Monitoring and Analyzing the Spread of Drug Dealers "Drug Pills Addiction" Using the Geographic Information System (GIS) in Baghdad City for the period 2020 – 2021

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Abstract

   The phenomenon of the drug trade has become a concern for the whole world, due to its negative effects on societies and the frustration that it caused when spreading to all parts of the society after being prevalent among young people only. The purpose of the study is to detect and identify the presence of drug dealers' gangs and the possibility of their presence and spread according to the neighboring areas and the number of residents. According to the data of the Iraqi Ministry of Interior for the period 2020-2021, organized gangs of the drug trade have become rampant in Iraqi society and are not confined to a specific group or place, but are practiced by many due to the multiple entry and exit outlets for this trade and the lack of control over it. There are many reasons for this organized attack. It was processed using remote sensing techniques and Geographic Information Systems (GIS) ArcMapV10.4 and the use of shapes that simulate reality (shape files) as the study area, which is the city of Baghdad, the capital of Iraq, which was made according to satellite images of the Landsat Satellite, to provide a model to help decision-makers make a set of measures to reduce the spread of the phenomenon of drug trade in Baghdad, confine, and restrict it. The results of the study were that the population had the highest probability of gang spread (1.983-61.52) in the areas of Rashydea, Husseiniya1, Al-Shaab, and Rafydean (Al-Sadr) sub-districts, and the least probability (61.53-189.4) represented the rest of the study areas. The highest probability of spreading the work of drug gangs in relation to the city of Baghdad was (255.52-1,004.3) in Al-Sadr City 1, Al-Sadr City 2, and Rafydean sub-districts. Our study has pioneered in giving results that we believe are the first to be proposed at the level of researchers in the world using modern technologies that simulate reality according to contemporary analysis.

Keywords: Phenomenon of the drug, addiction to drug pills, RS Data, GIS, GPS, Production prediction maps.

رصد وتحليل انتشار تجار المخدرات "إدمان الحبوب المخدرة" باستخدام نظام المعلومات الجغرافية
(GIS) في مدينة بغداد للفترة (2020 - 2021)

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الخلاصة

أصبحت ظاهرة تجارة المخدرات مصدر قلق للعالم بأسره، بسبب المخلفات السلبية التي تركت آثارها على المجتمعات، وقد تركتها محبطة بعد أن تأثرت جميع قطاعات المجتمع بعد أن كانت سائدة بين الشباب فقط. الغرض من هذه الدراسة هو اكتشاف وتحديد وجود عصابات تجار المخدرات وإمكانية وجودهم وانتشارهم وفقًا للمناطق المجاورة وعدد السكان. ومن خلال بيانات وزارة الداخلية العراقية لعام 2021-2020 ، أصبحت العصابات المنظمة لتجارة المخدرات متفشية في المجتمع العراقي ولا تقتصر على مجموعة أو مكان معين، ولكن يمارسها العديد بسبب تعدد منافذ الدخول والخروج لهذه التجارة وعدم السيطرة عليها، وهناك العديد من الأسباب لهذا الهجوم المنظم. تمت معالجتها بواسطة تقنيات الاستشعار عن بُعد ونظم المعلومات الجغرافية (GIS) ArcMap v10.4)واستخدام الأشكال التي تحاكي الواقع (Shape files) كمنطقة الدراسة، وهي مدينة بغداد عاصمة العراق، والتي تم انتاجها وفقًا لـ صور الأقمار الصناعية للقمر لاندسات، لتوفير نموذج لمساعدة صانعي القرار على اتخاذ مجموعة من التدابير لتقليل انتشار ظاهرة الاتجار بالمخدرات في بغداد وإكمال الحصار عليها ومضايقتها واعتقالها.

كانت نتائج الدراسة، التي كان لها أعلى احتمال لانتشار العصابات بالنسبة للسكان (61.52-1.983) في مناطق ناحية الراشدية، ناحية الحسينية1، ناحية الشعب1 ، و قضاء الرافدين (مدينة الصدر)، وأقل احتمال (189.4-61.53) ، وتمثل بقية المناطق. وكان أعلى احتمال لنشر عمل عصابات المخدرات بالنسبة إلى مساحة مدينة بغداد (255.52-1,004.3) ، والمناطق هي مدينة الصدر1 ، مدينة الصدر2 و قضاء الرافدين.

كانت دراستنا رائدة في هذا الحقل، وقد أعطت نتائج نعتقد أنها أول من يقترح على مستوى الباحثين في العالم باستخدام التقنيات الحديثة التي تحاكي الواقع وفقًا للتحليل المعاصر.

الكلمات الرئيسية: ظاهرة المخدرات، الإدمان على حبوب المخدرات، بيانات RS، GIS، GPS ، انتاج خرائط التنبؤ.

Introduction

After 2003, Iraq has been considered a transit and a consumer of narcotic substances, while in the preceding years, it was only a transit point for them. Statistics, issued by the United Nations, suggest that the next 10 years will kill the Iraqi youth if the situation remains as it is. Iraq has become a major passage for the drug trade, as it is located in the middle between producing and consuming countries, and it is known that in countries that become transits for drugs, 10% of the children are addicted to these deadly curses [1].

Iraq has become a popular market for the spread, smuggling, and consumption of drugs, including the presence of four types of drugs that are smuggled into the country, confiscated, and whose promoters are arrested daily, the most important of which are Captagon pills and psychotropic substances. Although this drug is banned worldwide, it is difficult for the authorities in Baghdad to thwart its spread for many reasons and factors.

