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Sustainable prediction of epidemic spread and building up urban health: A case study of Hillah, Iraq, using Weka for intelligent city development

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Abstract:
The current modeling study involved the development of a new statistical model for predicting the spread of infectious epidemics and counts the expected number of infections in crowded cities and how to develop infected cities into intelligent cities according to international standards. The study was completed based on historical infections that occurred in the city of Hillah in central Iraq and the Weka program was used to evaluate the infection number on the basis of historical infections, city's infrastructure, metrological elements, and social education. The study included the scenarios of predicting the infections of epidemic due to *Changing Infrastructure* and *Intelligent City* scenarios. It was found the percent reduction of infections in the *Changing Infrastructure* of a city was ranged between (39.3%-100%) in January and between (6.5%-25.7%) in July, while in the case of Intelligent City the percent reduction was ranged between (66.6%-100%) in January and between (30.5%-75.2%) in July 2030. The main finding is that the number of infections decreases mainly by relying on the restructuring of infrastructure according to intelligent cities and the infection number is affected a lot by climate changes, especially the temperatures that are unfortunately uncontrollable. The study recommends using smart city specifications in designing cities to resist epidemics in the future.

Keywords: Epidemic, Prediction model, Intelligent city, Infrastructure redesigning, infections, Weka program

1. Introduction

During his life, man has gone through various global disasters, but the ones that hit him the most are epidemic disasters, including influenza, cholera, the plague, etc., but the Corona 19 epidemic was the most severe for him because it was a direct threat to his current civilization, despite the great scientific progress in the field of medicine and engineering. After the disaster, the world faces a new challenge, which is to create a new method for managing cities and making them have urban immunity to confront future epidemics, Afrin et al (2021). Several methods were invented to confront infectious epidemics, including social distancing, which took several forms, the most effective of which was remote work. Therefore, it was necessary to rehabilitate the city in a way that ensures social distancing in crowded cities Song et al (2021), Liu et al (2021). Most contemporary research now pays great attention to the challenges of the infectious epidemic and the causes that affect its spread, which are environmental resilience, health culture, urban infrastructure, security, education, food systems, and refugee crises, Liu et al (2020). The main foundations and important features of agriculture during the long-term epidemic phase and ways to ensure continued food security for residents of crowded cities subject to quarantine and social distancing were presented Khan et al (2020). Future challenges of long-term infectious epidemics, especially in cities with low infrastructure and densely populated areas, as well as those who were injured with endemic diseases before the spread of the epidemic, can be met by relying on 43 scientific research that addresses the various ways to defeat the 19-corona epidemic, and on this basis, appropriate agendas can be established to defeat viral epidemics, Ellis et al (2021). From the above, the design of pandemic-resistant smart cities is strongly linked to economic and urban flexibility and the use of technology to implement services and monitor the various stages of containing the epidemic, Apostu et al (2022). Strategic thinking must be matured in designing smart cities and new techniques in the field of the urban system to defeat the epidemic's challenges in the future, Gall and Allam (2022). Thus the smart city design system is based on social distancing in order to limit the spread of the infectious epidemic. This is done by constantly monitoring the movement of residents with digital cameras and then taking the suitable design steps, Shorfuzzaman et al (2021). We must not forget the significant role of water resources in the spread of epidemic diseases through which the virus is transmitted, as water is included in all goods provided to the citizen. Therefore, the water index must be included among the design factors of intelligent cities due to its importance in containing environmental, economic and health crises and our belief in the water necessity during epidemic spread. This will enhance our ability to build an intelligent city that is resistant to the epidemic, Giovanni et al (2020).

This study adopts a study of the Corona Covid-19 epidemic disaster in the city of Hillah in central Iraq during the year 2021-2022 and how to confront the epidemic during the next ten years. The study relied on demographic, climatic and environmental information, the infrastructure of the study area, and the number of infections for a period of 23 months during the year 2021-2022. The study began by collecting various data for the city and forecasting information for the coming years up to the year 2030. The data was then entered into the Weka program to analyze it and predict the expected number of infections in the year 2030 after the verification process. Then, two scenarios were issued, the 1`first is developing the city's infrastructure to ensure social distancing, and the number of infections for the year 2030 was predicted accordingly. In the second scenario, the city of Hillah was redesigned according to the standards of a smart city resistant to epidemic diseases, and the number of potential infections was also extracted. The study found that the number of infections in a smart city decreases significantly by up to 100%, and thus we have designed a city that is not preventively affected by epidemic diseases to live in.

2. Materials and Methods

2.1 Weka Analytical Technology

Weka is a program usually uses in the analysis prediction of agricultural, environmental, disasters data with a particular algorithm fit as much as possible. It was created by Waikato University in 1993WEKA includes many sequential features; classifying, clustering, associating, selecting attribute, visualizing and preprocessing, Holmes et al (1994), Garger et al (1995), Witten and Frank (2002). It was developed to including modeling algorithm implementation in 1997. In 2005, Weka included SIGKDD Data Mining, Hall et al (2009). Once the data is specified for Weka, it is analyzed by model processing and then it is classified due to classification algorithm, the user can chose the best algorithm of the suggested 21 algorithms depending on the validation factors such as correlation coefficient (), mean absolute error (MAE), root mean square error (RMSE) …etc. which should give minimum error for a certain data Gupta et al (2012)

2.2 Weka Reduce equation

The main prediction equation of Weka may be written as follows, Al Maimuri et al (2024)

$$Event\ No. = \sum_{i=1,\ j=1,\ k=1}^{i=26,\ j=32,\ k=19} W_{i,j}\ x_{i,k} \qquad (1)$$

Where i, j, and k are months no., indicators no. and sectors no. respectively, and are the weight via single indicator and monthly standard per specified sector respectively.

2.3 Model statistic and Weka tests

Internal algorithms of Weka Program contain many statistical tests hereinafter:

$$R^2 = \frac{n\sum O_i E_i - \sum O_i \sum E_i}{\sqrt{\left(n\sum O_i^2 - \left(\sum x\right)^2\right)\left(n\sum E_i^2 - \left(\sum y\right)^2\right)}} \qquad (2)$$

$$MAE = \frac{\lfloor O_1 - E_1 \rfloor + \ldots + \lfloor O_n - E_n \rfloor}{n} \qquad (3)$$

$$RMSE = \sqrt{\frac{(O_1 - E_1)^2 + \ldots + (O_n - E_n)^2}{n}} \qquad (4)$$

$$RAE = \frac{\lfloor O_1 - E_1 \rfloor + \ldots + \lfloor O_n - E_n \rfloor}{\lfloor E - \bar{E} \rfloor + \ldots + \lfloor E_n - \bar{E} \rfloor} \qquad (5)$$

$$RRSE = \sqrt{\frac{(O_1 - E_1)^2 + \ldots + (O_n - E_n)^2}{(E_1 - \bar{E})^2 + \ldots + (E_n - \bar{E})^2}} \qquad (6)$$

Where are the relative absolute error, and the root relative squared error respectively, O, E, are dependent and independent data series and n is events no., Chai and Draxler (2014, Ali et al (2021), Franses (2016) and Reich et al (2016).

