960.05
Apr-20	6727.73	416200	6050419	227486.42
Apr-19	9981.88	1282879	12056508	272148.08
May-21	22715.78	1857389	22306006	750751.02
May-20	20466.76	1424373	11122411	465050.59
May-19	28395.90	2908093	26380339	583009.39
Jun-21	52725.25	3463732	32239438	1200631.01
Jun-20	49335.44	3105611	20479452	875033.36
Jun-19	60637.22	4807717	46655398	1004852.31
Jul-21	73159.98	5568612	44995930	1637668.54
Jul-20	72321.53	4913592	30561688	1255281.45
Jul-19	82146.47	7000277	64229837	1383113.48
Aug-21	100980.72	7949344	60964244	2053545.29
Aug-20	99361.32	6794872	42025663	1640070.74
Aug-19	105701.40	9329976	82248111	1788129.45

(Source: www.irda.gov.in)

period

Note: The first year premium in the statement refers to actual premium collected by life insurers net of only free look cancellations for the period.

Interpretation (Table 2) From the above Table 2 the researcher can interpret that, during the year 2020, the overall business performance of the insurance sector had significantly decreased compared to its business performance for the year 2019. This decrease can be clearly seen for all the variables under study. Similarly, it can be observed that the business performance for the year 2021 is showing positive growth i.e. the insurance sector can be said to be moving towards the post-COVID 19 recovery phase of the business.

First year premium

The following Table 3 presents a comparison between the percentage growth in respect of the first year premium for the years 2019-20 & 2020-21

TABLE 3

	March	April	May	June	July	August
% in growth 20-21	7.49	44.75	10.99	6.87	1.16	1.63
% in growth 19-20	20.60	-32.60	-27.92	-18.64	-11.96	-6.00

(Source: Calculations based on the data available on www.irda.gov.in)

The data in the above Table 3 could be presented graphically as under:

GRAPH 1



Number of policies

The following Table 4 presents a comparison between percentage in growth for years 2019-20 & 2020-21 in respect of the number of policies.

TABLE 4

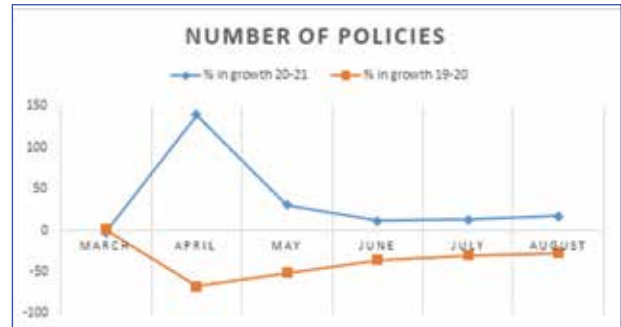
	March	April	May	June	July	August
% in growth 20-21	-2.49	139.53	30.40	11.53	13.33	16.99

% in growth 19-20	0.69	-67.56	-51.02	-35.40	-29.81	-27.17
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(Source: Calculations based on the data available on www.irda.gov.in)

The data in the above Table 4 could be presented graphically as under:

GRAPH 2



Number of lives covered

Following Table 5 gives the comparison between percentage in growth for the years 2019-20 & 2020-21 in respect of the number of lives covered under group schemes

TABLE 5

	March	April	May	June	July	August
% in growth 20-21	-21.10	114.94	100.55	57.42	47.23	45.06
% in growth 19-20	1.43	-49.82	-57.84	-56.10	-52.42	-48.90

(Source: Calculations based on the data available on www.irda.gov.in)

The data presented in Table 5 above could be graphically described as under:

