

### Miqat Application in Determining the Qibla Direction of the Mosque

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**Keywords:** *Qibla Direction;*  
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**Abstrack:** *In this all-digital era, the use of Android devices is no longer just a medium for communication, but on your smartphone device, there are already many applications circulating on the Play store developed by software companies and astronomers that are easy to use to assist you in determining. qibla direction. To fulfill the need for information on the Qibla direction of a place, you have to activate the technology on your smartphone that provides real-world Qibla direction information, namely by using the miqat application. This research is to find out the method of using the miqat application in determining the Qibla direction and knowing how the Qibla direction of the Sultan Mahmud Badarudin Jayo Wikramo mosque and Al-Islam Muhammad Cheng Ho Mosque is using the Miqat application. This research is classified as field research, namely research conducted by direct observation of the object studied in the field, aiming to determine the level of accuracy of the use of the miqat application in determining the Qibla direction. The use of the Miqat application in determining the Qibla direction is a method that is very easy to use wherever you are, but before using the application, it is better if you first calibrate the magnetic compass on your smartphone by shaking the phone so that the needle on the compass is stable. The accuracy of the Qibla direction of the Sultan Mahmud Badarudin Jayo Wikramo Mosque and the Al-Islam Muhammad Cheng Ho Mosque with the Miqat application, that in terms of whether or not this application is accurate, in principle, depends on usage. If used in places that contain metal it will make the magnetic sensor on the compass inaccurate which results in degree deviations on the compass being affected by the magnetic field and the metal around it which will result in a larger deviation of degrees on the compass, this application should be used outside the building because in principle, the compass on the cellular relies on magnetic sensors and GPS on the smartphone itself.*

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### **The Introduction**

Facing the Qibla is a must for someone who prays so that the fiqh experts agree that facing the Qibla is a condition for the validity of prayer. For the person who performs the prayer, it is obligatory for him to face the Qiblah completely (starting from takbiratul ihram to greetings). For Muslims who are in Indonesia, they cannot see the Kaaba directly as the direction of Qibla as Muslims in Mecca. So it takes an effort to determine the Qibla direction. Along with the development of the times, science has grown rapidly in this day and age, there are lots of android-based astronomy applications circulating on the Play Store. Whether it's developed by software companies or individuals. Whether they are astronomers or not. Which application is very easy to use. So that people who are Muslim in this era are compelled to download an android-based astronomy application to facilitate their daily lives in their worship needs. One of them is in determining the Qibla direction.

Qibla is the direction to the Kaaba Baitullah through the closest path, and it is a must for every Muslim to point in that direction when performing prayers, wherever they are in this part of the world (Hambali, 2011, p. 167). Qibla direction is the direction of the shatr kaaba. Shatr Kaaba is a semicircular area whose diameter coincides with the vertical line of the Kaaba. In short, the shatr of the Kaaba is the vertical semicircle of the Kaaba. So the Qibla direction of a place is the direction of the semicircular plane that passes through that place (abd salam Nawawi, 2016). Qibla direction is a very important thing for Muslims. This is related to one of the worship of Muslims, namely prayer. That is facing the direction of the Kaaba in the Haram. Kibla comes from the word *istiqbala* or face, which means facing. (Fitriyati Yusida & Ifrohati, 2019, p. 128) Facing the Qibla when praying is a condition for the validity of prayer (Rusyd, 2005, p. 92). In carrying out prayers, in addition to knowing when the time for prayer arrives and when the prayer time will end, that is by also knowing the direction to face when praying. Because, as we all know, facing the Qibla has become a valid condition for praying for Muslims. (Fauziah, 2018, p. 103).

All scholars agree that facing the Qibla (Kaaba) when praying is an absolute obligation and is a condition for the validity of prayer. The scholars have also agreed that anyone who prays around the Grand Mosque and for him is able to see the Kaaba directly, then it is obligatory for him to face directly towards the Kaaba (*ainul Kaaba*). But when the person is in a place far from the Grand Mosque or far from Mecca, the scholars have different opinions about it. Imam Maliki, Hanafi, Hambali and some Shia Imamiyah explain that the qibla of people who are far from the Ka'bah is the location where the coordinates of the Ka'bah are. Meanwhile, Imam Shafi'i in the book *al-Umm* explains that people who can see the Kaaba with the naked eye then he must face the Kaaba itself. (Wafiroh, 2018, p. 163). The Qibla problem is nothing but talking about the direction of praying exactly to the Kaaba in Mecca from a point where it is located one line in the great circle of the earth and is the closest distance between the point of place and the Kaaba. (Nurmila, 2017, p. 195).

