The Importance of Google Maps for Traffic in Calculating the Level of Service for the Road and Traffic Delay

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Abstract. Traffic congestion is one of most important problems generated in the modern era, due to the need to move quickly between different sites, technological development, economic and population growth. Led to a significant increase in private transportation vehicles in urban areas. It has even exceeded the capacity of the planned road in some locations, especially those that attract trips significantly, causes cluster of vehicles, traffic congestion, and delay in the trip, which causes material and psychological costs to people. Therefore, this problem needs to be defined accurately and quickly in order to address it. There are many methods, including the traditional and advanced ones, in determining congestion and the amount of delay. Since determining the amount of delay for many sites is very expensive and takes a long time. We assume there is a method to facilitate data acquisition and delay in a fast and cost-effective manner. Through the use of websites on the Internet, one of which is Google traffic maps. Works to provide data on the traffic situation of the roads in any area, and at any time in the world, which can be used to know the amount of delay of the trip in this area. As it was noted that there is a failure in previous studies to convert this data into a data that can be used. Conversion descriptive data to numerical, for processing an accurate measurement.

1. Introduction

Road traffic consists of road users who are pedestrians, vehicles, animals and all those who need to move from one place to another. This is why it has become important to regulate the traffic process, especially with the increased traffic density on the roads due to the increased demand for transport between different places. Because of the increased need for transport and the increased density of vehicles on the road, this was caused by traffic congestions. These congestions need to be well identified in order to know the causes and to reduce them. However, the study of the status of road traffic is costly and stressful and limited, as it relates to a road or intersection and is difficult to determine in each transport network. In the present, many technologies, devices and applications have emerged that collect traffic status data more easily and accurately than before. This paper will also examine the importance of google traffic maps in determining the traffic situation of the road.

1.1. Traffic congestion

Due to the significant increase in population and economic development, the need for rapid transportation led to an increase in the number of vehicles that caused traffic congestion Traffic congestion has become a serious problem for passengers. And it is present in all cities of the world [1]. Congestion is an important issue on the road. There is congestion, when there is a decrease in average speed and increased traffic density and increased travel time (Zhicai et al. 2004). Human stress increases

due to uncertainty in flight time and traffic accidents increase due to congestion. Among the main factors causing traffic congestion are insufficient infrastructure, road works and traffic accidents [1]. Traffic congestion is one of the important problems in urban areas, especially during peak times. This negatively affects people's lives [2]. In urban transportation planning a lot of efforts are devoted to solving this problem [4]. Traffic control systems are like cameras is Precise, but expensive systems. Instead, we can use GPS data on the phones of passengers or drivers [5]. Kardashyan [27] proposed a solution to the problem of bad traffic management in complex transport networks. It is where the vehicles send their information continuously to the traffic management unit, which decrypts and analyzes it, which helps determine the location and speed of each vehicle. And that's how it determines the traffic situation of the road. [27] Buses and taxis have been used as traffic detection investigations based on location data [6]. Using vehicle average speed to determine traffic conditions whose data is obtained by GPS, laser scanners, video recorders, as well as cell phones [3]. Collecting traffic data using GPS phone users is one of the most affordable ways [7]. It is a new method used to estimate the actual time of traffic and traffic density [9]. Examined the accuracy and performance of the cell phone's GPS system in collecting traffic speed data [10]. It is suggested to use GPS in mobile phones in order to monitor traffic [11] despite the current trends in the use of location data in mobile devices in order to monitor traffic speed, these trends were associated with concerns regarding accuracy and reliability related to location and speed [13]

1.2. Google traffic maps

Previously, traffic data collection based on infrastructure such as camera or sensors, which are expensive. Therefore, the process of collecting data on the most important sites and not for the entire transport network. That's why some applications have been developed that collect data more easily and efficiently. For example, Traffic Pulse [25] collects traffic data and passenger information and works on geographic information system. The iPhone, which provides traffic accident reporting service to determine the state of traffic congestion. [21] Google Maps was introduced in February 2005. Revolutionized the way maps are used on web pages by allowing the user to use the map to navigate. Since this is why Google Maps developers have improved and developed their programming interface, in order to add more modern functionality features [19]. Google Maps provides live traffic data. Where the traffic situation can be represented in different colors on the road to determine the traffic congestion between the origin and the destination. Where traffic congestions appear in four colors. Where the green color represents no crowding. The orange color represents medium traffic, and the red color represents traffic delay. The redder the color, the more severe the crowding. As for the gray color, it indicates that there are not enough readings in the passing vehicles (google support, 2019). Google now working with its customers to collect their data of GPS in mobile phones. Google has provided privacy by blocking the identity of users, which encouraged them not to disable this feature. Google uses a large number of information provided by active mobile phones to show the current traffic situation in a particular location. (Petrovska et al., 2015). (Denaxas et al. 2013) Where proposed a system for estimating the average speed of traffic, which depends on the GPS data in public transport vehicles, which was designed by NOKIA RESEARCH, a system designed by NOKIA, which collects speed and location data from GPS devices inside the vehicle. It can show the old and current traffic on the road in google traffic map [29]. [15] argued that a smartphone can provide reliable data. As the correlation coefficient was calculated between the resulting variables in the devices in the vehicle, the results appeared with 99-100% reliability. The traffic speed data obtained from the GPS device has been validated in Morocco. Where the accuracy of the data that reflects the traffic appeared in the past days. Accuracy appeared on weekdays, at 74.9% and at 83.3% on weekends [16]. The causes of traffic congestion vary, the most important of which are accidents, road construction work and traffic light stops. Also, the large number of vehicles on the road may cause disturbances that cause traffic congestion. Sometimes the traffic data from the GPS system is not illogical and the reason is the behavior of the drivers. Where some of them drive slowly or recklessly who are in traffic. Therefore, historical traffic data cannot predict the surprising factors that cause traffic congestion. In order to determine the accuracy of Google Maps to

