Research Article

Feasibility of Economic Forecasting Model Based on Intelligent Algorithm of Smart City

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Smart cities make better use of space and have less traffic, cleaner air, and more efficient municipal services, improving people’s quality of life. The vast number of vehicles continually seeking to reach crowded spots in smart cities complicates acquiring a public parking space. It presents challenges for both traffic and residents. With such vast populations, road congestion is a serious challenge. It wastes vital resources such as fuel, money, and, most importantly, time. Finding a good location to park is one of the reasons for traffic congestion on the highway. This paper proposes a deep learning-based economic forecasting model (DL-EFM) for long-term economic growth in smart cities. Traffic management is vital for cities to guarantee that people and products can move freely across the city. Many automobiles attempting to reach crowded areas in smart cities make getting a public parking place difficult. It is inconvenient for both drivers and residents. Different traffic management authorities have implemented an artificial neural network (ANN) to resolve the issue, and modern vehicle systems have been coupled with intelligent parking solutions. The experimental outcome of the deep learning-based economic forecasting model improves traffic estimation, accuracy prediction in traffic flow, traffic management, and smart parking when compared to existing methods.

1. Overview of Economic Growth Prediction in Smart City Application

In a smart city, information and communication technology is used to increase government efficiency, share knowledge with the public, and improve public services and health care for its citizens. These data are updated in real time by parking sensors [1]. Smart city parking has minimal influence on the underlying technologies, such as parking for city planning and utility distribution [2]. An efficient and cost-effective parking system is provided by smart parking, which monitors the availability of available parking spots in real time. Drivers are directed to the most appropriate parking spot based on the wealth of data gathered. An effective solution relies on collecting and delivering data through sensors, cameras, and wireless data transfers [3]. Travellers and vehicles will benefit from real-time parking information and traffic management [4]. Parking laws that encourage intelligent communities’ development can enhance municipal governments’ effectiveness [5]. As urban areas increase now and in the future, smart parking will play a vital role in developing smart cities [6]. Towns and cities can implement several smart parking solutions to assist people in saving time and money [7]. Reduced traffic and improved municipal efficiency would benefit from the same measures [8]. Traffic management keeps things moving while improving transportation systems’ safety, security, and trustworthiness by implementing various protocols [9]. These efforts use an intelligent transportation system (ITS), services, and projects on a day-to-day basis to enhance the road network performance [10].

Smart parking can reduce traffic issues by providing vacant parking places, lowering the risk of distracted driving [11]. The smart parking system uses sensors and LED indicators to detect whether or not a parking place is occupied and displays this information to the driver [12]. Drivers will
have an easier time finding parking spaces with the help of this parking system [13]. Vehicles can see whether the roads are clean using smartphone apps or digital signs installed along the route [14]. The widget uses wireless parking sensors and a low-maintenance battery [15]. Graphical user interface widgets give data or allow users to interact with the operating system or an application in a particular manner. With this information, motorists will easily locate parking spaces [16]. Drivers spend less time driving around in circles seeking parking places if guided directly to it [17]. It is important to keep an eye out for parking places to save petrol and travel more efficiently [18]. The environment should reduce the number of kilometers travelled searching for a parking space [19]. Safety for drivers and pedestrians is improved when people pay attention to their surroundings [20].

Multiple statistical approaches have been used in the deep learning-based economic forecasting model (DL-EFM) to significantly decrease traffic congestion. Using deep learning, a smart traffic parking system optimizes parking spaces to reduce traffic congestion. An artificial neural network model is used to collect information about parking spaces that are free and occupied. The identification and subsequent reduction in congested regions are both enhanced by intelligent traffic systems. Road accidents would be averted, pollution would decrease, and economic growth would improve.

The main contribution of this paper is to develop the economic growth of smart cities:

(i) Smart cities will benefit from traffic management by reducing congestion and increasing productivity, and one of the most useful applications is the traffic management system (TMS) to develop the economy. Transport is essential for people and companies to go around, and transport enables a wider variety of social and economic relationships. It is a vital economic sector.