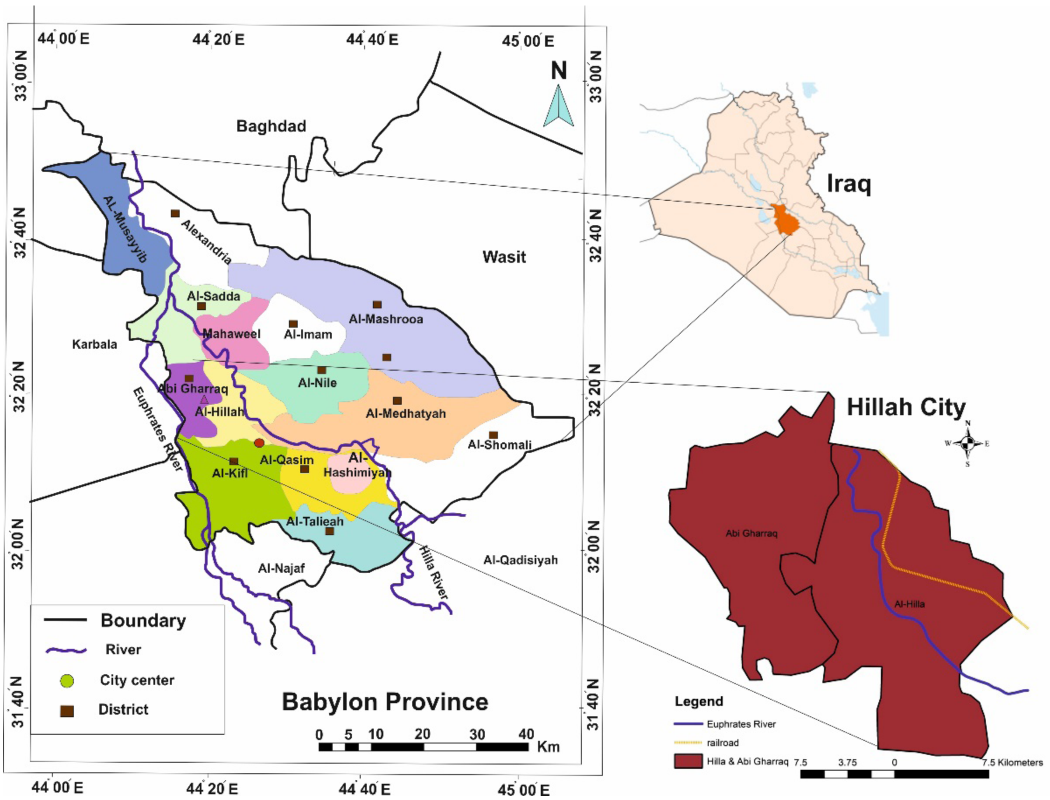

Figure 1. Hillah City geography

2.4 Epidemic location and case study

The case study was undertaken in Hillah city, mid-Iraq for Corona-19 based on a large number of infections spread all over the area during 2nd month / 2020 and 3rd month / 2022. Hillah is located south of the ancient city of Babylon in central Iraq. It is presented in Fig.1

2.5 Monthly Infections Assessment

Once the number of injuries and parameters affecting the epidemics spread are entered to Weka program, it is immediately analyzing the data to find special weights representing parameter activity extent, the values of these weights are usually fallen between (0-1). The number 1 points out to the high activity level and zero is specified for no effect for the parameter in epidemic spread. Weka reduces Eq.1 into a number of criterions exactly equal the number of the entered parameters. In this study, twenty one equations were obtained due to the actual effecting parameters.

For facilitating purposes and comparisons between the different area of Hillah, It was preferred to divide the city into 19 healthy administrative sectors. Table 1 and Fig.2 include the nomenclature, areas and perimeter of 19 sectors.

Table 1: Areas and perimeters of sectors

Sectors Symbols	Area, $*10^4 m^2$ = (hectare)	Boundary, km
S1	6749	65
S2	2340	23
S2	4566	35
S4	2624	26
S5	607	10
S6	489	11
S7	578	10
S8	3333	25
S9	1113	21
S10	1646	36
S11	1744	20
S12	747	20
S13	1967	27
S14	422	9.5
S15	395	12
S16	149	5
S17	131	4.8
S18	1353	26
S19	4112	39.3