The risk of drug spread is linked to the escalation of crimes in societies, as one study indicated the seriousness of drug spread among members of society responsible for the vast majority of crimes, including 70-80% of thefts and 85% of shoplifting. It concluded that losses from these crimes were estimated as £16 billion annually in the UK [2].
Except for some of the intelligence and tactics that the group's leader in the regions has, drug trafficking, particularly the trade in pills and psychoactive chemicals, has easily turned into a lucrative venture for those in marketing, such as the employment of advanced technologies, where gangs with smugglers use technology to track their goods, communicate with one another to sell their products, and launch their warnings, among other things. As a result, one

of the drawbacks of modern technologies is that they are abused by these gangs, who are dispersed throughout the globe [3].

To combat drug trafficking and smugglers, arrest them, conduct investigations, and protect people and society in the future, it was crucial for law enforcement agencies to be proficient in current technology. It was also crucial to be aware of and keep up with their cutting-edge tactics. If law enforcement's work is dull and repetitive, it will always take advantage of those who possess technological intelligence and use it to its advantage rather than the state by conducting routine operations to identify the threats posed by such intelligent individuals [4] [5].

To save time, law enforcement might organize information and evidence into databases that they share among themselves. However, it is challenging to train cadres to assess this data, which covers all facets of drug trafficking cases. Therefore, it was important for these organizations to keep up with the latest advancements in quick information technology, including intelligent analysis software that aids in gathering, sorting, and disseminating information to the appropriate authorities. If they do not follow development and progress and address problems rapidly, this will harm these organizations' ability to execute their jobs and cause a setback for society [6] [7]. Reducing drug trafficking, boosting law enforcement, and bringing about justice will help accelerate investigations, confront gangs with incontrovertible scientific proofs, forge local and international relationships, and strengthen the exchange and disaggregation of data [8].

Remote sensing is an art and science that relies on energies emitted from objects in the form of wavelengths to be picked up by portable camera lenses on aircraft or satellites, as well as the numerous applications of these techniques, which are provided by legal and less time-consuming means, including the spatial accuracy to install juveniles. For the aim of making these events visible, GPS was delivered in space and placed there, and there was good flexibility to read ground measurements in several universal offices [9].

The Geographic Information System (GIS) is a clever program installed on the computer that has been harnessed for data management, storage, and utilization. These data are in the form of schedules or databases, which can be used to benefit from these data and relate them to event sites and descriptive information to extract relationships and phenomena reflecting the interest of data for mapping to help individuals, groups, and law enforcement agencies stop the spread of Captagon pills and psychotropic substances trafficking, and analyze events that occur on the Earth [10] [11].

The aim of this research is to monitor the gangs of drug dealers (addiction to drug pills) in Baghdad City, detect their presence, and determine the possibility of their spread according to their regions, neighboring areas, and the number of the population, through the data of the Iraqi Ministry of Interior for the year 2021.

Methodology and Material
The study area
Baghdad, the administrative and economic capital of Iraq, is considered the center of commercial, cultural, and population gravity. According to the census of 2022, the city's population was about 9.1 million with different ethnicities, located between the longitude and latitude from the top left. (43 50.06° → 33 45.68°) and from the bottom right (44 57.23° → 32 48.59°). The Universal Transverse Mercator (UTM) projection is located from the top left (391,695.26 - 3736045,936) meters and the bottom right (495,676,664 - 362,683,223) meters with an area of 5215,200 square kilometers, and the study area is 2037,733 square kilometers.

The highest elevation in the north of Baghdad is 49 meters above sea level, and in the south it is 24 meters above sea level, as shown in Figure 1 [11] [12].
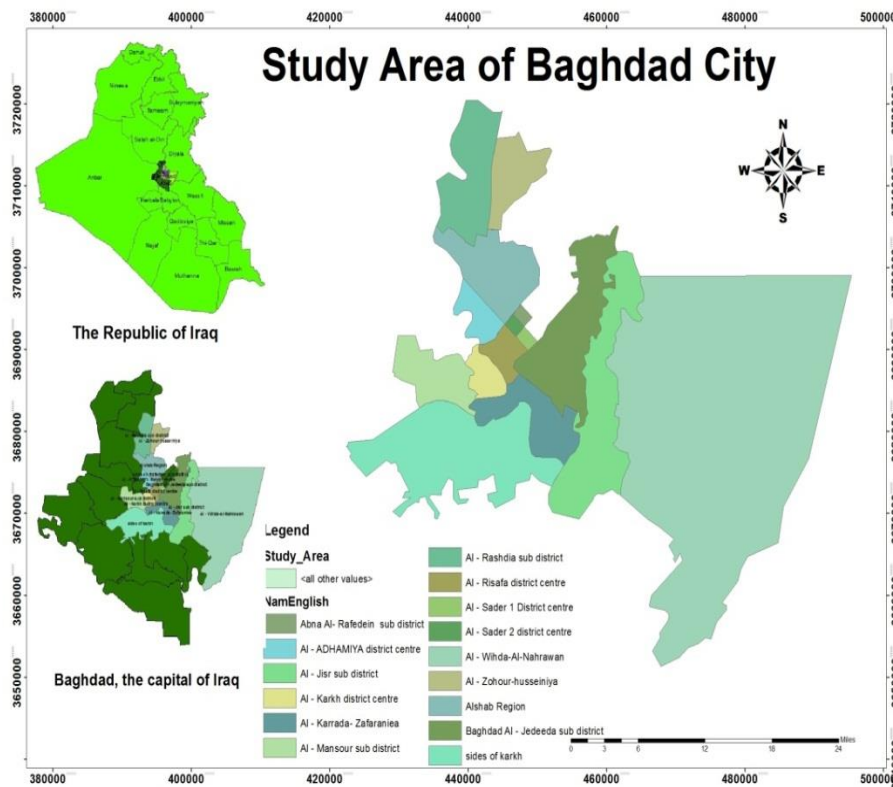

Figure 1: The figure shows the study area, which represents fifteen areas in the west of Baghdad City, Baghdad City is the administrative and economic capital of Iraq and is located in the middle.

