User manual – G.U.A.R.D

Version 1.0



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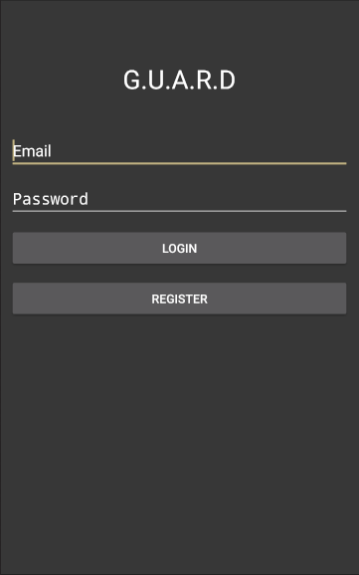
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# 1. Login

**When the application is launched for the first time (or if the user chooses to log out), he or she must first login before gaining access to the application.

## Registered G.U.A.R.D user

In case the user already has registered a G.U.A.R.D account, he or she may enter their credentials and press “login”, see *Figure 1* to the right.

## New to G.U.A.R.D

However, if the user has yet to create an account, he or she must go through the registration process to gain access to the application. The user simply presses the register button, see *Figure 1* to the right, and another view is shown where the user is asked to enter e-mail and password. *Notice that the password must be of at least of 8 characters.* When the registration is done, the user is a registered G.U.A.R.D user and logs in accordingly (see 1.1 Registered G.U.A.R.D user above).

# Connect to G.U.A.R.D

Figure 1 – view of login screen

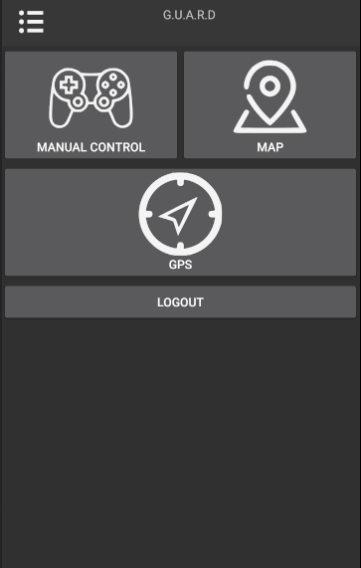
G.U.A.R.D utilizes two connections to work as intended; Bluetooth and Wi-Fi. The Bluetooth connection handles the exchange of data between the Arduino and the mobile device while the Wi-Fi connection handles the data exchange between the Raspberry Pi and the mobile device. For optimal user experience both connections are recommended to be used when using G.U.A.R.D (*absence of either connection will disable certain features*).

## Bluetooth connection

\*\*\*\*\*\*\*

## Wi-Fi connection

# Main screen

When the user has logged in, the main screen is presented, see *Figure 2* to the right*.* At main screen, the user is greeted with various options. Clicking on of them options will redirect the user to the view of such choice.

## Manual control

Manual control allows the user to control the car manually with help of a joystick. A video stream as well as “parking sensors” is provided to simplify the maneuvering of G.U.A.R.D. See 4. Manual control for more information.

## MAP/GPS

MAP/GPS has two usable features; it shows a map of where the both the user and the G.U.A.R.D units are as well as it gives the user the possibility to activate the autonomous following. See 5. MAP/GPS for more information.

## Logout

If the user wants to logout of the application for any reason, the button “LOGOUT” at the main screen, see *Figure 2*, will do just so. After the user has logged out, the login screen is prompted and the user has to login again to gain access to the features and his or hers account.

