Pattern Analysis of Mosques in Gaza-Palestine by Using GIS (Geographic Information Systems)

تحليل أنماط توزع المساجد في مدينة غزة-فلسطين باستخدام نظم المعلومات الجغرافية

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Abstract

The distribution of mosques is considered one of the problems that residents and planners suffer from in Gaza Strip, thus losing part of their civilized impact and influence. The non observance of planning standards in the distribution of mosques to cope with population growth and urban expansion and the needs of the population on the one hand, and the surplus in number of scattered mosques on the other hand, led to planning problems that affect the role of mosque in community. This research aims to find appropriate planning standards contribute to reduce these problems, and indicate some criteria to choose best locations for future mosques through a case study of neighborhood in Sheikh Radwan district. The importance of this research is analyzing and evaluating the pattern of mosques through descriptive and analytical approach based on using Geographic Information Systems (GIS). This research shows the importance of using the GIS in planning and urban design through selecting the best places to establish new mosques in the future based on the suitable design and planning criteria. These standards are applicable anywhere in Gaza Strip to arrive the available best solutions.

Key words: Mosques, Planning criteria, Geographic information system, Spatial Analysis, Pattern Analysis

ملخص

يعتبر توزع المساجد في مدينة غزة واحدة من المشاكل التي يعاني منها سكان المدينة والمخططين، مما افقدها جزءًا من تأثيرها وإشعاعها الحضاري فعدم مراعاة المعايير التخطيطية في توزيع المساجد بما يتناسب مع الزيادة السكانية والتوسع العمراني واحتياجات السكان من جهة، ومن جهة أخرى الفائض في عدد المساجد المتناثرة والتي لا يستفيد منها إلا النزر اليسير، أدى إلى ظهور بعض المشاكل التخطيطية التي تؤثر على دور المسجد ومكانته المجتمعية. لذا يهدف هذا البحث وباستخدام نظم المعلومات الجغرافية (GIS) للعثور على المعايير التخطيطية المناسبة التي تسهم في الحد من هذه المشكلة، ويتطرق الى بعض المعايير لاختيار أفضل المواقع لانشاء مساجد في المستقبل وذلك من خلال دراسة حالة في منطقة حي الشيخ رضوان. وتكمن أهمية هذا البحث في تحليل وتقييم نمط المساجد من خلال المنهج الوصفي - التحليلي باستخدام تكنولوجيا نظم المعلومات الجغرافية (GIS). وقد أظهر البحث امكانية تطبيق هذه المعايير في أماكن مختلفة في قطاع غزة للتوصل إلى أفضل الحلول المتاحة.

كلمات مفتاحية: المساجد، المعايير التخطيطية، نظم المعلومات الجغرافية، تحليل النمط، التحليل المكاني.

Introduction

The distribution of mosques is considered one of the problems that residents and planners suffer from in Gaza Strip, as the distribution of mosques within the city is not consistent. The lack of planning standards and criteria regarding mosques distribution led to planning problems that affect the role of mosque in community. The research aims to find appropriate planning criteria to choose best locations for future mosques through a case study of neighborhood in Sheikh Radwan district.

Mosques are Muslims' place of worship, and provide spiritual, educational, social, medical, judicial, military messages. Mosques are classified according to (Hassan N, 2002):

1. Small mosques (Mosalla): has a capacity for forty worshipers at least, and are used often in an institutions, factories or schools.
2. Mosques: are a nucleus of communities with a walking distance (150-200m) and a capacity not less than 200 worshipers.
3. Grand mosques (Jame'a): The largest of all mosques, they are called Friday mosque, and the walking distance isn't exceeding (500m).

Previous studies

1. Study of Kefah Abdullah, 2007, MA Thesis entitled: **Distribution of public services and planning in the Tammun town (Tubas), using Geographic Information Systems**. The study aimed to analyze and evaluate the public services in the town of Tammun, in terms of distribution, adequacy and compare the population density and urban residential neighborhood in every town with reference to planning standards for these services, as well as to identify priorities for urban development in the town during the next period.
2. Study of the Nidal Annaya, 2004, Unpublished MA Thesis entitled: **Distribution and planning of public services in the Qalqilya city using GIS applications**. The study included the education and health services, administrative, cultural, and recreational. This study aimed to highlight the importance of the application of planning standards, and to identify the most important reasons that hinder application of such standards in the city, and then study addressed the most important criteria to be used in the planning of Public services.

Absence of the mosque role in a contemporary city

The current planning standards are established from requirements, determination and criteria according to the foreign theories. For example, the residential neighborhood idea of Clarence Perry depends on the elementary school as the main element in a city (instead of a mosque in the old Islamic city), this obliges any Muslim Architect to try reviving the role of mosque in the formation of urban fabric as a future planning priority and to treat current errors, (Ali, 2001).

Planning criteria for mosques

The planner should take into account some of the major planning considerations that raise mosque and strengthen it in the hearts of Muslims. The researchers summarize the most important considerations for mosque planning according to (Ibrahim H, 1979):

1. The mosque's location should be away from noise, pollution, smoke and other environmental hazards.

2. Mosque site must integrate with built environment and urban fabric, and it is preferred to put in the center of public services.
3. Site must be founded in a permissible location in Shariah, not in graves, unclean, occupied, or public use land, (Khudairi I, 1998).
4. The selected land to establish new mosque must be not adjacent to another mosque, which cause a dispersion of Muslims.
5. The mosque location must be supported by good roads and pedestrian paths and preferred to provide them the shade and trees.
6. The exploitation of the mosque as attraction point of the visual aspect, and the minaret as a distinctive sign.

Geographic Information System (GIS)

A Geographic Information System (GIS) is a collection of computerized maps and databases that are linked together for the purpose of storing, retrieving, managing and analyzing information, (ESRI, 2003). Also, it's defined as information systems for the collection, entry and processing, analysis, presentation and output of spatial and descriptive data for specific objectives. GIS helps in planning and decision making with respect to agriculture, urban planning and the expansion of housing, in addition to reading the infrastructure of any city through establishing layers. The system can treat with spatial data (maps, aerial photos…etc.) and descriptive data (names, tables), and revision of the error, storage, retrieval, inquiry, spatial and statistical analysis, and display data on a computer screen or on paper in the form of maps, reports, charts, graphic or through the website, (Halabi, 2003).

