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Research Article

Optimized Reinforcement Learning Approach on Sustainable Rural Tourism Development for Economic Growth

Guofang Chen

School of Economics and Management, Jiaozuo University, Jiaozuo 454000, China

Correspondence should be addressed to Guofang Chen; guofang_chen@outlook.com

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A country's economic development relies on different features such as export/import, industrial processes, and tourism. Rural tourism is a discussion-centric research field for analyzing its contribution to a country's economic growth. This field generates voluptuous data for tourists, expenditure, location, etc. analysis; the information increases over the years and the density of visiting tourists. Therefore, this article introduces an optimized reinforcement data analysis approach (ORDAA) for generating precise guidance information. This information is two-faced, namely, summarized data for tourist guidance and summarized data for the country's economic development. Data augmentation's steep rise and downfall are analyzed using reinforcement learning, wherein decision agents are precise for a relevant summary. The relevance is identified using associated development targets over varying years. Besides, the guidance information that identifies low tourist summary or nonachievable development targets is separately identified. The identified targets are analyzed using reinforcement agents for economic growth improvements compared to the previous tourist densities. This improves the focus on rural tourism sights and economic contributions to an optimal level.

1. Introduction

Rural tourism development is implemented in the tourism system, which increases the economic growth ratio of the countries. Rural tourism is developed by providing proper maintenance and activities which impress tourists [1]. Rural tourism development reduces the economic uncertainty ratio of a country. Innovative ideas and places are created which provide effective regions for tourism. Economic development uses various ideas and functions to gain more growth around a country [2]. Redefining rural areas and building greenhouses attract tourists to visit rural areas. Rural tourism is developed based on certain models and techniques. The global management approach in the development process organizes every activity presented in rural areas [3]. The global management approach maximizes the economic and financial growth of a country. Both sustainability and efficiency range of rural tourism is developed, which provide feasible services for the tourists. The management system first predicts unique features and patterns for the development process. Essential requirements and activities are provided to rural areas which produce necessary services to tourists [4, 5].

Industries, enterprises, and other events enhance the efficiency ratio for economic development. Economic development improves the financial status and condition of a particular country or industry [6]. The tourism data analysis system is mainly used to analyze the data presented in the database. Tourism data produce important values and points which provide feasible data for architecture and design processes [7]. Tourism data provides the exact data relevant to tourism that reduces latency in the development process. Tourism maximizes the overall economic development level of organizations and industries. Tourism data develops the economic growth of a country which reduces poverty and illiterate ratio among people [8]. Economy development contributions are provided by every organization, enhancing the economy's development range. Increasing tourism growth will enhance the economic development ratio of a country [9]. Tourism flow creates huge employment opportunities and builds small-medium-sized enterprises that provide effective services to tourists. Various approaches and

schemes are used in economic development contributions based on tourism data that reduce uncertainty range in the economic development process [10].

Machine learning (ML) approaches and algorithms are most widely used in various fields. ML approaches maximize accuracy in prediction and analysis and enhance the performance and effectiveness range of the systems [11]. ML approaches are also used in tourism data analysis for economic growth and development processes. The support vector regression model is used in data analysis that analyzes the required data for further processes [12]. Regression models use feature extraction methods that extract important key values and features from the database. The extracted data produce optimal information for tourism data analysis systems. The feature extraction method reduces both the time and energy consumption ratio in the computation process, which improves the efficiency of the systems [13]. The regression model maximizes the factors that enhance a country's economic growth and development range [14]. The deep learning (DL) approach is also used in tourism data analysis. DL approach addresses the demands and content which are presented in datasets. DL approach increases accuracy in the prediction, providing feasible data for the development process. DL approach provides various development schemes for economic growth development systems [15].

An apparent possibility to enhance the memory-based and model controllers inherent in the most popular and widely used optimization techniques is reinforcement learning (RL), a machine learning technique to learn optimum controllers. Reinforcement shines when it comes to figuring out the optimum feasible order of operations to finish a job. When models learn from their own mistakes, they were able to create algorithms with more complexity and adaptability. Reinforcement learning (RL) is a crucial area of machine learning that goes beyond traditional supervised learning to focus on optimizing solutions for difficult decision-making situations. RL is an effective learning framework for solving continuous control challenges.

However, in wide state spaces, reinforcement learning techniques may raise computing cost and decrease optimization efficiency. Reinforcement learning methods that integrate deep learning with reinforcement learning have been extensively employed across all applications as a means of overcoming these restrictions.

The primary goal of this work is to present an optimized reinforcement data analysis approach (ORDAA) for the generation of accurate directional data. The data has two uses: first, as a guide for tourists; second, as a tool for the country's economic growth. Reinforcement learning, in which decision agents are exact for an appropriate summary, is used to examine the quick ascent and subsequent decline of data augmentation. In order to calculate economic statistics and their contribution, the suggested method gathers data on economic activity, expenditures, and the attractiveness of certain locations. Here, reinforcement learning is used to determine which pieces of advice should be used. For the purpose of providing a summary of events based on relevance, this data is collected from the tourists. In particular, the elements responsible for the sequential increase and decline are isolated from the studied data, allowing for the identification of exact target agents. The learner's end goal should be to identify the negative or economic effects of the different visitor densities and years, independently managed by the location's attractiveness and individual preferences, the least tourist density, contribution, and growth rate. Connected long-term goals for growth help determine significance. Low tourist summaries or unreachable development objectives are also highlighted independently by the guideline data [16].

Using reinforcement agents, the specified goals are studied to see tourism might boost the local economy. As a result, more attention is paid to rural tourist attractions, which in turn benefits the local economy. Therefore, the pace of progress is managed by employing comparative growth analysis, which incorporates prior visits and comparable data evaluations into the education process. These additions boost productivity by 9.46%, contribution identification by 13.49%, data analysis by 8.73%, and summary by 7.58%. This results in a 10.93% faster analysis.

2. Related Works

Al Fararni et al. [17] designed a conceptual framework based on big data and artificial intelligence (AI) for tourism. The main aim of the proposed framework is to provide a recommendation based on tourists' preferences and interests. The proposed framework is a recommendation model that increases tourism's efficiency range. Big data and AI are mainly used here to promote recommendations among users via online applications and systems. The proposed conceptual framework maximizes performance and effectiveness ratio in tourism systems.

Zhou et al. [18] proposed a text mining-based intelligent tourism recommendation algorithm for tourism development systems. MP nerve cell model is also used in the recommendation algorithm that analyzes the problems which are occurred during recommendation. MP nerve cell identifies the important transportation modes that provide tourists feasible services. Text mining combines the information which is gathered from tourists that provide relevant data for a recommendation. Compared with other algorithms, the proposed recommendation algorithm reduces the time and space complexity in tourism.

Arif et al. [19] introduced an automatic scenario control in a series game. The main aim of the proposed control is to visualize the tourism destination recommendation for tourists. A hierarchical finite state machine is used here that translates tourists' exact preference and interests. A finite state machine also identifies variables and characteristics of destinations, which provides the required data for the destination recommendation process. The introduced control provides necessary services to tourists, which maximizes efficiency range in destination recommendation.

Penagos-Londono et al. [20] designed a machine learning (ML) approach for segmentation in tourism. Perceived sustainability and trustworthiness data are used in the ML approach, which reduces complexity in the identification

and segmentation process. Perceived trustworthiness creates more impact on the tourism development process, increasing tourism's development range. The proposed ML approach achieves high segmentation accuracy, enhancing the performance and effectiveness levels of tourism applications.

Wang et al. [21] developed a dynamic tourism carrying capacity (TCC) for urban tourism destinations. The main aim of TCC is to develop both environment and economic growth of urban areas. TCC provides various services such as infrastructure, environmental protection, tourism resources, and economic development range in urban areas. Environment scenario simulation contributes more characteristics to economic growth. Economic scenarios maximize the overall efficiency range of TCC in urban areas.

Xie et al. [22] proposed an optimized machine learning (ML) approach for forecasting cruise tourism. The least squares support vector regression model (LSSVR) with gravitational search algorithm (GSA) is used here to classify the forecasting demands. Big data is used here to analyze the relevant data required for cruise forecasting. Experimental results show that the proposed ML approach enhances tourism forecasting systems' effectiveness and performance levels.

Sun et al. [23] introduced an improved strategy-driven approach for a multistep ahead tourism demand forecasting system. Demand forecasting provides relevant data for decision-making. Multistep ahead tourism demand requires proper data to provide optimal services to tourists. The introduced approach maximizes accuracy in demand forecasting and recommendation processes. The introduced approach reduces the computational process's complexity range, which increases demand forecasting systems' efficiency.