determine the speed of traffic, an experiment was carried out, which consisted of selecting four lanes in order to measure the real traffic speed. Four vehicles equipped with a GPS device were driven to determine the vehicle's speed and deduce the traffic speed. Where the results showed that when the speed of the vehicles is less than 15 km / h, there are traffic congestions in red color in Google Maps, and by matching the colors with the speed in the path, it was found that there is a match of 90%, so it is possible to use Google traffic maps to determine the traffic situation on the road [17].

1.3. Experience the speed of colors in google maps

An experiment was done by driving a car and using a smartphone with GPS device. Move in places where a congestion is and where there is no congestion in some streets of Baghdad city from 4:48 pm-6:46 approximately two hours on 1/12/2019 to find out the speed of the four colors in the Google Traffic Maps. The highest vehicle speed that can be reached per minute was recorded in these four colors. The car was move in the black color for 982 meters, the red color 6808 meters, the orange color 6680 meters and the green color 32984 meters. Then collect the number of speeds for each color and extract the average for these speeds. Google also computes the average of the measured speeds. The results appear in the Table 1. The results showed that the highest average speed that can be reached by walking in the four colors. black reaching 7.8 km/h, red 18.6 km/h, orange 35 km/h, and green 64.5 km/h. Comparing the results with the previous research [17], which extract the average speed of the red color is 15 km/h. the speed extract in the experiment is 18.65 km/h. finding that the results are very close and within limits. The traffic situation and the level of service for the road can be extract easily, low effort, low cost and very little time with high accuracy. By using Google traffic Maps data.

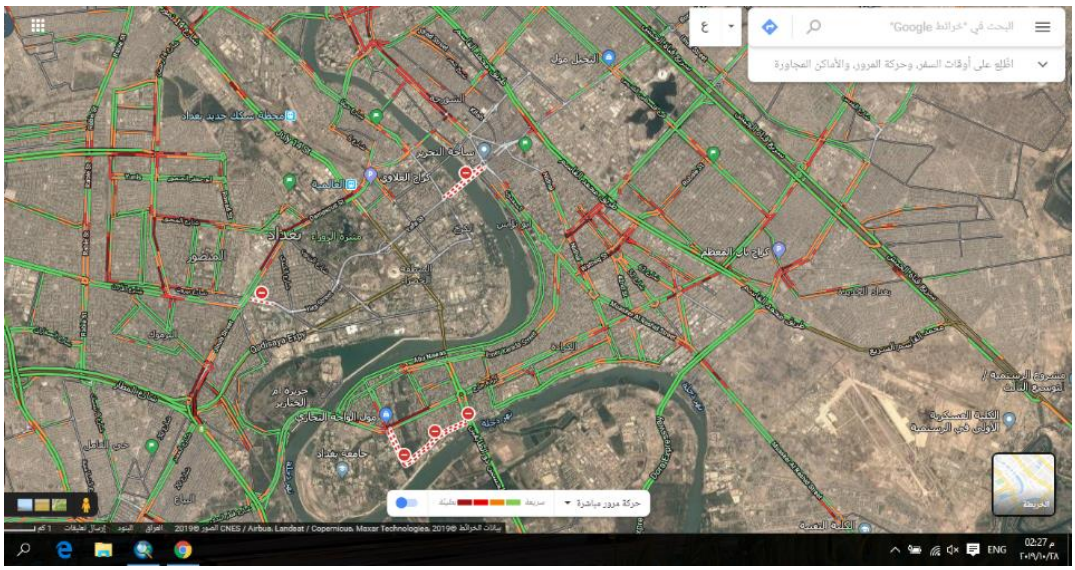

Figure 1. The google map at instantaneous traffic congestion. (Google map, 2019)**.**

Figure 1 a captured image, to make sure that Google Maps are working accurately. By using Google maps for traffic movement on the day of the demonstrations on October 29, 2019, as the government blocked roads due to the large number of protests and set up many police inspection sites. That caused severe congestion in many of Baghdad streets. The image also shows a complete blackout in some streets, where the dark red mark is placed on it.

Table 1. Maximum speed for each colour detected in the experiment (the researcher depend on google traffic map)

Time	Color speed (km / h)				Time	Color speed (km / h)			
	green	orange	red	black		green	orange	red	black
04:48			20		05:44		55		
04:49	80				06:03		40		
05:00		45			06:04		35		
05:01	45				06:06				
05:02	80				06:07		40		
05:03				15	06:08			30	
05:04					06:09			20	
05:05				10	06:10			20	
05:06					06:11			25	3
05:07			15		06:12				5
05:08					06:13		30		
05:09					06:14		35		
05:10					06:15	80			
05:11			10		06:16	80			
05:12					06:17			20	
05:13					06:18			15	
05:14					06:19			10	
05:15		30			06:20				
05:16					06:21		30	20	
05:17				5	06:22			15	
05:18				10	06:23			25	
05:19			25		06:24				5
05:20					06:25				10
05:21					06:26				
05:22					06:27				
05:23			10		06:28				
05:24					06:29				
05:25					06:30			20	
05:26					06:31	35		20	
05:27					06:32	50			
05:38					06:33		35		
05:29					06:34		35		
05:30			15		06:35	70			
05:31					06:36	80			
05:32					06:37				
05:33			20		06:38				
05:34					06:39				
05:35					06:40				
05:36					06:41				
05:37					06:42				
05:38			25		06:43			5	
05:39			20		06:44		15		
05:40			25		06:45	45	30		
05:41			25		06:46		30		
05:42			10		Total	645	525	485	63
05:43		40	20		Average speed	64.5	35	18.65	7.87