General Description and Demographics of the Study Area

Administratively, Baghdad City contains 15 districts and 33 sub-districts. Most of human and residential activities are concentrated in the center of Baghdad [13]. It is surrounded by three rivers (Tigris, Euphrates, and Diyala), orchards, farms, natural plants, and artificial lakes for fish farming. Public and secondary roads cover most of Baghdad City, and the highway and international networks cover central Baghdad, western and eastern edges, and extend from north to south towards other governorates, facilitating rapid movement [14]. The study area was dominated by the nature of popular housing due to the splitting of families with the increasing number of residents in the same areas, so the house is divided into several small secondary houses due to the lack of development activity in Baghdad City and the lack of organizational and expansion plans. The rule of law and surveillance contributed to the spread of Captagon pills and psychotropic substances crime [15].

Data Acquisition

Attempting to obtain any type of organized crime data, including the trade in Captagon pills and psychotropic substances, is not easy, especially dealing with recent data due to its confidentiality, and some of the investigation procedures have not been completed by law enforcement agencies.

The research requires locating the gangs or their area of presence, at least with extreme accuracy, and it was best to use the GPS device, which helped us analyze the spread of these dangerous substance gangs on the population and determine their impact on the Baghdad City area. Samples were collected from the Anti-Narcotics Directorate of the Iraqi Ministry of Interior for the year 2021. Fifteen gangs in this dangerous substance were dealt with, as shown in Tables 1 and 2.

Table 1: The total of the gangs of drug dealers of Captagon pills and psychotropic substances and their GPS locations, the number each gang members, the type of trade, and the address of each location.

No	Latitude	Longitude	Type of Crime	Address	Number of accused	place of Crime
1	33.362	44.447899	Narcotic Substances	Al-Sadr City1	3	Baghdad
2	33.3759	44.427399	Narcotic Pills	Al-Sadr City2	8	Baghdad
3	33.3245	44.352299	Narcotic Substances	Mansour Sub-District	5	Baghdad
4	33.3054	44.481602	Narcotic Pills	Baghdad Al-Jadida	19	Baghdad
5	33.2586	44.3568	Narcotic Pills	Al-Karkh Site	19	Baghdad
6	33.3776	44.710899	Crystal drug trade	East of the capital Baghdad	4	Baghdad
7	33.4094	44.429901	Crystal drug trade	Al-Shab Region	1	Baghdad
8	33.5506	44.413898	Narcotic Substances	Husseiniya1	5	Baghdad
9	33.2542	44.512798	Crystal drug trade	Zafaraniea	13	Baghdad
10	33.2309	44.529999	Narcotic Substances	Aljyser Sub-District	2	Baghdad
11	33.3311	44.386799	Crystal drug trade	Al-Alkarkh District	6	Baghdad
12	33.3331	44.413601	Narcotic Substances	Al-Rysafa District	1	Baghdad
13	33.3847	44.3913	Crystal drug trade	Al-Adhamyea District	2	Baghdad
14	33.3862	44.439602	Narcotic Substances	Rafydean Sub-District	1	Baghdad
15	33.5365	44.354198	Narcotic Substances	Rashydea Sub-District	5	Baghdad

Table 2: The coordinate system was converted from the GPS readings from the geographical location to the metric (UTM) to calculate the working areas of the Captagon and psychotropic drug dealer gangs with the total area of Baghdad, in addition to the number of gang members and the address of each location.

No	Latitude	Longitude	X-Coordinate	y-Coordinate	Address	Number of accused
1	33.362	44.447899	448640	3691560	Al-Sadr City1	3
2	33.3759	44.427399	446735	3693110	Al-Sadr City2	8
3	33.3245	44.352299	433916	3689260	Mansour Sub-District	5
4	33.3054	44.481602	451739	3685270	Baghdad Al-Jadida	19
5	33.2586	44.3568	440089	3680150	Sides of karkh	19
6	33.3776	44.710899	464712	3688760	Al-Nahrawan	4
7	33.4094	44.429901	446994	3696820	Al-Shab Region	1
8	33.5506	44.413898	445596	3712480	Husseiniya1	5
9	33.2542	44.512798	454621	3679570	Zafaraniea	13
10	33.2309	44.529999	456208	3676990	Aljyser Sub-District	2

11	33.3311	44.386799	442934	3688160	Al-Alkarkh District	6
12	33.3331	44.413601	445428	3688370	Al-Rysafa District	1
13	33.3847	44.3913	443384	3694100	Al-Adhamyea District	2
14	33.3862	44.439602	447880	3694240	Rafydean Sub-District	1
15	33.5365	44.354198	440040	3710960	Rashydea Sub-District	5

Types of Drug Pills
Types and Forms of Drug Pills
Various types of drugs manufactured under general names as narcotic pills have been detected, and they are called in the following forms [16]:
1. Capsules
2. Chewable tablets
3. Traditional tablets
4. Sublingual tablets
5. Soft gels
6. Sprinkle capsules
7. Effervescent tablets
8. Oral disintegrating tablets

Figure 2: The most important types of drug pills are desired and common among addicts, and often their number is eight or a little more.

How Do the Pills Work?
    When taking narcotic pills, it is the same as any drug that takes its course to the stomach and then the intestines, and the process of absorption and its passage into the bloodstream changes, and then it will be turned (cracking) in the liver to be sorted and distributed again until it reaches the brain, the center of the distribution of nerve signals, and this process is called (traffic effect). First, before its actual effect on the body begins, that is, the effect of the drug is spread throughout the body and its effect is weak. The first time, the concentration of the drug is weak, but in the meantime, the body feels a little euphoria and a comfortable change in which the user needs to take another quantity to discover that its effect is greater and faster, and thus the user finds it difficult to leave it, especially if he really needs it as a result of life pressures or entertainment, for example.

