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COMPARATIVE STUDY ON MACHINE LEARNING AND DEEP LEARNING CONGESTION CONTROL TECHNIQUES IN VANET WITH REFERENCE TO INDIAN CITY

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Abstract: VANET (Vehicular Ad-Hoc Network) works through direct short-range communication(DSRC). It is a wireless protocol that exchanges data between nodes. (In VANET vehicles are considered a node). VANET is a dynamically converting self-organizing network. Network. Nowadays an increasing number of motor vehicles led to traffic congestion and the need for an Intelligent traffic management system. The integrated system for Intelligent Traffic Management System, Traffic Enforcement System, Surveillance System and Integrated Command and Control Centre under Smart City Initiative (Raipur Smart City). The system has the major components used in the Intelligent Traffic Management System. Author considered this survivallence system for implementation of framework for mitigating congestion control using real-time mobility model employing a combination of machine learning and deep learning methodologies in future. Literature Survey is conducted from 2008 to 2022. Machine learning and deep learning methods are identified and compared for traffic congestion control. A few causes are recognized for congestion and accidents also corresponding methods are listed and proposed by the author as a solution concerning Indian Cities.
Index terms: ITMS, VANET, Deep Learning, Machine Learning, CNN.

I. INTRODUCTION

Intelligent Traffic management system (ITMS) employed by the Raipur Smart city it is an adaptive Traffic Control System consisting of a vehicle detector digicam to detect and examine the vehicle count at all approaches of intersection and compute the required demand time for each phase of the signal system. Red Light Violation Detection System, Speed violation detection, false way detection through ANPR through automatic number plate recognition. The emergency call box system is a Panic Button system installed at specific locations in the city to enable citizens to establish two-way audio communication with Integrated Command and Control Centre. The Pan Tilt Zoom cameras, abbreviated as PTZ cameras are installed outdoors as per site requirements. These cameras provide a 360° view of the locations and are connected to Central Control Room for viewing and recording. The minimum video resolution is 1920 X 1080 and the frame rate of Min. 25 fps. These cameras have a minimum 100-meter IR distance for higher night vision monitoring. Taking into consideration the environmental conditions, the operating temperature of the cameras has a minimum temperature range of not less than 0 to 50°C. The Integrated Command and Control System are set up on the top floor of Multi-Level

Car Parking at Jaistamb Chowk in Raipur which provides a personalized view of the information received from edge equipment such as the Adaptive Traffic Control System, Traffic Enforcement System Surveillance System etc. The system provides real-time information on field activities. This system was implemented by Raipur Smart City (figure: 1). This paper focuses on traffic monitoring and accident avoidance that mainly occurs due to weather conditions sunny, rainy, and foggy weather conditions. Accidents due to road features such as potholes, and curve roads. Traffic congestion according to road type T, Y -junction, staggered junction, four arm junction, roundabout junction concerning Indian city Raipur. Still, some initiatives need to be taken for congestion control in the city. Based on the paper reviewed we provide a solution for traffic monitoring and collision avoidance. The Paper is organized as follows: [II] Literature Survey [III] Accidental Causes [IV] Methodologies [V]Tools [V]I Data Processing [VII] Result and Discussion [VIII] Conclusion.

