

A Review on Machine Learning Applications in Medical Tourism

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Abstract

People who travel for medical reasons are referred to as medical tourists and seeking medical care in a country other than their own. The key goal of medical tourism is to contribute low-cost special medical services for patients who need surgical and other types of specific treatment in cooperation with the tourism industry. Several international and domestic tourists prefer Maharashtra, Kerala, Karnataka, Goa and Gujarat for medical services and tourism. The nature, importance and difficulties in medical tourism in India are discussed in this paper. The popularity of medical tourism is growing world wide therefore needs computer science techniques to solve the problems risen in this field utilizing the massive amount of data produced by online platforms. Various machine learning algorithms and applications are discussed in this paper and also described the ML algorithms applied in medical tourism.

Keywords: *Tourism, medical tourism, Health travelers*

I. INTRODUCTION

Tourism is the practice and method of experiencing good time out of home in search of entertainment, leisure, and enjoyment while using hotel services and amenities according to individual's preferences and interests. It refers to economic or cultural phenomenon which made people travel away from home for pleasure, leisure, or business purposes. It has developed to be one of the world's most important markets, and also for many nations, It is a major source of revenue and employment. It is the most fascinating social and economic phenomena that affects national economy remarkably. In 1987 Goodrich et. al. has explored new kind of tourism viz. health tourism, and also termed as Medical Tourism [1]. Medical tourism refers to individuals seeking medical facility intentionally in a country other than their own. It also refers to the phenomenon of attracting tourists with chronic illnesses to stay near a hospital or within a hospital, or in any hotel room or medical resort that have been specially equipped with disease-specific devices, processes and health care personals. Health tourism's main purpose is to provide

customers with "cost-effective" and personal medical facilities who need surgical and other types of specialist treatment in cooperation with the tourism industry. Numerous nations are prioritizing medical tourism by easing the system by supportive rules and procedures which creates work prospects for the local community. Health tourists from all around the world are flocking to India for better hospital facilities. Because of the expert and professional staff, sophisticated technologies, low cost health care services, globally competitive and diversified cultural background, and advanced anglicized version of medicine and affordable travelling facility, India is one of the few developed nations that has been a hub for medical treatment for international patients. Seeing such enormous promise, the Indian Ministries of Tourism and Aviation have been infusing in the field of health and social industries [2][3]. This development in medical tourism provides a substantial economic opportunity for destination countries [4].

It's time to change the *situation* by looking at the current scenario and above-mentioned factors by using modern computer science techniques like Machine Learning. Machine learning is one such technology used, which is capable of processing vast amounts of data in order to widely used in forecasting, classification, sentiment analysis and also as in recommender system.

II. MACHINE LEARNING

Artificial intelligence (AI) is a branch of computer science that focuses on problem solving and allows us to create intelligent systems that can perform tasks that require human consciousness. Artificial intelligence is a collection of algorithms and intelligence that aimed at simulating intelligence in humans. AI is an interdisciplinary discipline with various methodologies Innovations in machine learning and deep learning are driving a paradigm shift in practically every sector of the

software business. Machine learning is one of these techniques. Machine learning (ML) is the application of computer programs that learn from their mistakes and improve over time. Its algorithms create a statistical model based on training data to make forecasts or choices without being explicitly instructed.

A. MACHINE LEARNING AND ITS IMPORTANCE

The introduction of the Internet has dramatically altered the planet. Education, medicine, industry, finance, economics, agriculture, tourism, and other fields have all been transformed by smartphones and the internet [5].

Furthermore, it has been determined from the literature [6 - 11] that as the number of smartphones or Web users grows eventually increases the number of digital or online purchases, shopping, education, and other purposes. Consequently, generating the massive amount of data which has become a significant challenge as different industries become more digitalized [12] and required data analytics and processing tools like Machine Learning.