Cepeda-Pacheco and Domingo [24] designed a deep learning- (DL-) based tourist attraction recommendation system in smart cities. The main aim of the proposed system is to identify important features and patterns for the recommendation process. Content-based and context-related information are detected from the database that provides relevant data for recommendation systems. Experimental results show that the proposed DL approach improves tourism recommendation systems' overall performance and significance level.

Bi and Liu [25] developed a hybrid intelligent categorization approach for intelligent tourism information services. The Internet of Things (IoT) is used in the categorization approach, which reduces both time and energy consumption levels when performing certain tasks. The proposed approach provides tourists the necessary information, increasing accuracy in the destination-deciding process. The proposed approach increases the efficiency range in IoT-based tourism applications that enhance feasibility in providing tourist services.

Chobar et al. [26] proposed a multiobjective artificial immune system algorithm using machine learning (ML-MOAIS). The metaheuristic algorithm is used here to solve problems during computation. An analytical approach is used here to analyze tourism-relevant data required for decision-making and further processes. ML increases the overall accuracy of the decision-making process, improving the systems' efficiency. The proposed ML-MOAIS method reduces tourism systems' latency and computation cost range.

Qian and Ge [27] introduced a deep learning- (DL-) based leisure tourism enterprise management system. The backpropagation neural network (BPNN) model is used here to identify the risks and problems presented in computation. BPNN increases the accuracy of risk prediction, which improves the efficiency level of management systems. Compared with other methods, the proposed DL-based model enhances enterprise management systems' performance and quality of service ratio.

De Siano and Canale [28] designed a spatial analysis for tourism's economic growth evaluation process. The main aim of the proposed method is to analyze the exact economic growth of enterprises and the environment. Italian provincial data is used here to produce the necessary data for the analysis process. The spatial analysis also provides effective information to tourists, which increases accuracy in the decision-making process. The proposed spatial analysis provides the exact content and cause of economic growth.

Vaduva et al. [29] examined the social impact of tourism education in universities on the Romanian tourism industry. The proposed analysis addresses the impact and effects of tourism education. Employees' education level, capabilities, and perspectives are detected from data that universities manage. Tourism education maximizes a country's economic growth by providing various employment opportunities to employees. The examined study produces optimal information for further analysis and management systems.

Scarlett [30] proposed a panel assessment for tourism recovery and economic growth. Tourism characteristics and functions are measured that provide feasible data for analysis and development processes. Tourism increases foreign direct investment (FDI) inflows, which maximizes the gross domestic product (GDP) ratio. GDP increases the efficiency and accuracy range in economic development systems. The proposed assessment increases the overall GDP ratio, which improves economic growth via tourism.

Giannoni et al. [31] introduced a market segment strategy for tourism-based economies. Sustained tourism-led growth and impacts are identified by analysis that provides the required information for the development process. The proposed model provides necessary data for the economic development process. The introduced strategy improves the performance and efficiency range of market segments. Experimental results show that the proposed model increases economic growth in tourism systems.

Zhu and Jian [32] proposed spatiotemporal convolution neural network (ST-CNN) to address the problem of inadequate consideration of the planning and tourism market and integrated the multifactor model after simple weighting with the neural network. The outcomes demonstrate that the model achieves a prediction accuracy of 97.69%, which is at least 2.13% greater than the deep learning technique. Further, the rate of change of the one-hour isochronous cycle reaches 41.67 percent. As a result, the neural network model may serve as an experimental reference for the digital evolution of rural tourism's spatial pattern.

Lei et al. [33] introduced radial neural network (RNN) system is based on the FPGA tool. The tourism statistics are sorted using this method. Tools like the FPGA and RNN are utilized to analyze the data. Key findings from the study are displayed, such as the positive and statistically significant effect that tourism has on GDP development and the persisting connection between employment and research factors. It provides a precise measure of production and a reliable basis for evaluating performance. The research demonstrates that, given the country's enormous potential, policymakers should prioritize tourist development initiatives.

Du et al. [34] proposed new deep reinforcement learning (DRL) control system to optimize the system energy management approach. Validation of the new framework is performed using a realistic driving cycle, and results are compared to those obtained using the dynamic programming (DP) technique and an earlier method based on deep reinforcement learning. The newly created deep reinforcement learning framework improves upon the prior deep reinforcement learning technique in terms of training efficiency and energy consumption, and the fuel economy proves to be close to the global optimality. Also, various driving schedules verify its robustness and flexibility.

Zhang et al. [35] proposed a PPO-RL (Path Planning Optimization based on Reinforcement Learning) for scheduling logistics vehicles. The data-driven reinforcement learning technique is used to regulate the speeds and paths taken by the park's smart agents. Conventional mathematical models struggle to summarize and optimize the analysis of rules due to the complexity of the traffic environment in the park and the unpredictability of persons and impediments. The SUMO simulator creates a model of Lanzhou University's campus and then runs several tests with that model. The logistics truck scheduling method significantly outperforms the conventional route planning algorithm in terms of efficiency.

Previous studies have shown that when comparing deep reinforcement learning to traditional rural tourism, the latter falls short in terms of real-time, self-learning, and optimization performance. Mostly, a small number of publications have explored the use of reinforcement learning to boost economic development. Moreover, the current published literature that primarily focuses on the topic that produces bountiful data for visitors, spending, location. In the inaccuracies of the baseline model, the suggested solution generates exact guiding data. This data has two uses: first, as a guide for tourists; second, as a tool for the country's economic growth. Reinforcement learning, in which decision agents are exact for an applicable summary, is used to examine the meteoric rise and decline of data augmentation.

3. Proposed Approach

Rural tourism is a discussion-centric research field for analyzing its contribution to a country's economic growth. A country's economic development relies on different features such as export/import, industrial processes, and tourism. This field generates voluptuous data for tourists, expenditure location, etc., analysis; the information increases over the years and the density of the visiting tourists. Therefore, this article introduces an optimized reinforcement data analysis approach (ORDAA) for generating precise guidance information. This information is two-faced, namely, summarized data for tourist guidance and summarized data for the country's economic development. Rural tourism can increase the country's economic growth as it has voluptuous tourist data. The visitors who visit the tourist location can be helpful in the growth of the economy. With the help of reinforcement learning, the guidance of the tourists and the country's economic growth can be increased. The visitors who visit the location must be aid full in improving the country's growth and increasing the location's popularity. The yearly visits of the tourist can enhance the vogue of the location data and expand the profitable growth. Reinforcement learning is used for producing precise information for tourist guidance which has the summarized data. This will help increase the country's economic growth and check the relevance through reinforcement learning. The tourist guidance can be improved by the yearly tourists visiting the destined location, where the country's economic level can also be increased, in the paper, the reinforcement learning (RL) paradigm in a limited time horizon situation. The state space, the action space, the transition dynamics, and the reward function of a Markov Decision Process are denoted as (s, a, P, r), respectively, and t represents a limited time frame. Being a key component of many RL algorithms, the Bellman equation is reported widely throughout the RL field. The Bellman equation is thought of as a decomposition of the value function into its component elements, which are the present value and the deferred value of the prospective. The goal is to arrive at a strategy that π maximizes the total anticipated benefits Equation (1) provided.

$$E\sum_{t=0}^{T} r(s_{t+1}, r_{t+1}) = 1, \tag{1}$$

$$s_{t+1} \sim P|s_t, a_t|, r_{t+1} \sim \pi|s_t|. \tag{2}$$

Based on whether or not they construct a model of the dynamical context, RL strategies may be loosely classified as design or prototype. In the article, a model-based strategy uses data learning to choose a dynamics mode. The proposed approach is illustrated in Figure 1.