The methods that are often used to measure the Qibla direction are as follows: first, measuring with the help of a compass. The main function in using a compass is to show the cardinal directions, especially north and south because the shape of the magnetic needle follows the earth's magnetic field which is located at the north pole and south pole. The working concept is based on the Earth's magnetic field where each magnet has a pole (Khazin, 2005) Second, measurement using a stick, namely by plugging it perpendicular to a flat plane and placing it in the open, so that the sun can shine freely. This special stick is also known as a gnomon. In Indonesia, the main function of this *istiwa'* stick is to match the special hour and the prayer times (Izzuddin, 2012). To determine the shadows of the Qibla using the help of a special stick, you need to calculate first using Spherical Trigonometry calculations, then continue to calculate the Qibla shadows somewhere (Arkamuddin, 2009). Third, measurement with the help of Theodolite (with the azimuth of the sun). The use of this theodolite is a more accurate way to determine the Qibla direction.

Theodolite is a measuring instrument such as binoculars equipped with a lens, numbers that indicate the direction (azimuth) and elevation in degrees and a water-pass (Hambali, 2011) Fourth, Determine the Qibla Direction with a right triangle by calculating the Qibla point distance in meters. The basis used is a trigonometric comparison of right triangles (Hambali, 2011). And the fifth is using the Qibla *rasdul* (the shadow of the Qibla). Determining the direction of the Qibla with a shadow is the simplest way and the level of accuracy is sufficient.

In addition to these methods, in determining the Qibla direction, also experienced a significant development towards the era of digital, one of which is an android application and GPS. Compared to other systems and methods of determination, the Global Positioning System (GPS) has many advantages and offers more advantages, both in terms of its operation and the quality of the position provided. (Abidin, 2007, p. 1). Determining the position or coordinates of a place on the earth's surface with the help of technology, namely GPS or Google Earth (GE), is still considered passive consumptive. If you look at the use of GPS and GE technology both by astronomers and other people, it is only consumptive without any critical analytical efforts. Difficulties arise when the satellite system available on GPS or the data displayed on GE is in a state of error mistakes. The limited access to GPS and GE is also felt for people who are in areas that have not been touched by technology (Budiwati, 2016, p. 67).

The problem in determining the Qibla direction is the azimuth value between the location of a place and the position of the Kaaba. Azimuth is the distance from one point to another where the north point is the reference, so that it forms a clockwise angle. The use of Global Positioning System (GPS) technology as a navigation technology that provides information on the position of a place and a digital compass as a direction determiner, has been widely used as in smartphone Qibla direction applications. With the development of the times, the method of determining the position or coordinates of a place is getting more sophisticated. One technology for determining coordinates that is currently easy to find is the Global

Positioning System (GPS). Applications in determining the Qibla direction based on *Android that is currently developing include the Miqat Application. The Miqat application is an application that* In it there are various features such as the start of prayer times, Qibla direction compass, and Qibla map.

Qibla direction compass in Miqat app works to direct us towards the Kaaba, but this compass reference still refers to the earth's magnetism, so if in the area There is an automatic magnetic pressure, the accuracy level will be reduced compared to areas with magnetic levels low.

### **Research methods**

In essence, research is carried out to find objective truth. While this can be achieved through the scientific method which is also known as research methodology/investigative research methodology (H. Nawawi, 2017, p. 27) the type of research used is an empirical normative approach and the author uses this type of research, when viewed from the point of view of the usefulness of research results, research this is included in the category of applied research (H. Nawawi, 2017, p. 28). Furthermore, when viewed from the way and level of problem discussion, this research is included in the type of analytical descriptive research, namely the researcher tries to reveal a problem, situation, and event as it is from his point of view. object being studied. The data sources used are primary, secondary, tertiary data sources. Data collection techniques include interviews, measurement, and documentation. The data analysis technique used in this study used a qualitative descriptive analysis technique.

In this study, researchers took the object of a mosque which is a religious tourism place for Muslims and as a large mosque in the city of Palembang. Researchers took two mosque objects as research objects, namely the Sultan Mahmud Badaruddin Jayo Wikramo Mosque which is located on Jl. Jend. Sudirman, 19 ilir, Bukit Kecil District, Palembang City and the Al-Islam Muhammad Cheng Ho Sriwijaya Mosque which is located at 15 Ulu, Seberang Ulu District, Palembang City.

