

# Traffic Pattern Analysis from Object Oriented Perspective



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**Abstract:** *The Knowledge representation is the extensively known and applied method for scrutinizing huge set of database in order to spring innovative information. Data extraction techniques are almost used in every field to retrieve the hidden information in order to reduce real world complexity. In this paper, the issues involved in traffic consequences are analyzed. The semantic net representation and inferences are used to highlight the density associated with each object. The characterized knowledge is taken to derive finest assertions using AND-OR-graphs. The assertions improve the intelligibility in accepting the prediction of traffic occurrence under different age group of people. The knowledge depiction techniques demonstrate the problem from objected oriented viewpoint which outlines the state and behavior of a thing directly related with the stated goal. Objectives are branded into sub goals based on the functionality allied within the object. The mandatory hypothesis needs to be framed and verified once the individual task is applied. In this paper, a case study of Traffic Pattern is gauged with the hazards associated with it.*

**Keywords:** Facts, Knowledge, Assertions

## I. INTRODUCTION:

The knowledge depiction of the tricky domain plays the vigorous role in guiding the resolution provider in right path. The flexible analysis in different aspects and centering the outcome over that acknowledged relationship among variables are extremely decisive. Statistical studies over the handling variables are highly reinforced through the appropriate illustration by extracted information. Clustering methods are suggestible if the problem integrates with diverse categories of handlers. The efficacy of the analyzing practices are depends only on the discernment of what the analyzer chooses [1-7] Mostly to handle bottleneck traffic situation in our country, which substantively affect our result and causes inconvenience to our growing population,

can be knocked out by following a reverse causation and time lag method[8]. The factors affecting congestion maybe in (I) diminutive size and (II) large scale [9].

The congestion comes under diminutive size and the large scale involve road usage. The mitigation measures first should involve identification of congestion [10]. Inter vehicle communication was introduced in order to reduce the condition. It is a concept for accessing advent time to the terminal through bottleneck condition. Traffic simulator like "NETSTREAM" is used [11].

Time distribution can diminish the catastrophic condition of gridlock [12]. Bottleneck condition can also be controlled by certain personal factors which each individual must take care of. This is possible through personal well defined flextime [13]. Due to the increased economy mostly all people own vehicle and this mainly causes a critical gridlock condition. Meanwhile, vehicle sharing can reduce these gridlock related problems [14]. It is mainly depended on land, where the land is of vast area the traffic is low comparatively on a narrowed land space. Real time mapping of traffic monitored in Beijing revealed purely on land area [15] [16] [17].

### 1.1 Existing Road Designs:

Different structures were already existed to demonstrate the patterns of roadways as per the demand of the respective cities. The most popular road designs are adopted almost in the area where vehicle density is huge. They are,

- Rectangular Design
- Block Design
- Circular Design
- Grid Design
- Hexagonal Design
- Minimum Travel Design

The most common merits and demerits are listed below to ensure the effectiveness of the road structure.

### Merits of Existing Road Design:

- Rectangular blocks can be divided into minor rectangular wedges for further construction. Highly suitable for the city roads and easy to maintain and extend the construction.
- Decreases the level of congestion at the prime blockage location.
- Alternate side cannot affect if traffic occur in one side.

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- Severe smashes essentially are eradicated as vehicles mobility in the forward direction.

### *De-Merits of Existing Road Design:*

- Not very much convenient because at the intersections between the vehicles.
- Intersections can be exclusively challenging for aged persons who are driving.
- Traffic lighting should be adequate to control the driving speed and time management.
- Assertions can be avoided in designing the road design.

### *1.2 Traffic toys:*

Each of the object type (vehicles) has its own behavior and state. The behavior of an object is centralized that is used for driving or the movement of persons or things from one place to another. The state of an object is defined as start, drive, wait and stop. The existence of the state for any type of vehicle is depends on the current human requirement. The behavior of an object is used to categorize the vehicle type as restricted and non-restricted vehicles. The non- restricted vehicles such as 2-wheelers, 3- wheelers and 4-wheelers are privileged to utilize the road facility incorporated with traffic regulations.