Through the definitions above, the geographic information systems is designed to achieve one or both of the following two objectives:

- To find appropriate locations that accomplishes some goals depending on specific conditions and criteria, such as finding the best location for a new mosque, or any other services.

- To query about the characteristics of map features, such as knowledge of population density of a region, or allowed vehicle's speed on the road, or the property owner name and others.

The distribution of mosques in Gaza City by using GIS

Gaza City is located at latitude (31.3 degree) north, and longitude (34.18 degree) east, with an area of 45 km^2 approximately, and population of 483.869 inhabitants until 2007 (Fig. 1). The primary economic activities of Gaza are small-scale industries, agriculture and labor. However, the economy has been devastated by the blockade and recurring conflicts. Gaza has a very young population with roughly 75% being under the age of 25, and today the city has one of the highest population densities in the world. (Gaza Municipality website).

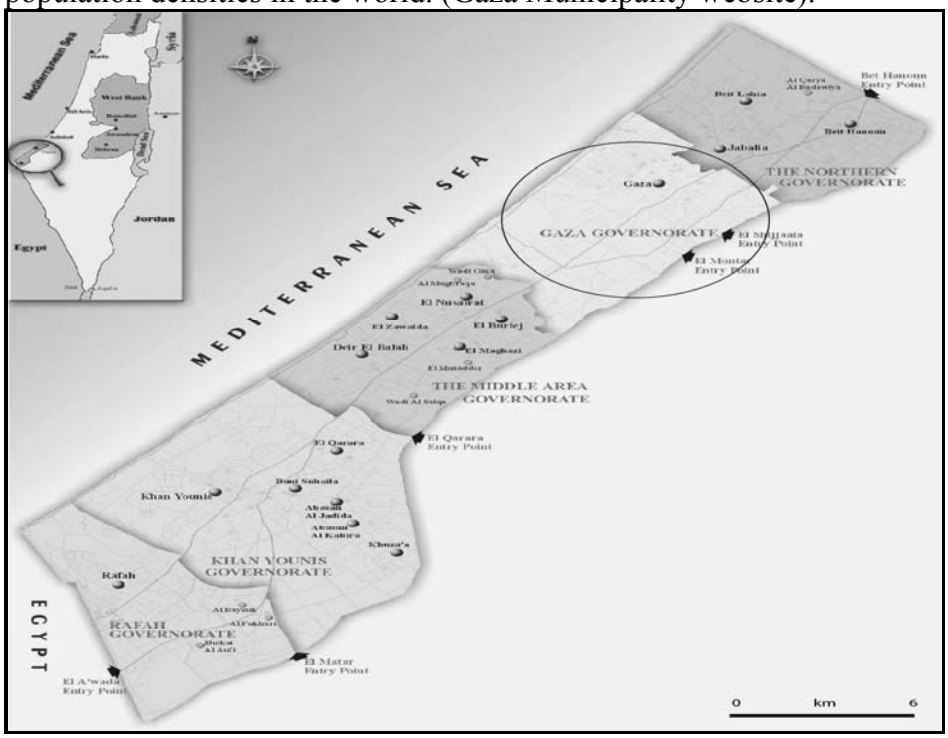


Figure (1): Gaza Strip Geographic Location.

The researchers treat with Gaza City as a sample that can be applied in all Gaza Strip, so he overlap the maps (obtained from Ministry of Local Government and Municipality of Gaza) with updated aerial photograph (obtained from Google Earth web site) to get a correct coordinate image.

In a recent division of Gaza Municipality, Gaza City consists of Seventeen residential districts. The researchers determined the border for every district, and then projected the mosques on the map as polygons by using (Arc GIS 9.3) to facilitate the calculating of mosques' buffer zones.

There are 220 mosques (Masjid), including 22 Musalla which are registered in Ministry of Awqaf and Religious Affairs. Show figure (2).

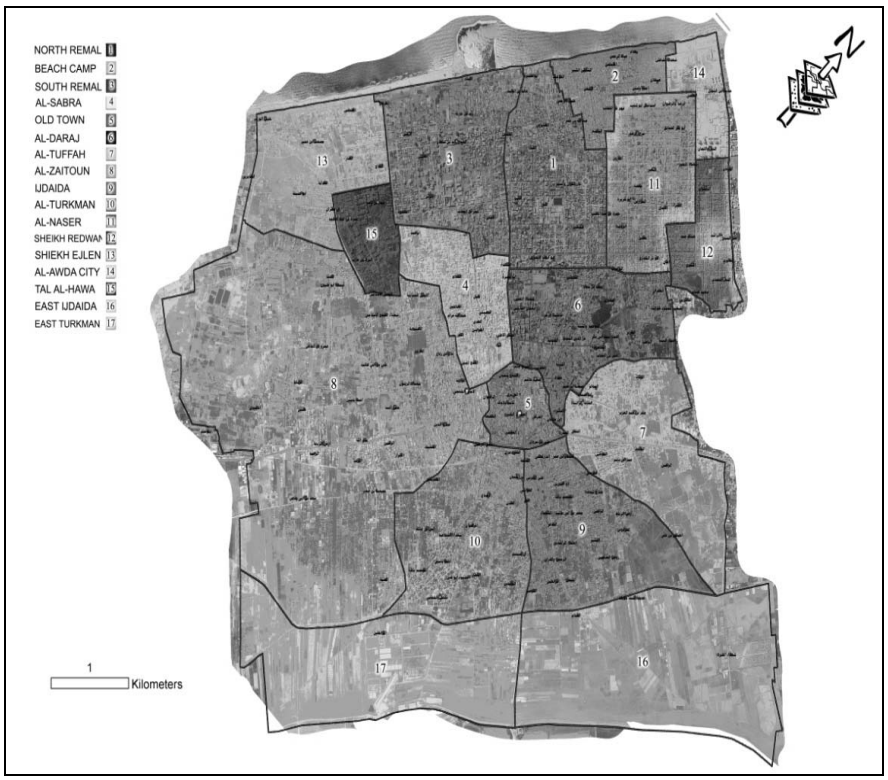


Figure (2): The distribution of all Gaza mosques.