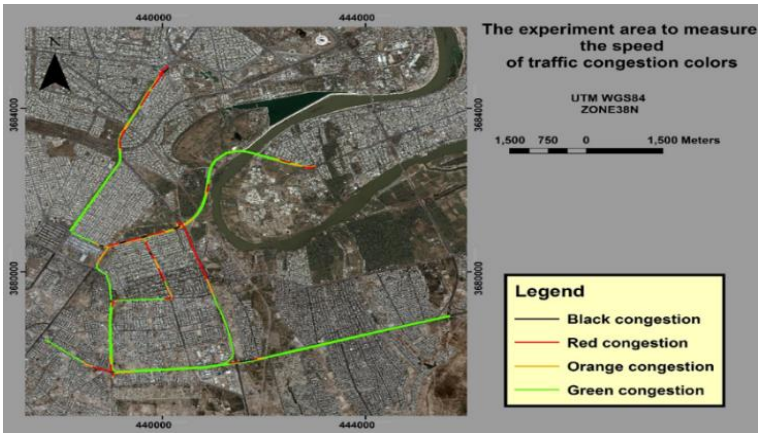

Figure 2. Experiment area. (Source: the researcher survey; geographic information system GIS; aerial image by [28] at 10 Am; Google map, 2019).

2. Study Area (Bayaa Transmission Line - Bab Al-Moazam)

The transmission road in the study area is one of the main transportation lines in Baghdad, connects the side of Al-Karkh and Al-Rusafa, through an arterial road with a maximum design speed of 70 km/h, with two lanes (three lines for each lane). The transmission road ends between two regional transport stations (Bab Al-Moazam station and Al-Bayaa station). Due to the lack of organization of the transportation process and the provision of special stations for the disembarkation and boarding of passengers. Land uses and road intersections effect on the identification of passenger embarkation and disembarkation stations. As there have become semi-permanent stations in this route, there is some random disembarkation places due to residential use or the passenger's closeness to the house. The Al-Bayaa Intersection Station is the first station. The second station is a station near (Al-Bayaa Court), is a disembark station where the passengers houses at Al-Amil neighborhood depend, as well as those who go to (Al-Bayaa District Court) in addition to (the Real Estate Department). The third station is the Yarmouk Hospital station. Whereas, due to the presence of a general hospital, passengers often come and go at this station, the residents depend on this station. And the fourth station is (Eagles Square) station. Due to the fact that eagles Square is an intersection, therefore, it is possible for the passenger to go to al- Mansour area, which is an area where there is a lot of entertainment and commercial uses. Also, this square is considered a starting point for minibuses to reach other areas, for example (the Amiriya area). The fifth station is the Baghdad International Fair Square station. This square is an important intersection with governmental and commercial use, which is (Baghdad International Fair) in addition to its closeness to College of Fine Arts, Al-Zawra Park, Baghdad Mall, travel companies, and Al-Naqabat Street. This square connects to the line that connects to the (Al-Mansour) entertainment district, in addition to the residential use that depends on the transport buses that pass this square. Consequently, this square is one of the squares that greatly encourage the descent and embarkation of passengers. The sixth station is Alawi station. This station is characterized by the presence of two regional transport stations. Alawi station and the railway station. Therefore, this station is important and attracts many passengers. The seventh station is the station of the Ministry of Culture, This station was formed due to its presence from the culture ministers and the retirement department, in addition to being the crossroads to the cultural, heritage and archeology (Old Baghdad District). In addition to the reliance of the residents on this station for transportation, as it supervises residential complexes with a high-density vertical building. The eighth station is Al-talaa intersection. The ninth station is the Bab Al-Moazam station, this station is an alternative to the main station of Bab Al-Moazam, and this station is distinguished by its closeness to Medical City Hospital and Medical Technology Complex. It is also a station in the center of Baghdad. One of the most important reason of the traffic congestion and the difficulty of developing solutions to it, is the large increase in the number of private cars, up to 10 times

more than the capacity of the roads in the city of Baghdad. The Baghdad street neighborhood with a capacity of 450,000 cars. The number of current cars in Baghdad is 4,500,000, it is an amount ten times according to the advice of officials in charge of traffic officers. And other problem is the absence of stops for the disembarkation of passengers on the road, this greatly affects the slowing down of cars in different areas, in addition to the clustering of more than one car in one place for stopping due to the presence of a hospital, for example.