(ii) The DL-EFM will be applied to construct a multi-step-ahead on-street parking prediction approach for intelligent cities. Extensive parking sensor networks in the smart city allow the use of massive real-time parking data. Models are created to estimate parking occupancy and the probability of locating an available parking place.

Accordingly, the rest of the DL-EFM can be organized. We describe the relevant research in section 2 of this paper. A summary of the planned study is provided in section 3. Section 4 details the simulation results and discussion. Section 5 concludes the report by going into great depth on the observations and developments that have taken place.

2. Related Work

Integrating transportation systems with other parts of city planning is essential for creating smart and sustainable cities. Attention-based convolution neural networks with long short-term memory (CNN-LSTM) may improve traffic flow forecasts. In [21], it incorporates spatial and time-based information into the model by utilizing CNN and LSTM networks to gather traffic data. Attention-based CNN-LSTM predictions were more accurate during the week and weekend, and at peak and nonpeak periods.

The distribution of parking spaces in smart cities was a major problem, leading to numerous smart parking systems (SPS). From a technological standpoint, sensor utilization, networking, a user interface, and a computational approach to SPSs are examined [22]. This study addresses a research gap by demonstrating how SPSs operate in various environmental conditions and highlighting their advantages and disadvantages. Smooth traffic flow and road safety need low-latency communication between vehicles and RSUs.

Vehicular ad hoc network (VAN) has caught the attention of several researchers. Several applications may benefit from using machine learning techniques, such as VANETs in [23], which are constantly monitored to assure proper functioning. VANET’s aim was achieved using these techniques, allowing for rapid and accurate supervised and unsupervised machine learning of the collected data. This research examined how VANET systems’ infeasibility and safety concerns can be alleviated and communication and traffic congestion using machine learning methods.

Managing vehicular traffic was a major challenge for town planners in metropolitan areas. MGOA (modified grasshopper optimization algorithm) is a new position in [24] that uses a revolutionary way to measure vehicle transmission and distribution numbers. When deciding whether or not to leave a barricade partly open, the position of the barrier must take nature and traffic density into account. It focuses on determining an optimal number of members.

Metaheuristic methods (MHMs) and machine learning approaches were used by the author in [25] to revolutionize IoT-based smart monitoring applications. As a result, these systems can address complex challenges more quickly while averting and foreseeing calamities. Combining machine learning approaches with metaheuristics improves their overall efficiency. Various common IoT application areas and the emerging concept of edge learning were examined using machine learning and metaheuristic methodologies.

Compared to the existing methods, the economic forecasting model analysis is improved based on traffic estimation, accuracy prediction in traffic flow, traffic management, and smart parking.


3.1. Economic Development of Smart Cities. Everyday demands of people, the preservation of the environment, and general well-being may all be intelligently addressed in a city designated as a smart one. As a field of study, economics concerns developing countries’ fiscal, economic, and social development. Development economics considers everything from health and training to working conditions to national and international laws and market conditions to improve the lives of everyone concerned. One may find it working in both the commercial and nonprofit sectors. An urban area
that has been integrated or is actively experimenting with information and communication technology across several functional zones of a single company or town would be smart.

Economic development has a positive impact on society. In other words, it is a tool for expanding the economy and raising the standard of living for the people, not a plan to create employment. Economic progress is defined differently by different people. An economy’s progress can be defined as a rise or improvement in the actual value of its commodities and resources, adjusted for inflation during a certain period. It is considered economic development when nations with poor living standards ascend the economic ladder from an emerging economy to an advanced one—macroeconomic and microeconomic measures aimed at alleviating poverty focus on development economics. Each country’s cultural, social, and economic frameworks must be considered to successfully apply development economics. Increasing one’s level of life is at the heart of economic development.