Here, in this method, the tourist locations enhance the yearly tourist visits by providing precise information and data analysis. The yearly visits of the tourists must enhance the location and economic data. From the yearly visits of the tourists, the location data and the economic data can be estimated. From the output of the location data, the popularity and the guidance information can be calculated. The popularity denotes the reach of the tourist location, and the guidance represents the service provided for the tourist when they visit the location. From the output of the economic data, the growth and the target can be determined. The growth and the target can be identified by comparing the last visits by the tourists. These are the data features extracted from the output of the location and the economic data. The relevance and contribution (downfall) can be

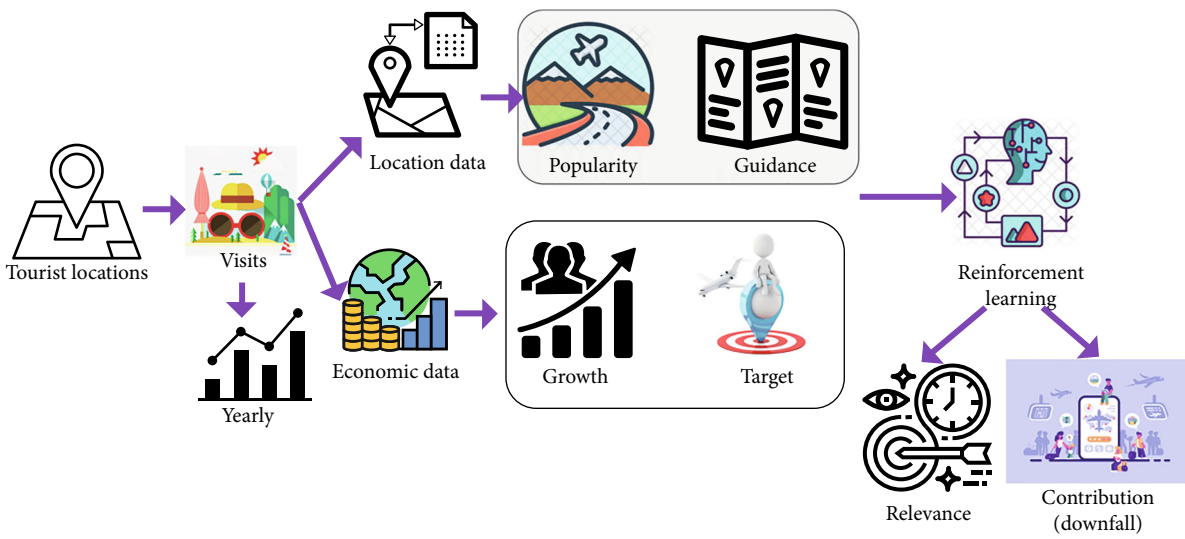

Figure 1: Proposed ORDAA approach.

estimated using reinforcement learning. Data augmentation's steep rise and downfall are analyzed using reinforcement learning, wherein decision agents are precise for a relevant summary. The relevance is identified using associated development targets over varying years. Besides, the guidance information that identifies low tourist summary or nonachievable development targets is separately identified [36].

The identified targets are analyzed using reinforcement agents for economic growth improvements compared to the previous tourist densities. This improves the focus on rural tourism sights and economic contributions to an optimal level. The tourist location has many visitors who visit yearly to the destined place. Their visits can improve the location and the economic data. The location data denotes where the tourist wants to chill throughout the vacation. It should contain the proper information about the place for the entire tourist location. It may help increase the country's economic growth through their yearly visits to a tourist location. The process of providing the location data from the tourist location to the visitors can be explained clearly by the following:

$$\frac{\partial a}{\partial b}(x,y) + D\Big(x, y, a(x,y), \theta^T(x,y)\forall a(x,y) + \forall a(x,y).\sigma(x,y) = 0, \tag{3}$$

where (x, y) is represented as the data collected from the destined location, D is represented as the precise information of the tourist location, $(\partial a/\partial b)$ is denoted as the calculation of the data collected from the location, and (θ^T) is denoted as the yearly visits by the visitors' data. Now, the economic data from the tourist location where the tourist visits yearly can be determined. Visitors' visits to the tourist location during their vacation may increase the country's economic growth. This can give precise information about the country's economy through tourism and then how it can be developed. The data analysis of the economic data is given to the visitors for their location. This may help produce high economic growth in the country. Rural tourism is a discussion-centric research field for analyzing its contribution to a country's economic growth. This economic data contains the voluptuous data on expenditure during their yearly visits to the tourist location. The economic data can be estimated by comparing the previous visits by the tourist to the location. It also has the expenditure information increases over the years and the density of the visiting tourists.

It can help increase the country's economic growth by providing precise information on the entire tourist location. The economic data helps in extracting the data features' information growth rate and the yearly target. This may help in enhancing the tourist visits to the place where the data analysis is given to the tourist to improve the country's economic rate. This improves the country's economic growth, and the data provided by the field is improved. The yearly visit of the visitors to their destined location contains the location data and the economic data. The location data contains data analysis and precise information about the tourist location. The economic data must have the country's economic level and further steps to increase the country's economic growth by providing precise information on rural tourism. The economic data will help increase the growth rate of the country. It can be estimated by comparing the previous visits to the tourist location by the yearly visitors. It can help to increase the information provided for tourists in rural tourism. This may enhance the country's economic growth rate. The process of estimating the economic data from the yearly visits by the visitors to the tourist location can be explained by the following:

$$X_x = \lambda + \int_0^x \sigma(S, X_S)ds + \int_0^x \tau(S, \times_S)dW_S, \tag{4}$$

where (X_x) is denoted as the data collected from the yearly visits by the visitors, $(\sigma(S, X_S))$ is denoted as the estimation of the economic data, and $(\tau(S, \times_S))$ is denoted as the data analysis of the economic data (W_S) is denoted as the precise information on the country's economic growth rate on

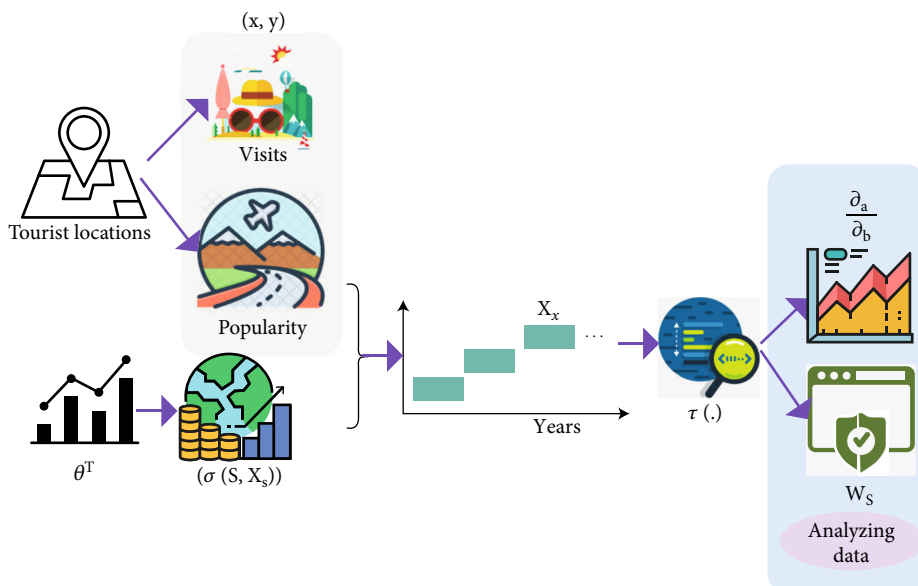

Figure 2: Data analysis process.

tourism. Now, from the output of the location data, the data features such as popularity and guidance can be determined. The popularity data depends on the visits of the tourists on a yearly basis. This can tell about the fame of the tourist location and also helps in increasing its popularity depending on the output of the location data. The location data's outcome leads to increasing the tourists' popularity and guidance data. The popularity depends on the tourists' visits and the location's fame. It can be stable once the tourist forms it. The location's features can manage the tourist location's popularity. This popularity fame of the location can also increase the economic growth rate. The data analysis process is illustrated in Figure 2.

The popularity also can increase the economic growth rate of the country. This popularity rate is extracted from the outcome of the location data where the visitors visit the tourist location yearly. This may also help the other tourist reach here and increase the economic data to reach the target. The location's popularity may help the visitors chase the location, which helps enhance the economic level of tourism and the country (Figure 2). The country's economic growth rate may also improve its tourist place popularity and location data. The popularity of the tourist location is extracted by the outcome of the location data, which provides precise information about the tourist location. It also tends to produce data analysis of the entire location that the tourists visit yearly. It can help increase the economic growth rate of the country. The process of identifying the popularity of the location from the location data can be explained by the following:

$$a(x, X_x) - a(o, X_o) = -\int_0^x g(S, X_S, a(s, X_S), \tau(S \times X_S) \forall a(s, X_S)) ds + \int_0^x [\forall_a(s, X_S)]^T \tau(S, X_s) dW_S, \quad (5)$$

where $(a(x, X_x))$ is denoted as the estimation of the popularity from the location data, $(a(o, X_o))$ is denoted as the data collected from the outcome of the location data, (g) is denoted as the data analysis of the popularity of the tourist location, $(\tau(S \times X_S))$ is denoted as the estimation of information on the tourist place popularity, and $(a(s, X_S))$ is denoted as the expenditure on tourist places. Now, the guidance of the location data can take place. The guidance must have the entire information of the tourist location, which is given to the tourist. The guidance must have summarized data for the tourist about the tourist location. This guidance may help the visitors to choose their wishing location throughout the vacation. This guidance is extracted from the outcome of the location data where the visitors visit the tourist location yearly. This may contain the entire data analysis of the destined location to provide the information to the visitors. This will be helpful in their entire journey of tourism.