Table 2. Assessment of the service level of the road, the irrigated density of vehicles on the roads and the flow velocity as an indicator of the severity of congestion [18]

level of service	Description of road conditions	Percentage flow speed on highway (design speed)	Density (power ratio)
A	Traffic flow at or above the speed limit	90%	Less than 60%
B	Little congestion with some hurdles to maneuver	70%	60% to less than 70%
C	The ability to pass or change lanes is restricted,	50%	70% to less than 80%
D	Speed decreases somewhat, maneuverability is limited	40%	80% to less than 90%
E	The flow becomes irregular and the speed varies and seldom reaches its maximum	30%	90% to less than 100%
F	Flow is restricted with frequent drops in velocity to nearly zero miles per hour, travel time is unpredictable.	Less than 30% to 25%	100% and more

The study area is a road with a primary arterial classification with a maximum speed of 70 km/h. [30]. A comparison had made between the crowding colors by drawing data on the dates 12/24/2019 and 10/23/2019 and on Wednesday and Sunday For more accurate data.

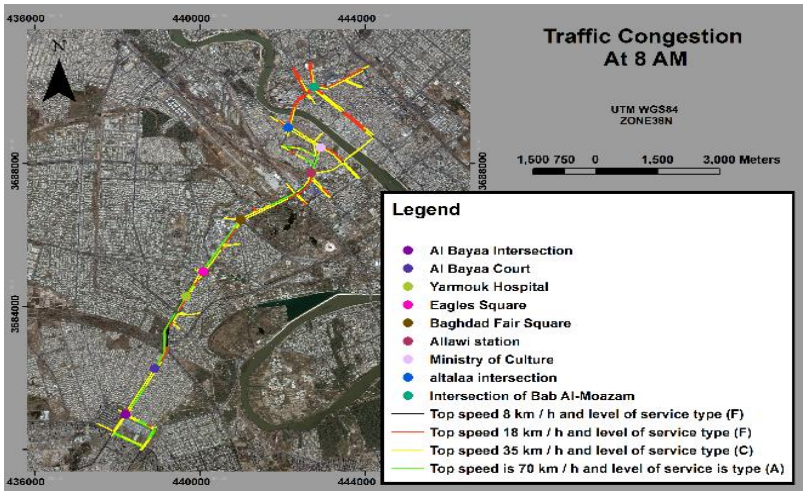

Figure 3. Traffic congestion at different time of the day.
Level of service depend on 'Table 1' and 'Table 2'.

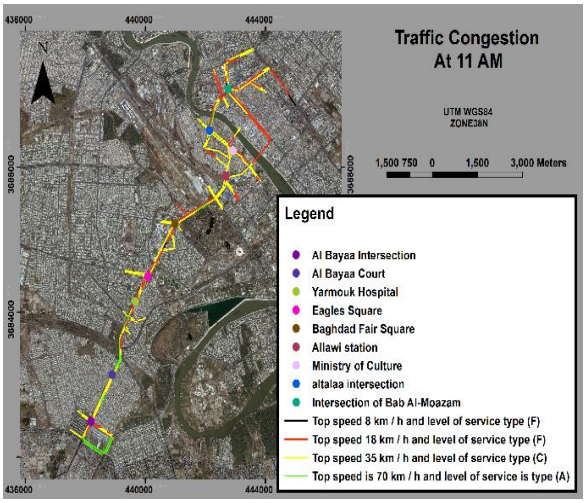

Figure 4. Traffic congestion at different time of the day. Level of service depend on 'Table 1' and 'Table 2'.

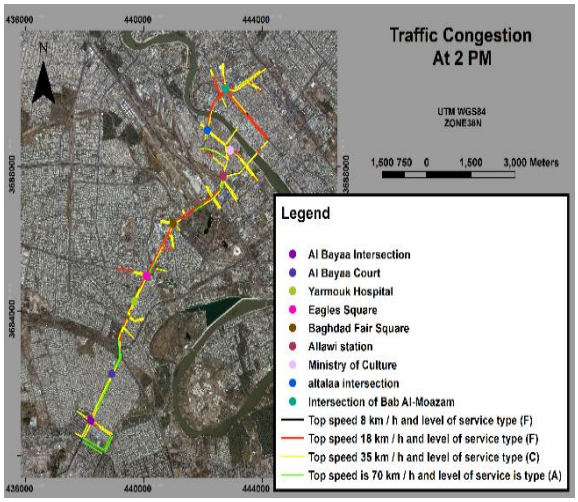

Figure 5. Traffic congestion at different time of the day. Level of service depend on 'Table 1'and 'Table 2'.

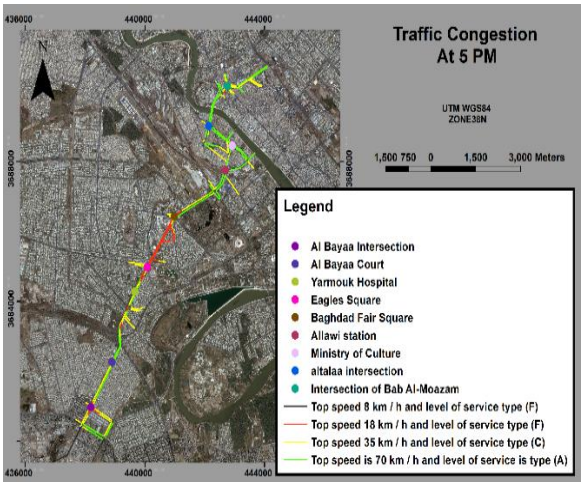

Figure 6. Traffic congestion at different time of the day. Level of service depend on 'Table 1' and 'Table 2'.