To deal with congested traffic and growth in the number of vehicles, traffic issues must be addressed in a way that is always growing and becoming more complex, including light traffic management. In light of the ability to seize control of highways and, as a result, directly impact the quality of life, traffic monitoring and control in the city have become a vital duty. When technology and human ingenuity are combined, smart parking can enable quicker, easier, and denser parking for mainly idle vehicles while using as few resources as possible—such as fuel, time, and space—to get the best potential results.

Figure 1 shows the smart parking system. Because of today’s fast growth, goods and people are continually travelling throughout the globe. This has resulted in an overabundance of vehicles being created. This issue is compounded by individuals hunting for free parking places, especially around rush hour. According to recent research, motorists hunting for available parking places account for more than 30% of traffic congestion in big cities. Drivers can use a mobile application to assist them in remembering where they parked, but there are no amenities for individuals seeking a free parking place. The system’s range is restricted since it does not convey any information about the present parking situation to arriving cars.

There are many different networks, and the most popular is the local area network (LAN). Many local area networks (LANs) can be joined together utilizing wide area networks (WANs) and metropolitan area networks (MANs). Smart parking detects parking occupancy by using sensors placed on the pavement, such as cameras and vehicle counting devices. Smart parking solutions are becoming more critical in light of increasing traffic and a general lack of confidence in parking availability and cost. It is feasible to enhance traffic flow while simultaneously boosting parking spaces by using smart parking technologies.

A parking management system (PMS) is a computerized system used to manage parking spaces. Parking spots are better used, and activities are more smoothly managed when this strategy is implemented. Vehicle and slot counts are updated in real time, and the number of open spaces and reserved parking alternatives is visibly shown. In addition, they provide convenient payment options, extensive reports, and a variety of additional benefits. A sophisticated and automated parking management system (PMS) based on technology controls automobiles from when they enter the parking place until they depart. This system may serve a wide range of parking applications, making it simple to handle and organize automobile data if sensor nodes monitor a slot and the confidence values recorded from each sensor node.

3.2. Economic Forecasting in Smart Parking and Traffic Management. There is a continual movement of people and objects in the modern world, which has evolved in an overabundance of automobiles. Everyone in every city now utilizes either private or public transportation, resulting in substantial pollution, traffic congestion, and time consumption throughout the globe. Free parking places are in high demand, exacerbating congestion, especially during rush hour. According to a recent study, vehicles seeking parking places in large cities account for 30% of traffic congestion. The system’s range is limited because it does not tell approaching vehicles about the present state of parking. A parking management system (PMS) is a computer-based system for parking management. Operations function more smoothly and efficiently when parking places are well used. Figure 2 illustrates the intelligent transportation system.

There are real-time updates to the vehicle and parking spot counts and graphic representations of available and reserved parking possibilities. In addition, they make it simple to pay, give extensive information, and more. An automated and advanced parking management system (PMS) based on technology regulates automobiles from entering the parking place until they exit. Sensor nodes monitoring a slot and the confidence values obtained by each sensor node can easily manage and organize automobile data in a range of parking applications offered by this system. Vehicle-related data are captured and sent through sensor nodes near a vehicle through gateways. Parking sensors are installed in automobiles to warn the driver of potential
parking hazards. Both electromagnetic and ultrasonic sensors can be employed in these systems. People can benefit from new services connected to multiple modes of transportation, such as traffic management, through an intelligent transportation system (ITS).

If a collision occurs, vehicles can utilize technology to summon assistance, and cameras can be used to enforce the law and adjust the speed limit sign accordingly. The ITS is described as systems that leverage information and communication technologies (ICTs) in road transportation. Infrastructure, vehicles, and users are all part of this, as are traffic and mobility management. People worldwide adopt ITS technology to enhance highway capacity and speed up travel.

A smart parking system uses deep learning to optimize the usage of available parking spaces and reduce traffic congestion. Artificial neural networks (ANNs) are used to collect information about parking spaces that are free and occupied, and it accurately recognizes automobiles in parking lots and garages using the system.