    There are other ways to bypass the "first-pass effect" by taking intravenous doses or inhaling the powder that reaches the bloodstream directly [17] [18]. Medicines you swallow are subject to a concept called the "first pass effect". The first-pass effect is when the body

metabolizes (breaks down) the drug before it can take effect. This usually occurs in the liver, but it can occur in other areas of the body as well. This process reduces the concentration of the original drug. So only some of the medicines in the pill circulate through the bloodstream or the area in the body that they are supposed to affect [19].

The first-pass effect is important when it comes to choosing a type of birth control pill. The drugs still need to work once they are metabolized. Therefore, if the effect of the first pass lowers the drug concentration too much, another dosage form may be required. Some medicines avoid the first-pass effect because they enter the bloodstream directly. These include injectable medications and some topical products (those that are placed on the skin). Pills that dissolve in the mouth, such as sublingual tablets, also avoid the first-pass effect [20].

Types of Drug Pills (Natural and Synthetic)
1- Natural Drug
It is made directly from natural herbs. Most people in the world know the nature of these drugs, which are used directly to relieve emergency pain, such as toothache, and in some small and large surgeries that require pain relief, the patient becomes addicted.
Among these natural drugs:
Opium is extracted from poppy leaves.
Cocaine is extracted from the coca plant.
Hashish and banjo are extracted from the cannabis plant.

2- Synthesized Drugs
These drugs are manufactured and extracted from chemicals and are divided into two types:
❖ Drugs for medical use as narcotic substances such as morphine, ketamine, tramadol, amphetamine, and a benzodiazepine group.
❖ Modern drugs manufactured for commercial and profitable purposes that are more desirable to young people for their quick and strong effects, which are characterized by their narcotic side effects that are more dangerous, powerful, and affect human health negatively. The most important types of these drugs are Voodoo and Astrox.

The Spread of Drug Pills in Iraq
The trade of this substance in Iraq spread rapidly, and the demand for it increased by the youth and adolescents after the war on Iraq and its occupation by the coalition countries, led by America in 2003. The dictatorial regime caused psychological and physical sufferings as a result of arrest, torture, and harsh measurements [21].

These procedures and provisions were greatly reduced, in addition to the change in the nature of the system of government to democratic, pluralistic rule, and the decentralized management of many regions, which led to a significant reduction in harassment against drug traders, and most importantly, the number of drug users increased significantly, as a result of several factors, the most important of which is the spread of terrorist organizations in Iraq [22], which trade and use this substance in the absence of authority. On the other hand, the numbers of the Iraqi security forces have increased to combat these organizations, and the fighters have used drugs to a large extent, also far from the control of the authority. Another reason was the increase in the number of unemployed youths, which allowed the work in the drug trade for quick profit, and the increase in drug users to relieve their psychological and societal pressures. Furthermore, there was the weakness of the official authorities of the state, which allowed the domination of tribesmen in the border areas and the areas nearby, as well

as the nature of geopolitical conditions and the topography of the many areas in Iraq, from the marshes, mountains, deserts, valleys, and extending with the neighboring countries [23]. It is added that most of the narcotic pills are easy to carry and easily hidden during movement and smuggling, which makes it an easy trade between neighboring countries, which have a long history of drug trafficking, to the extent that the latest statistics of the Ministry of Interior were eleven thousand cases seized of drug trafficking during nine months all over the country for the year 2022 [24].

Interpolation and Contour Line Technique
The interpolation method is the process of using data with known values to estimate data with unknown values. The IDW method assumes that this correlation can be defined as a function of the inverse distance of any of the adjacent points. Things that are close to each other are more alike than things that are divergent [25], [26]. To predict unmeasured location values, IDW interpolation uses the measured values surrounding the predicted location. IDW assumes that for every point that is measured, there are some local points whose effect diminishes with distance. IDW is an exact typeface [27] [28]. This means that the predictions will be exactly equal to the value of the data if predictions occur at locations where data has already been collected [29]. This method is mainly based on estimating the height of the unknown points by calculating the distances from this point to the other of the known points, as shown mathematically by the following equations [30] [31]:

$$Z(x,y) = \frac{\sum_{i=1}^{n}\left[\frac{z_i}{d_i^p}\right]}{\sum_{i=1}^{n}\left[\frac{1}{d_i^p}\right]}$$ ………, (1).

$$Z(x,y) = \sum \lambda_i * z_1 \xrightarrow{with} \sum \lambda_i = 1$$ ………., (2).

Where;
$Z(x, y)$ represents the predicted value at the ensample location X,Y.
d_i is the plan metric distance between the reference point and the *ith* interpolation point;

$$d_i = \sqrt{(x_i - x)^2 + (y_i - y)^2}$$ ………., (3).

Where;
i: is the measured sample point number within the neighborhood defined.
Z_i : represents the observed value at location i.
d_i : represents the distance between the estimated placement X,Y and the measured location *i*.
λ_i : represents the distance-dependent weight associated with each sample point.
p : represents the power parameter that defines the rate of reduction of the weight as distance increases.

Results and Discussion
Data Acquisition:
To control drug addiction, GPS has been used to determine the exact location of each gang, control the analysis of these dangerous events on the population, and determine the effect of its work spread on the residents and area of Baghdad City. Samples were collected from the Drug Enforcement Directorate in the Ministry of Interior for the year 2021. There were about fifteen gangs dealing with this trade, as shown in Tables 3 and 4.

Table 3: The number of crimes of "addiction to drug pills" officially registered for Baghdad City in the year 2021.