GRAPH 3



Sum assured

Following Table 6 makes a comparison between percentage in growth for years 2019-20 & 2020-21 in

respect of sum assured

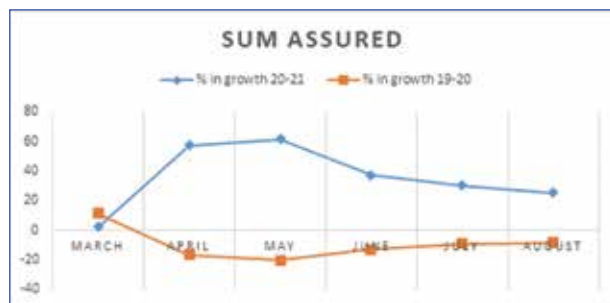
TABLE 6

	March	April	May	June	July	August
% in growth 20-21	2.39	57.35	61.43	37.21	30.46	25.21
% in growth 19-20	11.36	-16.41	-20.23	-12.92	-9.24	-8.28

(Source: Calculations based on the data available on www.irda.gov.in)

The data presented in the above Table 6 could be graphically described as under”

GRAPH 4



Graph 4: Comparison between sum assured and % in growth for years 2019-20 & 2020-21

Interpretation (Tables 3 to 6)

From the given Tables 3 to 6 and Graphs 1 to 4, the researcher interprets that, the overall performance of the life insurance companies during the year 2020, significantly declined.

First-year premium variable declined from April to August 2020. India faced its first lockdown in April 2020, thereby growth figures turned negative i.e. -32.6, -27.92, -18.64, -11.96 and -6.0 per cent. From April 2021 onwards it significantly increased to record positive growth i.e. 44.75, 10.99, 6.87, 1.16 & 1.63 per cent respectively.

The number of policies in the insurance sector also recorded a similar growth patterns. April 2020 onwards it showed overall negative growth of -67.56, -51.02, -35.4, -29.81 & -27.17 per cent. From April 2021 onwards it significantly improved to positive growth figures of 139.53, 30.4, 11.53, 13.33 & 16.99 per cent respectively.

Percentage in growth in number of lives covered under group scheme was found to have dropped to -49.82, -57.84, -56.10, -52.42, and -48.90 per cent during the year 2020 (months April to August), which was found to be positive at 114.94, 100.55, 57.42, 47.23 and 45.06 per cent respectively during the year 2021 (months April to August).

The sum assured percentage growth dropped and recorded a negative figure of -16.41, -20.23, -12.92, -9.24, and -8.28 per cent respectively from April to August 2020. These figures

went up to 57.35, 61.43, 37.21, 30.46, and 25.21 per cent for April to August 2021.

All negative figures recorded during the year 2020 were found to have become positive during the next year's corresponding period under the same parameters and variables under study.

Thus like many other sectors, the insurance sector also witnessed a downward trend incurring losses during the Covid 19 period as compared to the pre-Covid years. Similarly, the researcher can clearly see positive growth figures for almost all the variables under study, during the post-Covid 19 period.

GOVERNMENT'S INITIATIVES

To boost the insurance sector, The Indian government has taken few initiatives. Some of them are listed below:

- **The Finance Ministry announced its intention to infuse Rs 3,000 Crore (US\$ 413.12 Million) into the State-owned general insurance companies. This initiative is to improve the overall financial health of the companies.**
- **An amount to the tune of Rs. 1 6,000 Crore (US\$ 2.20 Billion) has been allocated for the crop insurance scheme. This is done under Union Budget 2021.**
- **The Government extended the Rs 50 Lakh (US\$ 66.85 thousand) insurance coverage scheme for healthcare workers across India (until the next year) in June 2021.**
- **The Parliament has passed the General Insurance Business (Nationalization) (Amendment) Bill in August 2021. This Bill aims to allow the privatization of State-run general insurance companies.**

THE ROAD AHEAD

The life insurance sector in India is expected to grow annually by 14 to 15% for the next five years at least. After a setback during Covid 19 pandemic, the insurance sector appears to be back on the positive track where the growth figures are showing a positive trends. The overall insurance sector is expected to earn up to US\$ 280 billion by end of the year. There have been various changes in the regulatory framework for the insurance sector. This makes the future to be promising for the insurance sector as the sector is using innovations in the way it is conducting business and engages its customers. Currently, there are 110 plus insurtech startups in India and the scope of the internet on things (IoT) in the Indian insurance market will continue to go beyond customer risk assessment. **MA**

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ESG: A NEW HORIZON

Abstract

The importance of the international economic meltdown, its negative consequences for growth and development, the repercussions of climate change, and global corporate scandals have all heightened stakeholder interest in ESG issues in recent years. Investors and international institutions have emphasized the importance of businesses in contributing to long-term sustainability. Companies, on the other hand, are taking a more proactive approach to integrate ESG aspects into the management system to gain various benefits in terms of cost, brand image, loyalty, risk management, etc.