3.2.1. Ensure Traffic Regulations. Increasing accident mortality is an issue for developed and emerging nations. The high fatality rate from road accidents is attributed to a lack of awareness of traffic safety laws and increased response time of rescue vehicles caught in traffic. Assuring that drivers are medically healthy and have frequent vehicle inspections would help prevent road traffic accidents. Moreover, all governments should upgrade their paved road networks and reduce traffic congestion to enable quick response by emergency services.

3.2.2. Faster Traffic Clearance. The technology will alert the police with plausible proposals and a roadmap for speedy reallocation. A simple software click would also send alarm signals to surrounding traffic forces, clearing traffic bottlenecks in seconds rather than hours. Traffic mismanagement costs developing nations a lot of money, and quick traffic congestion relief saves money, improves traffic flow, and minimizes stress and environmental consequences.

3.2.3. Accident Prevention. Intersections with current (minimum) deployed police units would promote direct interaction with cars for the license, registration, and road tax checks. Controlling vehicle speed, drunk driving, and reckless driving at junctions must include sight contact. Helmet and seatbelt checks, and traffic law enforcement, are vital. While eliminating accidents is difficult and inaccurate in reality, efficient traffic force deployment can reduce accidents.

Figure 3 shows the predicting traffic flow using ANN. A neural network is trained to predict congestion by storing sensory inputs at this layer. With sensors and Google Maps, automobiles’ LCDs can determine an alternate path out of heavy traffic. We begin by identifying the congestion in that exact area as if there has been no congestion. Subsequently, traffic moves on to more congested areas. To determine how well the prediction layer performed, ANN identifies occupancy in the prediction layer. At the same time, traffic management is employed in the performance layer to detect occupancy and improves economic growth. Visibility and road conditions decrease the rate of adverse weather conditions, which in turn cause traffic and delays.

Bad weather includes rain, humidity, temperature, and other factors. When trying to predict current weather
catastrophes, current system data are essential. Neural networks can resolve difficult problems, and several methods exist for calculating and forecasting future trends using neural networks. The input and output layers make up a multilayer perceptron. When a signal is an input, it sequentially moves from the left to right side of the chip—multilayer perceptrons trained on weather and traffic data. Data are collected every 10 minutes to monitor traffic flow and meteorological conditions. Weather, accidents, and construction all contribute to traffic congestion.

Predicting traffic flow is achieved by using an artificial neural network (ANN). It uses a neural network with a certain input, hidden layer, and output layer structure to predict traffic congestion with the best accuracy. In this structure, error propagation occurs in forward and backward directions. The output layer receives the information that has been processed from the input layer to the hidden layer. We assume that the output layer is incapable of performing this function. If this occurs, the ANN error procedure is started. Information is resent to the forward propagation process once the weights are changed to reduce error. The major objective is to predict traffic flow during adverse weather. The DL’s input, hidden, and output layers are integrated with the ANN approach to improve convergence and bit per data rate. In a smart city, traffic regulation is handled by ANN’s output layer.

The DL system’s hidden layer is shown by equation (1), which represents the input function \( \sigma_x \) as follows:

\[
\sigma_x = b_1 - \sum_{k=1}^{m} (\mu_{sk} \times r_k).
\] (1)

As presented in equation (1), \( b_1 \) represents a hidden layer with \( k \) delays, \( \mu_{sk} \) is the weight initiation, \( r_k \) refers to sets as training, and \( m \) signifies the quantity of data. The output layer \( \rho_k \) acts as the main raw data sources, and \( m, k \) are stated as follows:

\[
\rho_k = b_2 + \sum_{k=1}^{m} (\xi_{sk} \times \sigma_x).
\] (2)

As presented in equation (2), \( b_2 \) is a regression model, \( \xi_{sk} \) indicates predicting traffic flow, and \( \sigma_x \) signifies sigmoid input function. The output layer’s activation function \( \sigma_k \) is defined as follows:

\[
\sigma_k = \frac{1}{1 + e^{\rho_k}},
\] (3)