### **Discussion and Result**

#### **Method Qibla Direction Determination Using Miqat application.**

Qibla is the direction that Muslims go when they are praying. Qibla direction leads to a place that is the Kaaba (Baitullah) which is in Mecca. However, for those of us who are far from the Kaaba to find out whether our Qibla direction is correct, we need to use methods for determining the Qibla direction.

There are 3 ways to determine the Qibla direction that we usually do, namely:(Nur, nd, p. 26) :

- 1) By paying attention to the sun above the Kaaba.
- 2) By depicting the angle on the plane with the local geographic north-south base, determined with the help of:
  - a. B3MKA (Shadows of Upright Objects When the Sun Cultivates Above)
  - b. BBTI (Shadows of Special Sticks)
  - c. Sun azimuth.

## 3) By paying attention to the Qibla Shadows (BBK)

In addition to the methods above, in determining the Qibla direction, also experienced a significant development towards the era of digital, one of which is an application on android. In today's modern times, to find out the Qibla direction, it is enough to use an application that you can install on your smartphone via the Playstore application. Here's how to use an Android-based Qibla direction determination application:

- 1) Download the Qibla direction determination application (Miqat) on your smartphone on the Playstore application.
- 2) Enable location services for the Miqat app in the main settings on your Android device.
- 3) Make sure your Smartphone is connected to a data network (wifi or cellular data). because it will affect the GPS accuracy on the smartphone if you do not have a strong data network.
- 4) Open the Miqat application that you downloaded. Then the initial face of the miqat application will appear, namely the prayer time on that day.
- 5) Click the 3D Qibla text if you want to open the compass or real-world using augmented reality, and it will also show your current distance from Mecca.
- 6) Click Qibla map on your smartphone screen if you want displays the Qibla in an interactive map so that users verify the Qibla direction visually according to nearby buildings and roads. Here also you can find out the distance to the Kaaba, Qibla azimuth, and location accuracy.
- 7) Check for metal objects and magnetic fields around them, as they can affect the mobile compass. This application will notify the user when an abnormal magnetic field is detected

### **Accuracy Miqat Application in Determining the Qibla Direction of the Mosque**

The problem in determining the Qibla direction is the azimuth value between the location of a place and the position of the Kaaba. Azimuth is the distance from one point to another where the north point is the reference, so that it forms a clockwise angle. The use of Global Positioning System (GPS) technology as a navigation technology that provides information on the position of a place and a digital compass as a direction determiner, has been widely used as in smartphone Qibla direction applications. The development of increasingly advanced and sophisticated technology has resulted in a shift in the form and function of computers. Computers come in simpler forms, namely tablet computers and smartphones. A tablet computer is a complete portable computer that is entirely in the form of a flat touch screen, not using a keyboard and mouse as input media. While a smartphone is a mobile phone that has capabilities like a computer (Didik & Wahyudi, 2015, p. 78).

One of the applications in the Android-based Qibla direction that is currently developing is the Miqat application. The Miqat application is an

application in which there are various features such as the start of prayer times, Qibla direction compass, and Qibla map.

Qibla direction compass in Miqat app works to direct us towards the Kaaba, but this compass reference still refers to the earth's magnetism, so if in the area There is an automatic magnetic pressure, the accuracy level will be reduced compared to areas with magnetic levels low.

The Miqat application features prayer times, Qibla, and hilal visibility, distance to the kaaba, Qibla azimuth, and location accuracy. This application was developed by Samer Joudi. Samer Jaodi is from Dubai, United Arab Emirates. Miqat application uses a high accuracy formula to determine the Qibla based on the actual shape of the earth. Qibla map displays Qibla in an interactive map so that users verify the Qibla direction visually according to nearby buildings and roads. Qibla 3D displays the Qibla in real-world view using augmented reality and walking inside the Haram Mosque using a 360-degree panorama. Users can also determine the Qibla according to the position of the sun, moon, stars, and planets. The application will notify the user when an abnormal magnetic field is detected, as mobile compasses are unreliable and can be easily affected by metal objects and the surrounding magnetic field.