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ESG - BASIC CONCEPTS



ESG disclosures are whole heartedly welcomed by the investors as these reporting practices will be beneficial in the identification of ESG risks and performance evaluation. Exposure identification is also most likely to be successfully done with this. In the capital market in order to evaluate the corporate behaviour of any company, ESG can be used as an ‘integrated term’. Many investors are adopting ESG ratings in their final analysis as one of the key terms as non-financial

factor. This evaluation can be useful in identification of market growth opportunities and forecasting associated material risks (if any).

Looking from the view of sustainability angle, there is certainly

Many investors are adopting ESG ratings in their final analysis as one of the key terms as non-financial factor

a new challenge in front of Indian companies as ESG mandate in the corporate governance. Each company is different from the other in terms of the sector and industrial environment it is operating in. Here ESG necessities can be looked up as a ‘stakeholder driven approach, and more precisely ‘investor driven approach’. The same formula can’t be applied for the individual company because of their uniqueness.

Most awaited entry by Indian companies have been finally made in worldwide ‘ESG movement’. There

has been a constantly developing pressure from various regulators and investors for adopting the ESG norms. Indian companies are becoming progressively responsive towards various sustainability issues. There are certain predictions in recent years that these norms would be applicable to all types of businesses.

SIGNIFICANCE OF ESG IN TODAY’S CONTEXT

As per ESG norms, companies should have social adoptability while doing their businesses as they are responsible towards societal well-being. Any company’s act should be in the interests of their key stakeholders along with the environment and employees. While performing business, stakeholders’ wealth and profit maximization activities are valid but not at the cost of environmental and social damage. Companies should perform their businesses with alignment of their ‘value creation’ and ‘value enhancement’ functions with social responsibility.

Environmental	Social	Governance
<ul style="list-style-type: none"> • Environmental Disclosure • Environmental Impact • Pollution & Carbon Emission Reduction 	<ul style="list-style-type: none"> • Workplace Mentality (Human Rights, Diversity) • Community Relationship (Corporate Citizenship) 	<ul style="list-style-type: none"> • Shareholder Rights • Compensation • Management & Shareholders Relationship

Environmental parameter is concern about various climate crises and environmental sustainability. It’s an alarm for investors’ choices for investment as change in climate is an environmental threat that is gradually increasing. Companies which are dependent on such types of raw materials which are made by fossils etc. can raise the question of obsolescence in long term business. Social parameter includes business diversity, human rights, consumer protection along with the company’s relationship with their channel and business partners. Governance parameter is about company’s corporate governance. It includes the management structure, executive and employees’ compensation, employee relation etc.

Basically, it’s all about measuring the overall sustainability along with the impact calculated ethically of the investments or a company. This impact is on the society or larger community as a whole. Now it’s a worldwide buzz for the last few years among the companies, regulatory bodies, and investors. All across the globe, they are keen to integrate assessment models and regulations along with their developed business strategies with ESG. This they are doing with the objective of better management and risks assessment to develop their existing businesses beyond the conventional type and to enhance the financial performance.

During and after Pandemic days CEOs and all

stakeholders are forced to think about environmental well-being. Thus it is making a change in the view of stakeholders’ expectations from the way of doing businesses. The societal issues are no longer to be ignored and will have to be positively addressed by all those who are integral part of the society. After this consciousness towards the issues, companies can consider embracing the ESG as one of the ways to overtake the competitors.

