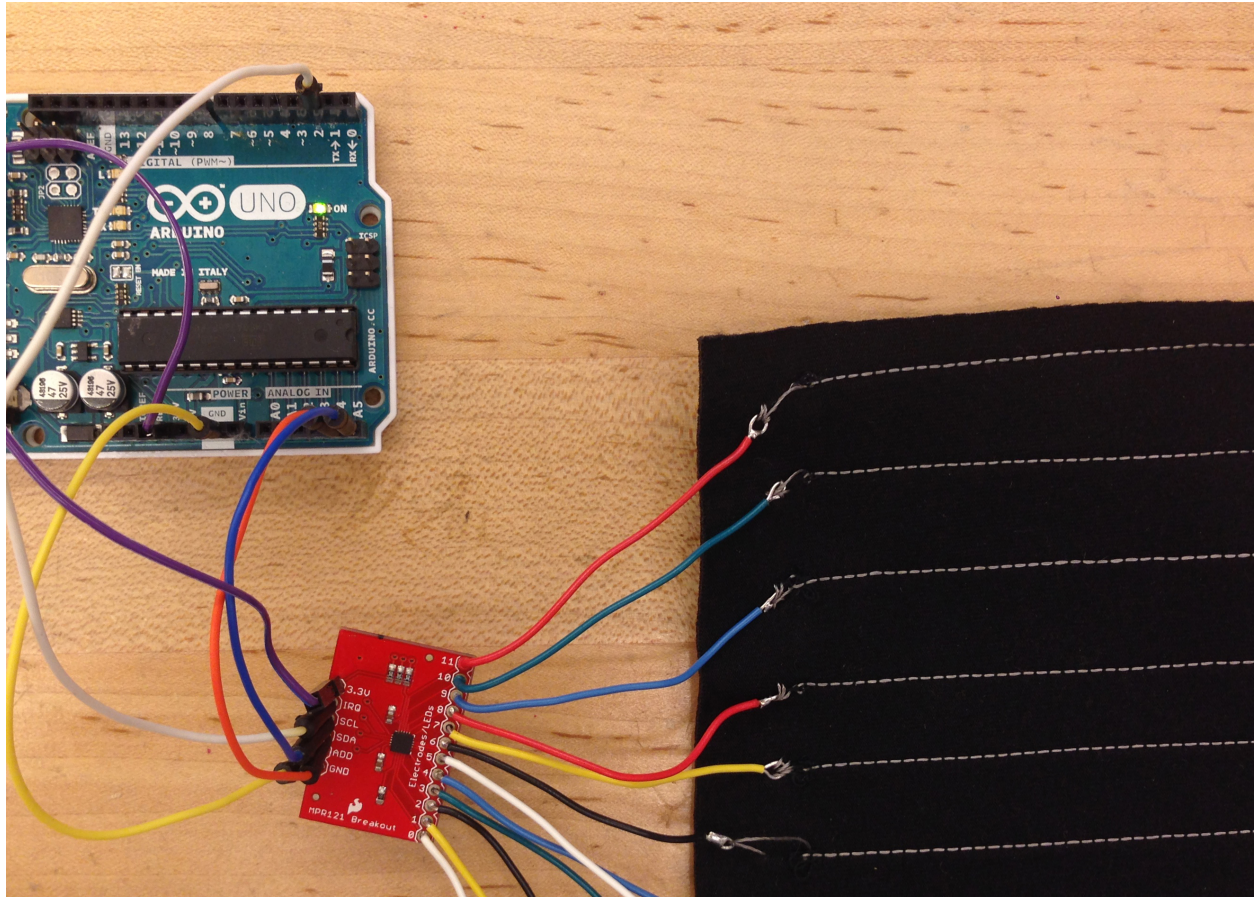


Conductive Thread Touch Sensor



After testing the capacitive touch sensor breakout with various conductive fabric materials, I wanted to create an array of conductive thread traces that could be used to activate the touch sensor instead. This instructable will demonstrate how to connect conductive thread to a capacitive touch sensor, to make switches out of conductive thread.