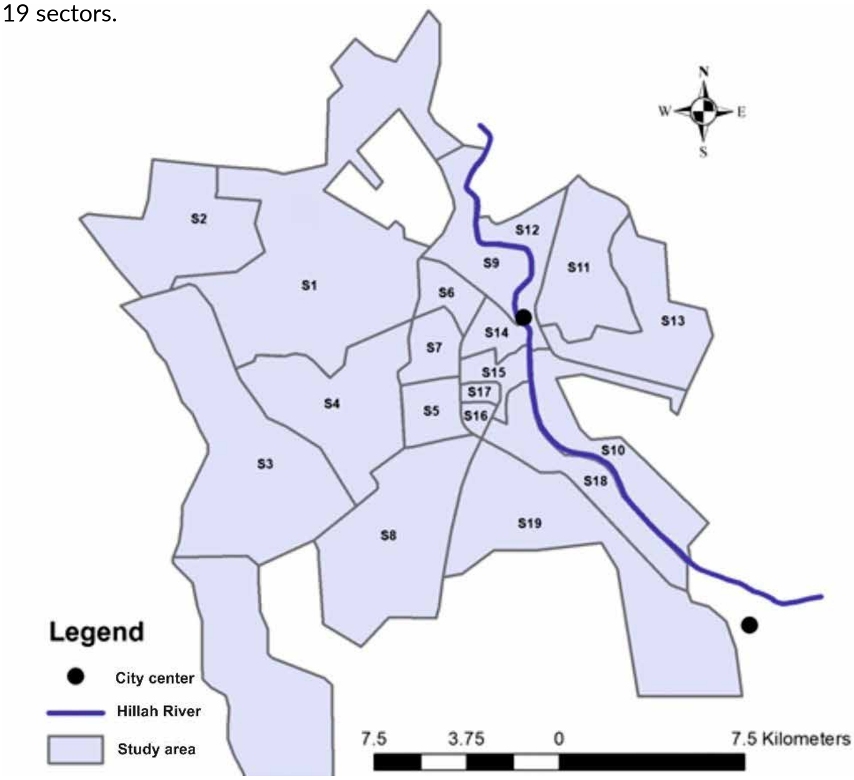

Figure 2. Spatial locations of Hillah healthy sectors

Table 2: Weights assignment for indicators of Hillah sectors

	Sectors																		
Indicators	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Small houses	8393	2922	4280	3364	5109	4626	6321	6866	9200	8923	5113	2255	4956	13917	7060	1439	1290	6530	5044
Big houses	4892	578	3045	4501	6320	5389	2208	6596	3222	3264	5597	2056	852	4926	3967	1542	1151	2423	7071
quarantine	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Rural / Urban	0.25	0.05	0.1	0.15	1	1	1	0.17	0.85	0.05	0.6	1	0.05	1	1	1	1	0.4	0.03
regular / arbitrary	0.2	0	0	0	1	0.9	0.92	0.12	0.2	0.03	0.4	0.75	0.04	0.7	0.9	1	1	0.12	0.03
Green spaces	0.65	0.85	0.9	0.7	0.03	0.01	0	0.73	0.25	0.86	0.22	0.1	0.85	0.05	0.08	0.15	0.1	0.45	0.87
Public areas	0	0	0	0.1	0	0.1	0.1	0.9	0.8	0	0.1	0.5	0	0.8	0.7	0	1	0	0
Commerce	0.5	0	0.1	0.5	0.1	0.5	0.2	0.2	0.5	0.1	0.3	1	0.8	0.9	0.9	0	0.1	0.1	1
Religious occasions	0.1	0.5	0.1	1	0.1	0.1	0.1	0.9	0.1	0.1	0.2	0.1	0.1	0.8	0.5	0.1	0	0.7	0.1
Tourist gatherings	0.1	0	0.15	0.1	0.75	0.1	0.6	0.5	0	0	0.3	1	0	0.9	0.7	0.7	0	0	0
Parks	0.2	0	0	0.6	0.7	0.8	0.95	0.3	0.4	0.2	0.7	0.8	0.3	1	0.9	0.8	1	0.6	0.8
Hospitals	0.2	0	0	0.8	1	0.8	1	0.4	0.5	0.7	0.9	1	0.5	0.8	1	1	1	0.9	0.3
Footpath	0	0	0	0	0	0.2	0.1	0	0.1	0	0	0.2	0	1	1	0	0.1	0	0
Public transportations	0.2	0.3	0.2	0.5	0.5	0.6	0.6	0.6	0.6	0.4	0.4	0.1	0.6	0.1	0.1	0.5	0.5	0.5	0.6
Average income	0.3	0.2	0.2	0.4	0.4	0.5	0.6	0.2	0.5	0.3	0.7	0.9	0.4	1	0.9	0.6	0.8	0.7	0.2
Cultural degree	0.2	0.1	0.1	0.5	0.6	0.6	0.8	0.2	0.7	0.4	0.8	0.9	0.5	0.9	0.9	0.8	0.85	0.7	0.3
Social cohesion	0.75	1	0.9	0.75	0.2	0.1	0.1	0.5	0.2	0.7	0.2	0.3	0.7	0.5	0.2	0.1	0.2	0.3	0.4
accreditation	0	0	0	0	0.1	0.1	0.1	0	0	0	0	0.2	0	0.3	0.2	0	0.1	0	0
Access to Technology	0.5	0.3	0.5	0.7	0.9	0.95	1	0.7	0.8	0.7	0.9	1	0.7	1	1	0.9	1	0.8	0.7
Education	0.6	0.4	0.3	0.75	0.9	0.9	1	0.6	0.8	0.8	0.95	1	0.6	1	1	0.95	1	0.75	0.6
Infrastructure development	0.2	0.1	0.1	0.2	0.7	0.5	0.7	0	0.6	0.1	0.7	0.85	0.1	0.8	0.7	0.5	0.75	0.3	0.2
Awareness to disaster	0.25	0	0	0.3	0.6	0.8	0.9	0.4	0.7	0.3	0.9	0.9	0.4	0.9	0.9	0.8	0.9	0.4	0.5

Before calculating the number of infections by Weka program, a weight between (0-1) is assigned to each indicator of the city's infrastructure, as in Table 2, which plays an important role in transmitting the virus. (0) is usually assigned for well-designed infrastructures and (1) for poor-designed and distribution infrastructures. If the sector is devoid of green areas, it is given one, and so on for all indicators, including climate and social indicators

2.6 Total infection of sectors

The infections size in any sector depends on the total number of residents, the extent of contact, friction among residents, and the deterioration of health services. In any case, it is noted that the total number of infections fluctuates in different sectors and is highest in the sector S6 with a value of 1597, while the lowest value 313 occurred in sector (2) in 2022 as indicated in Table 3

Table 3: Annual historical infections of Hillah City

	Sectors																		
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
2020 (11 months)	382	82	298	155	408	595	306	379	477	300	182	342	108	500	440	233	128	356	231
2021 (12 months)	858	227	557	505	806	969	724	907	636	637	573	727	603	789	679	416	359	614	342
2022 (3 months)	38	4	15	23	60	33	34	42	57	57	61	94	35	69	66	43	63	54	38
Total	1278	313	870	683	1274	1597	1064	1328	1170	994	816	1163	746	1358	1185	692	550	1024	1278
Monthly Ave	53	14	40	31	53	64	48	58	53	45	36	51	34	59	54	32	25	47	25
Monthly Max	159	62	134	93	171	195	196	179	143	163	122	175	115	185	167	69	62	104	87
Monthly Min	1	0	0	0	0	1	1	0	1	0	0	2	0	1	0	0	1	0	0

2.7 Factors affecting epidemic spread

2.7.1 Meteorology elements

Because the Corona 19 pandemic is a contagious biological disease, temperatures become the main factor in its spread. Accordingly, temperatures and relative humidity (R.H) were collected during the study period 1990 to 2021 and the average is included in Table 4, Siddiqui et al (2020), Bala et al (2021), Al-Hemoud et al (2021). The predicted temperatures and R.H in 2030 are also included.

Table 4: Average temp and R.H

	JAN	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
Temp	11	13	18	24	30	33	35	25	31	25	17	12
Temp, 2030	**12**	**15**	**21**	**26**	**31**	**35**	**37**	**37**	**33**	**27**	**19**	**15**
R.H	72	62	53	46	36	31	31	33	38	47	63	71
R.H, 2030	82	71	63	55	43	36	38	40	44	55	76	71

I) Population intensity

Population count data for the city of Hillah was collected for the years from 2011 to 2022, but the average and the predicted of the year 2030 are included in Table 5.

The population distribution at the peak of infection, which occurred in 2021, is plotted in Fig.3.

Table 5: Population intensity and annual infections of 2030

Sector	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19
Average	56380	14374	37684	24621	40843	35557	35223	61750	49750	47692	39317	28318	34637	45595	41082	12345	12131	33959	46859
Population intensity of 2030	73523	18573	47269	32170	52774	45205	45515	79784	59749	58851	44950	43282	55440	45594	48119	13601	14500	57866	57356
Annual infections of 2030	625	343	456	485	838	793	701	799	847	774	639	804	610	725	769	461	493	820	621