The restricted vehicles such as 6-wheelers, 12-wheelers and heavy load vehicles are constrained to use the public facility with the intention to avoid the interruption occur to the public. While driving, the frame of mind for the person (Osp) can change dynamically. The public may exhibit almost two extreme expressions.

- Highly spirited
- Low spirited

#### *a) High spirited:*

Whenever the driver is cheerful (E1), contented (E2), delightful (E3), ecstatic (E4), elated (E5), glad (E6), joyful (E7), peaceful (E8) and pleasant (E9). In all such conditions, he makes itself conscious about the regulations of the road. Out of total survey of travelling, only one-fourth of the people are happy.

#### *b) Low spirited:*

Whenever the person is sad (E10), angry (E11), pessimistic (E12), mournful (E13), sick at heart (E14), forlorn (E15), annoyed (E16), irritated (E17) and sullen (E18). In all such conditions, he makes himself unconscious about his surroundings. He loses his/her control over the road and can cause major disasters.

### *1.3 Knowledge Representation using Semantic Net:*

A semantic network is a knowledge base structure to represent semantic relations between the nodes denoted in the network. Each node has characterized by its properties and connected with the other node based on the relationship exist between them. The semantic net is

categorized into directed or undirected to epitomize the semantic relations among the nodes which are interconnected with each other. The basic to frame the semantic net is to decide the problem solving direction. This is considered to be a crucial functionality based on the following,

- Nature of the problem (P)
- Properties of rule set (PRs)
- Initial fact (IFi)
- Branching factor (BFi)

The Traffic condition is stated as

$$T_i = V_1 + V_2 + \dots + V_n$$

The instance of the occurrence ( $T_i$ ) of the traffic condition depends on the mobility of the vehicle ( $V_1$  to  $n$ ) in a specific period of time  $t$ .

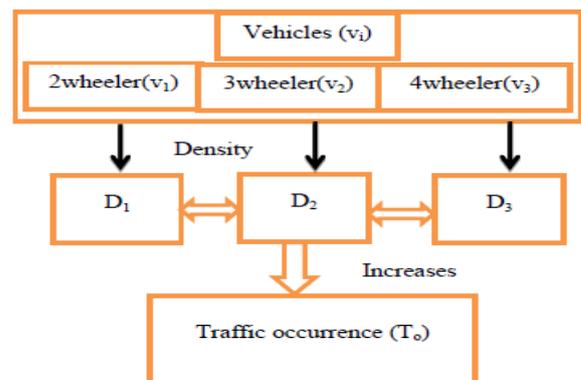
$$p(T_i) = D_1 + D_2 + \dots + D_n$$

where, the traffic occurrence happens only if sum of total density reaches the maximum and overflow condition arises.

Due to the growth emerges in all the sectors are rising the demand to use the own vehicle. Disambiguation occurs when a volume of traffic or modal split generates demand for space greater than the available street capacity; the point is commonly termed 'SATURATION'. The external factors force the human or to lead a sophisticated life every individual likes to own a vehicle. This behavior of the individual human results in increasing number of vehicles. When there is an increase in all types of vehicle object, the density increases that causes over flowing the maximum capacity to the specific road path.

#### *c) Inference:*

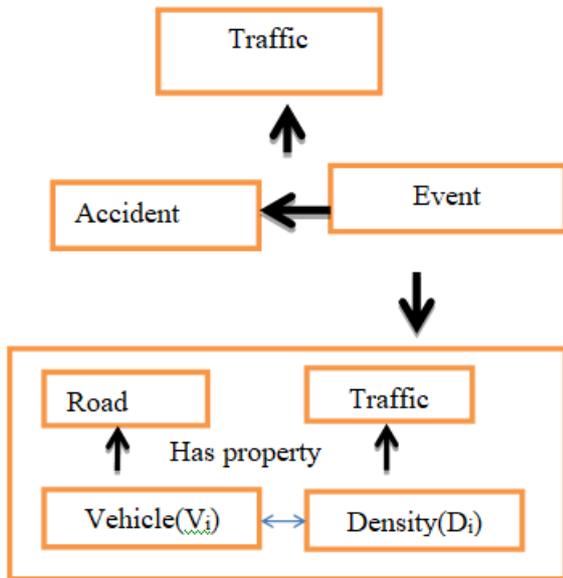
The lines established between the nodes ( $N_i$ ) represents the relationships( $R_i$ ) exist between them. The hidden inferences are extracted through intersection search or inheritance technique.