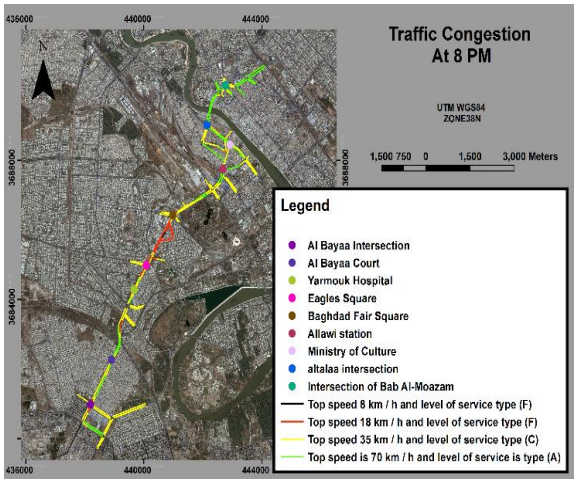

Figure 7. Traffic congestion at different time of the day. Level of service depend on'Table 1'and 'Table 2'.

Figure 3, 4, 5, 6 and 7 (Source: the researcher depends on geographic information system GIS; aerial image by [28] at 10 Am; Google map, 2019).

3. Generate a formula of traffic delay

Through the field survey, obtaining the traffic and vehicle stops (traffic cycle) period s for all traffic intersections. As the traffic officers explained, the periods change depending on traffic type. Where there are intersections that depend on each other to empty the traffic congestion, such as the intersection of Al-talaa 'and Intersection of Bab Al-Moazam. through operating the same traffic period. In order to calculate the delay in the trip, create an equation based on the speed of colors in Google Traffic maps. It also depends on the traffic period at intersections. And the design speed of road.

The ratio $\frac{R.L}{R.S}$ is used to extract time

The ratio $\frac{R.L}{R.S}+\frac{Y.L}{Y.S}$ is used to extract the time needed to cross congestion.

The ratio $\frac{\frac{R.L}{R.S}+\frac{Y.L}{Y.S}}{A}$ is used to extract the number of turns needed to cross the intersection.

The ratio $\frac{\frac{R.L}{R.S}+\frac{Y.L}{Y.S}}{A}*B$ is used to extract the time required to cross the intersection.

The ratio $\frac{R.L}{R.S}$ is used to extract the time required to cross the road without the red traffic.

The ratio $\frac{Y.L}{Y.S}$ is used to extract the time needed to cross the road without yellow traffic.

The ratio $\frac{R.L+Y.L}{H.S}$ is used to extract the time required to cross the road without the red and yellow congestion (the default time for the journey without congestion)

The ratio $\left(\frac{R.L}{R.S}+\frac{Y.L}{Y.S}\right)*\frac{B}{A}-\left(\frac{R.L+Y.L}{H.S}\right)$ is used to extract the delay time

$$X=\left[\left(\frac{R.L}{R.S}+\frac{Y.L}{Y.S}\right)*\frac{B}{A}-\left(\frac{R.L+Y.L}{H.S}\right)\right]*\frac{3600}{1000} \quad (1)$$

$$Z=\left[\left(\frac{R.L}{R.S}+\frac{Y.L}{Y.S}\right)-\left(\frac{R.L+Y.L}{H.S}\right)\right]*\frac{3600}{1000} \quad (2)$$

Where:

X: the delay in seconds at the intersection.

Z: the delay in seconds without intersection.

R.L: the length of the red congestion in meters.

R.S: the red congestion speed of 18 km/h.

Y.L: the length of the red congestion in meters.

Y.S: the yellow traffic speed of 35 km/h.

H.S: the maximum planned road speed of 70 km/h.

B: the vehicle stopping time in the intersection, in seconds.

A: the vehicle travel time in the intersection, in seconds.

The ratio 3600/1000 is used to convert the speed from km/h to m/sec.

4. Appling formula and calculate the delay

To calculate the delay in seconds at 8 am at Al-Bayaa intersection in the direction of the flight, Bab Al-Moazam – Bayaa

$$X = \left[\left(\frac{137}{18} + \frac{1296}{35}\right) * \frac{150}{30} - \left(\frac{137 + 1296}{70}\right)\right] * \frac{3600}{1000} = 730$$

To calculate the delay in seconds at 11 am at the Baghdad Fair Square in the direction of the flight Bayaa - Bab Al-Moazam

$$X = \left[\left(\frac{401}{18} + \frac{1222}{35}\right) * \frac{90}{60} - \left(\frac{401 + 1222}{70}\right)\right] * \frac{3600}{1000} = 225$$

To calculate the delay in seconds at 11 am at the Yarmouk Hospital station in the direction of the flight Bayaa - Bab Al-Moazam

$$Z = \left[\left(\frac{1197}{18} + \frac{629}{35}\right) - \left(\frac{1197 + 629}{70}\right)\right] * \frac{3600}{1000} = 210$$

To calculate the delay in seconds at 11 am at the Alawi Garage station in the direction of the flight, Bab Al-Moazam – Bayaa

$$Z = \left[\left(\frac{0}{18} + \frac{983}{35}\right) - \left(\frac{0 + 983}{70}\right)\right] * \frac{3600}{1000} = 51$$

Table 3. Flight delay in minuets from Bab Al-Moazam to Bayaa. (Source: the researcher depend on google traffic maps)