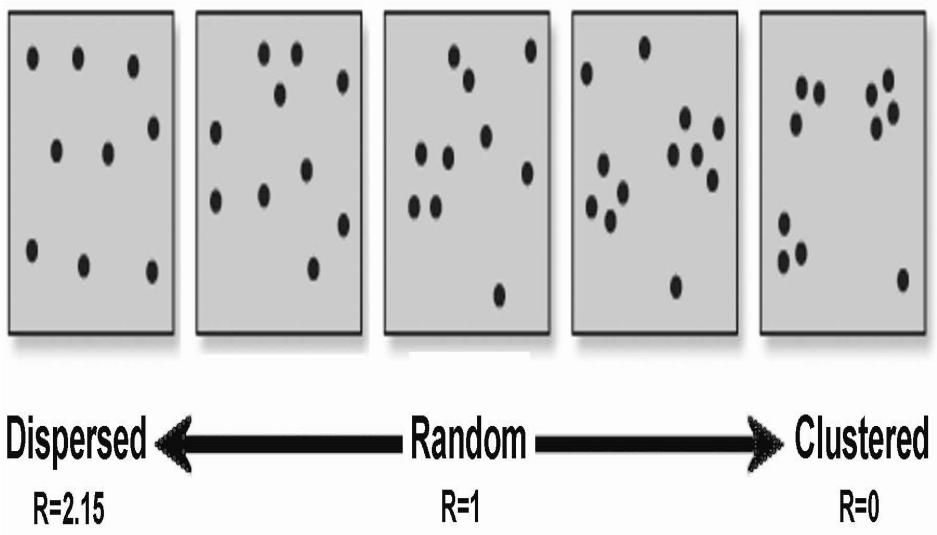
Methods of Analysis using GIS

The researchers used many of analysis and statistics methods to know the pattern of mosques distribution, and determine the problem, then suggest some suitable solutions.

Average nearest Neighbor method

It is a ratio of average distance between each real point (mosque) and the nearest point that is adjacent to the site in the study area to the average expected distance (theoretical) between the same numbers of points (mosques) if they were distributed randomly in the same area, (Fawzan S, 1999).

The value of distribution pattern coefficient is between (0-2.15).



The Indication of points distribution in district area

Source: www.esri.com

This analysis is applied on Gaza City districts, and the results in table (1):

Table (1): The result of Neighbor coefficient and Distribution Pattern in all Gaza districts.

N0.	District Name	Area (m^2)	Mosques No.	Average Real Distance	Average Theoretical Distance	Neighbor coefficient	Distribution Pattern	Standard Value
1	AL-Awda city	714847.22	3	453.84	244.1	1.86	Random ▲ Dispersed	6.16
2	Shiekh Ejleen	2219981.69	9	446.7	248.3	1.79		4.58
3	Tal Al-hawa	794827.50	3	455.4	257.3	1.76		2.55
4	Old Town	701073.51	13	189.7	116.1	1.63		4.37
5	Northen Remal	2374204.41	11	377.3	232.2	1.62		3.96
6	Skiekh Redwan	1025413.12	10	254.59	160.11	1.59		3.56
7	Eastern Ejdaida	4958502.11	3	980.5	642.8	1.52		1.74
8	Al-Naser	2044692.74	21	226.1	156	1.44		3.94
9	Al-Sabra	1516805.11	13	245.7	170.8	1.43		3.02
10	Beach Camp	975992.51	9	229.1	164.6	1.39		2.24
11	Al-Turkman	2899328.08	17	280	206.4	1.35		2.8
12	Southern Remal	2759672.19	12	313	239.7	1.3		2.02
13	Al-Daraj	2430272.54	26	187.8	152.8	1.22		2.23
14	Al-Tuffah	2898560.90	14	250.5	227.5	1.1		0.72
15	Al-Zaitoun	11329580.75	30	322.2	307.2	1.04		0.5
16	Ijdaida	2753563.36	25	168.3	166	1.01		0.13
17	Eastern Turkman	3952298.73	1	0	1121	0	0	0
Total			**220**	**351.01**	**283.11**	**1.50**		

After analyzing the table, it's clear that the distribution pattern of mosques in Gaza City is dispersed moving towards random, and this pattern means that the distribution of mosques is irregular, where the range graduated from Al-Awda city which represent the peak of mosques dispersion, and Ijdaida district, which the coefficient is near to **1**. (The mosques in this district are distributed randomly).

Analysis by calculating Standard Deviation

Standard deviation has a great importance, where the (Mean ±N*Standard Deviation) give statistical imagination for the distribution of phenomena items according to the following equation: (Abu Radi F, 1983)

- In 68% of cases, items fall in an interval (Mean ± Standard Deviation).
- In 95% of cases, items fall in an interval (Mean± 2×Standard Deviation).
- In 99% of cases, items fall in an interval (Mean± 3×Standard Deviation).

This is called the normal distribution curve.

The researchers has calculated Standard Deviation by using Statistics command, and the results appears in table (2), which shows that the variable values aren't less than zero (but equal zero only in eastern Turkman because there is one mosque only), and the values in Gaza districts increase directly until it reached a peak in Eastern Ijdaida district by value of standard deviation = 356.4.

Table (2): Standard Deviation and Coefficient of Variation for Average Real Distance (M) in all Gaza districts.

N0.	District name	Mosques Number	Average Real Distance (M)	Standard Deviation	Coefficient of Variation
1	AL-Awda city	3	453.84	85.5	12
2	Shiekh Ejleen	9	446.7	136	31
3	Tal Al-hawa	3	455.4	32.6	7.2
4	Old Town	13	189.7	73.9	39
5	Northen Remal	11	377.3	108	29
6	Skiekh Redwan	10	254.59	87.6	34
7	Eastern Ejdaida	3	980.5	356.4	36
8	Al-Naser	21	226.1	108	48
9	Al-Sabra	13	245.7	191	78
10	Beach Camp	9	229.1	107	47
11	Al-Turkman	17	280	121	43
12	Southern Remal	12	313	106	34
13	Al-Daraj	26	187.8	74.4	40
14	Al-Tuffah	14	250.5	196	78
15	Al-Zaitoun	30	322.2	189	59
16	Ijdaida	25	168.3	60.9	36
17	Eastern Turkman	1	0	0	0

The concept of standard deviation means a convergence or divergence of actual distance values between mosques. If values are large and convergent, standard deviation will give a low indication, while the neighbor coefficient will give a large value that indicate to the divergence

between the mosques, and if values are small and convergent, standard deviation will also give a low value, as well as neighbor coefficient indicate to a convergence between mosques.