**Fig : 1Schematic of Traffic Pattern**

d) **Semantic Net Partition**

The constructed Semantic Net is decomposed into various regions called as spaces. Each spaces can consists of groups of nodes and arcs and denoted as partitioned network.



1.4 Knowledge Representation using AND –OR Graph

Basically, the real world problems are defined with one or more major goals. Due to the huge complexity, the goals are decomposed into sub goals with specific objective. The problems are analyzed in terms of modular part named as objects which explains the detailed behavior and functionality associated with it.

a) **Initial Fact:**

FACTS	REPRESENTATOIN
Object is a Vehicle	English Representation
Vehicle(object)	Logical Representation
Vehicle(x) has wheels(x)	Formal Logical Representation
Has wheels(object)	Deductive Mechanism
Vehicle has wheels	General statement using backward mapping.

b) **Proposed Fact:**

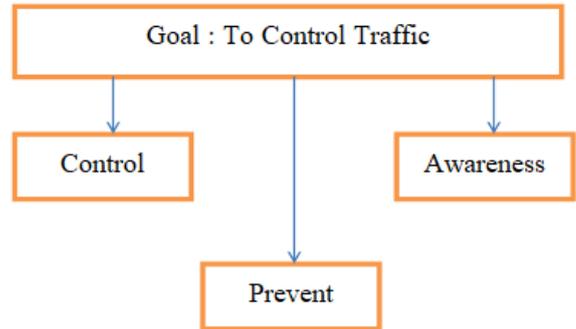
FACTS	REPRESENTATOIN
Traffic occurs due to high density	English Representation
Density(object)	Logical Representation
Density(x) causes traffic(x)	Formal Logical Representation
Causes traffic(object)	Deductive Mechanism
Traffic has high density of vehicles.	General statement using backward mapping.

Assertions:

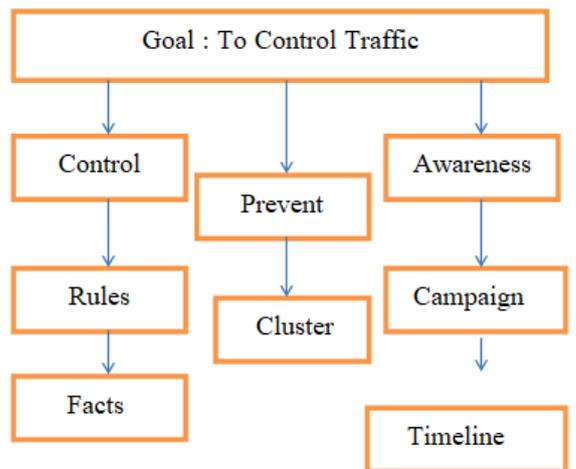
Step 1:



Step 2:



Step 3:



Rules :

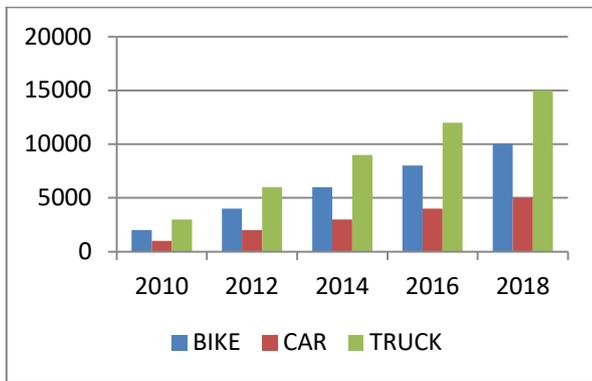
- a) If (Di) increases Then increases occur in (Ti)
- b) If (Ti) increases Then increases occur in (Pi)
- c) If (Ti) increases Then increases occur in (PEi)