II. LITERATURE SURVEY

[1] Wang.Z,et.al (2008) implemented Position based Clustering Technique to achieve stable cluster are reconfigured for moving nodes to know the traffic condition specifying the geographical position of the node. [2] M. Abuelela and S. Olariu. (2009) Proposed a Novel Probabilistic Automatic Incident detection technique using Bayesian theory to study the effect of lane changes on the probability of accident causes, detection rate and mean detection time can be calculated. [3] Knorr. E, et.al (2012) Periodic Beacon messages identify the velocity and position of messages that need minimum technical requirements for implementation. [4] Najada.H.et.al (2016) proposed the Lambda Architecture Model real-time traffic analysis for avoiding accidents it can predict congestion, accident, and clearing time. [5] Yan. H, et.al (2017) Mobile Crowd Sensing Architecture(MCS)Cloud assisted Mobile crowd sensing architecture uses large data procured from smartphones of drivers for traffic congestion control. The Fog-assisted architecture for VANET to avoid congestion during peak hours or emergency conditions number of new open research challenges are identified. [6] A. Ullah et.al (2018) Implemented Message Dissemination the prefetching, the RSU and these selected vehicles can act as the source of the data support efficient content prefetching. [7] Tolba. R et.al (2018) Trust-Based Distributed authentication (TDA) method, channel state routing protocol(CSRP) and DSRC-based V2V system congestion control validation and performance through vehicle-level testing adaptive joint rate-power control algorithm which lets vehicles adapt in a distributed manner using information. [8] Reinforcement learning-based Routing with Infrastructure Node Data Dissemination in Vehicular Network (RRIN) goals for low quit-to-quit conversation latency and an excessive data transport ratio. RRIN is a routing protocol that aims to acquire low cease-to-cease verbal exchange latency and an excessive data transport ratio. [9] The author proposes the region-based collaborative management scheme (RCMS) to consider the relationship between network connectivity and communication overlap jointly for maintaining the stability of network structure. [10] Real-time traffic distribution prediction protocol (TDPP) based on data gathered from travelling vehicles provides accurate traffic evaluation using wireless transceivers to evaluate traffic characteristics less bandwidth and time is needed as compared to other protocols.[11] spatiotemporal characteristic encoding with a multilayer neural network achieves promising detection accuracy and performance for traffic accident detection and meets the real-time detection requirement within the VANET

environment.[12] The proposed approach has succeeded to achieve high overall performance in terms of predicting rather congested areas over actual scenarios of street networks.[13] A Markov version is proposed to estimate the opportunity of channel availability for CR-enabled vehicular nodes the reliable estimation of the V2V communications is automatic with the usage of an Artificial Neural Network (ANN) model.[14] This paper first discussed the research demanding situations of IVN data processing after which proposed a new paradise for IVN information processing.[15] deep deterministic coverage gradient (DDPG) algorithm coordinates resource allocation in an energy-efficient scheme to reduce energy cost.[16] Vehicle-Consensus Routing Management Scheme (VCRMS) involves complete studies located demand for even higher overall performance in terms of delay and response time.[17] In the proposed device, the author first layout an intelligent and green vehicular communication framework, in which a DSRC-mobile hybrid communication is proposed.[18] The author proposed research investigating YOLOv2+CNN as the primary posture recognition model. It optimizes image-based posture recognition, and human skeleton recognition through object location [19] Augmented Reality Head-Up Display (AR-HUD) proposes fast deep learning-based object detection techniques for identifying road obstacle types also predicting complex traffic situations.

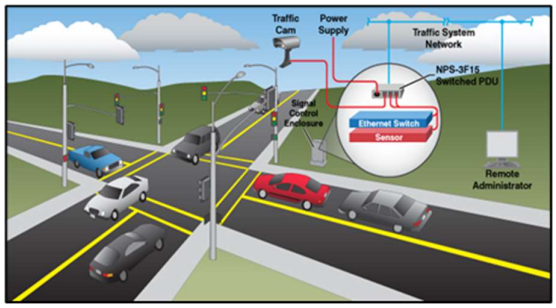

Figure 1: Intelligent Traffic Management System (Raipur Smart city)

III. ACCIDENTAL CAUSES

Based on review some accidental causes are given which may have led to traffic congestion some solutions are observed are as follows:

i)Potholes

M. Kumar et al. [20] Author uses GPS to locate potholes and accumulate the genuine region of the pothole, accelerometer readings can be taken in excel layout as a. Csv report layout. They are the usage of 3-axis accelerometer in gadget and Aurdino board for the computation of the readings. This device provides the circumstance of the roads alongside a selected place and exceptional areas. The data can be provided to the local authorities so that they can take respective measures. This paper is based on an application of mobile sensing and collecting information of road surface. Author developed the system and describe the required algorithms to sense the road anomalies by making a portable sensor that can be equipped in any car or public transport can be consider as system pothole detection system (PDS), it will use the mobility of the particular vehicle on which the system will be fitted, and side by side collect data from the vibrations and the GPS sensors, and further process and filter the data to monitor road surface condition. At first, Author deploy the PDS on their own vehicle and test it out in a particular sector of Noida. Using the machine learning approach, they were able to identify