Machine Learning is powerful tool that can provide a model for applications that are too complicated to be programmed manually such as labelling the pictures and perception problems based on sensors like computer vision and speech recognition etc. Another powerful feature of ML is adaptation i.e. customized the model according to the application's operating environment after it is deployed. There are the number of software applications that need customization according to their operational environment such as bookstores that customize to buying preferences, email readers that customize to concept of spam [13]. Machine learning promotes the development of self-monitoring systems that self-repair, self-diagnose, and approaches that model their users and enjoy the advantages of the continual stream of data flowing through the software rather of merely processing it and also by changing the topic from "how to programme computers" to "how to enable them to programme themselves" [14].

B. MACHINE LEARNING APPLICATIONS

Machine learning is a trending topic in today's world of technology, and it's increasing in popularity at a fast speed as the technology advances. In our daily lives, we employ machine learning through Google Maps, Google Assistant, Alexa, and other similar services, even if we aren't aware of it [15]. The hereunder are among the most popular real-world Machine Learning applications:

- *Image Recognition:*

One of the most popular uses of machine learning is image identification. It's used to identify things like people, locations, and digital photographs. Automatic friends tagging recommendation is a common use of picture recognition and facial identification. Facebook has a tool that suggests auto-tagging of friends. When we

share a photo with our Facebook friends, we receive a notification.

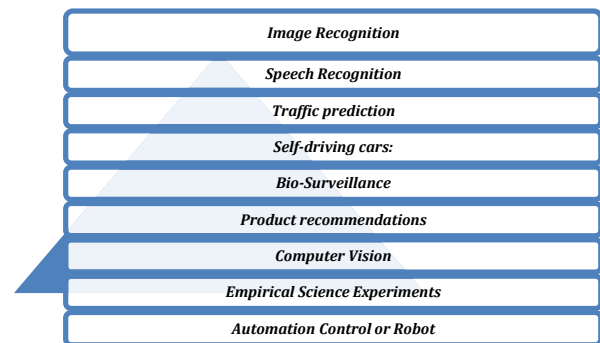


Fig. 1

- *Speech Recognition*

The machine learning approaches are highly utilized by all speech recognition systems available in market be it mobile phones or computer systems. Most of the systems implement learning in two separate phase's i.e (i) Speaker independent training before to shipment; (ii) Speaker dependent training after shipment.

- *Traffic prediction*

When we want to go somewhere new place, we use Google Maps, which offers us the best way with the quickest route and anticipates traffic conditions. It uses two methods to anticipate traffic conditions, such as whether it is clear, slow moving, or extremely congested.

Google Maps and sensors provide real-time car location. At the same time, mean rate has been taken on previous days. Everyone who uses Google Map contributes to the app's improvement. It collects data from the user and transmits it back to its database in order to enhance performance.

- *Computer Vision*

ML is employed by most of the computer vision systems such as facial recognition soft wares or apps, classification systems of microscopic images of cells etc. for precision. As a case, the Post Office of America employs a handwriting analyzer i.e a computer vision system that is trained to read individual handwritings and thus automatically sorts letters/mails which are having handwritten addresses with a notable correctness level of about 85%.

- *Bio-Surveillance*

Govt. bodies especially related to health sector employ machine learning algorithms for tracking outbreaks of diseases. Best example is RODS project in western Pennsylvania which collects all the admission reports, reported to emergency wards in all the clinics .ML system is competent enough to detect aberrant symptoms of patients admitted utilizing their profiles. It also checks the patterns and areal distribution of diseases from patients. Rather more detailed data is being tried to be collected with an ongoing research that would show the history of over-the-counter medicines' purchases. These automated learning methods simplify the intricacy of complex and dynamic datasets with much efficiency.

- *Product recommendations:*

Various e-commerce and entertainment organizations, such as Amazon, Netflix, and others, employ machine learning to provide product recommendations to users. Because of machine learning, whenever we look for a product on Amazon, we begin to see advertisements for the same goods while browsing the internet on the same browser. Google is aware of the user's desire to utilize multiple Machine learning algorithms and proposes a product based on the customer's preferences. Similarly, when we use Netflix, we receive suggestions for movies, entertainment series, and other content, which is also based on machine learning.

