CBU Admissions TJBots

User Documentation

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**Introduction**

It seems you are in charge of working with one of CBU’s TJBots, congrats! The purpose of this manual is to give you a basic understanding of what the robots are and how to operate them. The information is aimed to be simplified enough to the point that some one with little technical knowledge can operate the robots. After reading this manual the reader should know how to turn on one of the TJBots, start the chat program, identify the status of the TJBot by the status light on top of the TJBot, communicate with the TJBot, and lastly trouble shoot any minor errors that may occur. Hopefully you will come out of this manual knowing more than you did before and it is simple enough to read.

**Basic Overview**

The CBU Admissions Robots are two robots built using Raspberry Pis and the IBM TJBot platform. Their purpose is simple, they act as simple chat bots that can communicate with students and share basic information about CBU and different schools at CBU. They are small cube shaped robots that stand on two legs and they have a single arm. The TJBots also have an LED on the top of their head. This LED acts as status light, it changes color based upon what is occurring in the code. There is also a small button on the side of the TJBot’s jaw. This button starts and stops the program for communication. Inside of the TJBot’s head is a speaker that allows the TJBot to talk to those who are interacting with it. This speaker connects to a audio port that is on the side of the TJBots head. On the underside of the Jaw there is a small microphone that allows the TJBot to listen. The TJBot is powered by a micro USB wall adapter. This plugs into the side of the TJBot’s Head. The outer shell of the TJBot’s head may be removed to allow easy access to the USB power port, HDMI, and audio port onboard the Raspberry Pi.

The Raspberry Pi is inside of the TJBot’s head and as stated before can be accessed by removing the Head of the TJBot. All of the electronic components connect to the Raspberry Pi. From here on out the Raspberry Pi will not be mentioned and only the TJBot will be mentioned. It should be assumed that something connected to the TJBot will be connected to the Raspberry Pi that is in the head of the TJBot. The TJBot in Admissions is named Bonnie, and from henceforth the program that runs on the TJBot will be called Bonnie, while the hardware is referred to as TJBot. Bonnie may be referred to as feminine pronouns as well.

**<INSERT PICTURE OF TJBOT HERE With Skull WITH PARTS LABLED FIG 1>**

**<INSERT PICTURE OF TJBOT HERE WITH Out Skull PARTS LABLED FIG 2>**

**Quick Start Guide**

If you have operated one of the TJBots before this guide is a good quick reference for you. For first time users please see the detailed start guide.

1. Plug the USB power adapter into the TJBot.
2. Make sure the Speaker is turned on, and volume turned up
3. Allow the TJBot to boot up.
4. Once the LED is an orange/yellow you are ready to start Bonnie.
5. To start Bonnie push the button on the side of the TJBot.
6. Once bonnie has started the TJBot will say “Hello my name is Bonnie I am the CBU Admissions Bot”
7. Bonnie is now ready for user input and the Status LED should be **Blue**
8. In a clear voice you may now ask Bonnie a question or give her a statement. Remember you must include the name “Bonnie” in your question or the robot will not acknowledge you.
9. When Bonnie hears her name her LED should change to **Green**
10. She will then process her response
11. When she has a response her LED will turn **Pink** and she will talk.
12. When she is done and ready to listen her LED will go back to **Blue**
13. At any time the LED turns **Red** Bonnie has encountered an Error and will try to recover.
14. If Recovery fails press the button on the side once. Wait 20 seconds. Then press it again to restart Bonnie.
15. At any time this button can be pressed to stop the program and pressed a second time to start it again.
16. If this fails to solve a problem with a **Red** status LED please see Troubleshooting.

**Detailed Start Guide**

1. When you are ready to operate the TJBot you should first plug in the USB power to the side of the head. It is much easier to connect the power with the head removed from the TJBot. Just slide the head straight up and you will see the connection ports as show in Figure 2. Be mindful not to touch any of the circuit board when the head is off. This may damage the board and kill the TJBot. Connect the power but leave the head off.
2. Now is a good time to check and make sure that the speaker is turned on. Turning the TJBot around you will see the speaker. There is a small toggle switch on the TJbot. Make sure this is flipped in the ON direction. The Status Light on the Speaker may then turn Red or Blue, this depends on the charge. For more information see the Status LED guide. There is also a small slider on the side of the speaker. This controls volume. Turning it all the way will be loud.
3. It is also a good idea to ensure the Speaker is plugged into the TJBot as well If you flip it over to the front of the head you can see if it is connected or not.
4. Place the head back on the TJBot now if you have not done so already. You do not want to accidently damage it.
5. The TJBot will now boot up. This may take a few seconds, as it has t load the operating system, connect to the internet, and load some programs before it is ready. Once the TJBot status LED turns an Orange/Yellow it will be read to start Bonnie.
6. Now the TJBot is ready, press the button on the side once. This will cause Bonnie start. The color of the LED will cycle through a few colors for a second. This is a sign Bonnie has started. Next the TJBot should announce “Hello My name is Bonnie I am the CBU Admissions Bot” Or something along those lines. When this occurs we now know that Bonnie has a connection to the IBM cloud services and she can talk.
7. Next the TJBot’s Status LED should turn Blue This indicates that Bonnie is ready to listen to what is to be said around her.
8. She will not react to any statements that are said unless she hears her name “Bonnie”. As a result the phrase “Tell me about Engineering” will be met with silence. Though the phrases “Bonnie tell me about engineering”, “Tell me about Engineering Bonnie”, or even “Tell me Bonnie about Engineering” will trigger a response as she heard her name.
   1. Note that you can say her name at any time during a response and she will process what has been said. When she processes information her name is removed from the dialog and does not meddle with the meaning of the phrase.
   2. Bonnie continues to listen what is being said until there is a silence. When there is a silence the statement is then processed.
   3. When the statement is processed the Status LED will change to Orange.
   4. Please know, just like Siri, or google assistant there is a chance that Bonnie will not understand what you are saying and she may either not respond or may give a wrong response. If this occurs try again in a clear loud voice, and speak closer to the microphone.
   5. There is a chance that her “memory” will overflow and she will forget what has been said and take a second to recover.
9. Once Bonnie hears her name her status LED will change to Green and she will send the statement off to the IBM cloud for processing.
10. A reply is then sent back from the IBM cloud and converted to speech. The status LED will then turn Pink as Bonnie says her response. While Bonnie is speaking she will no longer be listening until she has finished what she has said.
    1. If new dialog has been added to Bonnie’s conversation it may take her a bit longer to reply as she must synthesize the audio file, save it, and then play it. This only occurs the first time she uses this dialog.
11. Once Bonnie is done speaking the LED will change back to blue and she will be ready for another question.
12. If at any time you are ready to stop Bonnie, you may press the button on the side of the jaw to stop her. Pressing the button again will start her up again.
13. At any time, the LED Turns Red this means that an error occurred. This is bound to happen. When the LED turns red Bonnie will try to recover from the error by restarting the program. However, there is a chance she cannot recover from it. If this is the case the LED should start flashing red. If this occurs, you Simply restart her by pressing the button once to stop and again to start.
    1. There may be a case where Bonnie cannot recover, and her LED simply stays red. If this occurs simple restart the program by pressing the button.
    2. If the error keeps occurring, please see trouble shooting.