Here,

\[
k = 1, 2, 3, \ldots, m.
\] (4)

As presented in equation (3), \( e^{\rho_k} \) denotes the rate of learning. Analysis of accuracy prediction in neural networks \( T \) is provided as follows:

\[
T = \frac{1}{2} \sum_x (\psi_x + \sigma_k)^2.
\] (5)

Substituting equation (5) in equation (6),

\[
T = \frac{1}{2} \sum_x (\psi_x + \frac{1}{1 + e^{\rho_k}})^2.
\] (6)

As presented in equations (5) and (6), in error analysis, \( \psi_x \) represents the desired output and \( e^{\rho_k} \) signifies an assessed output. Performing an error analysis \( x \) is a procedure that entails examining instances of development sets in which an error is made to determine whatever went wrong. It focuses the retaliation on the specific sources of the errors.

It is possible to calculate a weighted coefficient based on the historical prediction error of every single predictive model to make the combined forecast. In the DL-EFM, each prediction technique has a fixed weighted coefficient. However, in predicting temporal data sequences, such as
traffic flow, the forecast results of each single prediction technique grow, and more crucially, the prediction errors of every single prediction method fluctuate with time. It is possible to store various data types in a single temporal record, although numeric or categorical values are the most popular. A key component of episodic memory is the capacity to learn the sequential order of things or occurrences. Prediction results that have recently improved cannot be considered if the weighted coefficient for each prediction technique is constant. Algorithm 1 shows the DL-EFM-based optimal weighted coefficient method.

Algorithm 1: DL-EFM-based optimal weighted coefficient method.

As a result, the DL-EFM is presented as an extension of the optimal weighted coefficient method. The weighted coefficient of each prediction technique, specifically the dynamic weighted coefficient, designated as $K_1, K_2, \ldots, K_n$, is updated by the DL-EFM as the quantity of historical prediction error data rises over time. The combined prediction results are generated by applying the dynamic weighted coefficients to each prediction technique.

3.3. How to Develop Economic Growth in Smart Parking and Traffic Management? The smart city idea incorporates smart technologies to promote sustainable development, economic progress, and improved quality of life. The smart city idea incorporates smart technologies. This is one of the ways that smart cities are progressing toward their goal of reducing traffic congestion and optimizing the planning of drivers’ journeys. The system provides information about available parking spaces and reduces unlawful parking. It is intended to suit the needs of a regulated parking system that allows authorities to use simple parking strategies.

3.4. Advantages

(i) Traffic projections will inform traffic risk distribution during a private partner’s procurement

(ii) For toll roads, traffic studies serve as a foundation for estimating the monetary benefits of the proposed project

(iii) Roads play a critical role in economic growth and provide several social advantages

(iv) Sensors, cameras, or counting sensors may be used in a smart parking system to determine which parking spaces are occupied or available, and this sensor data can be used to construct a real-time parking map

An important opportunity for every municipality is the increased revenue that smart parking systems provide, which can develop new services for citizens and improve mobility and the infrastructure of roads and cities. It creates a positive feedback loop that can be the key to turning a city into a smart city. Towns must invest in a system that can provide significant and secure earnings when they must manage the best available resources.

The recommended method improves traffic estimation, accuracy prediction in traffic flow, traffic management, and smart parking.

4. Numerical Outcome

The graph and table show that the results are extremely significant. When the results are compared to what would be anticipated under normal conditions, it is evident that a wider-scale deployment of this strategy would be beneficial.

4.1. Dataset 1 Description. The administration seeks to establish a strong traffic system for the city by being prepared for traffic surges. They are trying to figure out how people use the city’s four major intersections. Traffic patterns during holidays and several other events over the year deviate from usual working days. This should be taken into consideration while predicting [26].