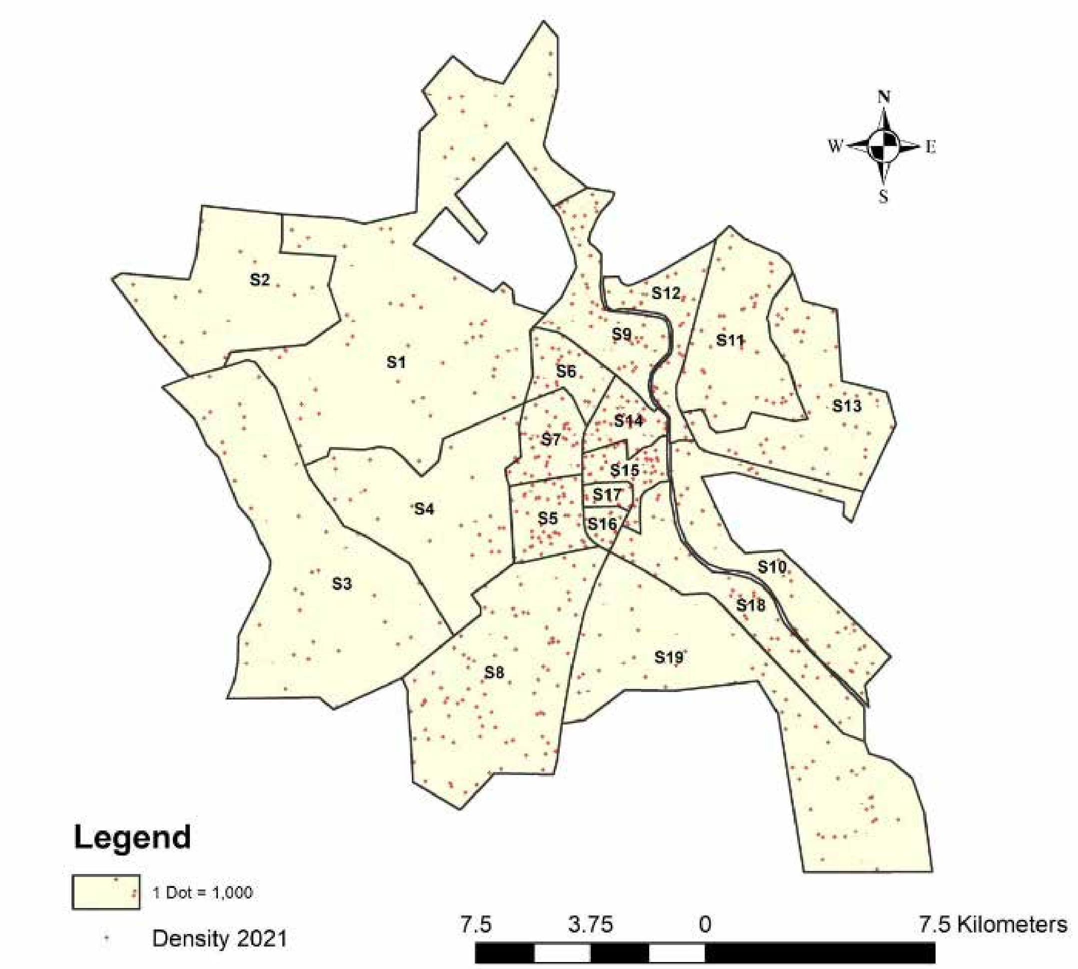

Figure 3. Population intensity in 2021

Population count data for the city of Hillah was collected for the years from 2011 to 2022, but the average and the predicted of the year 2030 are included in Table 5. The population distribution at the peak of infection, which occurred in 2021, is plotted in Fig.3.

I) Additional indicators

The most effective criteria that spread the epidemic are shown in Table 1.

2.8 Extreme distribution

This extreme mix distribution of Gamble, Weibull, and Fréchet type I, II, and III, Haan and Ferreira (2006) of Eq.7 and Eq.8 was used for prediction the mixing data of temperature, R.H, and population count during the recorded data period and also the probable population intensity for 2030. It is given by the following form:-

$$f(x)= \frac{1}{\beta} e^{\frac{x-\mu}{\beta}} e^{-e^{(x-\mu)/\beta}} \quad (7)$$

Where β and μ are factors depends on the time series and x is a random variable.

The mix distribution of Eq.7 may be reduced to the Standard Gamble Distribution, if μ takes 0 value and β takes 1, Eq.7 reduces to Soukissianand Tsalis (2015);

$$f(x)= e^{x} e^{-e^{x}} \quad (8)$$

The distribution of Eq.7 was used to predict both the missing and population intensity of the year 2030.

2.9 Percent reduction of infections (R)

The percent reduction of infection may be calculated by the following equation,

$$R = \frac{I_N - I_M}{I_N} * 100 \quad (10)$$

Where is the normal infections number, is the infections number after modification of the city’s infrastructure.

2.10 Model verification

When entering the indicators and their weights once with the monthly number of recorded infections, the number of infections for the same period must be calculated by model for the purposes of calibration and verification. The results of the calculated infections and the recorded one are represented in Fig.4.

The verification process by model requires comparing monthly infections of all sectors for total infective interval of 26 months. The total infection results equal 494. The model offers an acceptable coincidence between the calculated and the recorded count of infections. The correlation factor , RMSE = 23.855, MAE = 16.158, RAE =0.4812 and RRSE = 0.569 are all acceptable for such huge data.

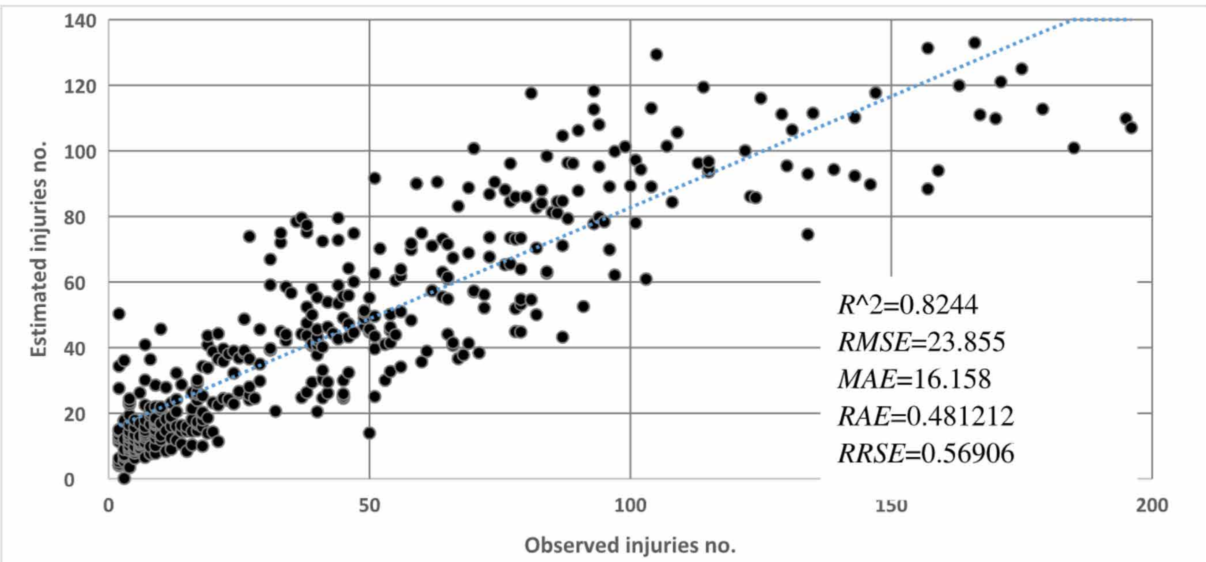

Figure 4. Verification between the calculated and recorded time series of infections

2.11 Population growth in 2030

Before starting prediction process for different scenarios, the population intensity for 2030 was estimated as included in Table 5. The population intensity for 2030 is shown in Fig.5, whereas Fig.6 indicates the population intensity comparison between 2021 and 2030. It is revealed that there is a noticeable increase in all sectors with a max of 39.2% occurred in Sector 18.