It can also improve the economic growth rate of the country. The clear guidance of the location to the tourists may increase the tourists' population towards the destined location. This information in the summarized data for tourist guidance is to develop the country's economic growth rate. ORDAA is used for generating precise guidance information to the tourist about the location. It must have the exact data about the targeted location to enhance the population rate of the tourists to the location data. Guidance is the main thing that tourists ultimately require. It helps provide clear information about the tourist place where the visitors regularly visit yearly, so that it should be at the correct level of producing the data analysis for tourism. This may help in the enhancement of the economic growth rate and is also likely to increase the number of tourists to the tourist location. This can contain the entire data of the location and its information about the visiting tourists. The process of guiding the location is explained by the following:

$$X_{x_{n+1}} - Xx_n \approx \forall(x_n, Xx_n) \forall x_n + \tau(x_n, Xx_n) \forall W_n, \quad (6)$$

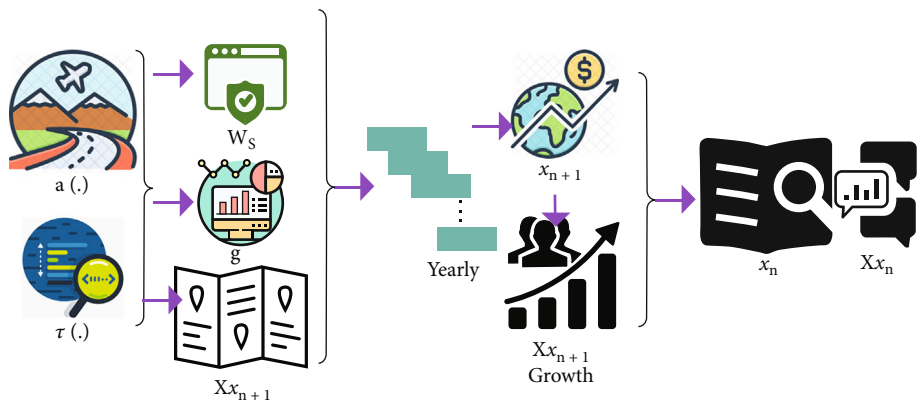

Figure 3: Growth rate analysis.

where $(X_{x_{n+1}})$ is denoted as the estimation of the guidance data of the location and $(\forall(x_n, Xx_n))$ is denoted as the outcome of the location data, which helps in providing guidance (W_n) which is denoted as the summarized guidance information of the tourist place. Now, the data features from the economic data take places, such as growth and target. The economic growth can be identified from the economic data, which is determined by the tourists' visits to the tourist location. This can be determined by comparing the previous visits by the visitors to the destined location. The guidance information is used to produce the summarized data for the country's economic development. The economic growth depends on the number of visitors who visits the destined destination. This may cause high economic growth, and the fewer number of visitors can cause the downfall of the economic growth rate. The growth rate can be increased by the optimization method, which can be used to produce the exact guidance information. The proper guidance may increase the population of visitors to the tourist location and enhance the country's economic growth rate. The precise guidance information of the tourist location can increase the growth rate. The growth rate of economic data can be increased with the proper guidance of the field. It can be enhanced by the perfect data analysis of the tourist location and also can increase the country's economic rate. The process of analyzing the growth rate is explained by the following:

$$\begin{aligned} a(x_{n+1}, Xx_{n+1}) - a(x_n, X_{xn}) + g(x_n, Xx_n, a(x_n, Xx_n), \tau^T \\ \times (x_n, Xx_n)\forall a(x_n, Xx_n))\forall x_n \\ = \forall a(x_n, Xx_n)^T \tau(x_n, Xx_n)\forall W_n, \end{aligned} \tag{7}$$

where (x_{n+1}, Xx_{n+1}) is denoted as the estimation of the growth rate of the economy, $(\forall a\,(x_n, Xx_n)^T)$ is denoted as the number of visitors to the locations, $(\tau(x_n, Xx_n))$ is denoted as the compared growth rate, and (W_n) is denoted as the improved rate of the economy. Now, the data feature target of the economic rate is determined. The target can be achieved only by the proper amount of visitors visiting the tourist location. This can be achieved by the proper guidance provided to the visitors, which contains precise information about the location. The guidance ensures that it has the entire data analysis of the tourist location. ORDAA is used for generating precise guidance information to increase the target of the economical rate. The target should be achieved by the proper guidance for the visitors, which is used to enhance the large number of people visiting the location. The growth rate analysis is presented in Figure 3.

This increases the economical rate and the target to be attained. The proper guidance can increase the number of visitors visiting the location and helps in the enhancement of the country's economic rate. The perfect visits in the year by the visitors can help make the correct target to be obtained and help in increasing the economical rate. The data feature target is obtained by the economic data from the visitors visiting the tourist location yearly (Figure 3). This can improve the economical rate by the precise guidance information which the ORDAA provides. The target can be identified by comparing the previous visits by the visitors to the destined locations. The target can be achieved by the proper guidance provided to the visitors, which is used to enhance the number of visitors to the tourist locations. The process of identifying and achieving the target is explained by the following:

$$\left.\begin{aligned} \forall x_n &= x_{n+1} - x_n \\ \forall W_n &= W_{xn+1} - W_{xn} \end{aligned}\right\}, \tag{8}$$

$$\begin{aligned} \tau^T(x_n.Xx_n)\forall_a(x_n, Xx_n) &= \left(\tau^T\forall a\right)(x_n, Xx_n) \\ &\approx \left(\tau^T\forall_a\right)(x_n, Xx_n|\varepsilon_0), \end{aligned} \tag{9}$$

where $(\forall x_n)$ is denoted as the previous target rate, $(\forall W_n)$ is denoted as the number of previous visits by the visitors to the tourist location, and $(x_{n+1} - x_n)$ is denoted as the target achieved by the growth rate. Now, from the output of the data features from the location and the economic data, reinforcement learning is used to identify the relevance and the contribution (downfall) of the tourist place economy. As rural tourism is a centric research field for analyzing its contribution to a country's economic growth, this field enhances the voluptuous data for tourists to determine the density of the visiting tourists. An optimized reinforcement approach is used to provide precise guidance information. This is to

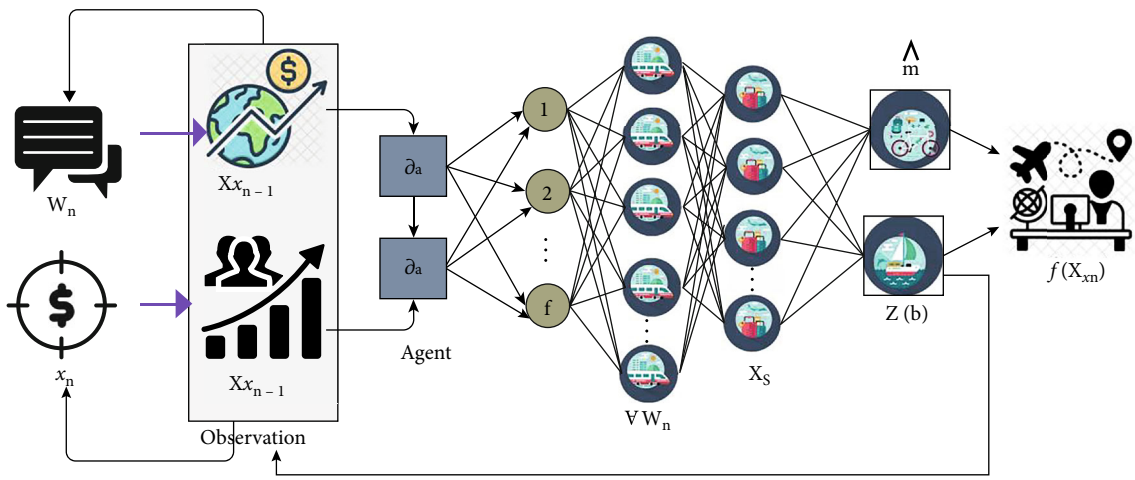

Figure 4: Learning for steep rise or fall.