and classify the potholes and other road anomalies from the accelerometer data. By non-stop testing and collecting statistics on a particular stretch of street capable of placing a set of rules that will successfully stumble on a pothole with a 4.3 % hazard of failure or if the pothole is simply too small to be detected. It became similarly performed a guide inspection of the said potholes and discovered that 80% of the street anomalies reported are in need of serious restore applied. The PDS machine on taxis going for walks along the roads. With help of the output indicators, the various street situations are detected. The potholes and different street anomalies are recognized by collecting facts.

ii)Curve road

P Ping et.al [21] This paper proposes an efficient pothole detection system using deep learning algorithms which might detect potholes on the road with only a camera attached to the dash of a car and an online connection. Four models are trained and tested with the preprocessed dataset, including YOLO V3, SSD, with SVM and Faster R- CNN. We select available data and then convert the labelled image file to the coach. Record which can be used as input by the models. All four models and size calculations of potholes are taken into account for more accurate detection results. Comparing the results of all four models, the YOLO V3 model performed best with an accuracy of 82%. the long-run work direction includes extending the detection object to broken drains and manhole covers and using images taken from moving vehicles.

Y He et.al [22] This algorithm consists of two modules: boundaries are first estimated supported by the intensity image and road areas are subsequently detected supported by the total color image. within the first module, a foothold image of the scene is analyzed to get the candidates for the left and right road borders and to delimit the world which will subsequently be wont to compute the mean and variance of the statistical distribution, assumed to be obeyed by the color components of road surfaces. The second module effectively extracts the road area and reinforces boundaries that almost all appropriately fit the road-extraction result. the mix of those modules can overcome basic problems because of inaccuracies in edge detection supported by the intensity image alone and thanks to the computational complexity of segmentation algorithms supported by colour images. Experimental results on real road scenes have substantiated the effectiveness of the proposed method.

iii)Intersection

A G Hosseinian and J Seitz [23] During this paper surveys on various intersection control methods for heterogeneous connected vehicles are considered. All kinds of intersection modelling, coordination architectures, and scheduling rules are okay to discuss. Signalized and semi-self-sufficient intersections are assessed with recognition of those parameters. The author concentrates on self-sustaining intersection control (AIM) and categorizes this phase based totally on four major desires concerning safety, and performance. Encompassing sensors, statistics management and sharing, preparing usual scheme, heterogeneous collaboration, automobile category, high-quality size, outside factors, intersection kinds, localization faults, communication anomalies and channel optimization, synchronization, automobile dynamics and version mismatch, version uncertainties, restoration, safety and privacy studied signalized, hybrid and self-reliant intersections with relevance numerous standards together with various intersection modelling, 3 scheduling rules, one in all a sort. They emphasized the self-reliant

intersections and investigated the relevant proposals in information in phrases of protection, and efficiency. Further explored IM attempts for VRUs united of the most vital road users with the purpose of interest on wheeled and motorized motors.
Also described numerous parameters that have a sway on the IM performance from the robustness and resiliency factors of view.

S. A. Rashid et al [24] This author proposes a unique framework as Reliability Aware Multi-Objective Optimization based VANETs Routing (RAMO). The framework consists of three stages: the first is the simulation of the VANET machine; the second is the routing criteria, based totally on reliability and geometrics; the examination is the routing set of rules. The framework consists of an optimization block that controls the parameters of every of the reliability, geometrical and routing blocks. This has been certain as Enhanced Gaussian Mutation Harmony Searching (EGMHS), which incorporates Gaussian mutation, goal decomposition and a harmony reminiscence extraction algorithm. The evaluation achieved supported ranges. The metrics received, which have set coverage, delta metric, hyper-volume, packet0 transport ratio (PDR) and quit-to-stop (E2E) postpone, demonstrate the prevalence over the baseline The urban model is simulated as a collection of junctions, whereby each junction combines four connected roads. The roads run east-west and north-south. Each road has two directions and a traffic sign for synchronizing the vehicle movements on the road. Also, the traffic sign uses two systems. First, one sign is green at a particular time and also the remainder is red. Hence, exiting vehicles can take one in every of three directions, forward, right or left, about the road. within the second system, two signs are green at just once and therefore the vehicles can move or be left about the road movement (Future work will expand to encompass a 3-D routing optimization, additionally to a 2D-based routing optimization.