Mean Center Method

To understand this analysis, it should be selected any district as a sample, Al-Daraj district for example. The analysis shows that the gravity center of the mosques in this district is in the South, where the mosques focus. The program has determined the actual center called Mean Center, which acts the focal point or actual axis of total district mosques, and it appears as a center of circle include the most mosques in this district (red point). The program has determined too supposed or ideal center called Central. This analysis shows the convergence shape between mean center and central with the deflection of ideal center to the Western South, this means that the mosques in Al-Daraj district is near to the geographical center and basic residential clusters.(see figure 3)

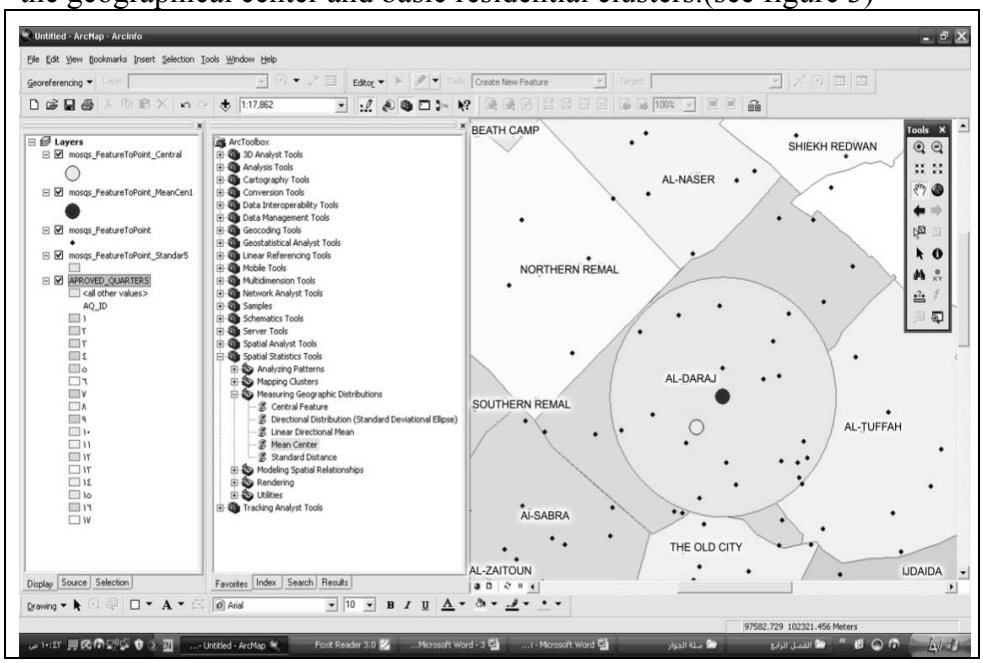


Figure (3): Mean Center and Central for *Al-Daraj* district.

Standard Deviational Ellipse method

The researchers also determined the actual direction for mosques pattern in the same previous district, where the extending takes an ellipse shape towards Eastern North and Western South. The longitudinal axis of ellipse takes the same direction of the district urban shape,(Figure 4)**.**

The eastern north extension is joined largely with surface quality in Al-Daraj district; the Northern region is described as agricultural areas, and has low population density, while the district center has a high population density, then increasing the number of mosques. There is large number of mosques in South direction because of the nearest to Old City of Gaza.

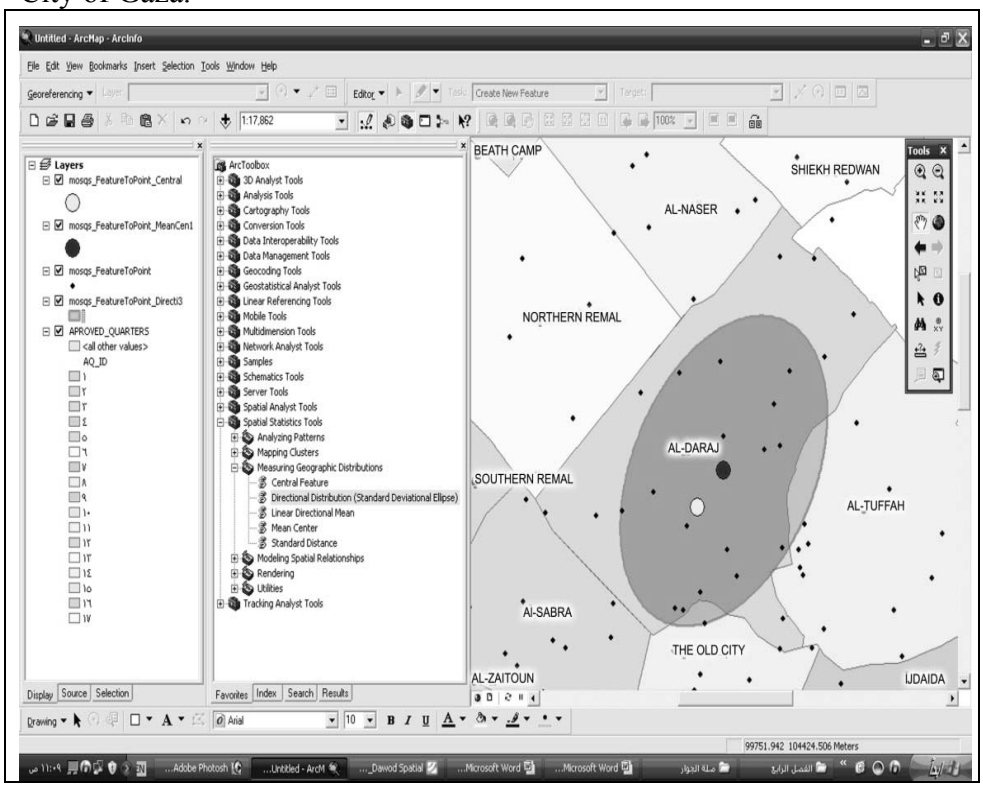


Figure (4): Distribution pattern direction in *Al-Daraj* district.

Kernel Analysis

These cartographic and statistical tests calculate the density of mosques in a geographical area of Al-Daraj district, by calculating the points' density around center. The value is higher at the center, and decreases to stay away.

The result of Kernel analysis appears in Figure (5) shows circular forms similar to rings which mean mosques' density in each range. It also shows surface directions, which are wide in areas with high density of mosques, and waning in areas with low density.