- *Self-driving cars:*

Self-driving automobiles are one of the most interesting uses of machine learning. In self-driving automobiles, machine learning plays a key role. Tesla, the world's most well-known automaker is working on a self-driving vehicle. It prepares automobile models to recognize some objects and people while travelling using a strategy of unsupervised learning.

- *Automation Control or Robot*

ML techniques are highly utilized in mechanical and auto industry from bottling plants to man less cars by Google which uses ML to assist the car from compiled terrain and road data to aviation in which control tactics are obtained for stable flight and aerobatics of aircrafts and helicopters.

- *Empirical Science Experiments*

ML is widely used for researches by majority of the data-intensive science disciplines such as it is utilized in identifying aberrant cosmic objects in astrophysics, in Genetics, in Neuroscience and psychosomatic study. Additional daily life pivotal roles played by ML are predictive analyses (in weather forecasting, stock market

predictions, market surveys etc.), fraud detection, topic identification and spam alerting and filtering etc.

B. MACHINE LEARNING ALGORITHMS

Over the years, an enormous amount of machine learning algorithms has been developed and implemented. Not a single algorithm can solve every problem, so various modification and upgradation was taking place and new version of algorithms was added in their place. Every algorithm of ML has different applications and learning methods [16]. So, they can be classified in two categories:

- *On the basis of their supervision style*

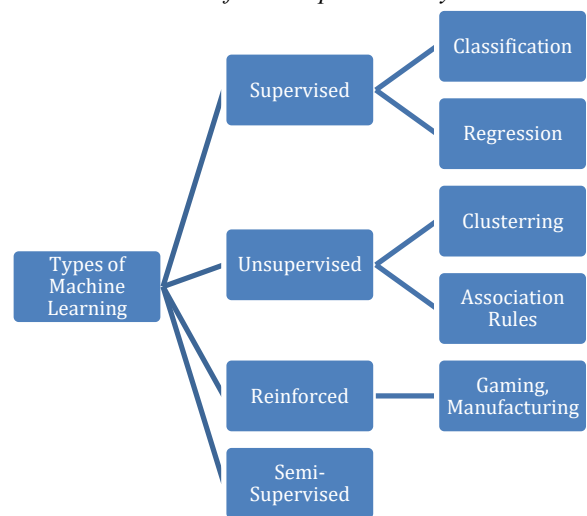


Fig. 2

1) *Supervised learning*: It refers the method where pre-defined tags as input data or training data set, such as True or False, Positive or Negative, Spam or Not Spam etc. and output data set for result is provided to machine. To get the desired test results which are provided earlier, a function or a model is designed and learned. Till the model achieve a satisfactory result, the model is continuously correctly calibrated. This model is mainly used in regression and classification.

2) *Unsupervised learning*: It refers the method where unlabeled data is used as training set or input data. By observing hidden patterns or clusters in input dataset, model learns and categorize or label the data set accordingly. So, it is widely used in clustering and association application.

3) *Semi-supervised learning*: This method uses both learning styles written above for the training of model. In this method, some data is labeled and some data is unlabeled which is used as training or input dataset for model learning.

4) *Reinforcement learning*: It refers to method where no previous data is provided to the system rather an algorithm is given to match behavior to situation in order to maximize the compensation or input signal. Model is learned by trial and error to identify the most rewarding actions.

- *On the basis of their computation*

1) *Regression based Algorithms*: The relationship that exists between the dependent (target) and independent variables is exploited in regression analysis, which is part of prediction analysis and widely used in predictions and forecasting [5]. The widely used regression models are: Stepwise Regression, Linear Regression, Logistic Regression, Multivariate Adaptive Regression Splines (MARS), Ordinary Least Squares Regression (OLSR) and Locally Estimated Scatterplot Smoothing (LOESS) etc.