### 1.1 Qibla map on the miqat application and Qibla info on the Al-Islam Muhammad Cheng Ho Mosque



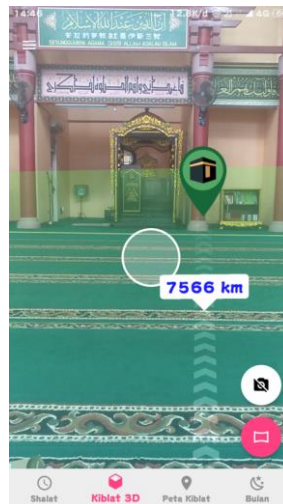
Based on the picture above, the miqat application in Figure 1.1 explains the real-world Qibla direction (the actual state of the earth) and the Qibla direction of the Al-Islam Mosque Muhammad Cheng Ho, and if you click on the Qibla info text, you will see information such as the Qibla from the North. actually, the distance to the kaaba, the research location.

### 1.2 Compass on the miqat application at Masjid Al-Islam Muhammad ChengHo



Furthermore, in Figure 1.2 describes the mobile compass on the Miqat application and the position of the sun and moon at the time of doing research.

### 1.3 3D Qibla in Real-world view and distance to Mecca at Masjid Al-Islam Muhammad Cheng Ho



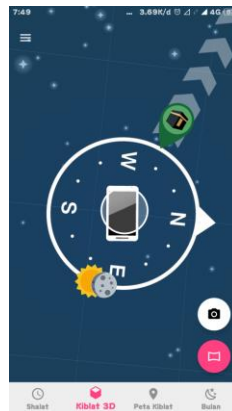
In Figure 1.3 it explains the 3D Qibla in real-world view and the distance between Al-Islam Muhammad Cheng Ho mosque and the Kaaba.

#### 1.4 Qibla map on the miqat application and Qibla info for the Sultan Mahmud Badaruddin Jayo Wikramo Mosque



In Figure 1.4 explains the real-world Qibla direction (the actual state of the earth) and the Qibla direction of the Sultan Mahmud Badaruddin Jayo Wikramo mosque. distance to the kaaba, research location.

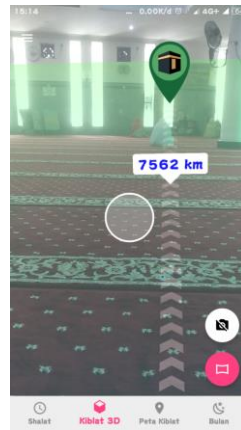
#### 1.5 compass on the miqat application at the Sultan Mahmud Badaruddin Jayo Wikramo Mosque



In Figure 1.5 describes the cellular compass on the miqat application and the position of the sun and moon at the time of doing research.



### 1.6 3D Qibla in Real-world view and distance to Mecca at Sultan Mahmud Badaruddin Jayo Wikramo Mosque



In Figure 1.6 it explains about the 3D Qibla in real-world view and the distance of the Sultan Mahmud Badaruddin Jayo Wikramo mosque from the Kaaba.

The methods of determining the Qibla direction that are commonly used to determine the Qibla direction are: Using a compass, Using a special stick, Using Theodolite, Determining with the Qibla rasdul. In addition to the above methods, in the current modern era, in determining the Qibla direction, there has been a significant development, the use of Android is not only for communication media, but on your smartphone device, there are many applications circulating to determine the Qibla direction with the help of Global Positioning. One of the systems (GPS) is the miqat application.

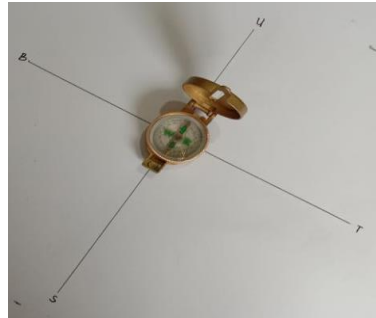
To determine the accuracy of the miqat application developed by Samer Joudi. The author conducted a study which took place at the Sultan Mahmud Badaruddin Jayo Wikramo Mosque because this mosque is one of the historic mosques in the city of Palembang and the Qibla direction of this mosque which originally followed the mosque building has now turned slightly deviated to the right after being carried out by a falakiyyah expert named Sheikh Abdurrahman Al-Masyri who saw that the Sultan Mahmud Badaruddin Jayo Wikramo mosque building was inaccurate in 1812. He used the rasdul qibla method since then the direction of the grand mosque no longer follows the mosque building.