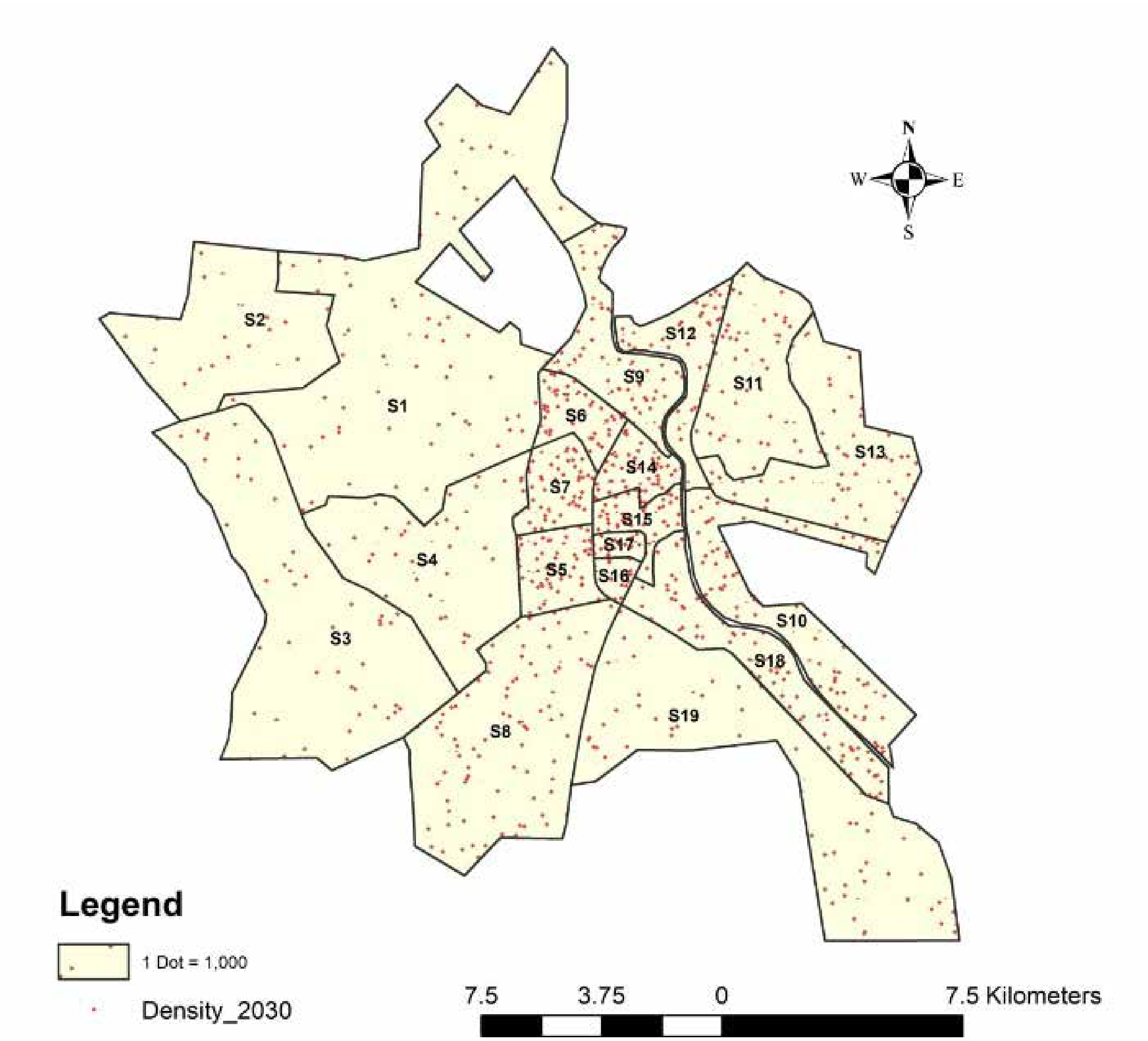

Figure 5. Population growth for 2030

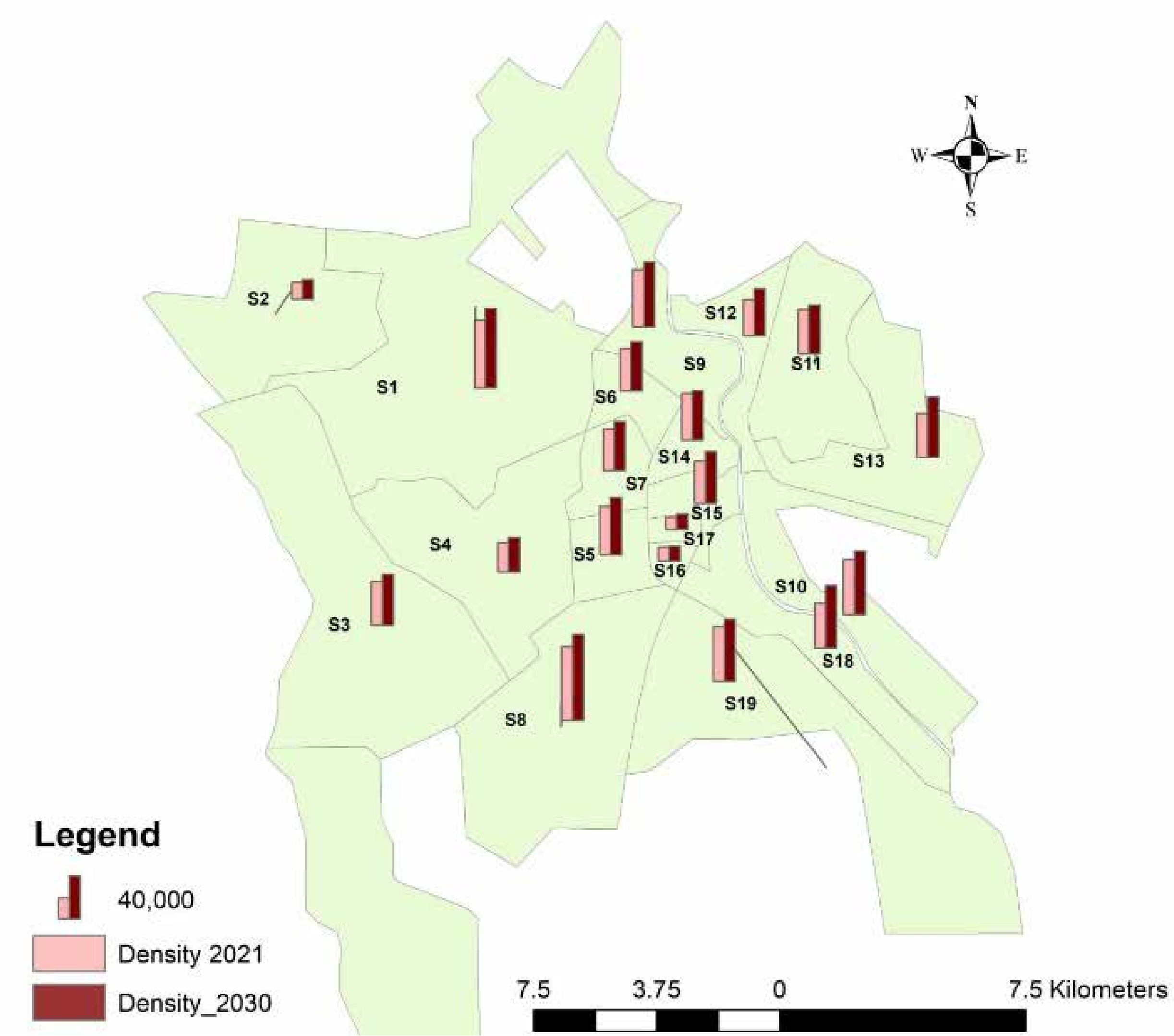

Figure 6. Population growth of 2021 and 2030

2.12 Predicting future infections

The current model is able to predict the potential future injury values for any year based on the criteria and indicators specific to Hillah city mentioned in Table 1 using the MP5 tree algorithm shown in Figure 7 which is one of the 21 algorithms in the Weka Program, but MP5 tree algorithm gave the best statistical measurements. Here the potential injuries were predicted for the year 2030 due to the availability of data for the ten-year strategic plan for Hillah city.