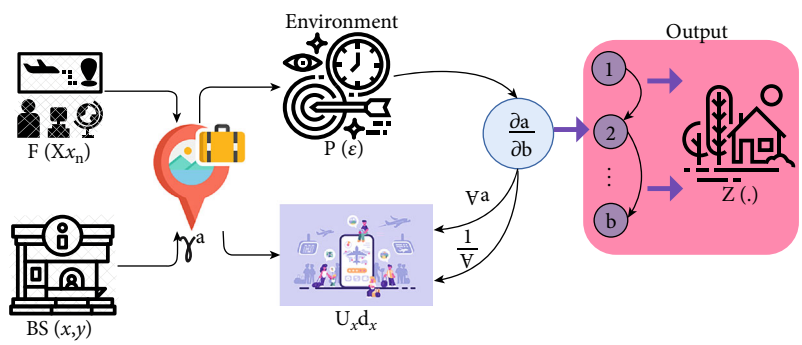

Figure 5: Target achievement using relevance data.

increase the country's economic development. Therefore, the reinforcement learning process to provide the guidance information to determine the relevance and the downfall data can be explained by the following:

$$P(\varepsilon) = H[1f(Xx_n) - \widehat{m}(\{Xx_n\}0 \le n \le N, \{Wx_n\}0 \le n < N|^2], \tag{10}$$

$$g(x, g, a(x, y), \tau^T(x, y)\forall_a(x, y) = -(1 - \partial)V(a(x, y))a(x, y) - Bs(x, y), \tag{11}$$

where $(P(\varepsilon))$ is denoted as the RL used to find the guidance information, (H) is denoted as the RL used to provide the voluptuous data for the tourists, $(f(Xx_n))$ is denoted as the calculation of the density of tourists, $(\widehat{m})$ is denoted as the calculation of the optimization approach used to determine the guidance, and $(Bs(x, y))$ is denoted as the calculation of the voluptuous data to calculate the guidance information. Now, the relevance is identified by the reinforcement learning from the output of the data features from the location data and the economic data. ORDAA is used for generating precise guidance information. This information is two-faced, namely, summarized data for tourist guidance and summarized data for the country's economic development. The learning for steep rise or fall is portrayed in Figure 4.

Data augmentation's steep rise and downfall are analyzed using reinforcement learning, wherein decision agents are precise for a relevant summary. The relevance is identified using associated development targets over varying years. Besides, the guidance information that identifies low tourist summary or nonachievable development targets is separately identified (Figure 4). The relevant data can be identified by comparing the varying years' targets in the previous visits by the tourists to the tourist locations. Then, the relevant data can be determined to check the target of tourism, and if it is not upped to the level, then the guidance information will be improved for increasing the country's economic growth. This relevant data can be observed using the data features extracted from the location data and the economic data. The process of identifying the relevant data by using reinforcement learning can be calculated by the following:

$$z(b) = 1(-\infty,a)(b)\gamma^a + 1(-\infty,t)(b)\gamma + (a, x)(b)[(b - a) + \gamma^a], \tag{12}$$

$$dX_x = \sqrt{\varepsilon}\, U_x dx + dW_x, \tag{13}$$

where $(z(b))$ is denoted as the calculation of similar data from the output of the data features, (γ^a) is denoted as the

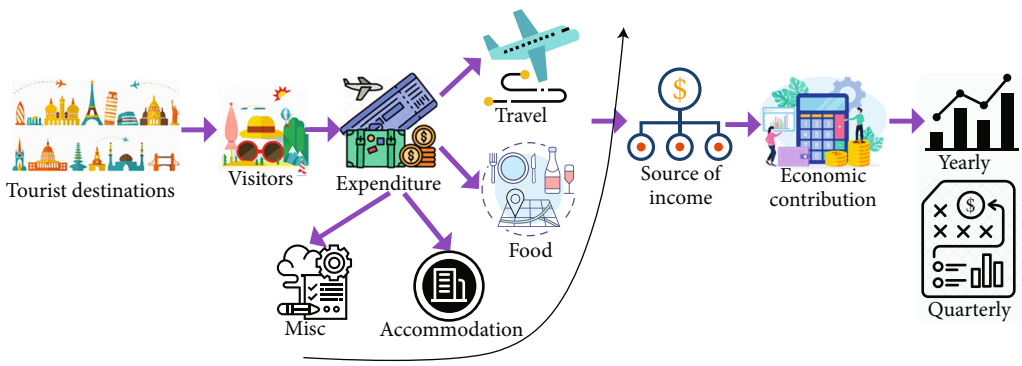

Figure 6: Tourist expenditure and economic contribution.

calculation of the output of the data features to determine the relevance, and $(\sqrt{\varepsilon}\, U_x dx)$ is denoted as the calculation of the relevant data by using reinforcement learning. Now, the contribution (downfall) can be determined from the reinforcement learning by using the output of the data features. Besides, the guidance information that identifies low tourist summary or nonachievable development targets is separately identified. The relevant data for target achievement estimation is portrayed in Figure 5.

The identified targets are analyzed using reinforcement agents for economic growth improvements compared to the previous tourist densities. The contribution may occur due to the low tourist visits to the tourist location and the targets which cannot be attained. The targets are maintained by the learning approach to check with the upcoming targets. This can be done by checking with the previous tourist densities which are analyzed (Figure 5). This process of determining the contribution (downfall) by using the reinforcement learning from the outcomes of the data features can be explained by the following:

$$\frac{\partial a}{\partial x}(x,y)+\forall a(x,y)-\forall\forall_a(x,y)^2=0, \tag{14}$$

$$a(x,y)=-\frac{1}{\forall}[(H(-\forall f(a+W_{X-x})))], \tag{15}$$

where $(\forall\forall_a(x,y)^2)$ is denoted as the calculation of the downfall from the output of the data features and $(-1/\forall)$ is denoted as the nonachievable targets from the entire process. This article introduces an ORDAA for generating precise guidance information. Data augmentation's steep rise and downfall are analyzed using reinforcement learning, wherein decision agents are precise for a relevant summary. The relevance is identified using associated development targets over varying years. Besides, the guidance information that identifies low tourist summary or nonachievable development targets is separately identified. The identified targets are analyzed using reinforcement agents for economic growth improvements compared to the previous tourist densities. This improves the focus on rural tourism sights and economic contributions to an optimal level.

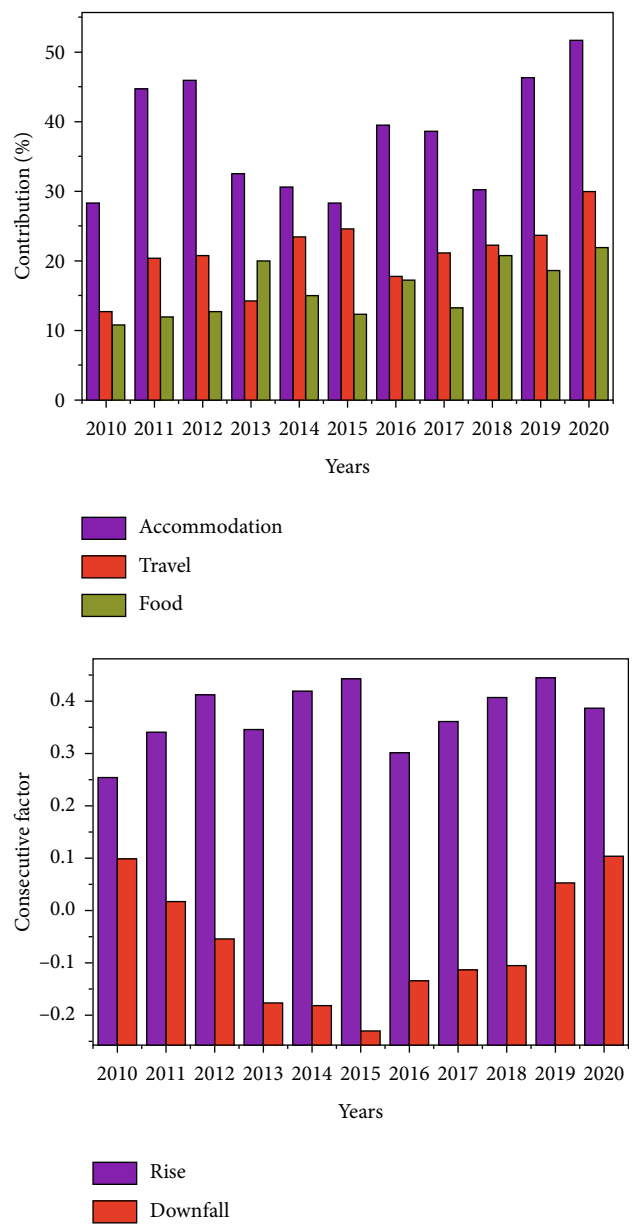

Figure 7: Observed cumulative contribution.

Table 1: Accommodation utilization.