Figure 2 – view of main screen

## Toolbar top

Plaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaceholder

## Toolbar bottom

Plaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaceholder

# Manual control

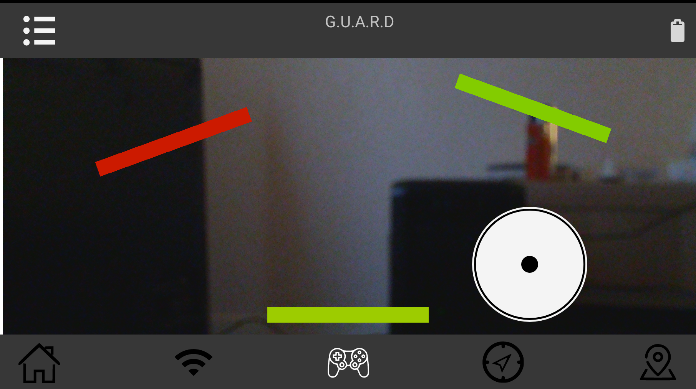
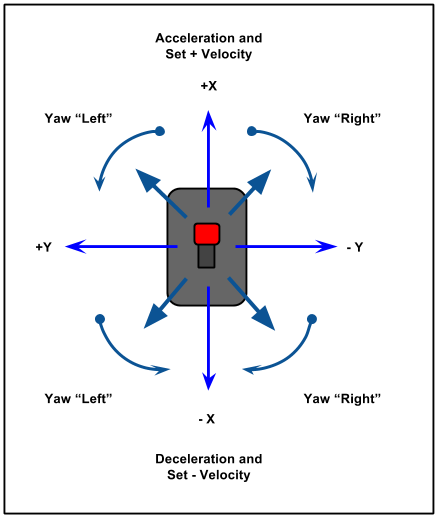
The manual control feature provides the user with an intuitive way of controlling G.U.A.R.D (see *Figure 3* to the right). A digital multi-axis controller that mimics a good old fashioned analog joystick provides the user with the ability to easily maneuver G.U.A.R.D. A in real time video stream shows what is in front of the G.U.A.R.D device. To further provide the user with tools for maneuvering the G.U.A.R.D device in a safe manner, “parking sensors” which graphically indicate potential objects surrounding the device, are present in the manual control view. *Notice that an established Bluetooth connection is required for the controller and parking sensors to work* *while* *the video stream requires an established Wi-Fi connection to work.*

Figure 3 – view of manual control

## Analog controller (joystick)

The analog controller works exactly as its physical equivalence (see *Figure 3* above, white circle in bottom left corner). Pressing and holding the joystick forward will make the G.U.A.R.D device drive forward. Likewise, pressing and holding the joystick in any other way, the device will turn/drive towards the heading the joystick points at (see *Figure 4[[1]](#footnote-1)* to the right for graphical guidance). The speed of the G.U.A.R.D device is directly proportional to how far the joystick is held from its center. Thus, holding the joystick as far as possible from the center, maximum speed from the device is requested. Letting go of the controller makes the joystick to automatically regress to its default position, in the center of the controller, and the device stops.

## Video stream

Figure 4 – graphical representation of how the analog controller functions

The background of the manual control view (see *Figure 3* above) is a real-time video stream facing the front of the G.U.A.R.D device. *Notice that a slight delay (less than 500 ms on average) may be present due to hardware limitations.*

## Parking sensors

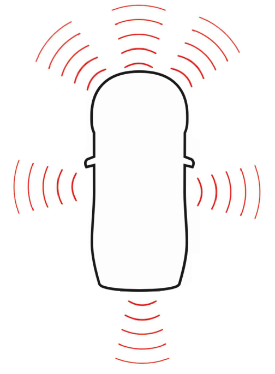
The colorful lines in the manual control view (see *Figure 3* above) are the so-called parking sensors. The G.U.A.R.D device utilizes various ultrasonic sensors, placed according to sketch (see *Figure 5* on the right). Each sensor sends and retrieves “beams” like the figure depicts. If a sensor senses that there is something there, a line that overlays the manual control is shown. The color and the position of the line indicates how close the sensors senses that an obstacle is. The color changes between green and red. The redder the color goes, and the close the line gets to the car, the closer is the sensed obstacle.

Figure 5 – sketch over how the parking sensors are positioned

Should we have a key translating color to distance?

## Battery indicator

The manual control also contains a battery indicator in the top right corner (see *Figure 3* above). The indicator simply gives an indication of how much battery there is left in the G.U.A.R.D device’s battery pack. In case of critical low battery level, the application will both notify the user via a toast as well as a notification. The user can acquire additional details of the battery level by pressing the icon which will prompt a view containing information such as, for example, estimated battery pack voltage.

# MAP/GPS

1. Image showing two different ways of configuring a joystick. Digital image. Imgur: The Most Awesome Images on the Internet. N.p., 3 Dec. 2013. Web. 10 May 2017. <http://imgur.com/cVHe5Tr>. [↑](#footnote-ref-1)