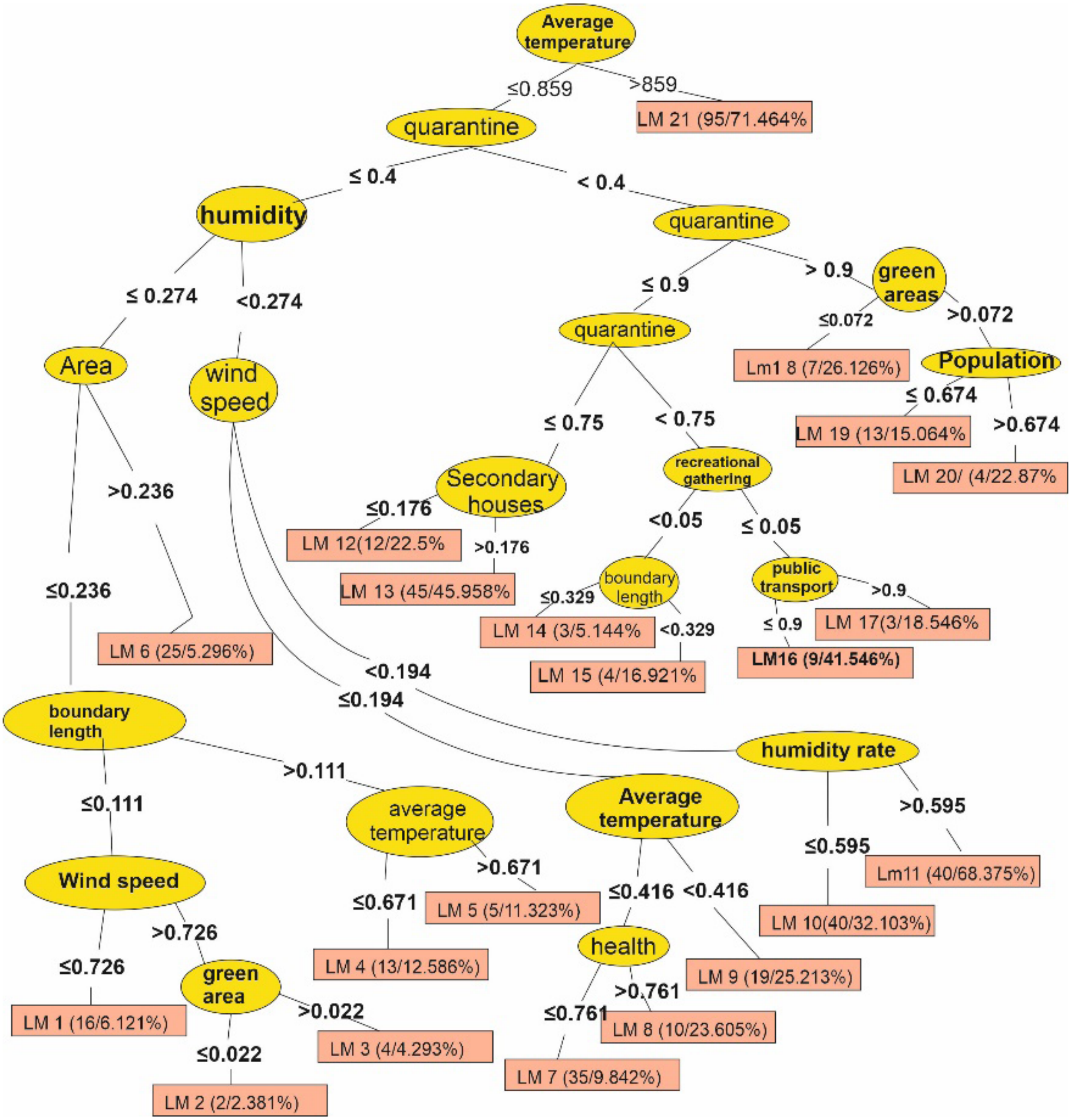

Figure 7. Model diagram using MP5 tree algorithm

Figure 7 illustrates the sequence of the calculation process in the model using MP5 tree algorithm. It was noticed that the mathematical model begins by calculating the number of infections with the indicator that has the most impact on the transmission of the virus, which begin with temperature, quarantine and humidity...etc.

3. Results and discussions

The importance of the current study lies in predicting the development and spread of the epidemic in the coming years based on the existing infrastructure in the city and the possibility of limiting the spread of the epidemic by changing the infrastructure and monitoring its impact through the number of infections calculated by the model. Several scenarios were developed, namely ***Predicted Infection*** (**PI**) of the year 2030 with the city's existing infrastructure, ***Changing Infrastructure*** (**CI**) , and ***Intelligent City*** (**IC**) scenarios**.**

Prediction of annual infections in 2030

The predicted monthly infections were estimated in 2030. For abbreviation purposes the annual infections were included in Table 5 and shown graphically in Fig.8. The variation of infections during 2030 is shown in Fig.9. The peak infection is unexpectedly happened in Jun; July and August due to the activity of the virus in hot weather, contrary to expectations, the Corona virus 19 is a type of influenza and is expected to be active in winter.