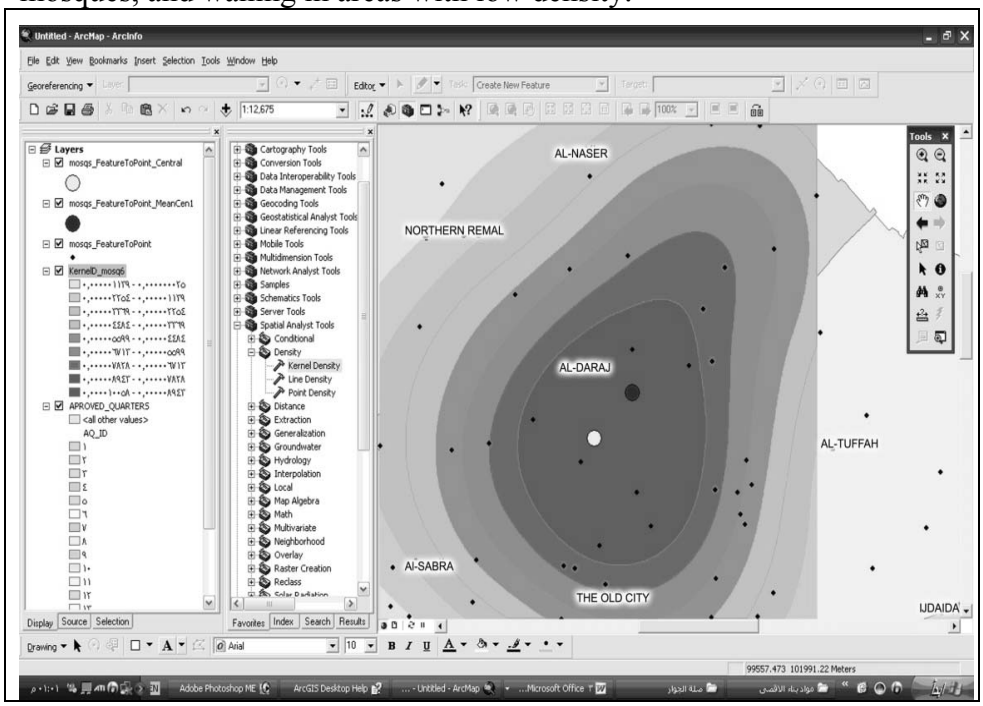


Figure (5): Kernel analysis result for Al-Daraj mosque distribution direction.

The previous five analysis methods give a general impression for the mosques spread pattern, but they treat with mosques as a Point without any consideration for the area of mosque, or the number of worshipers.

Buffer Zone method

It is considered the most important characteristic of GIS. It is defined a circle around each element that represents the scope of its impact, then it is inferred positive distribution or not.

At the beginning it is needed to calculate the radius of buffer zone by:

A. Knowing the population density: this differs from district to another.

B. Finding maximum capacity of worshipers in mosque. ($1m^2$ per people)

C. Knowing the proportion of males and females: suppose 50% for both.

D. Covered area by mosque: dividing mosque capacity on the population density, and the result is circle area.

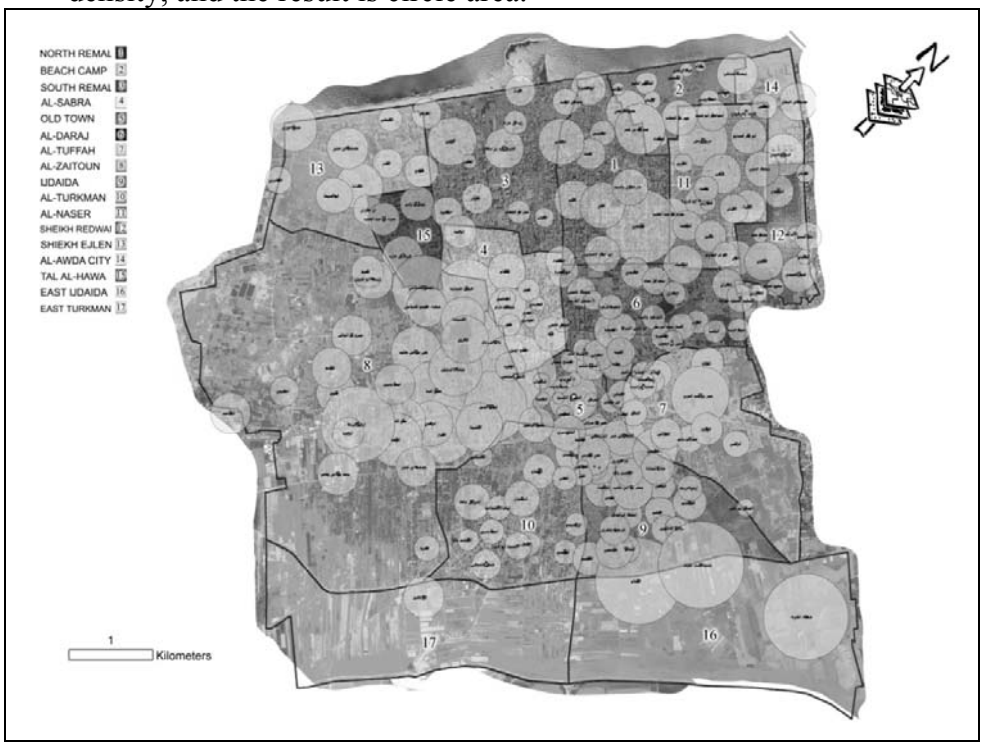


Figure (6): Buffer Zones for all Gaza mosques.

It is clear from analysis in figure (6) that the majority of Gaza mosques have a radius less than 500 m, (a suitable distance for walking), this mean a surplus in mosques number, which reduces the reliable chances on it as a center for neighborhood. The planner also can be aware of places covered or not by mosques, and the locations needed to new mosques.