2) *Instance based Algorithm*: A memory-based learning paradigm is another name for it because it memorizes the result set as it saves instances of training data rather than creating a specific target function description. As new problem or example occurred, it is compared to evaluate or forecast the target function value using the stored instances. Then it just simply substitutes an existing hoard instance with fresh one if the latter is a better match. That's why they're also recognized as the winner-take-all strategy. Some instance-based algorithms are given as Learning Vector Quantization (LVQ), Locally Weighted Learning (LWL), K-Nearest Neighbor (KNN), Self-Organizing Map (SOM) etc.

3) *Decision Tree Algorithms*: It has a tree-like appearance that contains potential solutions for problems based on situations or conditions. Its name is derived from the fact that it starts with a single root, called decision root also, and then fragments into a slew of sub-branches before any conclusion making or prediction result is generated, the formation of a tree. They are preferred because of their ability to formalize the problem-solving process, allowing them to find possible solutions quicker and more effectively as compared to other methods. Some Decision tree algorithms are given as: Classification and Regression Tree (CART), C4.5 and C5.0, Iterative Dichotomizer 3 (ID3), Chi-squared Automatic Interaction Detection (CHAID), Conditional Decision Trees, Decision Stump, M5 etc.

4) *Regularization Algorithm*: Regularization is the method of reducing or eliminating outliers by mitigating overfitting. Regularization is a brilliantly

simple adaptation that is used in conjunction with other ML models, most notably Regressive approaches. It straightens out the regression line by eliminating every curve bend that attempts to fit the outliers. Some Regularization algorithms are given as: Ridge Regression, Elastic Net, Least Absolute Shrinkage and Selection Operator (LASSO) Least-Angle Regression (LARS) etc.

5) *Bayesian Algorithms*: Bayes' Theorem is a method for computing a conditional probability that is based on logic. Although it appears to be a simple equation, it can be used to quickly measure the conditional probability of an event occurring where perception sometimes fails. Due to this fact, it is used by a group of machine learning algorithms to solve regression and classification tasks. Some Bayesian algorithms are given as: Naive Bayes, Multinomial Naive Bayes, Gaussian Naive Bayes, Bayesian Belief Network (BBN), Averaged One-Dependence Estimators (AODE), Bayesian Network (BN) etc.

6) *Support Vector Machine*: SVM is such a well-known machine learning method that it has its own subgroup. To draw decision lines between a series of data points with different labels, it uses a separating hyperplane boundary or a decision plane. It's a purely supervised classification algorithm in the strictest sense of the word. To put it another way, the algorithm generates an optimal hyperplane from input or training data set, and this decision plane then generates a decision result.

7) *Clustering Algorithms*: Clustering is the process of classifying and labelling data based on observation of hidden patterns in datasets. Some of clustering algorithms are given as: K-Means, Affinity Propagation, K-Medians, Ward hierarchical clustering, Spectral Clustering, Agglomerative clustering, Gaussian Mixtures, DBSCAN, Birch, Expectation Maximization (EM), Mean Shift etc.

8) *Association Rule Learning Algorithms*: Association rules aid in the discovery of association between seemingly unrelated data. E-commerce websites commonly use them to forecast consumer behaviour and potential needs in order to sell such appealing goods to him. Some of remarkable algorithms are: Eclat algorithm, Apriori algorithm etc.

9) *Artificial Neural Network (ANN) Algorithms*: A model focused on the design and functioning of real human or animal neural networks. Because it tries to discover positive correlations between input and output data, ANNs are regarded as non-linear models. However, rather than considering the entire collection, it selects a subset from the results, saving money and time. Some of ANN algorithms are: Back-

Propagation, Perceptron, Radial Basis Function Network (RBFN), Hop-field Network etc.

10) *Deep Learning Algorithms*: These are developed and modern versions of ANNs that take advantage of today's abundant data supply. They use larger and broader neural networks to solve semi-supervised problems in which the majority of the input data is unlabeled or unclassified. Some of deep learning algorithms are: Deep Boltzmann Machine (DBM), Convolutional Neural Network (CNN), Deep Belief Networks (DBN), Stacked Auto-Encoders etc.