Station	Time	Vehicle travel time (sec)	Vehicle stop (sec)	Red congestion length (m)	Yellow congestion (m)	Delay (sec)	Delay (min)
Al Bayaa Intersection	8 am	30	150	137	1296	730	12
	11 am	90	240	132	1299	353	6
	2 pm	90	240	151	1303	363	6
	5 pm	90	240	125	1306	351	6
	8 pm	90	240	147	1321	365	6
Al Bayaa Court	8 am	0	0	0	0	0	0
	11 am	0	0	306	504	71	1
	2 pm	0	0	226	892	79	1
	5 pm	0	0	0	992	51	1
	8 pm	0	0	0	1072	55	1
Yarmouk Hospital	8 am	0	0	0	353	18	0
	11 am	0	0	473	212	81	1
	2 pm	0	0	378	328	73	1
	5 pm	0	0	358	179	62	1
	8 pm	0	0	332	350	67	1
Eagles Square	8 am	30	0	0	0	0	0
	11 am	60	240	402	1209	736	12
	2 pm	60	240	1609	0	1204	20
	5 pm	60	240	1531	84	1176	20
	8 pm	60	240	1447	87	1115	19
Baghdad Fair Square	8 am	60	60	0	1114	57	1
	11 am	60	90	1453	476	410	7
	2 pm	60	90	1781	192	462	8

	5 pm	60	90	228	1060	166	3
	8 pm	60	60	128	1053	73	1
Alawi garage	8 am	0	0	0	559	29	0
	11 am	0	0	0	983	51	1
	2 pm	0	0	0	987	51	1
	5 pm	0	0	0	342	18	0
	8 pm	0	0	0	794	41	1
Ministry of Culture	8 am	0	0	0	800	41	1
	11 am	0	0	0	767	39	1
	2 pm	0	0	0	789	41	1
	5 pm	0	0	0	0	0	0
	8 pm	0	0	0	0	0	0
Altalaa intersection	8 am	120	180	1213	709	374	6
	11 am	120	180	1107	834	361	6
	2 pm	120	180	1224	700	376	6
	5 pm	30	0	0	192	0	0
	8 pm	30	0	0	0	0	0
Intersection of Bab Al-Moazam	8 am	120	180	620	0	154	3
	11 am	120	180	654	0	163	3
	2 pm	120	180	706	0	175	3
	5 pm	30	90	0	292	75	1
	8 pm	0	0	0	300	0	0

Table 4. Flight delay in minuets from Bayaa to Bab Al-Moazam. (Source: the researcher depend on (google traffic maps

Station	Time	Vehicle travel time (sec)	Vehicle stop (sec)	Red congestion length (m)	Yellow congestion (m)	Delay (sec)	Delay (min)
Al Bayaa Intersection	8 am	30	150	137	1296	730	12
	11 am	90	240	132	1299	353	6
	2 pm	90	240	151	1303	363	6
	5 pm	90	240	125	1306	351	6
	8 pm	90	240	147	1321	365	6
Al Bayaa Court	8 am	0	0	124	673	53	1
	11 am	0	0	122	963	68	1
	2 pm	0	0	0	628	32	1
	5 pm	0	0	0	261	13	0
	8 pm	0	0	0	653	34	1
Yarmouk Hospital	8 am	0	0	1224	563	211	4
	11 am	0	0	1197	629	210	4
	2 pm	0	0	360	1264	118	2
	5 pm	0	0	206	368	50	1
	8 pm	0	0	1075	367	179	3
Eagles Square	8 am	30	0	276	402	0	0
	11 am	60	240	394	279	395	7
	2 pm	60	240	0	663	239	4
	5 pm	60	240	219	314	277	5
	8 pm	60	240	0	569	205	3
Baghdad Fair Square	8 am	60	60	600	1029	142	2
	11 am	60	90	401	1222	225	4

	2 pm	60	90	489	660	189	3
	5 pm	60	90	1334	194	352	6
	8 pm	60	60	1021	559	180	3
Alawi garage	8 am	0	0	804	1249	184	3
	11 am	0	0	0	1603	82	1
	2 pm	0	0	509	851	119	2
	5 pm	0	0	0	0	0	0
	8 pm	0	0	0	1631	84	1
Ministry of Culture	8 am	0	0	635	787	135	2
	11 am	0	0	706	923	152	3
	2 pm	0	0	455	1055	122	2
	5 pm	0	0	0	0	0	0
	8 pm	0	0	0	842	43	1
Altalaa intersection	8 am	120	180	0	932	96	2
	11 am	120	180	195	687	119	2
	2 pm	120	180	196	707	121	2
	5 pm	30	0	0	0	0	0
	8 pm	30	0	0	483	0	0
Intersection of Bab Al-Moazam	8 am	120	180	620	0	154	3
	11 am	120	180	654	0	163	3
	2 pm	120	180	706	0	175	3
	5 pm	30	90	0	292	75	1
	8 pm	0	0	0	300	0	0

Table 5. Flight delay in minutes from Bayaa to Bab Al-Moazam depend on 'Table 4'.
(Source: the researcher depend on google traffic maps)