The components of ‘E’ ‘S’ and ‘G’ could be described as under:



ESG RATINGS: BENEFITS FOR BUSINESSES

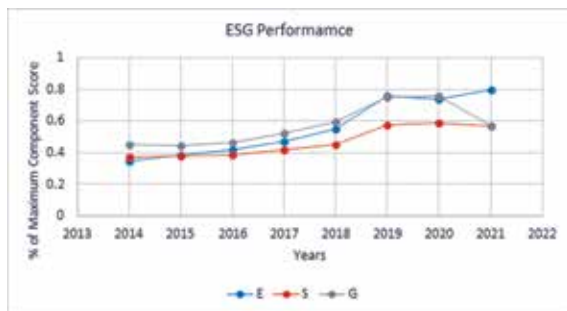


Achieving high scores in ESG will definitely enhance the existing ‘brand image’ of companies as it reflects market recognition of that company with reference to the company’s social responsibilities, efforts, and performance. In many counties (American and European) financial institutions are initializing ESG ratings as one of the consideration factors for the initial investment screening process. This in turn will attract investors and result in lowering the financial cost.

PAST PERFORMANCE OF ESG¹

Years	Environmental Performance	Social Performance	Governance Performance
2014	0.347286	0.37	0.451429
2015	0.388571	0.38	0.445714
2016	0.417143	0.383333	0.463717
2017	0.471429	0.42	0.52
2018	0.551429	0.453333	0.594286
2019	0.757143	0.573333	0.751429
2020	0.741209	0.591346	0.756044
2021	0.8	0.57	0.57

(Scores in % Component Score)



Steady growth in the percentage maximum component score has been seen in the ESG performance over the period. Companies are performing better in environmental parameter. There is scope for improvement for companies' scores in social and governance parameters.

ESG: ONE WAY TO ATTRACT INVESTORS²

A shift has been observed in the investment patterns and investment habits across the globe and companies are inclined to embrace this. 'Investing' is no longer a characteristic of group with similar individualities but diversified groups of people worldwide with different distinctive characteristics. It is not a narrow concept in the investment arena but it is a diversified concept with various factors and sub-factors still evolving with a progressive broader scope. Company's resiliency is highlighted in recent years particularly after pandemic. Investors are keen to invest in such companies where ESG is taken care of for the future generations. As a long term strategy, companies must positively adopt their business activities in the context of ESG sustainability.

CONCLUSION

Actions in favour of environmental conservation are mandatory so as to avoid their negative impact on everybody's life. With implementation of ESG mandate companies are obliged to give attention towards it as it has direct effect with investors' investing behaviour. Apart from assets formation, investors are keen to look for sustainable growth of the companies. The change in mind-set is for betterment of their future generations. By 2025 worldwide ESG assets are likely to reach \$53 trillion³. There is a threat that companies which fail to maintain ESG standards are most likely to lose their investors. **MA**

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Obituary



CMA K.C. Gupta (M-1775) passed away on 15th February 2022 at the age of 82 years. He was the Chairman of Jaipur Chapter during 2003-2004. He was the Ex-Chairman and Director (Finance) in Indian Telephone Industries. His body has been donated to SMS Medical College, Jaipur by his family members.

CMA K.C. Gupta was a man of integrity, honesty, dedication and initiated Chapter formation of ICAI ITI, Manakpur and the contributions made by him towards the development of CMA Profession will always be remembered. Our deepest condolences to all his family members at this time of inconsolable grief. God let his soul rest in peace.

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EMERGING TRENDS IN BLOCKCHAIN TECHNOLOGY TO FOLLOW IN 2022

Abstract

Blockchain continues to be in the talk since last few years before and after the pandemic hit. These years are witnessing significant developments in the blockchain technology and its applications and usage in many sectors and industries. Other cryptocurrencies and Bitcoin are gathering attention of the investors but at the same time blockchain too are gaining the focus and attraction. This study tries to trace various key emerging trends in blockchain technology in recent years.

1. BLOCKCHAIN DEFINED

Blockchain can be defined as a shared and absolute ledger that can enable the process of tracking the assets and recording transactions in any business network. Here assets can be tangible viz. land, factory, house, gold etc. or intangible viz. patent, brand, intellectual property etc. Thus virtually anything that possesses value can be tracked and/or traded on a defined blockchain network. This will cut costs and reduce the risk for all involved. Blockchain technology is set to transform the nature of transactions and trade across the globe.