Distribution justice Analysis

The benefit of this test is to know if the mosques are distributed regularly or not taking into account the area of buffer zone. In Gaza mosques buffer zones, there are a lot of intersections, which means injustice in this distribution. The researchers calculates the empty areas of each district, which does not fall in the scope of any mosque, and calculates intersected areas, then calculate the coefficient of distributive justice (calculated by dividing the intersected area on the empty space). Figure (7)

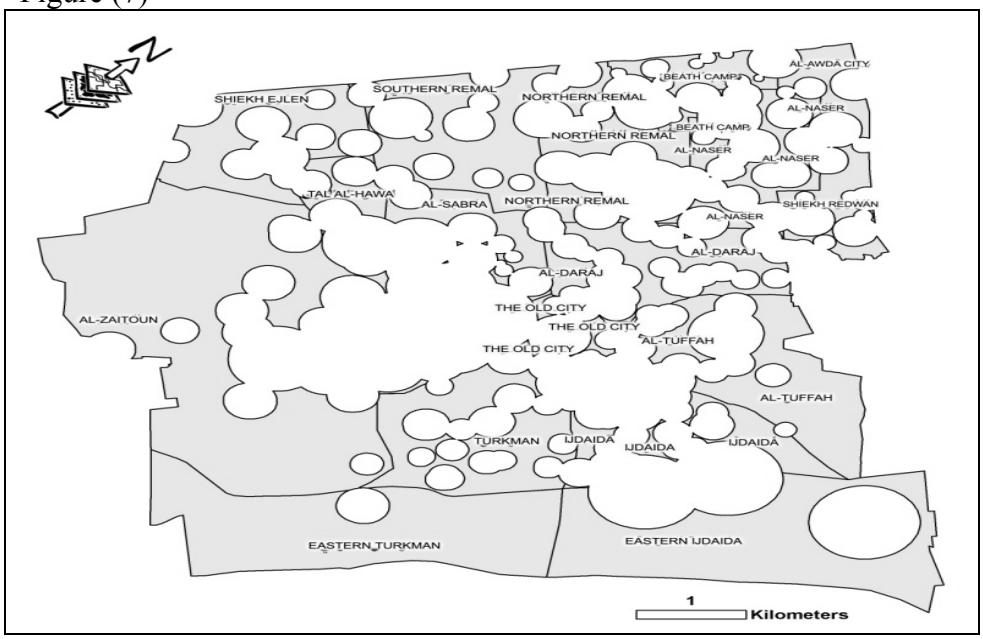


Figure (7): Empty Areas don't fall into any scope of impact of any mosque.

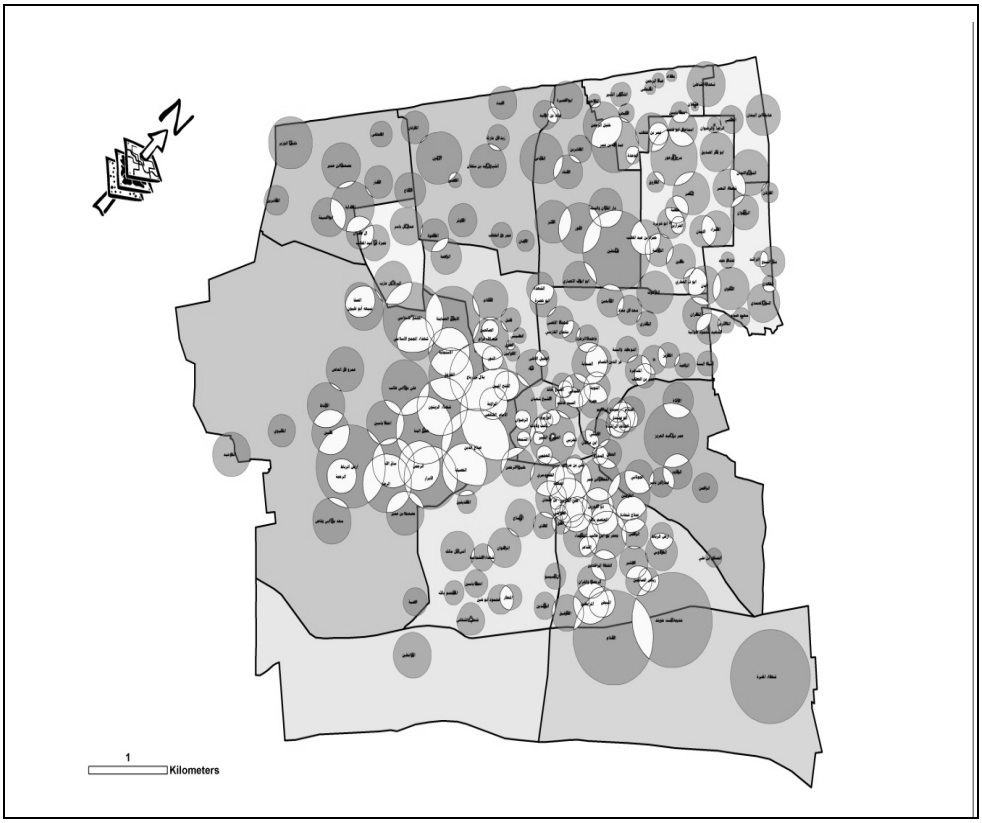


Figure (8): Intersected Areas between Gaza mosques.

Although the poor distribution problem increases or decreases according to the justice coefficient, but that need to link this coefficient with district's area, because the coefficient may be equal to 1 and has been interpreted as increase in empty area and increase intersections, which gives a negative impression from the district.

However, the researchers calculate the decrease or increase ratio according to the following mathematical equation:

$$\text{Decrease or Increase ratio} \quad \frac{\text{Area of Intersections - the empty space}}{\text{Whole Area}} \times \mathbf{100}$$

Table (3): Illustrate Distribution justice coefficient.

N0.	District name	Whole area (m^2)	Intersection Area (m^2)	Empty Area (m^2)	Distribution justice coefficient	Decrease, Increase Ratio	Intersection Ratio	Empty Ratio
1	Eastern Turkman	3952298.73	0	3765600.53	0	-95.28%	5.33%	50.53%
2	Southern Remal	2759672.19	84946.42	1549574.36	0.05	-53.07%	8.10%	42.49%
3	AL-Awda city	714847.22	38112.68	361224.97	0.10	-45.20%	42.26%	22.67%
4	Eastern Ejdaida	4958502.11	375079.88	3284890.37	0.11	-58.68%	4.99%	41.02%
5	Beach Camp	975992.51	48714.37	400320.04	0.12	-36.03%	28.47%	29.38%
6	Shiekh Ejleen	2219981.69	211220.71	1196330.48	0.17	-44.37%	38.78%	38.90%
7	Skiekh Redwan	1025413.12	83046.87	435691.91	0.19	-34.39%	25.15%	62.16%