In addition to conducting research at the Sultan Mahmud Badaruddin Jayo Wikramo Mosque, the author also conducted research at the Al-Islam Muhammad Cheng Ho Mosque because this mosque is a mosque that has a unique architecture. religious tourism destination. and the method of determining this mosque using the Qibla shadow method which is carried out by religious leaders and scholars of the city of Palembang in determining the Qibla direction of the mosque. Therefore the authors conducted research on the two mosques.

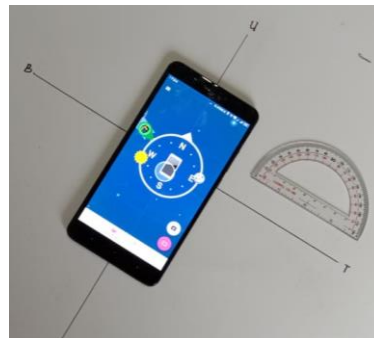
The following is the result of the practice of measuring the Qibla direction that the author did on January 29, 2020, which took place at the

Sultan Mahmud Badaruddin Jayo Wikramo mosque. and on January 30, 2020 at the Al-Islam Muhammad Cheng Ho Mosque.

### 1.7 Magnetic Compass Line

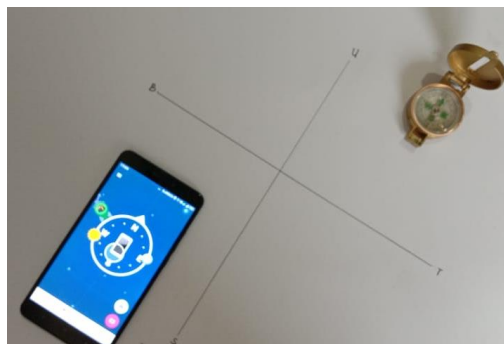


### 1.8 Accurate magnetic compass line with mobile compass



Based on the author's research, there is no difference in degrees between the magnetic compass and the cellular compass so that the level of accuracy in the miqat application can be used in determining the Qibla direction. The line on the surface is the line of the magnetic compass and is accurate with the mobile compass on the miqat application which is described in Figure 1.8 that the line of the mobile compass is the same as the magnetic compass.

### 1.9 Accuracy of mobile compass and magnetic compass



Based on Figure 1.9 explains that the accuracy of the cellular compass and magnetic compass is the same. However, if around a cellular compass or magnetic compass there are many metal objects, even though they are not visible, so that they will affect the compass, whether it is a cellular compass or a magnetic compass.

If you are going to do a research on the Qibla direction using a compass, it is better to pay attention to the following things:

- 1) Ensure that the earth's magnetic field can adjust when you want to measure the Qibla direction.
- 2) Calibrate the measuring instrument to be used before starting a measurement.
- 3) avoid places that contain metal as this can affect the sensitivity of the compass.
- 4) when using a mobile compass make sure you have a strong internet signal because it can affect the sensitivity of the compass.

Based on the analysis, the author concludes that the accuracy of the Qibla direction determination application using the Miqat application has the right accuracy because there is no difference in degrees between the compass in the miqat application and the magnetic compass. The author concludes that in terms of whether this application is accurate or not, in principle, it depends on usage. When used in places that contain metal it will make the magnetic sensor on the compass inaccurate which results in degree deviations on the compass being affected by the magnetic field and the surrounding metal which will result in a larger degree deviation on the compass, this application should be used outside buildings because in principle, the compass on the cellular relies on magnetic sensors and GPS on the smartphone itself.

### **Conclusion**

As a conclusion in this study, that the use of the Miqat application in determining the Qibla direction is a method that is very easy to use. You would be better off before using the application, but first calibrate the type of compass on the smartphone by shaking the phone so that the needle on the compass is stable. The accuracy of the Qibla direction of the Sultan Mahmud Badarudin Jayo Wikramo Mosque and the Al-Islam Muhammad Cheng Ho Mosque with the Miqat application, that in terms of whether or not this application is accurate, in principle, depends on usage. If used on metal in places that will make the magnetic sensor on the compass inaccurate which results in deviations in the compass which are affected by the magnetic field and the metal around it which will result in larger deviations in the compass, this application should be used outside the building because in principle the compass on the cellular rely on magnetic sensors and GPS that is on the smartphone itself.

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