Blockchain technology is said to be one of the significant innovations of the last decade with the ripple effect on various key sectors like finance, operations, banking, production etc.

2. EMERGING TRENDS IN BLOCKCHAIN TECHNOLOGY

From Federated blockchain to stable coins, here are the latest blockchain trends that we are likely see this year.

Federated Blockchains	Secured Digital Identity	Decentralized Finance	Blockchain as Service
Hybrid Blockchains	Blockchain with AI	Stable Coins	Central Bank Digital Currency

2.1 Federated Blockchain

Federated Blockchain is one of the most amazing blockchain trends in the business today. It is explicitly used for specific use cases and is just adopted from an upgraded form of the basic blockchain model. It functions under various authorities instead of a unit secure and trusted node. It is quite similar to private blockchain with a few added



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features and there is no sole organization influence on it.

Enterprise Ethereum Alliance i.e. EEA is one example of Federated Blockchain and few leading organizations such as Microsoft, J. P. Morgan Chase Bank, Accenture etc. are the members of EEA. According to experts, as a private blockchain there will be an increase in the usage of Federated Blockchain in 2022.

Any private blockchain can be controlled by one organization but in the case of Federated Blockchain there can be multiple authorities that can control the preselected nodes. Here various nodes and selected groups can validate the blocks in the existing or modified chain in order to process further transactions. Federated Blockchain is being moved to the central stage as it can be referred to as one of the best blockchain available at present. It is expected to see a rise in the usage of this type of blockchain with a more customizable outlook.

2.2 Secured Digital Identity

Nearly 10 billion internet connected devices are expected

to grow by 2025. Blockchains are expected to establish more secure digital identity in coming years. Many times unknowingly we leave extensive digital footprints when we do internet surfing. We can expect remarkable reduction in online fraud and online identity theft and our online presence will be more secure with the successful implementation of digital identity.

Data is stored in a trusted, immutable and decentralized manner in blockchain technology. Single user's identity should be stored in an incorruptible and secure manner and blockchain can ensure this. This year will witness growth in this trend as numerous digital identity solutions are under development and expected to integrate with online platforms. Here the advantage will be single digital identity can be always with latest and up-to-date user information.

2.3 Decentralized Finance (DeFi)

DeFi is a form of finance which is based on blockchain. It uses a layered architecture and one can compose building blocks. DeFi does not depend on traditional centralized financial intermediaries such as banks, brokerages or exchanges etc. It utilizes smart contracts on blockchain (most commonly used is Ethereum). By using the DeFi platforms people can earn interest in savings like accounts, take risks on price movements on a range of assets using derivatives, insure against risks, trade cryptocurrencies.

These platforms also allow people to borrow or lend funds from others. Some of the DeFi applications endorse higher interest rates but are subject to high risks. Till January 2020 around 20.5 billion dollars were invested in DeFi and till October 2020, more than 11 billion dollars (worth in cryptocurrency) were deposited in several decentralized financial protocols.

2.4 Blockchain as Service (BaaS)

Blockchain as a service is an emerging trend that is currently integrated with various start-ups and organizations. It is a type of cloud based service where users are allowed to develop their own digital products with blockchain. Businesses are permitted to use these cloud based solutions and they can build, use and host their own smart contract and own blockchain apps. Businesses can use utilities on blockchain infrastructure developed by a vendor. It is similar to SaaS i.e. Software as a service, here software is provided on subscription basis.

There is no need for any business if they do not want to develop their own blockchain, here they can access a blockchain network with expected configuration. Businesses can even build in-house expertise on the projected subject. Blockchain only concentrated on organizations offering BaaS including Factom, Dragonchain, Blog and Keleido. Many cloud service providing organizations such as IBM, Microsoft, Oracle, Salesforce, Alibaba etc. now provide BaaS.