…continue table (3)

N0.	District name	Whole area (m^2)	Intersection Area (m^2)	Empty Area (m^2)	ion justice coefficie	Decrease, Increase Ratio	Intersection Ratio	Empty Ratio
8	Al-Turkman	2899328.08	346952.3	1553700.29	0.22	-41.62%	71.22%	22.37%
9	Tal Al-hawa	794827.5	84347.6	254290.94	0.33	-21.38%	11.97%	53.59%
10	Al-Tuffah	2898560.9	729011.46	1801789.65	0.40	-37.01%	7.56%	66.25%
11	Al-Sabra	1516805.11	407593.71	531702.18	0.76	-8.18%	0.00%	95.28%
12	Al-Zaitoun	11329580.75	5363305.15	6556682.72	0.81	-10.53%	47.34%	57.87%
13	Northen Remal	2374204.41	675972.43	697531.26	0.96	-0.91%	26.87%	35.05%
14	Al-Daraj	2430272.54	942433.26	945260.85	0.99	-0.12%	64.24%	13.54%
15	Al-Naser	2044692.74	864188.55	463472.26	1.86	+19.60%	3.08%	56.15%

…continue table (3)

N0.	District name	Whole area (m^2)	Intersection Area (m^2)	Empty Area (m^2)	ion justice coefficie	Decrease, Increase Ratio	Intersection Ratio	Empty Ratio
16	Ijdaida	2753563.36	1961041.85	615914.85	3.18	+48.85%	10.61%	31.99%
17	Old Town	701073.51	450337.91	94951.85	4.74	+50.69%	9.51%	53.89%

Table (3) gives important indications for the current status of each district; If distribution justice coefficient equals 1, this means that intersections area equal empty area, so the problem is injustice in mosque distribution without need for more mosques (as in Al-Daraj district), then the values oscillate by increase or decrease about number 1. The least intersected areas are in Eastern Turkmen district (= 0), which indicates a lack of intersections, this means the problem is in the small number of mosques not in poor distribution, while the largest value is found in Old Gaza City which intersected area is larger than empty area, and this means a surplus in mosques number.

In decrease or increase ratio column, if ratio was negative; means a shortage in mosques number in this district. For explanation; even if we assume there is no intersections or we distribute Intersections on the areas of the district area, it also will stay lacking in the areas that have been covered by the mosques. If ratio is positive, this means that area of intersections is greater than the empty areas (surplus in the number of mosques), and if the ratio is near to zero, means empty areas equal to intersection area, then the problem is in poor distribution only, not in mosques decrease or increase.

Despite the advantage of this method and its benefits in calculation relationship between intersections and empty areas, it still deals with each district separately without linking it to others. In other words, if

there were a mosque in a district and its buffer zone in another, this method would not treat with. The researchers can overcome this problem in previous buffer zone method.

Case Study (a neighborhood *in Sheikh Radwan* district)

Sheikh Radwan district has been selected as a case study for several reasons: It is a new district and well-planned according to international criteria, has clear boundaries, clear local and collector streets too, and this district came in an intermediate position between other Gaza districts according to the previous analysis, and does not represent extreme cases.

The researchers chose first west neighborhood in case study district because its characteristics; clear urban center and a variety of services, mosque is located in an important position, has a regular shape, contains availability primary school in the middle. The area of this neighborhood is 305 donums, and number of inhabitants is 10700 peoples approximately, it is bounded by clear collector streets, *and has one mosque* with area 850m^2.

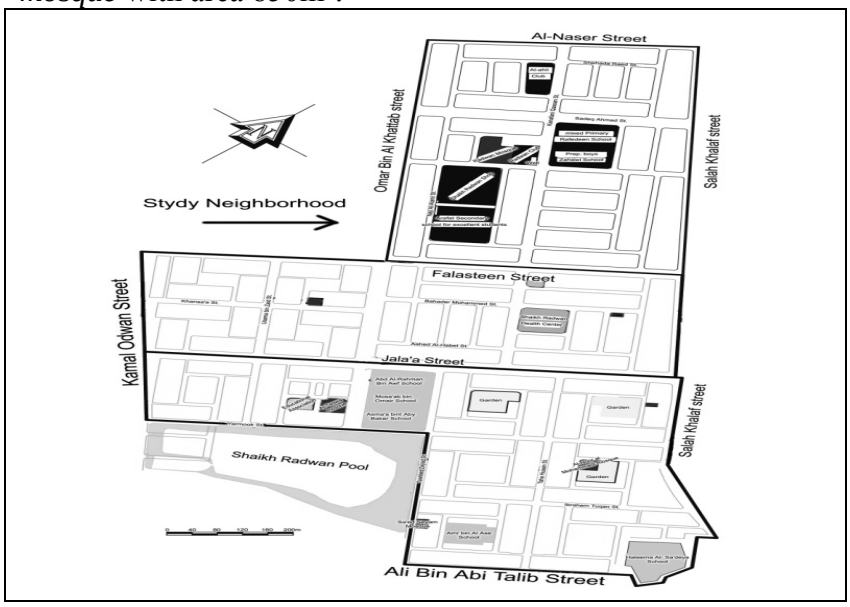


Figure (9): The boundary of Study Neighborhood and public services.

Source: Municipality of Gaza, urban planning department.

Spatial Analysis to choose the best location for Mosque

The researchers get the current physical and urban structure studies from Municipality of Gaza - Department of GIS, in addition to the field survey by researchers, these studies include (building height, land use and condition of the construction, etc.). It is clear that the study area does not contain any empty land, either governmental or private, so the researchers resorted to apply alternative ideas by searching for abandoned or old buildings with few floors and poor condition to demolish them and establish new mosques in their place. We can also search for places down apartment buildings to be used as small mosque (Mosalla). The operation contain of five phases:

1. Determining the mechanisms for selecting suitable locations and the importance of each mechanism.
2. Providing the required information.
3. Deriving the required data from the available data.
4. Reclassify data and give appropriate values.
5. Giving appropriate weight of each mechanism, and collection data.

The researchers put most important criteria, and gave it special weight according to its importance in planning field, after consulting specialist, and according to the Ministry of Awqaf and Religious Affairs. The process of weights of each criterion represent most important stage in spatial analysis, the researchers classified these criteria and gave a percentage for every one, and the total of it must equal 100%.

