

Heart rate monitoring mobile applications

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Abstract: Total number of times a heart beats in a minute is known as the heart rate. Traditionally, heart rate was measured using clunky gadgets but these days it can be measured with a smartphone's camera. This can help you measure your heart rate anywhere and at anytime, especially during workouts so you can adjust your workout intensity to achieve maximum health benefits. With simple and easy to use mobile app, 'Unique Heart Rate Monitor', you can also maintain your heart rate history for personal reflection and sharing with a provider.

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Heart rate monitoring mobile applications are in abundance in online app markets these days. But, people lack knowledge about which one to choose and for what purpose? Heart rate is defined as the number of times per minute a heart beats. In each heartbeat, the heart expands and contracts to receive and send blood from and to lungs and body. The maximum heart rate (the fastest a heart can beat in 1 minute) is linked to a person's age. According to American College of Exercisers, heart rate can be calculated by $208 - (0.7 \times \text{age})$.

Heart rate changes according to the physical activity a person is engaged in. The more intense the activity, the higher the heart rate, but aerobically fit people have lower heart rate at any activity level. On average, a normal person's heart beats 60–100 times per minute while a trained athlete's heart can beat 40–60 times. According to a recent study, higher ambient (sitting, relaxed) heart rate corresponds to higher risk of heart diseases. Similarly, the lower ambient heart rate (but not too low) signifies better health.

Traditionally, heart rates were measured using external hardware such as sensors, cardiac monitors and chest straps, or counting pulse at the wrist. However, with modern smartphones you do not need to use heavy equipment or perform calculations. When your heart beats, the volume of

blood flowing through your fingertip changes, a heart rate monitoring app can detect this by capturing color changes in your fingertip using a phone's camera. Proprietary algorithms are then used to calculate the heart rate.

Unique Heart Rate Monitor is the top rated mobile application in the Google Play Store at the time of this article. This app is good for measuring workout intensity especially High Intensity Interval Training (HIIT). It offers the user a selection of body states. If the user is in the process of workout or post workout, the app shows the user their exercise intensity level by place their heart rate into a zone or range of heart rates within certain percentages of the maximum heart rate. From the lower to upper end, the zones are "Recovery Zone", "Fat-Burning Zone", "Target Heart Rate Zone" and the "High Intensity Zone" (*Figure 1*). Since each zone has its own advantages, by knowing your zone during exercise, you can adjust your intensity to achieve the maximum benefits.

Besides giving you information about your zone, the app allows you to make notes along with a heart rate reading. You can also visualize your heart rate history via color coded bar graphs (*Figure 2*), and perform a very simple analysis of your heart condition over time. For example, you can monitor your heart rate in response to a medication or a therapy. You can link your heart rates to your moods, and



Figure 1 Information about Heart Rate Zones (courtesy—Unique Heart Rate Monitor).

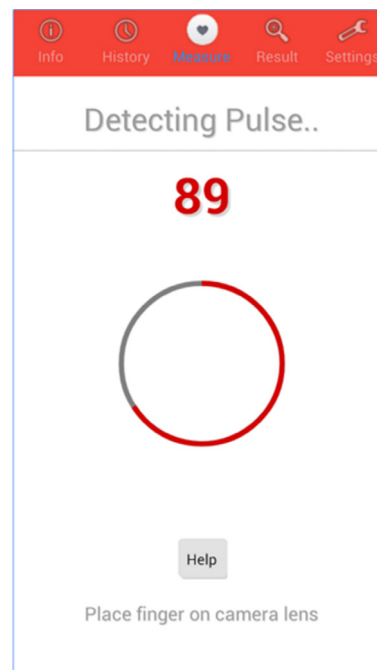


Figure 3 Measuring heart rate (courtesy—Unique Heart Rate Monitor).

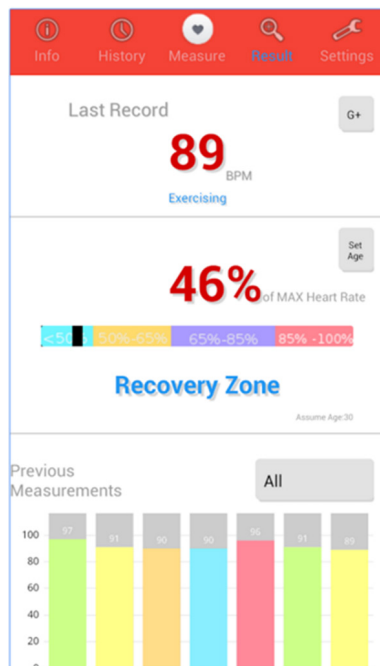


Figure 2 Current reading and history graph (courtesy—Unique Heart Rate Monitor).

hence hormonal activity. People with heart conditions, such as bradycardia, tachycardia and atrial fibrillation, can help their cardiologists better understand their clients' health by keeping a record of heart rates.

One advantage of Unique Heart rate application is that, unlike other top rated apps, it offers unlimited number of readings and recordings while being free. The interface is simple and easy to use (Figure 3). Graphics can be improved, and advertisements can get annoying (however, this is not an issue). The most important thing is that the app claims to be accurate, and users' comments seem to confirm the claim. The developers suggest the following test to check accuracy: *"A simple way to prove it (the accuracy) is touch your wrist to feel the pulse and observe the heart beat icon on the application, then you will be able to notice that the heart beat icon is synchronize with your feeling of heart pulse."* The main challenge could be figuring the best way to place fingertip on the camera lens so the app can measure the heart rate. The right thing to do is place the fingertip on the camera, and rest of the finger on the flash. The environment should be well-lit.

We recommend this application to our readers. Understanding one's health by tracking and identifying

patterns in numbers is revolutionizing the way we understand and do healthcare. You can join this revolution by doing something as simple as monitoring your heart beats.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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