2.5 Hybrid Blockchain

One of the emerging concepts in blockchain is hybrid type of blockchain where it attempts to use the most suitable part of the private blockchain solutions along with public blockchains. It operates in a closed ecosystem and thus every bit of information which is on the network is secured. In hybrid blockchains the transactions are quickly verified and the total transaction costs are usually much less. This is because the influential nodes in the network make the process much simpler.

Along with cost effectiveness, it has additional advantage of security as it protects systems from hackers who are unable to gain access to the existing blockchain network and thus prevents more than fifty percent of attacks.

2.6 Central Bank Digital Currency (CBDC) Central Bank Digital Currency (CBDC) is based on blockchain and is a digital form of central bank money. This is a legal tender created and backed by the central bank. It is the virtual format of a fiat currency for a particular nation. It is regulated by its monetary authority and is a digital token of its official currency or in the form of electronic record.

The key benefits include the simplification and implementation of monetary policy along with the fiscal policy. It supports financial inclusion in an economy that is done by bringing the unbanked segment into the financial system. But as they are in centralized form of currency they can erode the privacy of the people or citizens; that is the key weakness of CBDC. In January 2021, the Indian Government released its national blockchain strategy along with a Bill to launch its own digital currency. Similarly, many CBDC pilot projects are underway worldwide.

2.7 Stable Coins

It can be forecasted that stable coins will dominate the crypto space and will be more visible. Cryptocurrencies are in existence because of blockchain technology and cryptocurrencies (like Bitcoin) operate on their own platforms. As compared to traditional assets prices, many of these cryptocurrencies' prices are more volatile. It is predicted that stable coins will tend to get all-time high as they are now in their initial phase. Because of this the stable coins are expected to gain attraction in times to come.

The word 'stable' suggests that these high value stable coins are steadier in nature and do not witness many fluctuations. Frequent currency clashes are prevented in stable coins thus allowing investors to invest more in cryptocurrencies. These are popularly in existence because of the highly volatile nature of few of

the cryptocurrencies and association of the stable value for each stable coin. Facebook introduced its cryptocurrency 'Libra' in 2020 and it is one of the driving forces for using stable coins.

2.8 Blockchain with AI

Blockchain technology is expected to perform better with its integration with artificial intelligence. A numbers of applications are supposed to increase with this integration. According to IDC (The International Data Corporation) by 2020 the worldwide spending on artificial intelligence is expected to reach 57.6 billion dollars. With blockchain integration with AI, around 51% of the businesses will be making the transition to AI.

Following are some important applications of blockchain with AI:

- ⊙ Smart computing power
- ⊙ Protection *de datos*
- ⊙ Trusting AI decision making
- ⊙ Data Monetization
- ⊙ Creating diverse data sets

Blockchain efficiency can be enhanced with the help of AI and this will be much better than standard computing. Also AI can be more understandable and coherent because of blockchain and hence it is a win-win situation for both technologies. This integration is beneficial as one can find out why the decisions are made in machine learning and we can better trace with the help of blockchain.

3. LIST OF OTHER EMERGING TRENDS IN BLOCKCHAIN

- i. Social networking problems meet blockchain solution
- ii. Interoperability and blockchain networks
- iii. Economy and finance will lead blockchain applications
- iv. Blockchain integration into Government agencies

The key advantages of blockchain technology include protection from cyber-attacks, help in maintaining user confidentiality, option to change the rules and lower transaction costs operated in a closed ecosystem

- v. Blockchain combines with IoT
- vi. Demand for blockchain experts
- vii. Content streaming to be more secure with blockchain
- viii. NFT's will revolutionize digital assets and digital art

4. FINAL THOUGHTS

As discussed above we can see numerous emerging trends in blockchain technology in various sectors and industries worldwide. The key advantages of blockchain technology include protection from cyber-attacks, help in maintaining user confidentiality, option to change the rules and lower transaction costs operated in a closed ecosystem.

Experts are analyzing the faults in any existing technology and are trying to come up with the solutions.

Technology convergence will happen with integration of various other technologies like artificial intelligence with blockchain or IoT with blockchain etc. Thus undoubtedly blockchain technology will impact different sectors and verticals differently. Though the blockchain technology is still in the budding phase in India it has an enormous potential across the board.

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