No.	Criteria	Weight
1	To be as far as possible from existing mosques	30%
2	To be near to public services	12.5%
3	To be near to the center of the residential group	10%
4	To be easily accessible through streets	7.5%
5	Building should be abandoned or unused	12.5%
6	Building situation is bad construction	10%
7	To be building up one floor or less	10%
8	Building area Should not exceed of 200 m^2	7.5%
Total		**100%**

To apply these criteria, the researchers input necessary data as layers form, then treated and derived it to obtain the required data as follows:

At First three criteria, which depend on the distance (near or far), data is converted from polygons to points, then distances Map has been derived into Intervals and reclassified data to give specific values for near and far distances. If (X = 10) means the best location, and the value reduce to reach (X = 1) that means bad location. For example; in public services criteria, near site is the best, but in existing mosques criteria, the far are best, these steps are repeated for every criteria.

For other criteria which is unrelated with distance, the researchers convert it into raster, then re-classification, and give a value for each number as that (X = 10) is considered the best value. For example; building use layer has been divided into categories (residential, commercial, abandoned, industrial, religious, special cases) and give value for each number according to its importance.

After treatment of all layers, reclassification and weighting them according to planning requirements, environmental conditions, users needs and design considerations, layers are merged to realize the input weights.

The map can be explained as follows: if the number values on the left of screen were much larger, the place will be more suitable and valid, means black color with a higher value represents the best places to set up new mosques in this neighborhood, and the researchers has selected two places between suitable places (which are considered enough to cover the need of worshipers), these places are located in the center of residential groups in the northern and eastern direction of neighborhood. (See figure 10)

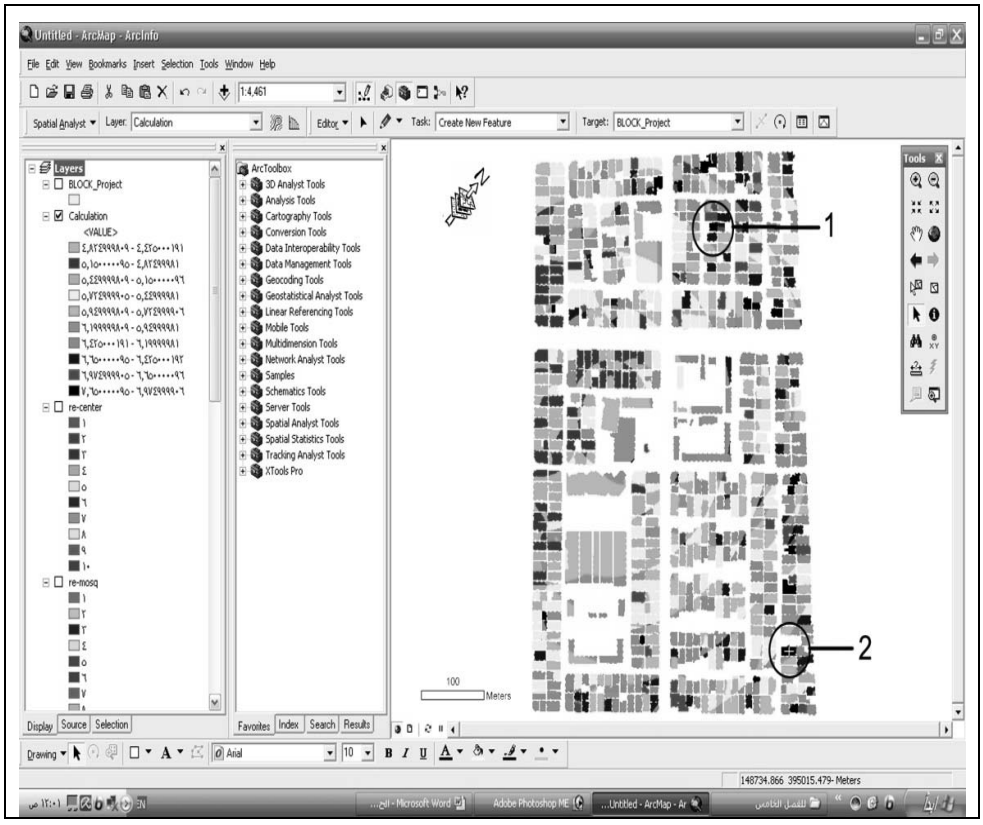


Figure (10): Final output to the best location for new mosque.

Conclusion

1. There is no regular distribution of mosques in Gaza City, it was noted that a large concentration of mosques exists in some areas and low density in other areas.
2. To calculate the radius of scope of impact for any mosque, it is necessary to know the three variables (population density, capacity of the mosque, accepted walking distance), taking into account future population growth and rates of males and females in society.
3. There are many methods of analysis that deal with the distribution of geographical phenomena, including:

A. Average nearest neighbor: that resulted in the pattern of spread and distribution of mosques in Gaza City districts, and the extent of harmony with the ideal situation.
B. Analysis using standard deviation and coefficient of variation: the resulting knowledge of the near of the values of the actual distances from each other and gather around the arithmetic average.
C. Mean center & central method: Specifies the compatibility of the center of gravity of the mosque with the center of default gravity if distributed properly.
D. Analyzing the pattern of distribution: results in an ellipse shape that gives an impression of how the emergence of mosques and how to reach to and distribution pattern and its relation to the format for the district.
E. Kernel Analysis: it is benefit in determining the intensity and the concentration of mosques in the center of the district and deployment.
F. Buffer Zone Method: put a circle around each mosque refers to the space covered by this mosque, and therefore see the need for the establishment of mosques in the district.
G. Distributive justice factor: give a comparison between an intersections area and the empty spaces, which determine the problem if they were in the need for more mosques or in poor distribution.

4. GIS Technique can determine the best locations for future mosques arranged descending from the best to worst according to the colors.

Recommendations

1. Establishment a comprehensive detailed reference in planning standards of the mosques and developing the current mosques.
2. The adoption of Geographic Information Systems software (GIS) as a basis for future planning of mosques and Establish a special unit of GIS for developing the technological performance, and take

advantage of the various applications of GIS, and for use in various related fields.

3. Establishment of more local mosques in some parts of Gaza, and on the opposite emerge small mosque to big that near to it.
4. There is a need to follow up and supervise the current mosques through raising their efficiency and provision of their requirements, as well as control of new mosques.

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