		Delay at the station in minuets						Cumulative delay in the path to the station in minuets				
Station symbol	Station	8 am	11 am	2 pm	5 pm	8 pm	Sum	8 am	11 am	2 pm	5 pm	8 pm
B.I	**Al Bayaa Intersection**	12	6	6	6	6	36	12	6	6	6	6
B.C	**Al Bayaa Court**	1	1	1	0	1	3	13	7	7	6	7
Y.H	**Yarmouk Hospital**	4	4	2	1	3	13	17	11	9	7	10
E.S	**Eagles Square**	0	7	4	5	3	19	17	17	13	12	13
B.F.S	**Baghdad Fair Square**	2	4	3	6	3	18	19	21	16	17	16
A.I	**Allawi station**	3	1	2	0	1	8	22	22	18	17	17
M.C	**Ministry of Culture**	2	3	2	0	1	8	24	25	20	17	18
A.I	**Altalaa intersection**	2	2	2	0	0	6	26	27	22	17	18
I.B.M	**Intersection of Bab Al-Moazam**	3	3	3	1	0	9	28	29	25	19	18
	sum	28	29	25	19	18	119					

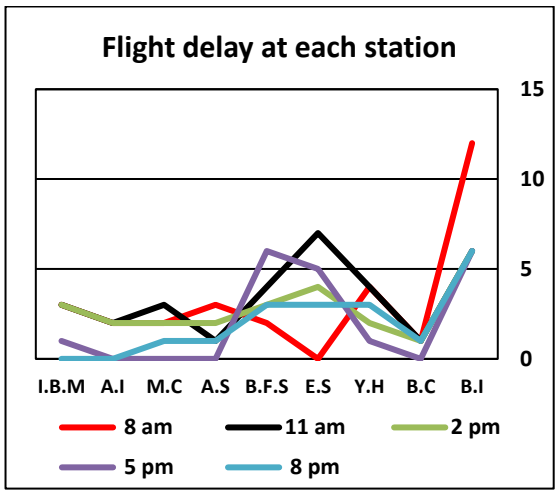

Figure 8. Flight delay in minuets at each stop in time in Bayaa to Bab Al-Moazam depend on 'Table 5'. (Source: the researcher)**.**

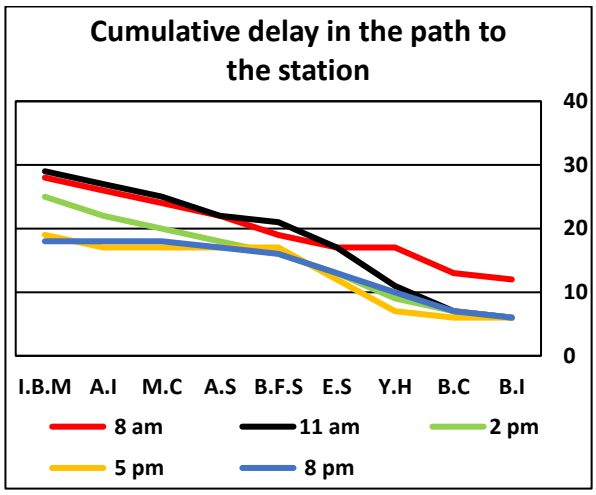

Figure 9. Cumulative flight delay in minuets at each stop in time in Bayaa to Bab Al-Moazam depend on 'Table 5'. (Source: the researcher).

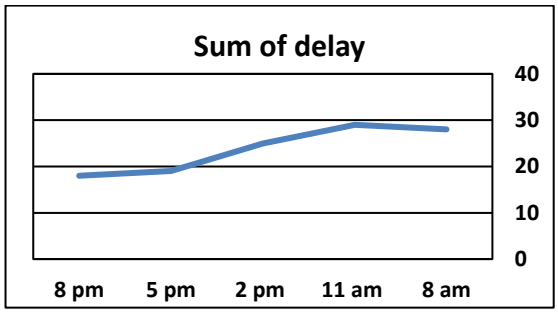

Figure 10. Cumulative flight delay in minuets at each stop in time in Bayaa to Bab Al-Moazam depend on 'Table 5'. (Source: the researcher)**.**

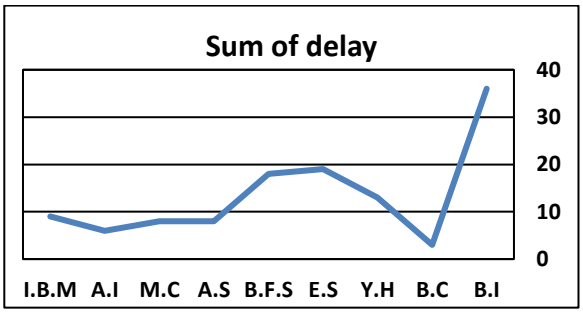

Figure 11. Total flight delay in minuets at each stop per day in Bayaa to Bab Al-Moazam depend on 'Table 5'. (Source: the researcher).

Table 6. Flight delay in minutes from Bab Al-Moazam to Bayaa depend on 'Table 3. (Source: the researcher depend on google traffic maps**)**

Station symbol	Station	Delay at the station in minuets						Cumulative delay in the path to the station in minuets				
		8 am	11 am	2 pm	5 pm	8 pm	sum	8 am	11 am	2 pm	5 pm	8 pm
B.I	Al Bayaa Intersection	12	6	6	6	6	36	23	38	47	32	29
B.C	Al Bayaa Court	0	1	1	1	1	4	11	32	41	26	23
Y.H	Yarmouk Hospital	0	1	1	1	1	5	11	31	40	25	22
E.S	Eagles Square	0	12	20	20	19	71	11	29	38	24	20
B.F.S	Baghdad Fair Square	1	7	8	3	1	19	11	17	18	4	2
A.I	Allawi station	0	1	1	0	1	3	10	10	11	2	1
M.C	Ministry of Culture	1	1	1	0	0	2	9	9	10	1	0
A.I	Altalaa intersection	6	6	6	0	0	19	9	9	9	1	0
I.B.M	Intersection of Bab Al-Moazam	3	3	3	1	0	9	3	3	3	1	0
	sum	23	38	47	32	29	169					