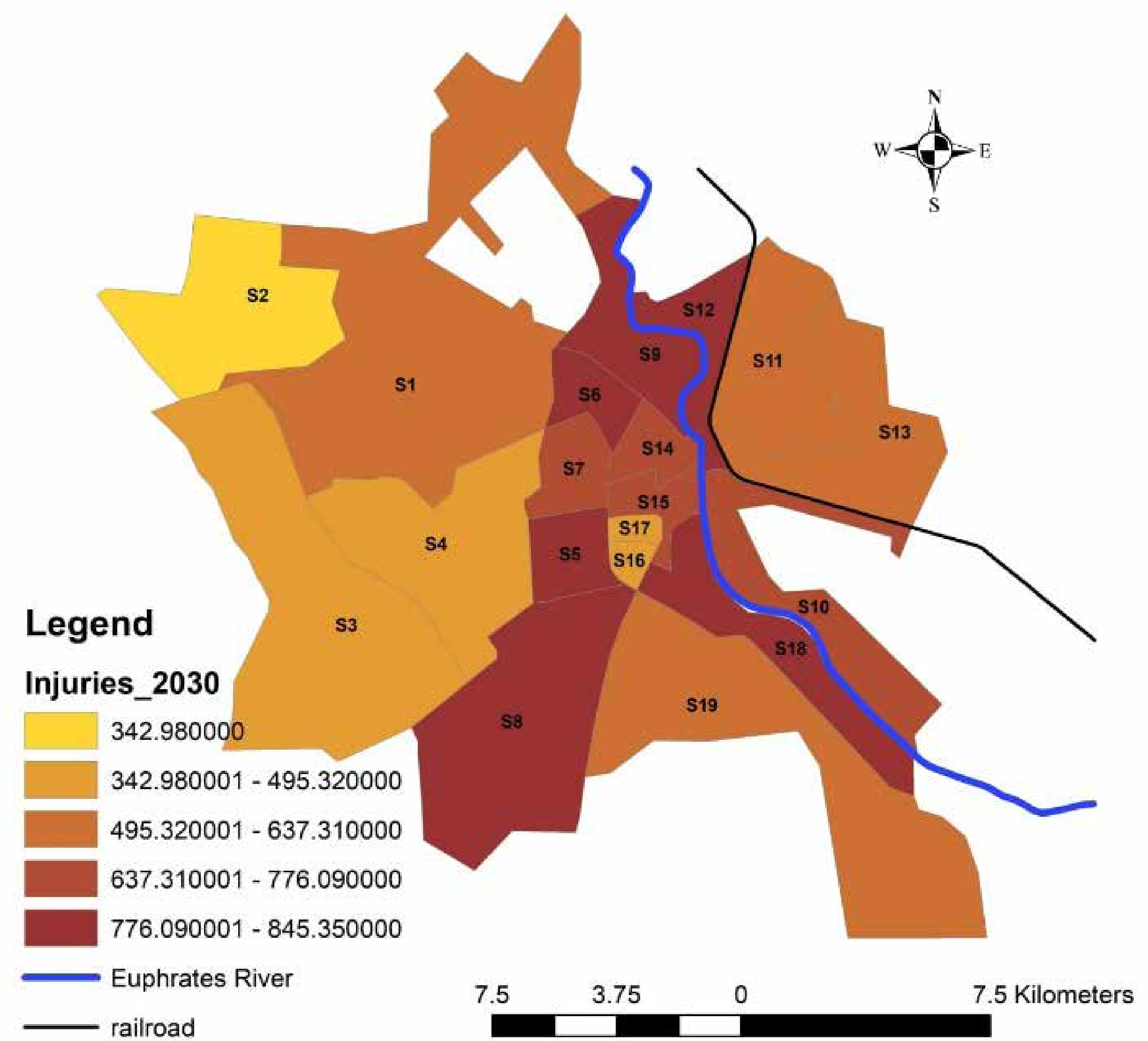

Figure 8: Spatial annual infections in 2030

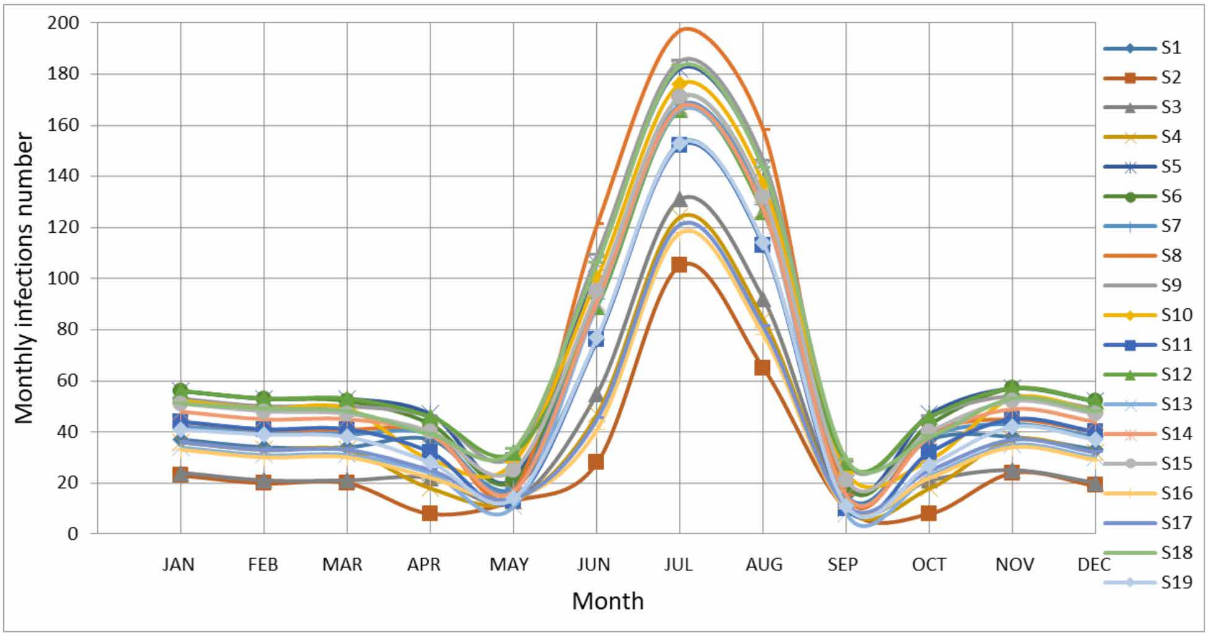

Figure 9: Variation of monthly infection during 2030

3.1 Future solution for the epidemic

To face any epidemic in the future, the current policy can be followed step by step by developing the city's infrastructure to ensure changing the indicators shown in Table 2 in order to obtain the lowest number of infections. Unfortunately, it is not possible to change all the indicators in Table 2 because some of them are not control, such as meteoroidal elements. While the city's infrastructure, such as markets and green spaces, can be changed and their indicators can be minimized to zero. Accordingly, future solutions to defeat virus threads can be divided into two parts:

3.1.1 Changing infrastructures (CI) scenario

In this scenario, the research includes developing the city's infrastructure so that the weights of the indicators change to reduce the spread of the virus. For instance, in Table 2, the indicator's weight of the ***Green Spaces*** is 0.65 in sector 1. If the green areas increase to become standard, the weight of this coefficient decreases to zero, and thus its effect on increasing the spread of the epidemic disappears, as shown in Eq.1. After modifying the weights of all indicators according to changing the specifications of the civil, architectural and social infrastructure as much as possible, a reduced number of monthly infections will be obtained.

Since the amount of data is very large because it becomes (12 months * 19 sectors), the results of infections presentation were limited to sectors (2, 5, 9, 12, and 14) in (Jan to represent winter) and (Jul to represent summer).

After the modification of the city infrastructures, and operating the model accordingly, the infections were

Table 6. Monthly infections and (R) in Jan and Jul in (2030)

Sector No.	Scenario	January		July	
		Infections No.	R	Infections No.	R
2	PI	17		105	
	CI	0	100	78	25.7
	IC	0	100	26	75.2
5	PI	37		182	
	CI	18	51	153	15.9
	IC	0	100	105	42.3
9	PI	53		185	
	CI	21	60.3	173	6.5
	IC	0	100	124	33
12	PI	56		166	
	CI	34	39.3	150	9.6
	IC	6.5	88.4	115	30.7
14	PI	48		167	
	CI	16	66.6	155	7.2
	IC	6	87.5	116	30.5

reduced a lot. For instance, in Jan and sector 9 the number of infections was reduced from 53 to 21, while it reduced from 173 to 185 in July. The small decrease in summer months is attributed to the activity of the virus due to the high temperature in Hillah summer.

3.1.2 Intelligent City (IC) scenario

The city of Hillah was completely redesigned according to the healthy standards of intelligent cities, Soukissian and Tsalis (2015), Pinheiro and Ferrari (2016), Lambert et al (2020), for the same sectors 2, 5, 9, 12 and 14 under a comparison for Jan and Jul in 2030. The results of the three scenarios were indicated in Table 9. Table 6 indicates that the infections number of sector 2 has been lowered from 17 to 0 in January and reduced from 105 to 26 in July and so on for other sectors. This is also referred to the virus activity due to temperature variation. It is noticed that the reduction percentage (R) is 100% in January and 75% in July

A comparison between the three scenarios was made and the percent reduction (R) was calculated by Eq.10 in January and July for the considered sectors as included in Table 6.

It was found that the percent reduction R of the infections number is more in the case of Intelligent City (IC) scenario than the Changing infrastructure (CI) scenario especially in January which was in the range (100-87.5) as indicated in Table 6. Figs (10 and 11) show the variations infections in different sectors. Since the redesigning of the city is too complicated due to huge amount of details, therefore the redesign was limited to a part of sector 9 of 0.605 km^2 in area as case study as shown in Fig.12.