No	Latitude	Longitude	Type of Crime	Address	Number of accused
1	33.362	44.447899	Narcotic Substances	Al-Sadr City1	3
2	33.3759	44.427399	Narcotic Pills	Al-Sadr City2	8
3	33.3245	44.352299	Narcotic Substances	Mansour Sub-District	5
4	33.3054	44.481602	Narcotic Pills	Baghdad Al-Jadida	19
5	33.2586	44.3568	Narcotic Pills	Sides of Karkh	19
6	33.3776	44.710899	Crystal drug trade	East of the capital Baghdad	4
7	33.4094	44.429901	Crystal drug trade	Al-Shab Region	1
8	33.5506	44.413898	Narcotic Substances	Husseiniya1	5
9	33.2542	44.512798	Crystal drug trade	Zafaraniea	13
10	33.2309	44.529999	Narcotic Substances	Aljyser Sub-District	2
11	33.3311	44.386799	Crystal drug trade	Al-Alkarkh District	6
12	33.3331	44.413601	Narcotic Substances	Al-Rysafa District	1
13	33.3847	44.3913	Crystal drug trade	Al-Adhamyea District	2
14	33.3862	44.439602	Narcotic Substances	Rafydean SuB-District	1
15	33.5365	44.354198	Narcotic Substances	Rashydea Sub-District	5

Table 4: The number of drug crimes (drugs, pills, and crystals) officially registered for the City of Baghdad for the year 2021.

No	Latitude	Longitude	X-Coordinate	y-Coordinate	Address	Number of accused
1	33.362	44.447899	448640	3691560	Al-Sadr City1	3
2	33.3759	44.427399	446735	3693110	Al-Sadr City2	8
3	33.3245	44.352299	433916	3689260	Mansour Sub-District	5
4	33.3054	44.481602	451739	3685270	Baghdad Al-Jadida	19
5	33.2586	44.3568	440089	3680150	Sides of Karkh	19
6	33.3776	44.710899	464712	3688760	Al-Nahrawan	4
7	33.4094	44.429901	446994	3696820	Al-Shab Region	1
8	33.5506	44.413898	445596	3712480	Husseiniya1	5
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14	33.3862	44.439602	447880	3694240	Rafydean Sub-District	1
15	33.5365	44.354198	440040	3710960	Rashydea Sub-District	5

And now the locations of the gangs that deal with drugs (crystal substance) are determined in different areas of Baghdad City after taking their locations with a GPS device and dropping them on the maps of Google Earth, as shown in Figure 3.

Al-Sadr City1 District	Al-Sadr City2 District	Mansour Sub-District
Baghdad Jadida Sub-District	Sides of Karkh Sub-District	Al-Nahrawan
Al-Shab Region	Ausseiniya1	Zafaraniea
Aljyser Sub-District	Karkh District	Al-Rysafa District
Al-Adhamyea District	Rafydean Sub-District	Rashydea Sub-District

Figure 3. The location of the drug gangs in the study area was determined by using GPS.

In order to know the impact of drug gangs on society in this study, it is necessary to map the spread of these gangs. The application of the interpolation technique and the selection of the Inverse Distance Weight (IDW) process is the best way to predict the spreading areas of these gangs as well as their impact on the population of Baghdad City. A very important benefit of the results of these maps is to determine the presence of these gangs. Distributing the tasks of crime-fighting men in a better and more focused manner will limit the spread of these gangs, tighten the noose around their work, catch them easily, and bring them to justice so that they may receive their just punishment.

According to the operations of linear mathematics (ratio and proportion).

The weighted value was extracted for:

1.   The number of gangs dispersed in their residential areas in relation to the population of Baghdad City.

2.   The number of gangs dispersed over the area of their presence in Baghdad city, as in the following equations:

The number of residents in Baghdad city for the year 2020 is equal to 9200500.

The probability of gangs for residents = (No-Accused*population region /Baghdad population) * 0.1   ……., (1).

Baghdad total in kilometers squared = 5215.3 k^2

The probability of gangs for area = (No-Accused*Area/Area of Baghdad) * 0.1 …., (2).

And when applying the ratio and proportion equations as in Tables 5 and 6, as shown Figures 4, 5, 6, and 7.

Table 5: The possibility of an increase in the number of people accused of selling drugs in all areas of Baghdad City.

No	Address	Number of accused	District Area	Probability [Number of accused] *5215.299515/ Area
1	Al-Sadr City1	3	4443290	352.124
2	Al-Sadr City2	8	3892400	1071.89
3	Mansour Sub-District	5	65709700	39.6844
4	Baghdad Al-Jadida	19	142348000	69.6135
5	Sides of Karkh	19	230751000	42.9427
6	Al-Nahrawan	4	1027090000	2.0311
7	Al-Shab Region	1	93813400	5.55923
8	Husseiniya1	5	56382000	46.2497
9	Zafaraniea	13	169868000	93.5263
10	Aljyser Sub-District	2	72470900	6.14042
11	Al-Alkarkh District	6	23671400	132.192
12	Al-Rysafa District	1	14064800	37.0805
13	Al-Adhamyea District	2	27242800	38.2875
14	Rafydean Sub-District	1	3647920	142.966
15	Rashydea Sub-District	5	102320000	25.4852

Table 6: The possibility of an increase in the number of people accused of selling drugs in the entire population of Baghdad City.