11) *Dimensionality Reduction Algorithms*: Dimensionality reduction is a technique for condensing a broad data set into its most prejudicial components such that it can be defined with limited parameters and contain necessary information. This gives a proper visualization for data with numerous features or of high dimensionality and helps in implementing supervised classification more efficiently. Some of most widely used algorithms are: Principal Component Analysis (PCA), Partial Least Squares Regression (PLSR), Principal Component Regression (PCR), Sammon Mapping, Projection Pursuit, Multidimensional Scaling (MDS), Quadratic Discriminant Analysis (QDA), Linear Discriminant Analysis (LDA), Mixture Discriminant Analysis (MDA), Flexible Discriminant Analysis (FDA) etc.

12) *Ensemble Algorithms*: They are also known as Ensemble techniques whose main target is to combine the results of many weaker estimation techniques that have been trained separately in order to improve generalizability or reproducibility over a single estimator. The types of learners and the methods for incorporating them are carefully selected to ensure maximum accuracy. Some of ensemble methods are given as: Bootstrapped Aggregation (Bagging), Boosting, Stacked Generalization (blending), AdaBoost, Gradient Boosting Machines (GBM), Random Forest, Extremely Randomized, Trees Gradient Boosted Regression Trees (GBRT) etc.

III. TOURISM SECTOR AND ITS GROWTH

Tourism is the practice and method of experiencing good time out of home in search of entertainment, leisure, and enjoyment while using hotel services and amenities according to individual's preferences and interests. It refers to economic or cultural phenomenon which made people travel away from home for pleasure, leisure, or business purposes. It has embellished as one of the world's biggest markets, and also for many nations, it is a crucial source of exchange of overseas currency and jobs. It is the most

fascinating social and economic phenomena that affects national economy remarkably.

The tourism growth in India has been studied on a national level both from the perspective of international tourists and from inside India [17]. Tourism has a unmediated influence on economic maturation and development. consequentially contribute to India's GDP. According to the tourist industry growth hypothesis, tourism boosts growth of the jobs, infrastructure, foreign currency earnings in the various nations such as Pacific Islands, Singapore, North Cyprus, Spain, Bulgaria, Romania and Slovenian [18-28]. Eventually individual and cultural practices, behavioural trends, societies, people's lifestyles, and quality of life all change as a result of tourism growth in a nation. It has long been assumed that as people travel across the world and just get to recognize one another, get to comprehend each other's customs, and admire the unique attributes of citizens of each country, development of international understanding, which improves attitudes toward world peace. Improvements in the information sector, technological advancements, contact barrier declines, transportation advancements, and the construction of tourist-friendly amenities have all linked to the tourism industry's growth in past few decades. The overall contribution of hospitality & tourism to India's actual GDP has been found to have a linear pattern over time. As a result, it is nationally perceived that tourism will play an predominant role in achieving inclusive and long-term development and growth [29].

A. BOTTLENECKS IN TOURISM MANAGEMENT

Despite the perfect situation that exists for encouraging tourism, it is not without its drawbacks or problems. A few scholars who researched the trends of tourism discovered certain bottlenecks. Many scientists, conducted a study regarding the tourist arrivals which had a significant negative long-term and short-term impact on carbon emissions in various countries, according to the research [30]. Some studies shows the effect of climate change on tourism directly. The potential impacts of climate change on the United Kingdom tourist arrivals was studied, and it was discovered that extreme weather patterns reduce tourist arrivals [31].