IV] METHODOLOGIES:

Based on the paper reviewed comparative study is done on methodologies as follows:

Deep Learning				
	Author	Methodology	Work Done	Performance
Q-Learning	M. A. Hossain et al. [25]	Faster Convergence of Q-Learning in Cognitive Radio-VANET	The framework uses teacher-student transfer learning approach which accelerate the learning of the vehicles for the energy-efficient and real-life VANET implementation	The proposed method provides reliable learning to the vehicles in very dynamic environments with reduced delay and network overhead
	S Y Jang et.al [26]	context-aware trust estimation scheme (CARES)	In context-aware trust estimation scheme that supports real-time, reliable crowd sensing services in public vehicular edge networks where many unknown vehicles exist	Method that maximize the detection accuracy of malicious vehicles using time difference-based Q-learning. CARES-B take less time to achieve higher accuracy
	Zhao et.al [27]	cOllaborative vehiClE dAta correction approach (OCEAN	based on rationality and Q-Learning to know strategies to accurate the error V2X information for ensuring the riding protection of vehicles on the street	The Q-learning set of rules is used to examine the riding behavior of the car and to test and accurate the acquired Basic Safety Message(BSM)
YOLO	Rahman et al [28]	YOLOv5	implemented in the street for real-time traffic detection which can be used for traffic control and data collection	To improve the performance and robustness of method they tried to incorporate dataset modification by adding night images from different view angles, got better

				results as compared to other method.
	H Khan et.al [29]	YOLOV3	The proposed system utilizes single image processing via neural network and You Only Look Once (YOLOv3) framework to establish traffic clearance on the signal.	Vehicle counts had been well matched with the actual automobile count and proposed approach apprehended a median accuracy of 81.1%
Deep Learning	C Chen et.al [30]	DEEPSORT	Deep SORT (Deep Simple Online and Real-time Tracking) algorithm is optimized by retraining the feature extractor for multi-object vehicle tracking for real-time vehicle tracking counter for vehicles that combines the vehicle detection and vehicle tracking algorithms to realize the detection of traffic flow	The test results indicate that model can efficiently detect the traffic flow with an average processing speed of 37.9 FPS (frames per second) and an average accuracy of 92.0% on the edge device
	L Zhao et .al [31]	GAN-VEEP	GAN is used to train an excessive-precision vehicle position prediction model to forecast the riding role of vehicle at road	This approach improves the accuracy of the prediction version for vehicle trajectory prediction. AN-VEEP reveals better effectiveness in phrases of the Average

				Accuracy, Mean Absolute Error, and Root Mean Squared Error
Machine Learning				
	S. S. Sepasgozar, S. Pierre 2022[32]	RF-GRU-NTP (Random Forest- Gated Recurrent Unit- Network Traffic Prediction algorithm)	Implemented network traffic flow considering road traffic flow, by combining machine learning and deep learning algorithms, combined V2V and V2R datasets, and used the RF algorithm for feature selection by implementing the proposed RF-GRU-NTP model	the proposed RF-GRU-NTP model predicted network traffic this is the first research that predicts the network traffic flow based on road traffic flow
	L Zhang et.al [33]	RF-CGASVR (Random Forest -Genetic Algorithm, Support Vector Regression)	The experiments conducted in this study confirm the performance of the proposed method with real-world traffic flow data	The proposed RF-CGASVR method provides efficient forecasting performance than the other tested methods for short term traffic flow forecasting
Clustering	J Cheng et.al [34]	Dynamic Clustering prediction based model	To realize stable communications among vehicle nodes dynamic clustering model-based routing method is used	This routing method can achieve lower end-to-end latency and higher delivery rate than the greedy perimeter stateless routing and modified distributed and mobility-adaptive clustering-based methods.