| No	Address	Number of accused	Population	Probability [Number of accused] *9200.500 / Population
1	Al-Sadr City1	3	456.217	24.2076
2	Al-Sadr City2	8	501.710	194.895
3	Mansour Sub-District	5	863.609	12.076
4	Baghdad Al-Jadida	19	680.629	16.4649
5	Sides of Karkh	19	1200.180	20.2417
6	Al-Nahrawan	4	180.332	20.2162
7	Al-Shab Region	1	542.69	1.69535
8	Husseiniya	5	708.472	24.994
9	Zafaraniea	13	380.421	42.8508
10	Aljyser Sub-District	2	274.111	12.9387
11	Al-Alkarkh District	6	506.905	55.5686
12	Al-Rysafa District	1	787.566	8.89883
13	Al-Adhamyea District	2	700.542	7.3433
14	Rafydean Sub-District	1	398.382	6.83244
15	Rashydea Sub-District	5	257.591	122.23
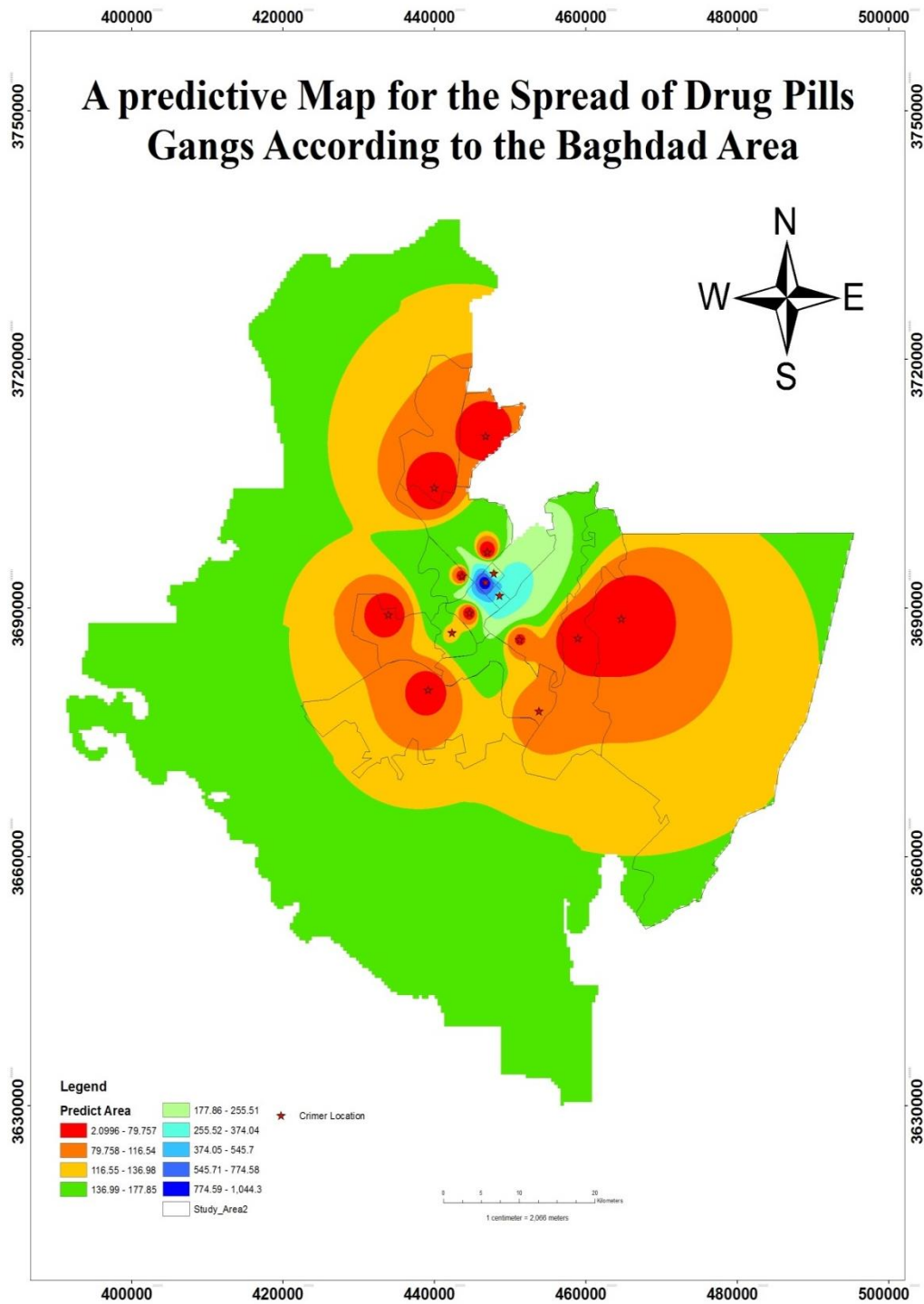
Figure 4: The interpolation technique shows the spread of drug crime according to gang members in neighboring areas if they have the opportunity and without the supervision of competent authorities.