Cities	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Liverpool	70.8	70.4	67.2	68.3	71.8	74.3	78.7	80.7	72.5	78.2	76.2
Manchester	71.2	73.6	73.3	75.2	77.6	81.7	82.8	81.2	75.2	80.6	81.4
Glasgow	77.4	77.7	77.2	79.2	81.5	82.2	83.1	83.2	80.3	89.6	83.2
Leeds	71.1	72.1	72.3	77.1	77.8	78.7	77.8	76.2	74.5	75.4	76.2
Newcastle	73.9	74.6	72	72.4	75.8	72.8	72.4	72.4	75.2	74.65	76.8

4. Discussion

The tourist economic data from [37] is used for analyzing the proposed approach's performance. The visitor's economic data from 2010 to 2020 is used for analyzing the expenditure (by tourists) and its contribution to the country's economy. The economic improvement analysis accounts for the cities Liverpool, Manchester, Glasgow, Leeds, and Newcastle. In this analysis, the relationship between tourists and economic growth is discussed. This discussion is provided through an illustration in Figure 6. In this illustration, the analysis pursued and the output validations are provided.

Tourist expenses for travel, food, accommodation, and miscellaneous are one of the income sources for a country. This economic data is quarterly and yearly analyzed for its improvement and overall contribution. The lead for improvements is handled across varying environments with economic downfall and steep rises (Figure 6). Depending on this analysis, the observation for accommodation, food, and travel within the 5 cities (cumulative) is presented in Figure 7.

The contribution is analyzed using the aforementioned three factors. This depends on the popularity and economic affordability of the tourists in a country. It is seen that accommodation tops the list compared to the others; therefore, the downfall is observed due to the accommodation factor. This can be due to unavailability or fewer tourists' interests. The same factor is reflected in the accommodation utilization by the tourists, which is tabulated in Table 1.

The occupancy varies with the tourist interest and expenses, which in turn identifies the economic growth rate. The tourism contribution of Liverpool in 2012 was comparatively less than the other years. Contrarily, the contribution of Newcastle in the year 2017 economy is less compared to the other cities. Therefore, the variations for years (consecutive) and cities are influencing the growth factor. Based on the available data, the growth rate between the consecutive years is analyzed as presented in Figure 8.

The growth rate over the accounted cities varies based on the three considered factors. This is due to personalized recommendations, attractions, and economic factors. The data $(x, y)\forall(\tau(SxX_s))$, $(a(S, X_S))$, and $(\sigma(S, X_S))$ are used for validating the above cities based on the three factors. Considering the changes in $Z(.)$, the variations (steep rise/downfall) are recorded. This enables the estimation of estimating the $\partial a/\partial b$ over economic growth. Therefore, the data analysis relies on the above three for the various economic data fetched (Figure 8).

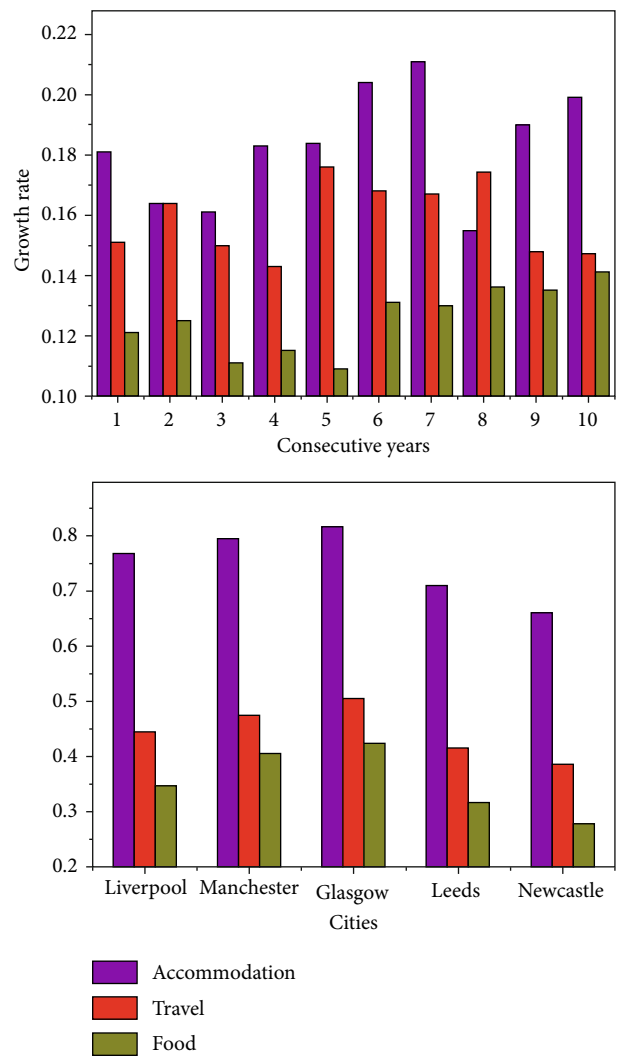

Figure 8: Growth rate (consecutive years).

4.1. Comparative Discussion. The comparative discussion is performed using improvement (%), contribution detection, data analysis (/Input), summary (/Input), and analysis time (min). The data inputs are varied between 100 and 1200 for 1 to 11 years. The existing DRL [34], PPO-RL [35], TEM-BPNN [27], ST-CNN [32], RNN [33], and TAR-DL + IoT [24] are used with the proposed ORDAA for analyzing the proposed approach performance.

4.2. Improvement. The tourist location is improved, and the downfall is lesser by using the ORDAA for generating

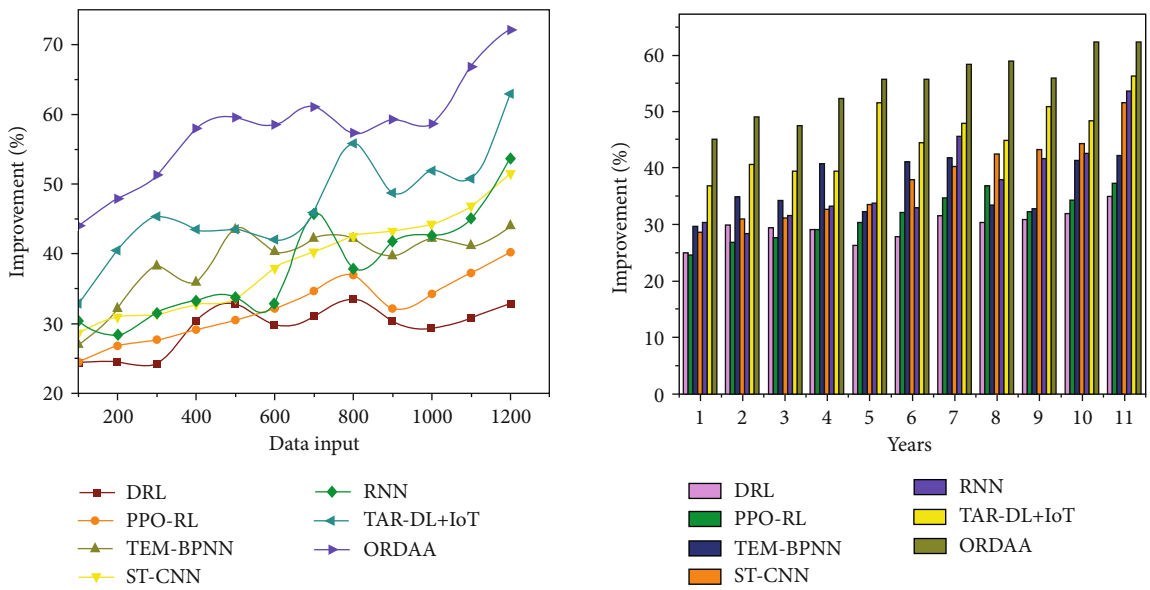

Figure 9: Improvement comparison.

precise guidance information. This information is two-faced, namely, summarized data for tourist guidance and summarized data for the country's economic development. The location data and the economic data are determined from the yearly visits by the tourists in the tourist location. Data features are improved by the optimization method from the output of the location and the economic data. Then, reinforcement learning is used to identify the relevance and the contribution. The downfall is reduced by providing precise guidance information and the entire data analysis of the tourist location. Besides, the guidance information that identifies low tourist summary or nonachievable development targets is separately identified. The identified targets are analyzed using reinforcement agents for economic growth improvements compared to the previous tourist densities. This improves the focus on rural tourism sights and economic contributions to an optimal level (Figure 9).