	P Sewalkar and J Seitz [35]	Multi-Channel Clustering-based Congestion Control (MC-COCO4V2P) algorithm	Novel Multi-Channel Clustering-based Congestion Control (MC-COCO4V2P) algorithm for vehicle to infrastructure network congestion mitigation	The proposed clustering technique significantly improves vehicle CBP (Channel Busy Percentage) and reduces average power utilization

Machine Learning				
	Author	**Methodology**	**Work done**	**Performance**
Clustering	Regin.R and Menkadevi.T[36]	density-based dynamic clustering (DBDC)	Average vehicle density is calculated on the basis of received high signal strength	Average delay is reduced to 18% using Vehicular Weighted clustering scheme
	Lin.K .et.al [37]	overlapping and hierarchical social clustering model (OHSC), social based localization algorithm (SBL)	Vehicles are classified into social cluster using Overlapping and Hierarchical Social Cluster. Social based Localization Cluster (SBL) algorithm main purpose to provide vehicle current location in local area and Localization prediction in global area.	SBL is implemented using OHSC which provides global location information based vehicle's location without GPS.
	Chaurasia.B (2019) [38]	Motion Parameters Based Cluster Medium Access (MPMAC) protocol	The proposed MPMAC protocol give adequate channels to dispersal of messages with upgraded throughput	Proposed protocol send safety messages efficiently which has better channel allocation with minimal overhead.
	Alkhalifa I.S[39]	Novel Segment based Safety message broadcasting in Cluster(NSSC), Adaptive Carrier Sense Multiple Access/Collision Avoidance (Ada-CSMA/CA) protocol	NSSC is mainly concentrated in three successive processes that are cluster formation, Collision Avoidance and Safety Message Broadcasting	NSSC enhances PDR and throughput up to 30% compared to the other techniques. NSSC method reduces duplicate data packet up to 50% as compared to the existing methods. Latency is major issue in safety message broadcasting which is decreased in NSSC method up to 55% compared to the TBED, EDGE and SCF methods.
	Pal.R et.al [40]	Regional Super Cluster based Optimum Channel Selection (RSCOC) technique	It allocates channel randomly and clustering based medium access protocol, also calculates optimum channel to using linear programming model.	proposed protocol outperforms the average delay is improved by 6%, 12% increase in packet delivery ratio and 21% increase in throughput and the PU collision is decreased by more than 50%.
	Wu. C et.al (2018) [41]	A reinforcement learning algorithm	The protocol is incorporated with a multi-hop records delivery virtualization scheme that works on the pinnacle of the transport layer and affords excessive performance for multi-hop end-to-end information transmissions	A multi-hop information conveyance virtualization is incorporated with the routing to guarantee a high throughput and low delay in multi-hop loss vehicular Situations

Machine Learning				
	Author	**Methodology**	**Work done**	**Performance**
Routing Protocol	Rajesh. M and Gnanasekar.J [42]	Path Observation Physical Routing Protocol (POPR)	The proposed routing protocol consists of relative distance with traffic density to forward the information in the direction to enhance physical forwarding among node and on the intersection.	outcomes show better performance of POPR in phrases of packet delivery ratio, path length and path length, vehicle density, packet size.
	Raw and Das [43]	Peripheral node based GEographic DIstance Routing (P-GEDIR), a position-based routing protocol that takes advantage of GEographic DIstance Routing (GEDIR)	P-GEDIR method is used to select the appropriate peripheral node to route data packet -GEDIR protocol selects the only peripheral node that is closest to the destination node as the next-hop node for forwarding packet from source to destination.	P-GEDIR gives better performance than GEDIR in terms of average number of successful hops and one-hop progress
Routing Protocol	Younes.M and Boukerche.A [44]	Efficient road Congestion DEtection protocol (ECODE)	Using multihop communication and Geocast principle identify road segment suffering traffic jams.	The proposed protocol provides efficient end-to-end communication delay and the bandwidth utilization. ECODE outperforms 50% more better as compared to COC and Street-smart in case of congestion detection at each road segment direction.