The previous map shows the predictive ranges of the phenomenon of drug trafficking according to population numbers, living status, and the cultural and educational level of the population at the sites of the spread of the phenomenon. The population decreases as we move away from the site of the phenomenon, and therefore the degree of awareness is higher when moving away from the location of the phenomenon, and this varies from one location to another, as shown in the map below:
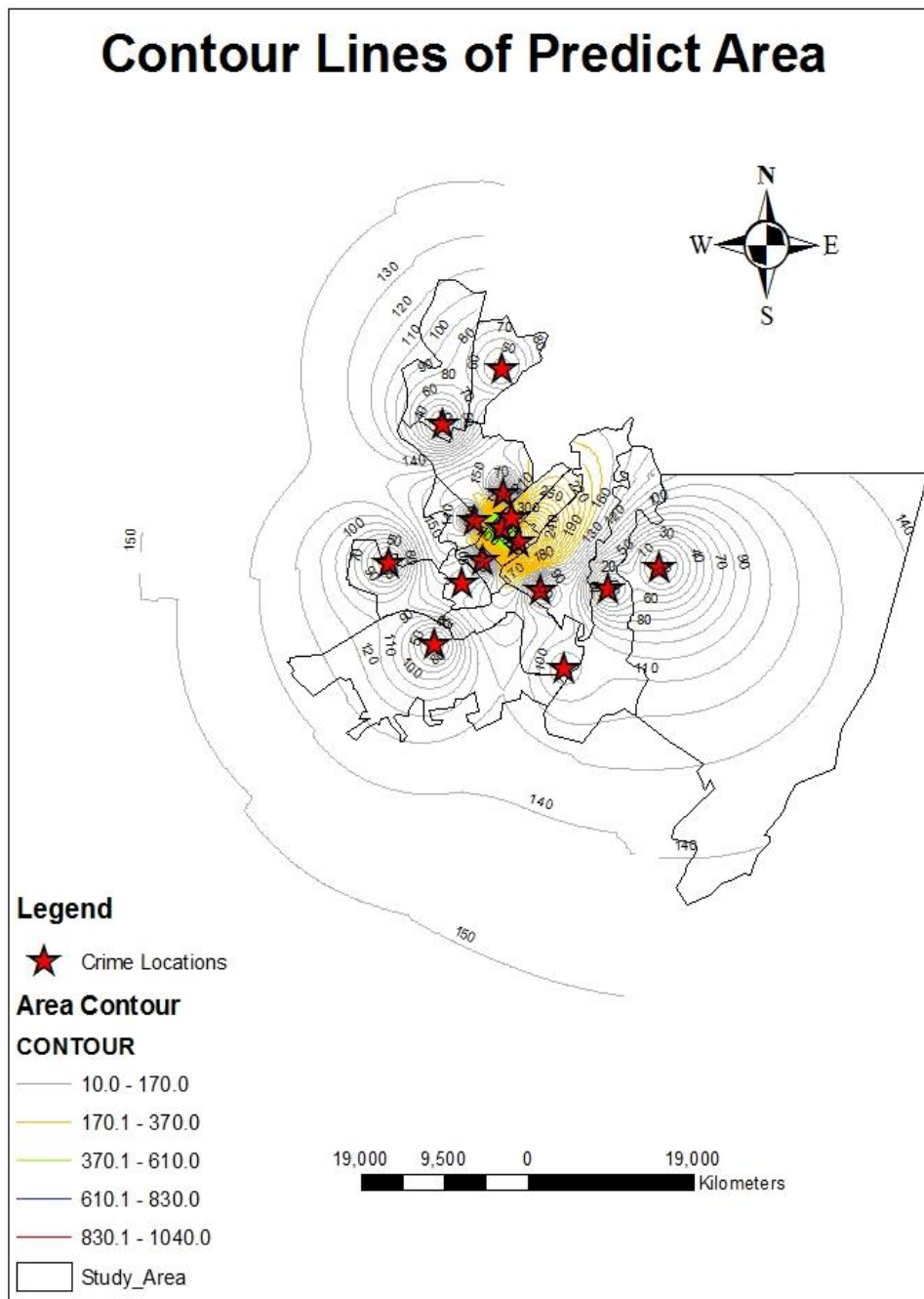
Figure 5: Shows the contour technique, which uses imaginary lines that follow the effect of interpolation intervals and reflect the values of concentrations of the spread to facilitate the tracking of drug crime according to the workspace of gang members in the neighboring areas.
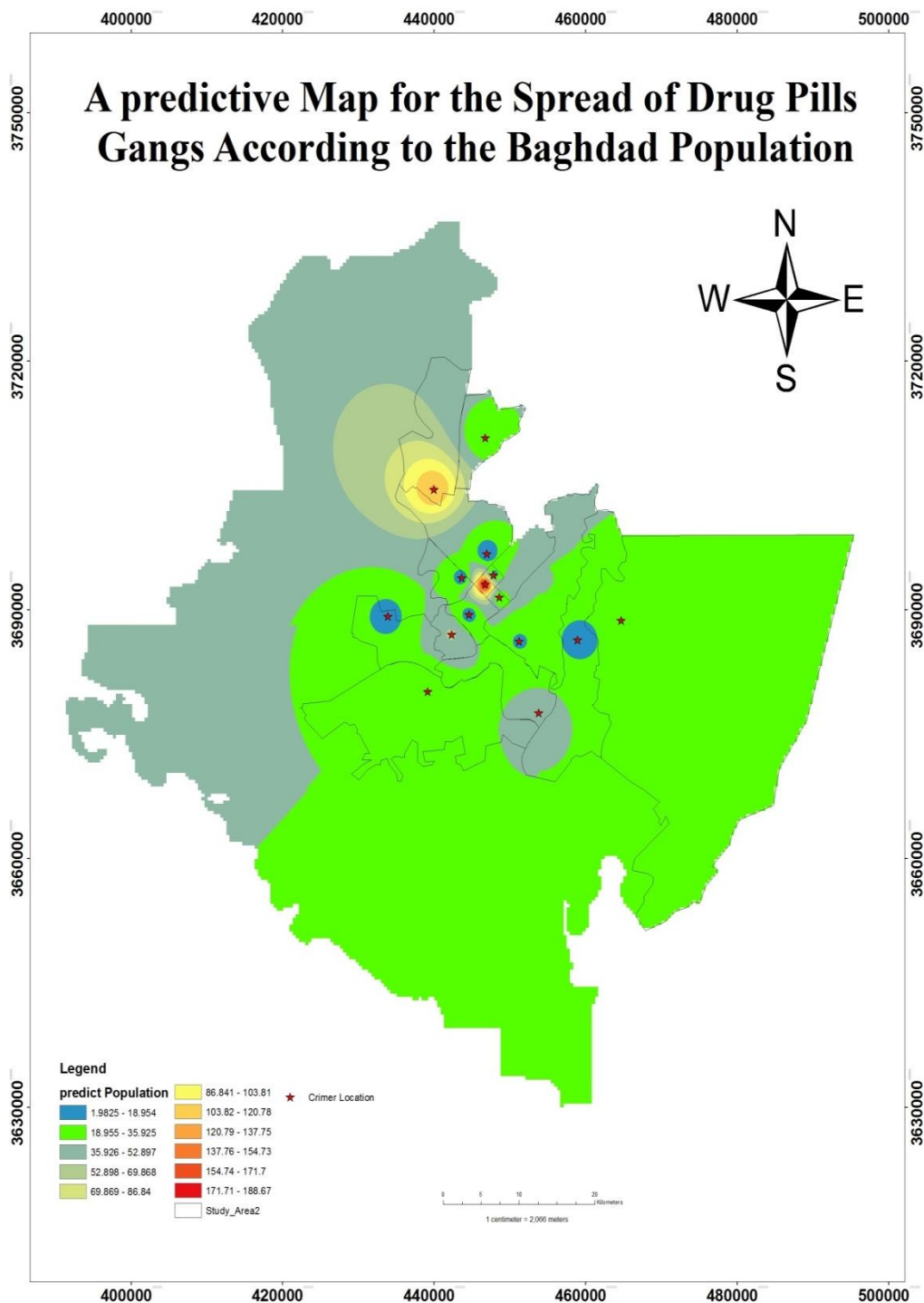
Figure 6: The interpolation technique shows the spread of drug crime according to the number of gang members in the residents of the neighboring areas, if given the opportunity and without the supervision of competent authorities.