4.3. Contribution Detection. The contribution detection is high in this method by using the reinforcement learning approach. The contribution may occur due to the low tourist visits to the tourist location and the targets which cannot be attained. The targets are maintained by the learning approach to check with the upcoming targets. The focus on rural tourism sights and economic contributions to an optimal level is improved. Nonachievable development targets may lead to the contribution (downfall), and then, it is estimated by comparing the achieved targets with the previous visits by the tourist to the tourist location. The yearly visits of the tourist can enhance the vogue of the location data and expand the profitable growth. Reinforcement learning is used for producing precise information for tourist guidance which has the summarized data. This contribution is detected by the reinforcement learning from the output of the data features, which is extracted by the location and the economic data. The proper guidance information can improve the country's economic growth without any downfall (Figure 10).

4.4. Data Analysis. Data analysis is done high in this method by using the ORDAA. From the yearly visits of the tourists, the location data and the economic data can be estimated. From the output of the location data, the popularity and the guidance information can be calculated. It should contain the proper information about the place for the entire tourist location. From the output of the economic data, the growth and the target can be determined. The economic data helps in extracting the data features' information growth rate and the yearly target. This may help in enhancing the tourist visits to the place where the data analysis is given to the tourist to improve the country's economic rate. These are the data features extracted from the output of the location and the economic data. The relevance and contribution (downfall) data can be estimated using reinforcement learning. Data augmentation's steep rise and downfall are analyzed using reinforcement learning, wherein decision agents are precise for a relevant summary. The relevance is identified using associated development targets over varying years (Figure 11).

4.5. Data Summary. The data summary is high in this method with the help of the reinforcement learning approach. Rural tourism is a discussion-centric research field for analyzing its contribution to a country's economic growth. This field generates voluptuous data for tourists, expenditure, location, etc. analysis; the information increases over the years and the density of visiting tourists. This information is two-faced, namely, summarized data for tourist guidance and summarized data for the country's economic

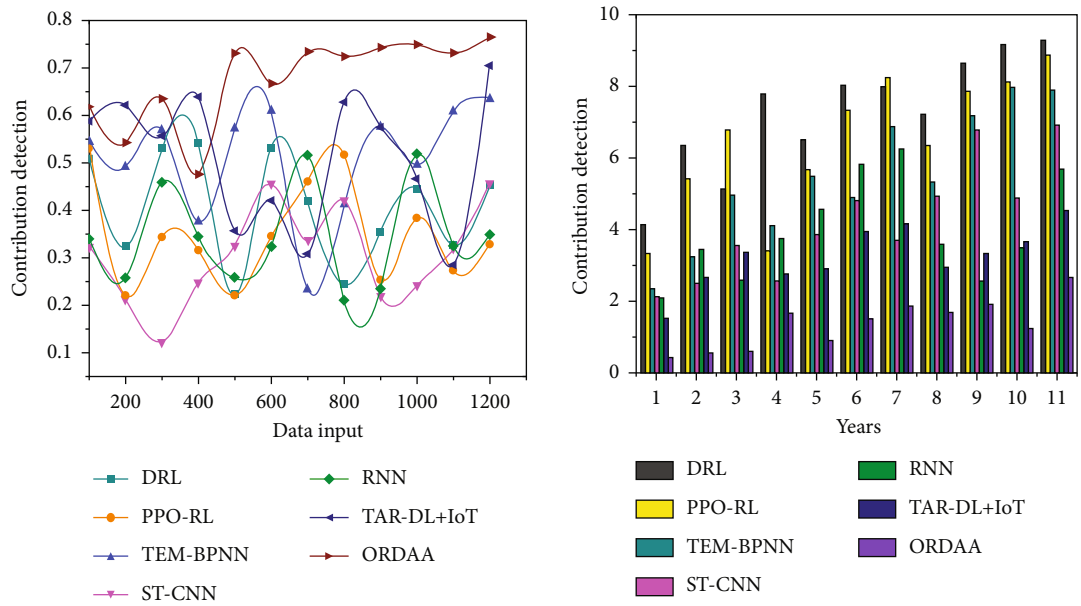

Figure 10: Contribution detection comparison.

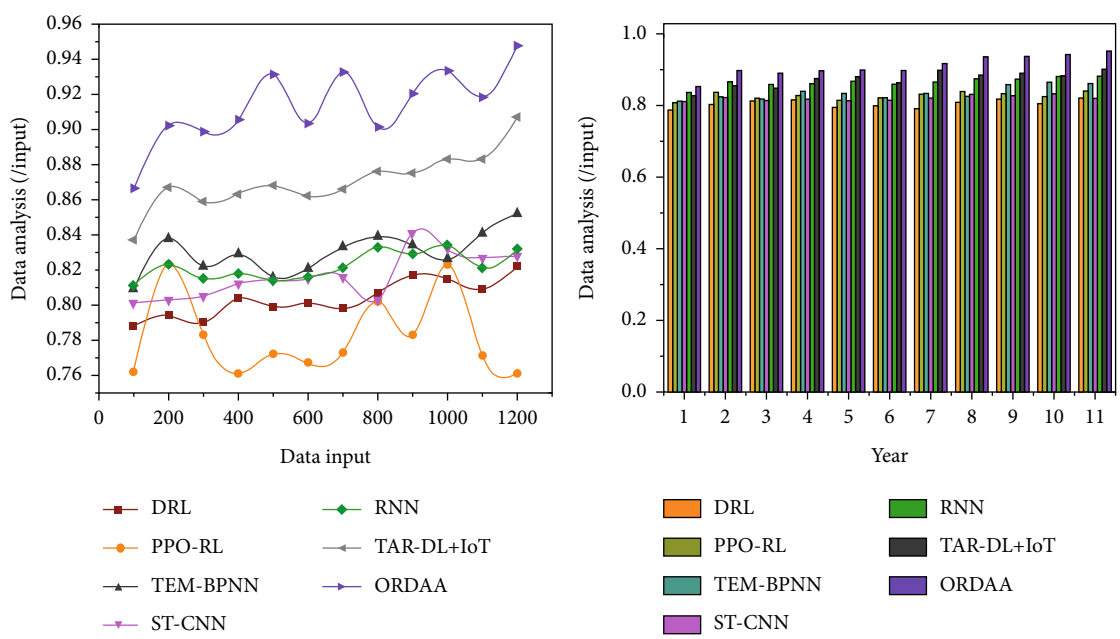

Figure 11: Data analysis comparison.

development. Data augmentation's steep rise and downfall are analyzed using reinforcement learning, wherein decision agents are precise for a relevant summary. The popularity data depends on the visits of the tourists yearly. The clear guidance of the location to the tourists may increase the tourists' population towards the destined location. This information in the summarized data for tourist guidance is to develop the country's economic growth rate. This may help in the enhancement of the economic growth rate and is also likely to increase the number of tourists to the tourist location (Figure 12).

4.6. Analysis Time. The time taken for analyzing is less by using the reinforcement learning approach (Figure 13). Guidance is the main thing that tourists ultimately require. It helps provide clear information about the tourist place where the visitors regularly visit yearly, so that it should be at the correct level of producing the data analysis for tourism. This may help in the enhancement of the economic growth rate and is also likely to increase the number of tourists to the tourist location. This can contain the entire data of the location and its information about the visiting tourists. The target can be achieved only by the proper amounts of

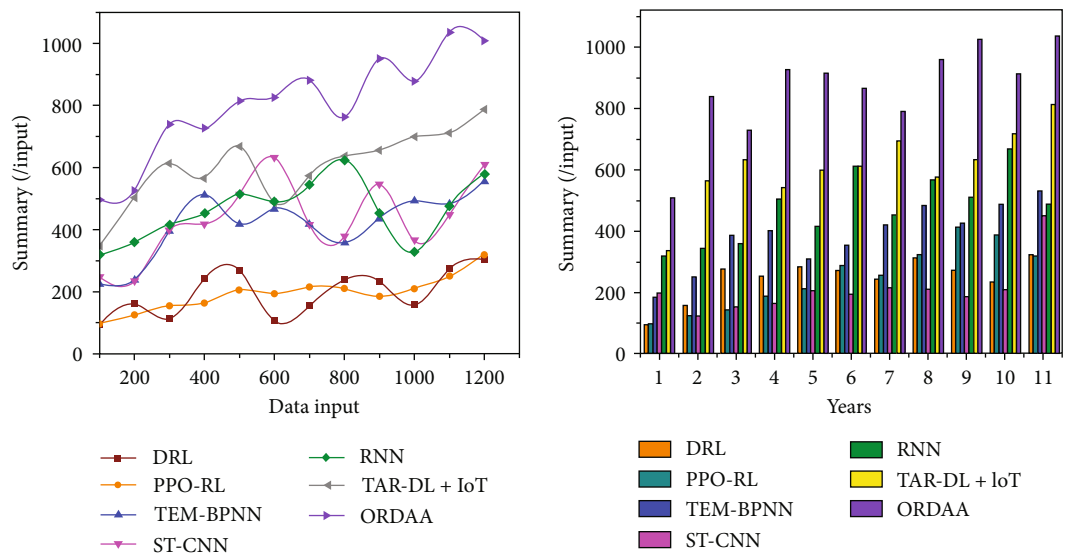

Figure 12: Data summary comparison.