Machine Learning				
	Author	**Methodology**	**Work done**	**Performance**
Framework	Joshua.C and Varadarajan.V [45]	Firefly Algorithm-Optimized Link state routing protocol	Analysis and identify optimized weighted cost function	Provides improved QOS metrics such as PDR with resource utilization
	Chen. C et.al (2017) [46]	TRASONET	Provide information to connected vehicles about traffic status	Provide real-time data analytics and explores network techniques
	Teja.M. et.al (2020) [47]	Adaptive Traffic Light Control System	Priority based traffic management with the help of sensors	Reduced queue length and density
	Xiong.X et.al (2018) [48]	Chain of Road Traffic Incident (CRTI)	SVM for classifying leaving lane, Gaussian Mixture Makow model to classify accident and accident pattern	Prediction of collision as early warning to driver by CRTI data classification
	Yuan et.al (2020) [49]	RACE: Reinforced Cooperative Autonomous Vehicle Collision Avoidance	It enables vehicles to adapt changes according to traffic condition such as vehicles at intersections	Improved driver behavior and minimize the collision risk, it avoids collision 42 % average faster than POMDP
	Yousefi et.al (2020) [50]	VeriVANca, an actor-based framework	Time Rebeca is used to for transferring message among vehicles by using actor based programs	Modelling Warnging message transfer
	Yan .H, et.al [51]	Mobile Crowd Sensing Architecture(MCS)	Cloud assisted Mobile crowd sensing architecture uses large data procured from smartphones of drivers for traffic congestion control.	brief review on Qos and improvement in architecture
	Rath. M et.al (2018) [52]	Mobile agent based Improved traffic control system	Implemented framework uses mobile agent for congestion control	Provide improved congestion control and information system
	Najada.H.et.al and Mahgoub.I[53]	Linear Regression (LR) model Naive Bayes (NB) and Distributed Random Forest (DRF) classifiers	Find the real time average speed of vehicles and predicts accident and congestion	Speed, efficiency and high accuracy is optimized
	L Zheng et.al [54]	Architecture Analysis & Design Language (AADL)	Identify parameters required to handle the real time data	Need real time data model and high bandwidth
Framework	Karthikeyini. S and Shankar. S (2019) [55]	Cross-Layer Aware Optimization of TCP (CLAO-TCP) Distributed TDMA the	Attenuation in Line-Of-Sight (TSALOS) detect the path loss in advance to save the route failure and Distributed TDMA	Provide route identification by avoiding path loss Aim of the proposed framework CLAO-TCP supports all

		usage of Directional Antenna (DTDMA-DA)	using Directional Antenna (DTDMA-DA) for slot allocation without conflict to Quality of Service	varieties of traffic and predicts the failure in advance to prevent the direction loss.

Machine Learning				
	Author	**Methodology**	**Work Done**	**Performance**
Algorithm	Teherkhani. N and pierre [56]	Tabu search Algorithm	Heuristic technique is used to reduce communication channel	Performance is improved increased safety and reliability. Throughput is enhanced by 3.86 %
	Liu.T et.al [57]	V2I bandwidth allocation scheme under IEEE 802.11p protocol	Allow user to choose optimal route	It lowers the system cost
	Paranjothi et.al [58]	Statistical Network Tomography Algorithm	to allow vehicles to dynamically choose the least congested route and reduces the impact on bandwidth.	Improves correspondence execution by proactively directing vehicles to less loaded nodes and routing messages from purposes of congestion. To empower the utilization of messages to evaluate congestion
	Yao et.al [59]	a dynamic platoon dispersion model (DPDM), exhaustive optimization of phases (EOP)	The dynamic platoon dispersion model (DPDM) proposed platoon dispersion model based on real-time cross-section data, which predicts vehicle arrivals. Traffic detection environment and the dynamic platoon dispersion models make it possible for signal control system to have short-term prediction capability which contributes to a new generation of signal control which is the dynamic predictive signal control framework.	The EOP algorithm utilizes a full count strategy under limiting delay. EOP calculation to refresh timing plan continuously dependent on present moment anticipated traffic flow.