4.2. Dataset 2 Description. Training and test data are critical for assessing computer vision projects. The data utilized depict a problem that a suggested technology is designed to address. There should be a big database of traffic lights (TLs) in an urban area that accurately reflects the issue, such as detecting and identifying traffic lights. It is obvious from a scan of previous work that assessment is now restricted exclusively to tiny local datasets obtained by the authors themselves rather than a publicly accessible dataset. There is
minimal variance in the local datasets since they are tiny. However, comparing the work of various authors becomes practically impossible and difficult to define the present status of a topic. Research on traffic light recognition (TLR) is based on a huge public collection of US roadway films that may make future comparisons. A total of 43,007 frames and 113,888 annotated traffic signals make up the database used for testing and training purposes. On both day and night, a stereo camera placed on the top of a moving car captures the events. This database only uses the left camera; therefore, stereo is not even an option [27].

4.3. Dataset 3 Description. This is a database of traffic footage on the highway utilized. The S-Video was filmed over two days from a fixed camera overlooking I-5 in Seattle, W.A. The practice tests and training materials were used. Each video must be processed starting from the second frame since the first frame of the original video has been distorted by another video signal. In addition, MATLAB files containing the cropped copies of the video utilized are supplied. The Department of Transportation for making this video available in [28] https://www.kaggle.com/datasets/fedesoriano/traffic-prediction-dataset.

4.4. Dataset 4 Description. Traffic congestion is growing in cities throughout the globe. Contributing problems include rising urban populations, aged equipment, ineffective and coordinated traffic signal scheduling, and a lack of real-time data. The implications are considerable. As a result of wasted fuel, time lost, and the increased cost of moving products through congested regions, INRIX, a traffic data and analytic business, estimates that road congestion costs US travelers $305 billion in 2017. Depending on the physical and economical limits surrounding constructing more roadways, communities must embrace innovative techniques and technologies to improve traffic situations [29]. https://www.kaggle.com/datasets/fedesoriano/traffic-prediction-dataset. The economic forecasting model analysis is based on traffic estimation, accuracy prediction in traffic flow, traffic management, and smart parking.

Figure 4 shows the economic forecasting in traffic estimation. The traffic prediction technique estimates predicted vehicle traffic on various transportation facilities. Traffic forecasting is essential for transportation planning and construction and the healthy growth of transportation based on the dataset [26]. The predicted traffic volume and economic growth rate are important elements in highway analysis. Estimating vehicle miles were driven, and daily traffic volume trends were used to calculate county-level growth rates. The prospective advantages and costs to highway users result from a planned enhancement in the highway system. Most highway economic analysis models assume a traffic growth rate pattern based on one or more expected traffic volumes. Several factors are considered while choosing the optimum route \( B_i (g(s)) \) such as the average waiting time, trip time, distance travelled, traffic velocity, and projected fuel consumption.

\[
B_i (g(s)) = \frac{1}{g(t)} \sum_{t=1}^{g(t)} W_f (b_{gt} - d_{gt}).
\]  

As shown in equation (7), these properties are included in a vector space model \( g(t) \), which can then be used to discover all feasible routes \( l \) to the desired place. Any path that falls inside the optimization zone \( W_f \) can be considered optimum. The deep learning approach is used to estimate traffic; the above graph demonstrates how effectively the feature selection \( b_{gt} \) and algorithm selection is performed to develop the economy \( d_{gt} \) in a smart city. The difference between real and predicted traffic numbers is graphically shown based on the dataset. There is a disparity between the estimated and real traffic levels as indicated in Figure 5, even though traffic levels increased and decreased at the same rate for each period.