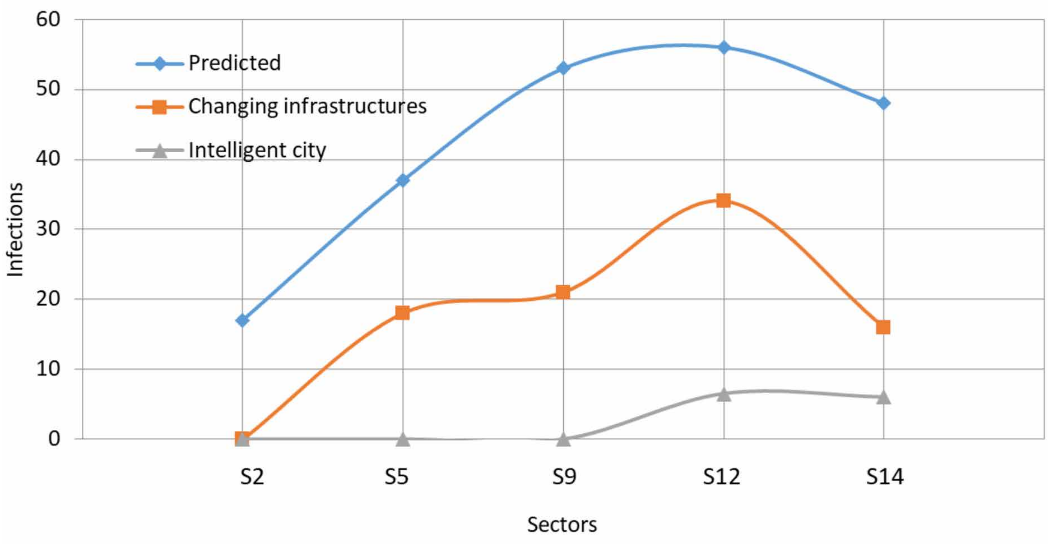

Figure 10: Infections in January in the year 2030

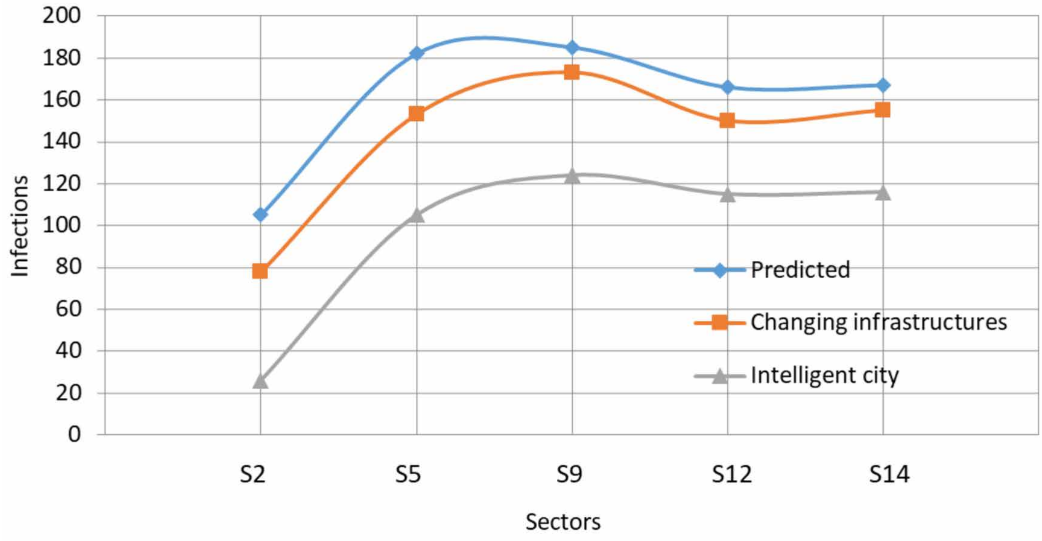

Figure 11: Infections in July in the year 2030

A) **Changing infrastructure**

B) **Intelligent design**

Figure 12 shows that the infrastructure of Sector 9 has changed a lot. Figure 12A shows the design according to the changing infrastructure (CI) scenario, while Figure 12B show the design according to the specifications of intelligent city (IC) scenario. It shows that the number of houses has decreased with the increase in green spaces, the width of roads, and the increase in the number of health centers, according to which the values of the weights of the indicators have been changed.

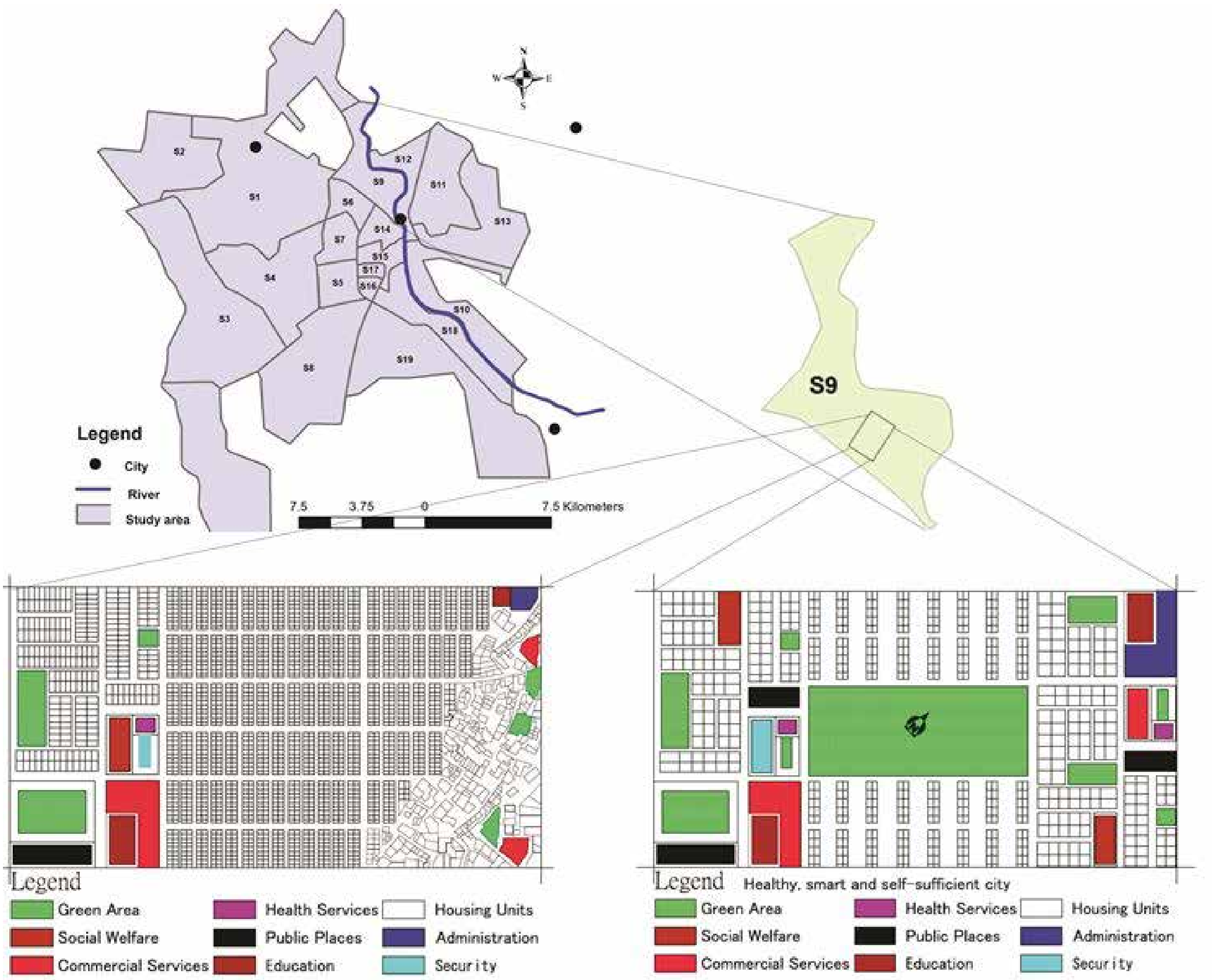

Figure 12: Intelligent design of a part of Sector 9

2. CONCLUSIONS

The current study developed scenarios to reduce the number of epidemic diseases to the minimum using the current mathematical model based on the Weka Program. The study relied on changing the infrastructure of old cities as much as possible towards the international specifications of the healthy city and also designing modern cities on the international foundations and specifications of the intelligent city to ensure reducing epidemic diseases to the minimum. The main finding is that the intelligent city has complete urban immunity in winter, with zero infections and maximum resistance in summer.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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