The Personal emotional expression(PEi) are listed as Personal issues, Hunger, Thirst, Traffic jam, Tension, Pressures and Health issues

- d) If (Ti) increases Then Increases occur in (Ai)

Knowledge of traffic rules (Tr) should be accede from the present generation to our future generation by all possible means. From the vintage, the primitive structure of a vehicle hasn't been changed. Although the designs and other things of features had been changed. Still bikes are driven two wheels, cars with four wheels.

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**Fig : Increase In Vehicle Rate**

There is huge increase in traffic due to the drastic increase in number of vehicles. From the vintage ages where there was a gold age, it became one of greatest days where the most important thing in daily life “TRAFFIC RULES” was created.

### Inter Vehicular Communication:

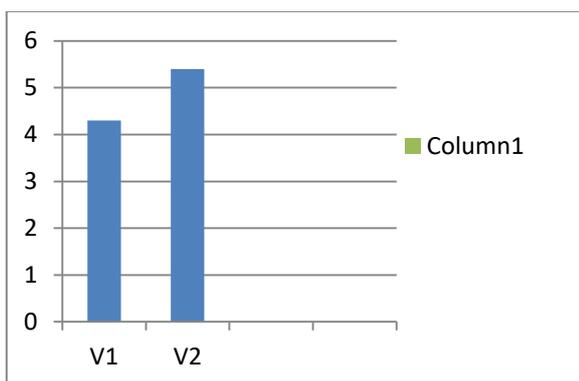
This inter-vehicular communication system is used to assist drivers in the road in order to provide faster and safer ride. These are bound to GPS and sensors. Time, Accuracy, Security are the main requirements of IVC. The vehicular collision warning communication (VCWC) protocol is a way to caution vehicles when anomalous situation comes so it can stopped before the congestion. They take place in two states:

- i) Active
- ii) Passive

Passive state is that is a normal condition in which we can trace out the normal condition of the vehicles.

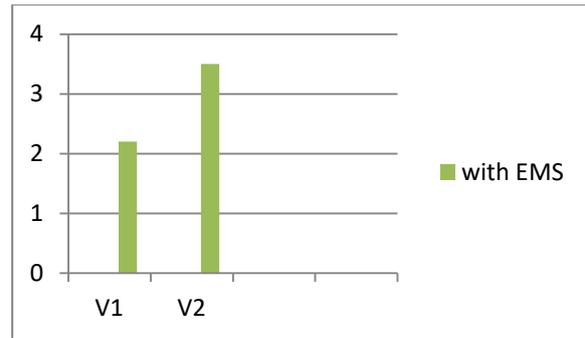
Active state occurs when only problematic situation occurs. It starts to send emergency warning signals (EWS). There are three types of EWS's, they are categorized based on their priorities.

- i) It always gives emergency warning signals (EWS). Because the most priority is given to the vehicle (V) which is at the stake.
- ii) Forwarded EWS, it given a beacon signal to the approaching vehicles.
- iii) Normal EWS, gives out normal signals to the approaching signals.



**Fig: Without Ews**

The above picture depicts the braking time interval taken by the approaching cars.



**Fig: With Ems**

The above picture depicts the braking time interval taken by the approaching cars by EMS.

## II. CONCLUSION

Evidence depiction through knowledge extraction plays dynamic role in describing practicable elucidations to the complications exist in traffic pattern in the crowded city. In this proposed study, it visibly fixated on problems that necessitate intellectual decision production and processing mission involved in directing the objects that causes traffic. Amongst the combined analysis the variety of objects, the literature review highpoints the most focusable solutions to the respective objects. The information depiction techniques are used to view fromobjected oriented perspective which outlines the state and behavior of an individual object directly related with the stated goal. The Fact examines were conceded out to guarantee the quality of the facts under review. The universal observing declarations are signified as facts occurred from application domain. The planning progressions were discussed with prompting factors.

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