**Status LEDs Guide**

1. Status LED Colors for the TJBot
   1. RED – Error will attempt to recover
   2. Flashing Red- Cannot recover from this error
   3. BLUE – Listening to what is being said
   4. ORANGE/Yellow- Ready to start Bonnie
   5. ORANGE – Done listening and checking what has been said
   6. GREEN – “Bonnie” was heard in the last statement
   7. PINK – Bonnie is speaking
2. Status LED Colors for the Speaker
   1. When turned off
      1. BLUE – Fully Charged
      2. RED – Charging
   2. When turned on
      1. BLUE – ON and ready to work
      2. RED – Battery is low need to charge
         1. The speaker should constantly be charging so you should not see red in this state
3. Status LEDs C for the Raspberry PI (Onboard hard to see)
   1. If the RED LED is a solid on and there is no GREN LED flashing please see technical manual.

**Troubleshooting**

1. When the button is pressed the TJBot goes straight to a flashing RED.
   1. When Bonnie first starts she makes her connection to the IBM Cloud. If she is unable to connect to the IBM cloud she will go into a critical failure state. Common causes of this include
      1. No Internet Connection
         1. Check and see if the Wifi on campus is currently working, and if you can get to the internet. If you cannot you can check and see if the wired network is working. If it is you can connect the TJBot to the wired network. However, if the wired network is down too. You must wait for connection to be re-established. Or you can see **Phone Tethering** in the technical guide
         2. If the WIFI on Campus is working, Bonnie may not have enough time to connect to the network. Stop Bonnie with the button. Wait a minute and try again.
         3. If the WIFI is working and Bonnie is unable to connect after waiting a little bit please see **Checking Connected Networks** in the technical guide.
      2. Invalid Credentials
         1. If the WIFI is working and Bonnie is able to connect to the internet, but she is unable to connect to the IBM Cloud some of the credentials for the IBM servies may be invalid or expired. Please see **Checking and Changing Credentials** in the technical manual.
      3. The IBM Cloud is down
         1. If all above seems correct, than there is a good chance the IBM Cloud is down. As they update it often there are times that it goes down for brief amounts of times for maintenced. Simply wait for them to bring it back up.
2. Bonnie stars up after button press, Cycles through LED colors, but does not speak
   1. Goes to RED Flashing LED. If this occurs then Bonnie was able to connect to all of the IBM services. However, she was unable to successfully access the Text to Speech Service.
      1. Invalid Credentials
         1. Please see **Checking and Changing Credentials** in the technical manual
   2. Does not go to a RED Flashing LED
      1. Check to make sure the Speaker is on and the volume is turned up. Also check to make sure that it is connected to the TJBot.
      2. If that does not work, please look at **Testing Audio Out** in the technical manual.
3. Bonnie starts up, says her greeting, but does not seem to listen.
   1. RED LED
      1. Bonnie has more than likely experienced a input overflow from recording audio. She will be able to recover from this. They occur every so often and an exact fix has not been discovered
   2. Flashing RED Led
      1. Bonnie has experienced a fatal failure with her recording program. Please see **Streaming.py** **Issues** in the Technical manual.
   3. LED is Blue and does not change
      1. Check to make sure the microphone is connected
      2. Check **Testing Audio In** in the Technical manual
4. TJBot will not boot up and change the LED to Orange/Yellow
   1. Check the Power Status LEDS. If there is only a steady RED led please see **Fatal Failures** in the Technical manual.
   2. If the Power Status LEDs are one and blinking or steady, the TJBot is probably not done booting up. Just wait a bit
   3. If neither LED is on make sure that the power is connected to both the TJBot and the wall outlet. If it is and the TJBot does not turn on try another power adapter. Any standard Micro USB adapter will do.
5. For any other errors that may occur check the Technical Manual and see if you can find it there. If not use the contact information in the technical manual create a Issue on the GitHub repository.

**Adding to Conversation**