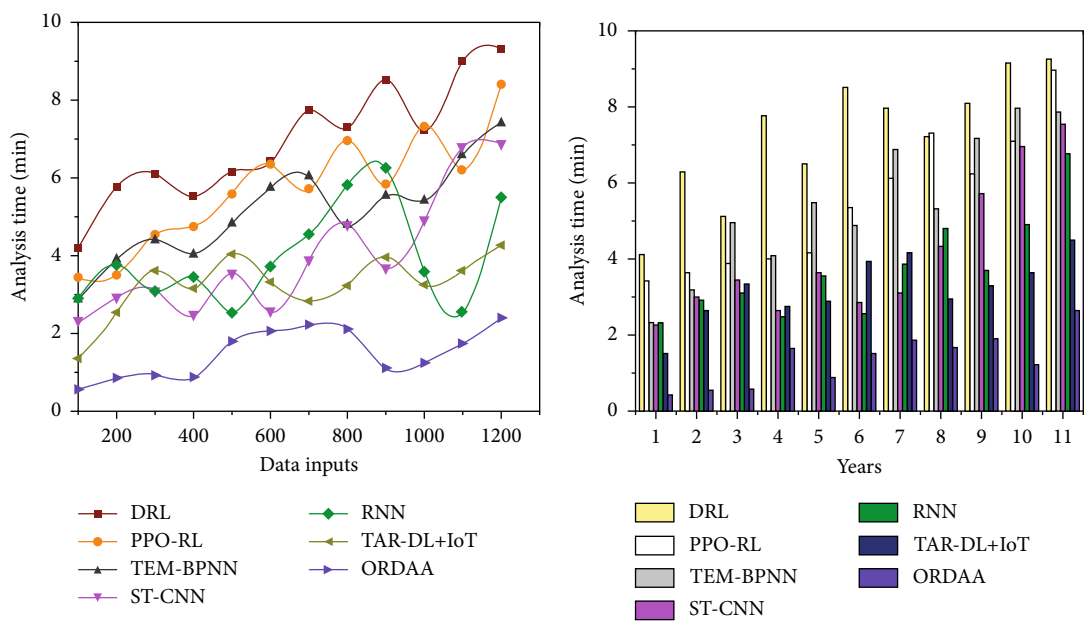

Figure 13: Analysis time comparison.

visitors visiting the tourist location. This can be achieved by the proper guidance provided to the visitors, which contains precise information about the location. The guidance ensures that it has the entire data analysis of the tourist location. ORDAA is used for generating precise guidance information to increase the target of the economical rate.

4.7. Error Rate. The error rate is the ratio of the model's predictions to the correct ones of the reinforcement algorithm used in proposed ORDAA method for economic growth improvement (Figure 14). It aids in disseminating accurate information about a popular tourist destination. Therefore, it should be sufficiently advanced to generate adequate tourism data analysis. This has the potential to raise the rate of economic growth and attract more visitors to the area. This may include all relevant information about the destination and its guests. Attracting the right number of tourists is essential for reaching the goal. As a result of the geographical and economic data output, the optimization approach enhances data attributes. In the next step, reinforcement learning is utilized to determine what specifically is important and what specifically is contributing. Providing precise advice information and a comprehensive examination of the tourist destination might help mitigate this problem. In addition, we isolate the advice that highlights unreachable development goals or a weak tourist overview.

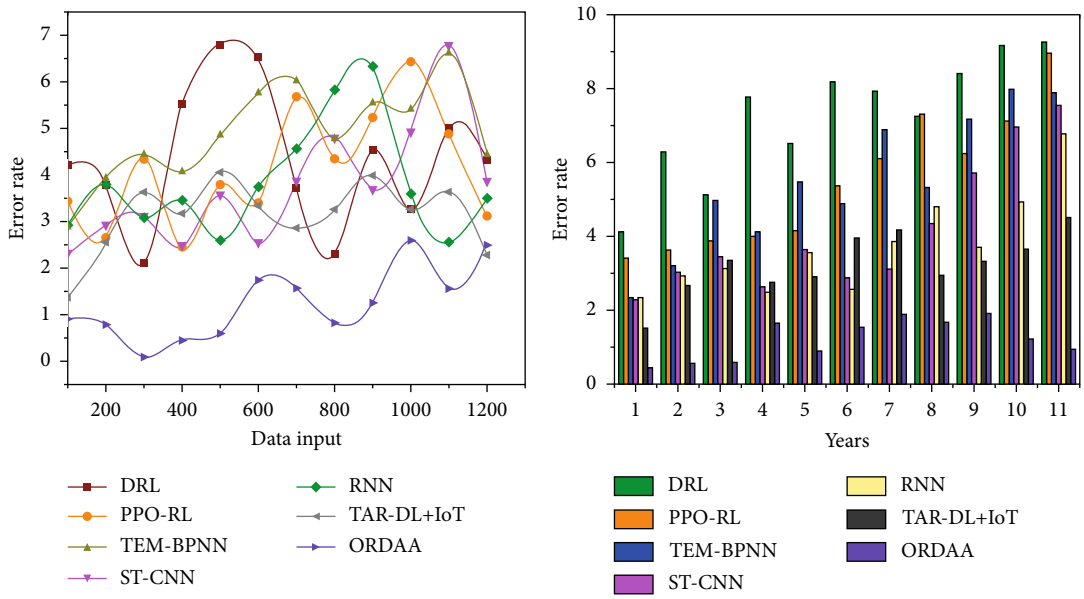

Figure 14: Error rate of ORDAA.

Table 2: Comparative analysis results for data inputs.

Metrics	DRL	PPO-RL	TEM-BPNN	ST-CNN	RNN	TAR-DL + IoT	ORDAA
Improvement (%)	32.68	39.45	43.94	46.34	53.45	52.87	62.126
Contribution detection	0.563	0.593	0.635	0.689	0.699	0.705	0.7659
Data analysis (/Input)	0.832	0.878	0.852	0.874	0.893	0.907	0.9476
Summary (/Input)	316	425	556	612	702	787	1008
Analysis time (min)	9.42	8.43	7.43	6.28	5.93	4.28	2.414

Findings: the proposed ORDAA maximizes improvement, contribution detection, data analysis, and summary by 9.46%, 13.49%, 8.73%, and 7.58%, respectively. It reduces the analysis time by 10.93%.

Table 3: Comparative analysis results for years.

Metrics	DRL	PPO-RL	TEM-BPNN	ST-CNN	RNN	TAR-DL + IoT	ORDAA
Improvement (%)	34.9	36.78	42.26	46.46	51.43	56.35	62.264
Contribution detection	0.568	0.562	0.631	0.676	0.694	0.705	0.7677
Data analysis (/Input)	0.822	0.873	0.863	0.876	0.869	0.903	0.953
Summary (/Input)	326	452	532	456	547	815	1039
Analysis time (min)	9.26	8.37	7.89	5.68	4.13	4.51	2.665

Findings: the proposed ORDAA maximizes improvement, contribution detection, data analysis, and summary by 8.88%, 13.3%, 9.03%, and 7.73%, respectively. It reduces the analysis time by 10.51% and reduced error rate.

The data analyzing time and the detection of the contribution are less in this method by using reinforcement learning (Figure 13). In Tables 2 and 3, the comparative analysis results are summarized.

5. Conclusion

For identifying the contribution of tourism to a country's economic growth, this article introduced an optimized reinforcement data analysis approach. The proposed approach accumulates economic, expenditure, and location popularity data for computing the economic stats and their contribution. In this analysis, reinforcement learning is employed for selecting guidance information. This information is obtained from the tourists to provide a relevance-based summary of developments. In particular, the consecutive growth and fall factors are identified from the analyzed data with precise target agents. The target agents in the learning process are responsible for identifying the downfall or economic impacts of the varying tourist densities and years. The least tourist density, contribution, and growth rate are independently handled using the location's popularity and

personal interests. Therefore, the improvement rate is handled using comparative growth analysis such that the previous visits and similar data assessments are parted in the learning. These features maximize improvement, contribution detection, data analysis, and summary by 9.46%, 13.49%, 8.73%, and 7.58%, respectively. It reduces the analysis time by 10.93%.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

It is declared by the author that this article is free of conflict of interest.

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