Demonstration of drug trafficking rates according to the regions where this phenomenon is prevalent rising in three locations, and reaching 20.6 as the largest value, while falling to 1.4 as the smallest value in three locations.
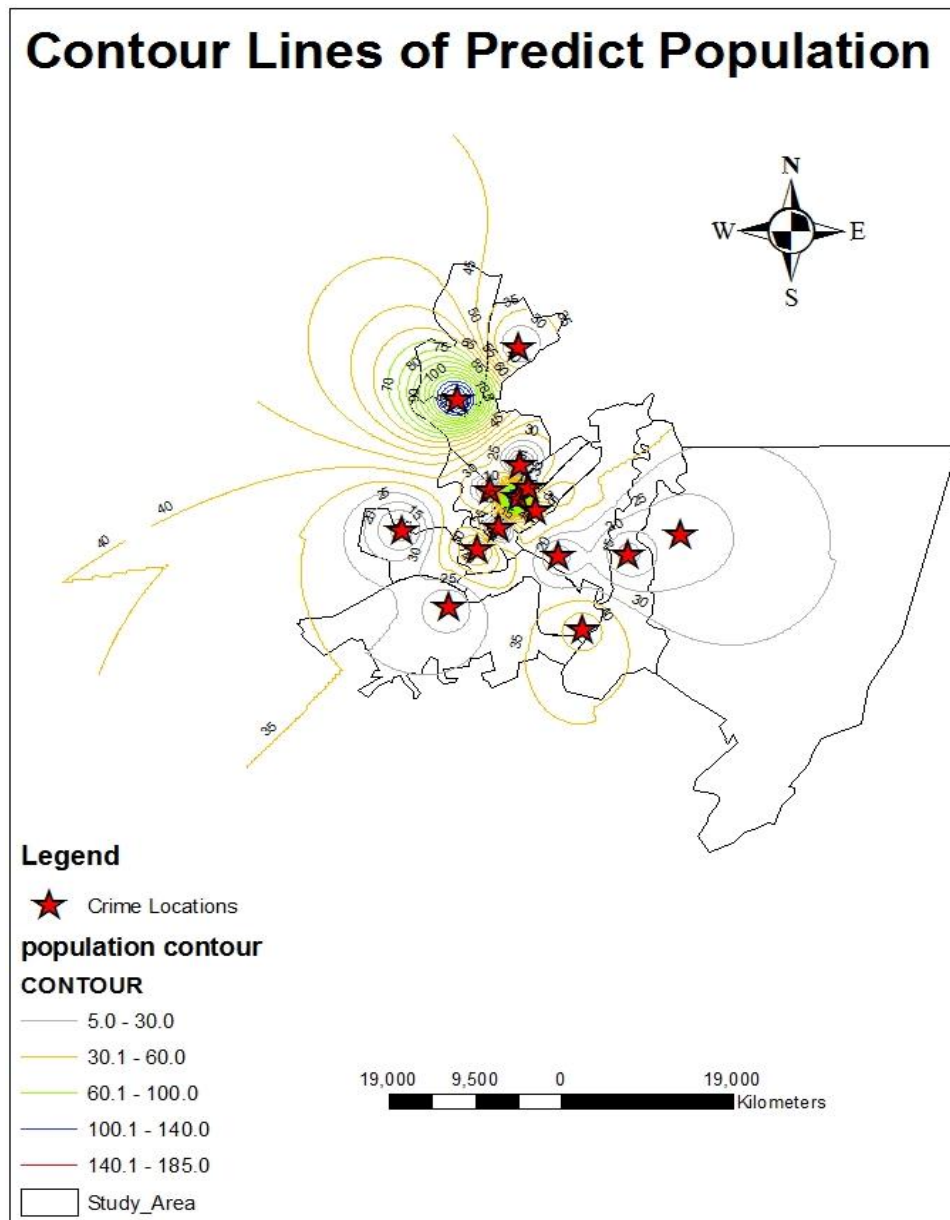
Figure 7: Shows the contour technique, which is the use of imaginary lines that follow the impact of interpolation intervals and reflect the values of concentrations of the spread to facilitate the tracking of drug crime according to the number of gang members in the residents of neighboring areas, if they have the opportunity and without the supervision of the competent authorities.

Conclusions

The importance of determining the presence of gangs and the possibility of their spread according to the population of Baghdad Governorate and the neighboring areas is to provide a GIS model to help the regulatory and executive authorities besiege and arrest those gangs.
The conclusions of our study were as follows:
1. The highest probability of the spread of drug gangs according to the numbers of each gang and the increase in the population of neighboring areas in Baghdad City was in the areas of Rashydea, Husseiniya1, Al-Shab Region, and Rafydean Sub-Districts, and their values, according to the interpolation technique and the contour lines, were (1.983-61.52), and the least probability was (61.53-189.4) for the areas that are the remainder of the study area.

2. The probability of the spread of these bands, according to the neighboring areas, were Al-Sadr City1, Al-Sadr City2 and Rafydean Sub-Districts, and their values ranged between (255.52-1,004.3), and the rest of them are the remaining areas.

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