[V] TOOLS

[61] For machine learning techniques network simulator 2 (NS-2) was the most used, reaching 37.9% of the 198 articles citing the application of some sort of network simulator. NS-2 was followed by OMNET++ with 8.6%, MATLAB with 8.1%, and 7.1% for NS-3. Flexible, well-documented, and popular open-source frameworks such as Veins [28] enhanced the adoption of OMNET++, mainly for the simulation of V2X networks. It is noticeable that while NS-2 usage dropped 19.5% (41 to 33) since the first five years, OMNET++ adoption has increased. Figure 5 presents the main vehicle movement pattern originators employed by experimenters. The most used mobility simulators are SUMO (31.2%) and VanetMobiSim (11.8%). A high percentage (42.4%) of all simulation-based papers do not report the type of mobility (Figure 2). (1) For deep learning techniques computer vision tools are used OpenCV, Viso Suite, Tensor Flow CUDA, MATLAB, Keras, SimpleCV, BoofCV, CAFFE, OpenVINO, DeepFace, and YOLO.

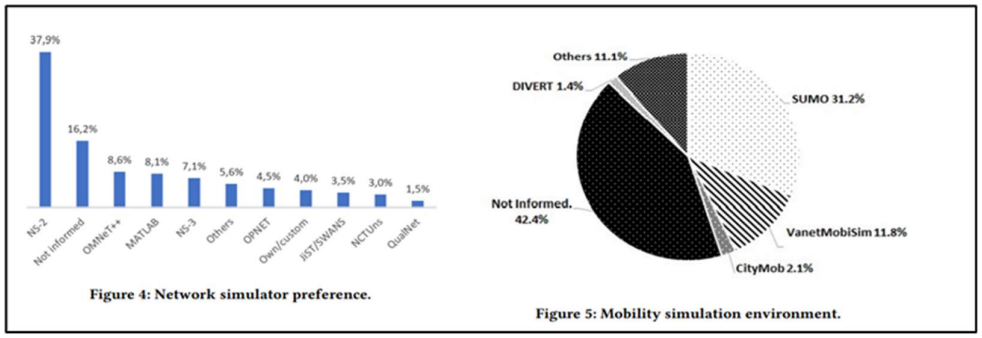

Figure 2: E R Cavalcanti et.al (2018) [61]

[VI] DATA PROCESSING

As data is available only in video format, we convert videos into frames for further research. Videos are taken from the Smart city of Raipur are in. NVF format. This NVF format is converted into .AVI with NV player (smart city Raipur application for video survivallence) then. AVI to. Mp4 format using Freemaker video converter application (Figure 3). Thus .MP4 format video file is converted into frames using OpenCV [62]. traffic flow and vehicle detection accuracy have improved, still, some initiative needs to be taken for training in real-time digital data concerning Indian cities as most of the cities are not equipped with roadside units and smart vehicles.