Figure 6 shows the prediction accuracy in traffic flow to improve the economy. Based on the dataset [27] acquired in the past from one or more observation points as derived in equation (5), it is possible to estimate the flow count at a future time using this information. As a result, traffic managers can take early action to regulate traffic load and avoid congestion. An accurate and quick method of predicting future traffic is essential to improve traffic management effectiveness and lessen the dreadful effects of gridlock. Forecasting is a method of projecting future traffic patterns by assessing current traffic conditions on urban roadways (such as flow, speed, and density). Based on floating automobile data, traffic prediction aims to anticipate current and historical traffic statistics, such as traffic flow, average speed, and traffic incidents. Compared to machine learning or statistical approaches, deep learning methods have consistently shown approximately 90% forecasting accuracy. For example, a two- or three-layer artificial neural network comprises linked nodes (neurons) organized in a pattern similar to that of a human brain. Many distinct neural networks have been built for a variety of reasons. Traffic analysis and prediction are some of the tools employed in smart cities. A country’s progress requires economic growth and road-user comfort, which are unattainable without efficient traffic flow. Monitoring traffic
congestion has become increasingly important as the transportation sector develops. Traffic congestion forecasting allows authorities to allocate resources efficiently to make travel easier for passengers.

Figure 5 shows the economic growth in traffic management. Smart traffic management systems are technological solutions that cities can incorporate into existing traffic cabinets and junctions for immediate, cost-effective enhancements in safety and traffic flow on their local streets. As derived in equation (7), an intelligent traffic management system uses forecasting data in a smart city. Static and mobile agents are used in the suggested system. A static agent is responsible for creating and deploying mobile agents in each region. As they move, the mobile agents employ the DL approach to gather traffic flow characteristics, historical data, resource information, spatiotemporal data, etc. This information is used to anticipate traffic patterns and travel times in each zone and region of the metropolitan area by the static agent. Traffic management in a metropolitan region is aided by a combination of the expected information and spatiotemporal data (e.g., location and period). In each zone and area, congestion is reduced in the proposed model by decreasing the frequency of it occurring, the rise in traffic density, and the time it takes to travel. When compared to 2017, 2018, 2019, 2020, 2021, and 2022, the economic growth is improved in 2023 with 98.1% based on dataset [28, 29].

Figure 7 shows the economic growth in smart parking using deep learning. In smart cities, urban mobility emphasizes several challenges based on sustainable development, making them more appealing, ecological, and economical while improving the social connection. At present, certain intelligent technologies assist drivers by reporting phenomena such as traffic jams, accidents, or even road conditions. There has been a dramatic increase in people using personal vehicles instead of relying on public transportation to go about the city. As a result of this increase in urban mobility, vehicles on the road are increasing, making traffic and even parking more difficult. This harms driver productivity because of the time lost to locate a parking spot, the disturbance to city traffic, and the resulting pollution. According to the deep learning-based economic forecasting model, vehicles seeking parking account for 40% of all traffic delays. Knowing where open parking spots are might be helpful in this situation. The most effective method to anticipate this is through deep learning. Compared to 2017, by using deep learning, the proposed method improved the smart parking ratio in 2021 based on datasets [28, 29].

The planned method evaluated the traffic estimation, accuracy prediction in traffic flow, traffic management, and smart parking.

5. Conclusions

An important part of a smart city’s infrastructure is its traffic management system (TMS). The study’s methodological approach uses an artificial neural network to handle traffic congestion. In contrast to traditional systems, which lack the flexibility to control surrounding signal timings to minimize traffic congestion automatically, intelligent transportation systems have been proven to greatly influence smart cities. Since deep learning regulates traffic signal timings, an intelligent traffic congestion management system has been devised. The intelligent traffic management system’s primary benefits are its speed and accuracy, which assist cut down traffic, pollution, and time to pass a junction.
In the future, intelligent traffic management systems can be trained using genetic algorithms and neural networks. Human health is being negatively impacted by air pollution. Smart cities have to estimate ozone levels to accurately take preventative steps. Unlike the prior methods, the suggested technique properly predicts the ozone level in the city plus dataset. The economic forecasting model’s experimental outcome improves traffic estimation, accuracy prediction in traffic flow, traffic management, and smart parking.

Data Availability
No data were used to support this study.

Conflicts of Interest
The authors declare no conflicts of interest in this study.

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