IV. MEDICAL TOURISM AND ITS IMPORTANCE

Medical tourism is practices of inviting patients who are suffering from dangerous ailments to stay near the hospital or inside the hospital or in medical resorts specially designed with equipment, process, protocols, and personals to treat the disease. Several countries are making medical tourism as the top priority by facilitating the whole process

through civil laws and protocols; this not only enhances the quality of patients but also provide job opportunities to the local population. India from olden days is famous for its medical treatment process and proved to be an available option for many country nationals; it has developed several protocols and procedures to treat various diseases, which become famous across the globe. Many country nationals used to come to India for treatment due to its cost-effectiveness, professional practices, stringent quality norms and friendly peoples' nature which made this country a popular medical tourism destination. Research works had been undertaken by several researchers to analyze the current trend of medical tourism, the pattern at which its conducted, implementation methodologies, cost factor and economics involved and other important attributes. Majumdar investigated that the aim of medical tourism is to provide 'high-quality and cost effective treatment , with minimum waiting time, patient-centered care, and an exotic experience, internationally qualified and experienced specialists and that should be given with top priority [36]. The choice to participate in medical tourism, on the other side, is more complicated, and is influenced by the unmet needs of patients in native country, the quality of treatments sought, and the method by which care is obtained. One of the researchers recommends a step-by-step decision-making mechanism for deciding whether to pursue medical services abroad or engage in medical tourism, including aspects of required procedures, treatment venue, and quality and safety concerns [32].

A. FACTORS INFLUENCING THE MEDICAL TOURISM IN INDIA

India from olden days is famous for its medical treatment process and proved to be an available option for many country nationals; it has developed several protocols and procedures to treat various diseases, which become famous across the globe. Many country nationals used to come to India for treatment due to its cost-effectiveness, professional practices, stringent quality norms and friendly peoples' nature which made this country a popular medical tourism destination. Research works had been undertaken by several researchers to analyze the current trend of medical tourism, the pattern at which its conducted, implementation methodologies, cost factor and economics involved and other important attributes.

Research work in this field has shown that India has potential to cater the demands of medical tourists. One of the researchers analyzed the percentage increase in foreign tourist arrivals in previous years, and looked into the foreign exchange earning option of medical tourism in India. It also looked at the annual growth and efficiency of handling potential of Indian medical tourists, which could

be boosted by introducing e-visas and developing tourist destinations to attract more international visitors to India. Many other researchers explored other reasons, which attracts foreign patients to India [33].

India can become a most preferred destination for medical tourism because India has a wide pool of qualified medical professionals, outstanding hospital services, and highly skilled staff at a low cost [3]. They spoke about the best hospitals and treatment centers in India and around the world, as well as the most popular treatments like cardiac surgery, knee transplants, cosmetic surgery, and dental care. Not only best infrastructure, more hospitals receive JCI accreditations and foreign patients' concerns about safety and quality of care grow, India's low-cost, high-quality treatment for health tourists has grown in popularity, attracting more people from cross over seas for their medical and tranquility needs [34]. Other countries prefer India for surgical procedures such as cardiac surgery, knee transplantation, plastic surgery, hip replacement, and dental surgery. They clarified that India has become a popular medical tourism destination because the combined cost of travel and care in India is still a fraction of what is spent in western countries on medical treatment alone.

Many factors have been studied that affect the decision to go on a medical mission abroad. In terms of biologically granted and individually acquired potentials, health importance is focused on patient health awareness, which enables individuals to take healthier acts [35].

B. IMPACT ON ECONOMY

Many studies have been performed in Medical tourism. One bountiful researcher studied economics and also studied that Medical tourism has a major impact on the economy, due to the fact that it is the primary source of foreign exchange and stimulates economic development in other sectors such as tourism, transportation, pharmaceuticals, hotels, and restaurants. He also mentioned that the Ministry of Tourism in India had developed a section called MDA (Marketing Development Assistance) and Medical Visa (M-visa) to promote medical tourism.

C. MAJOR CHALLENGES IN MEDICAL TOURISM

Despite the ideal scenario prevailing for promoting medical tourism, it is not coming without side effects or issues, some challenges were also obtained by a few researchers who studied the pattern of medical tourism. Many researchers studied the challenges faced by health travelers. One of the researchers presented that India's low-cost advantage, excellent reputation in the field of modern healthcare (eye surgery, organ transplants cardiovascular surgery etc.) and the variety of tourist locations obtainable in the country are all factors that contribute to the country's