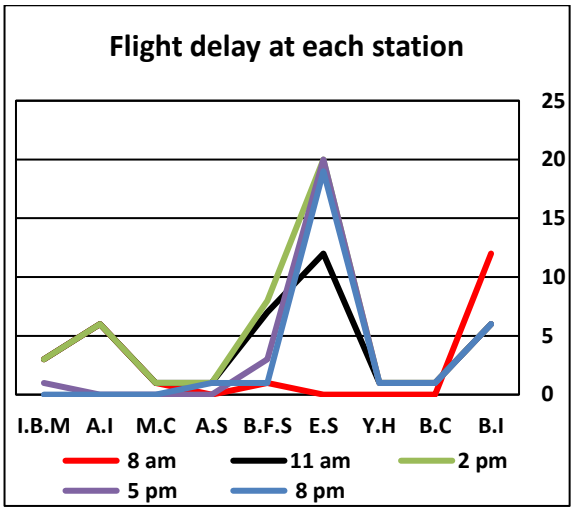

Figure 12. Flight delay in minuets at each station in time in Bab Al-Moazam to Bayaa depend on 'Table 6'. (Source: the researcher).

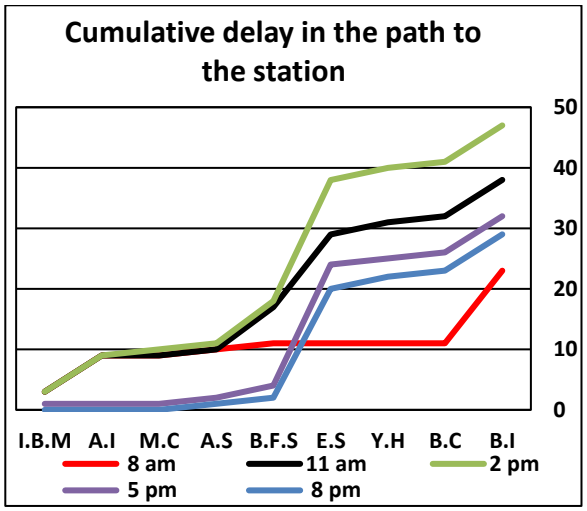

Figure 13. Cumulative flight delay in minuets at each stop in time in Bab Al-Moazam to Bayaa depend on 'Table 6'. (Source: the researcher).

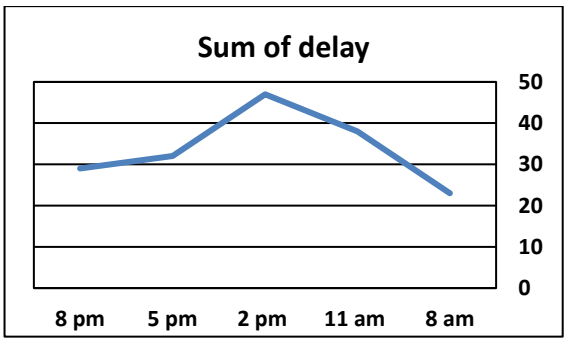

Figure 14. Sum of flight delay in minuets at each station in time in Bab Al-Moazam to Bayaa depend on 'Table 6'. (Source: the researcher).

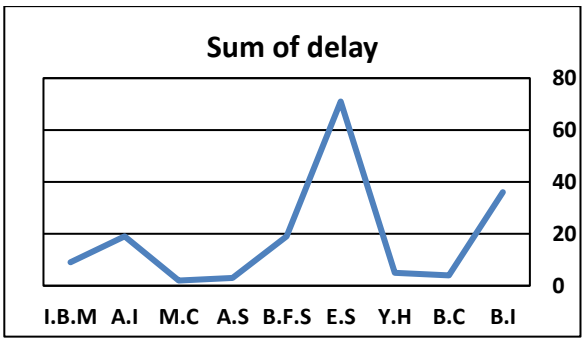

Figure 15. Sum of flight delay in minuets at each stop per day in Bab Al-Moazam to Bayaa depend on 'Table 6'. (Source: the researcher).

5. Conclusion

The problem of determining the traffic status of the transport network is a financially and physically costly problem. It's also a problem with variable data. Here, there was a need to obtain traffic status data for the transport network more quickly and easily and easily updated. In this paper was studied, the use of google traffic maps to solve this problem. The google traffic maps show the traffic status data descriptively in the form of colors. So we experimented to see the speed of traffic in these colors and convert the data from colors to numerical data to use it in comparison in more accurate. The results showed the average speed of vehicles on the road when the black color is less than 8 km/h, the red color is less than 18.6 km/h, the orange color is less than 35 km/h, and the green color is less than 64 km/h. With these results, obtained the traffic period at intersections and determined the normal speed of the road without congestion. In order to create a mathematical equation that helps determine the amount of delay of vehicles when passing these colors. The results became very close with the reality of the situation when going through these congestion in Baghdad. We also calculated the level of service on the roads. Different results emerged where black and red had a type F level of service, yellow was a type C level of service, and green had a type A level of service. In this way, we have been able to solve the

problem of providing traffic status data in the transport network with ease, lower cost and can be updated, and can be used to Identify, analyze and solve traffic congestion problems in the future.

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