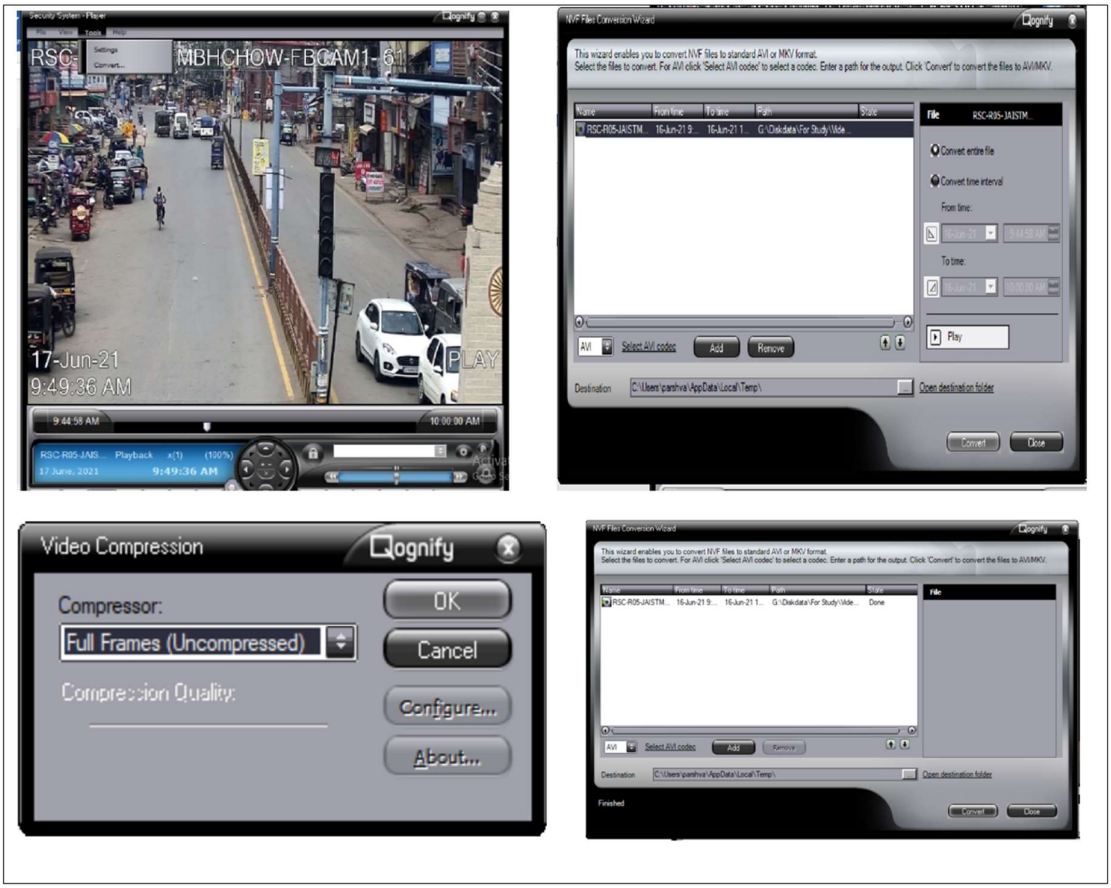

Figure 3: Data processing (Raipur Smart City)

[VII] RESULT AND DISCUSSION

The outcome of the survey is categorized into two parts based on machine learning and Deep Learning Using machine learning methods Average delay packet loss, packet delivery ratio, and energy efficiency these parameters are improved using various clustering Schemes, routing protocols and algorithms are used. Using Deep learning methods such as Q-learning, Deep sort, and yolo are used to predict the traffic flow and vehicle detection accuracy has improved, still, some initiative needs to be taken for training real-time digital data concerning Indian cities as most of the cities are not equipped with roadside units and smart vehicles.

[VIII]CONCLUSION

Based on the literature survey we conclude that a real-time mobility hybrid model is required employing a combination of machine learning and deep learning methodologies. ITMS at Raipur Smart City is survivallence system. In future author will implement framework for congestion control considering this ITMS.A dynamic machine learning framework is required which might decrease the correction distance in real-time response in future. Adjusting vehicle transmission ranges to hide the optimal number of vehicles that yields the very best reliability level. Predicting VANETs reliability using other machine learning methods to make more real-time IoV model fuzzy logic integration on the neural network design will implement improved performance within the lowest request-response delay in future. An initiative has to be taken to fetch data by testing cameras established at better altitudes having extensive and panoramic coverage to hide larger phases of the road on the thanks to additionally improve the accuracy of the results. Following research, aspects must be considered to incorporate real-time inference of road density, a deeper understanding of the speed and power adaptation mechanics for more innovative ways to manage the channel load in VANETs to realize a deeper understanding of why a neighborhood density prediction will investigate the advantages of dynamic resizing of the graph-lets supported the penetration rates of DSRC technology.

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