medical tourism success. But still there are many challenges are faced. Research highlighted the India's strengths and challenges, such as the lack of government initiative, a concerted effort to promote the sector, a hospital accreditation mechanism, and consistent pricing policies and standards across hospitals [38]. Furthermore, One researchers, Dawn presented the paper which discussed the important bottlenecks and opportunity that the Indian medical tourism industry possesses that allow it to resolve local and international impediments to improving its medical assistance include faster visa grants to foreign tourists, fiscal perks for service providers, medical products import duty reductions, committees that promote medical tourism, as well as the need to develop infrastructure such as roads and transportation services [48]. Some medical tourism strategies suggested in this paper include building and promoting India's reputation as a high-quality medical tourism destination.

V. ML APPLIACATIONS IN TORISM AND MEDICAL TOURISM

With the introduction of internet and smartphones, the social networks, businesses and individuals are increasingly turning to online platforms for data and information to make better decisions. In the last decade, Machine Learning has aided several innovation solutions, whether it is tourism, industrial manufacturing or business forecasting, and it has played a crucial role in the prediction and monitoring of different attributes. ML is widely used in classification, forecasting, regression, prediction, pattern recognition and recommender system etc. In the tourism sector, the research has revealed that the support vector regression (SVR) with hybrid chaotic genetic algorithms was used for tourism demand forecasting with calculating three components of an SVR model, inherent unpredictability of chaotic iterations is exploited to circumvent premature local optimum [39]. Based on the Baidu index, another model PCA-ADE-BPNN was designed to anticipate tourist volume [40]. In tourism customer reviews, a unique deterministic methodology for aspect-based recommender systems was deployed which was based on novel NLP (Natural language processing) principles and also used for sentiment categorization at aspect level [41]. Various supervised machine learning algorithms are also used for sentiment categorization of internet reviews for tourism locations. A study compared and examined the performance of three supervised machine learning algorithms such as Nave Bayes, SVM, and the character-based N-gram classifier for sentiment categorization of comments on tourism websites for seven prominent tourist attractions in the US and Europe found SVM and n gram approach give better accuracy [42,47]. Scalability, sparsity and grey sheep issues are all challenges with existing recommender systems. A tourism system with a personalized mixed recommendation algorithm was built. Its use in a tourist system and the case

study conducted suggest that the methods included in the method, such as fuzzy logic and association-based categorization, can be useful [43]. A Machine Learning approach using apriori algorithm for modeling basic Big Data analysis for Korean Medical Tourism was applied to identify any unnoticed association rules in the target databases by analysing massive data that works better over others. The findings of the study revealed that the objective of foreign tourists' visits differed based on their age groups, as well as their unpleasant experiences [44]. SigTur/E-Destination is a social media system was designed and deployed that delivers individualized tourist activity recommendations in the Tarragona area according to a certain ontology, the actions are appropriately categorised and labelled, guiding the reasoning process [45]. Another researcher introduced a agent-based personalized recommender system i.e. Turist@ which has specialized recommendation engine that is capable of making recommendations in a variety of situations [46]. Here researcher constructs an ontology as a highly expressive hierarchy of categories, populating it with data from Tunisian medical tourism providers' services to describe all ideas and relationships in Tunisian medical tourism. The above ontology will be used in a trust-based recommendation system to address the absence of background knowledge in customized tourism recommendations [50].

VI. CONCLUSION

With a remarkable combination of advanced facilities, skilled doctors, and low healthcare treatment costs, India has become a popular medical tourism destination, attracting thousands of foreign patients each year. At a low cost, India has a large pool of skilled doctors, outstanding medical facilities, and highly trained employees. In comparison to their foreign counterparts, Indian physicians have superior technical skills. The government and healthcare stakeholders are concentrating their efforts on attracting international patients. As the industry competes on a global scale, it faces some difficulties. Increased medical tourism has shown a strong correlation with foreign currency inflow, thereby raising India's Foreign Currency Reserve and boosting the Indian economy. Machine learning techniques are applied in the medical tourism for classification, forecasting, regression, prediction, pattern recognition and recommender system etc.

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