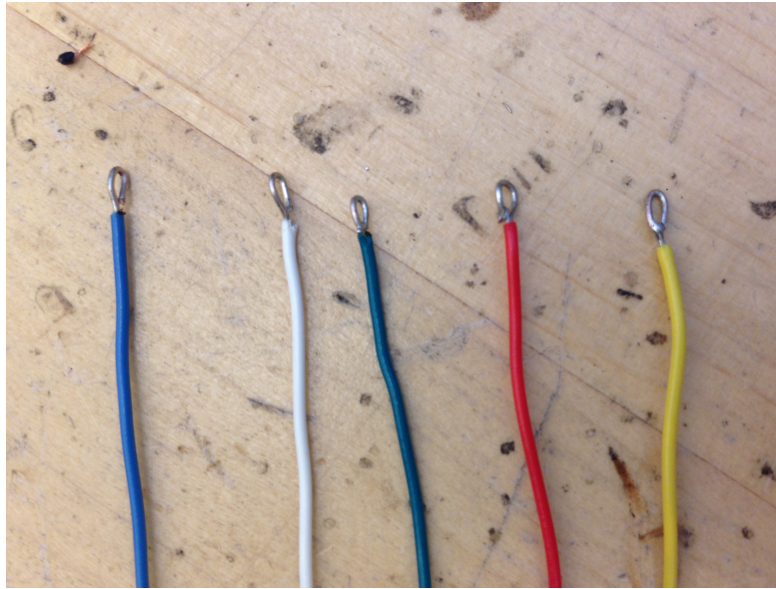
Materials list:

- + Capacitive touch sensor breakout (MPR121)
- + Conductive thread
- + Solder
- + Solid core wire
- + Fabric (preferably neoprene or a fabric with cushion of the sort)

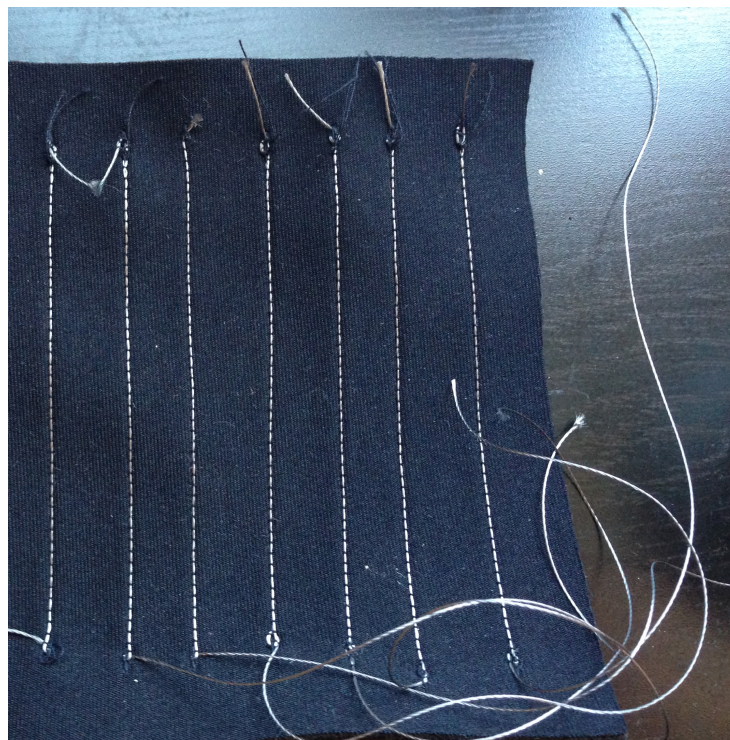
Tools:

- + Soldering iron
- + Wire stripper
- + Needle nose pliers
- + Needle

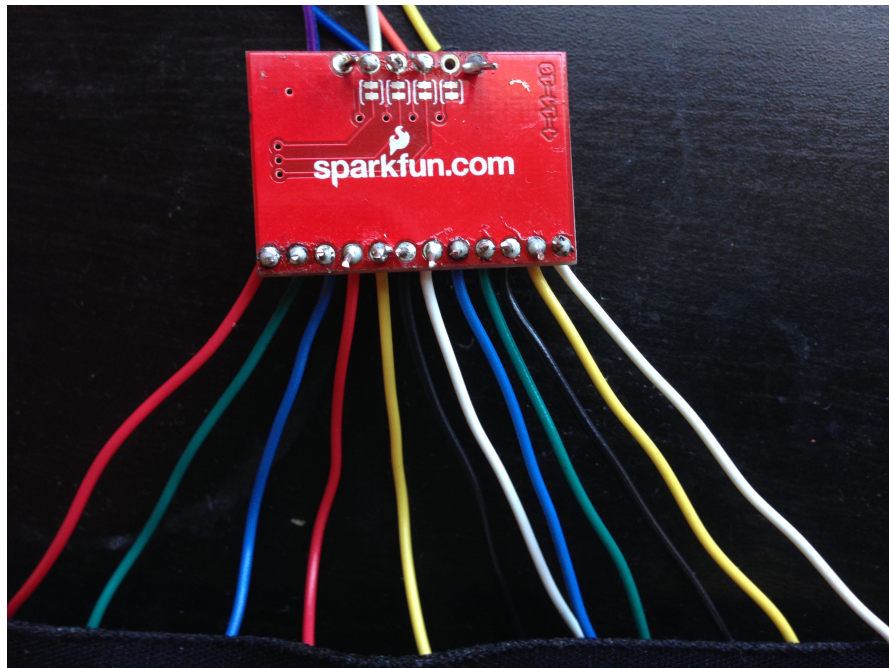
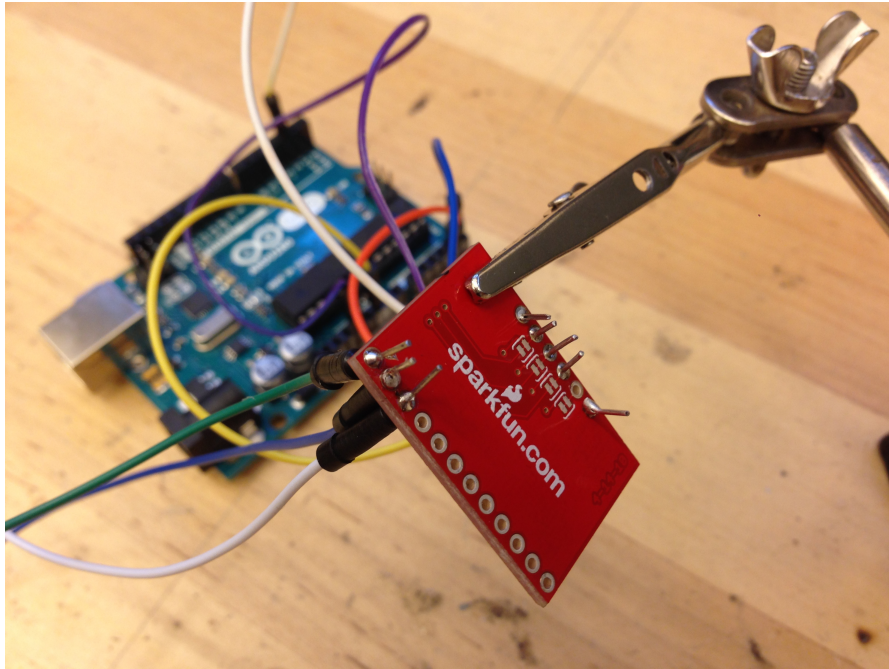
1. To create the connection from the capacitive sensor to the conductive thread, you need to create a loop on the end of a solid core wire to sew the thread onto, which will then be soldered onto the sensor via the other end of the wire. Use the wire strippers to strip the end of the wire, then bend the ends into a loop using the needle nose pliers. You can then close the gaps of the loops by soldering. This method was inspired by this instructable on conductive thread female connectors. (<http://www.instructables.com/id/Conductive-Thread-Female-Connector/?ALLSTEPS>) Create as many connectors as you want to create switches (this sensor allows up to 12 connectors).



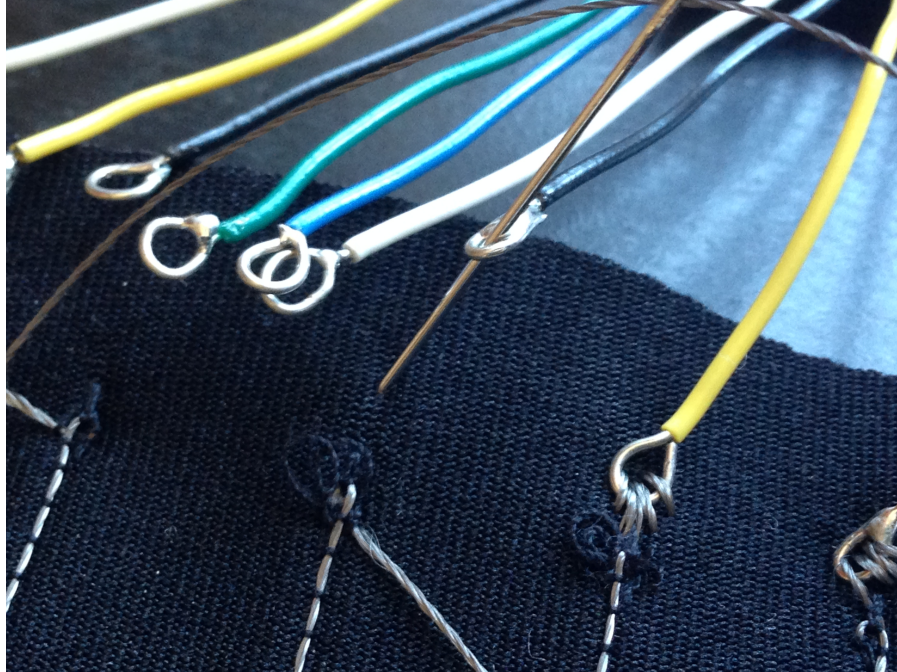
2. Sew your conductive traces with conductive thread, either by hand or with a sewing machine, in whatever configuration desired, as long as the traces are not touching. This example uses simple straight rows for demonstration purposes. At the end of the trace, make sure to leave enough of an extension to then hand sew the conductive thread onto the loop connection.

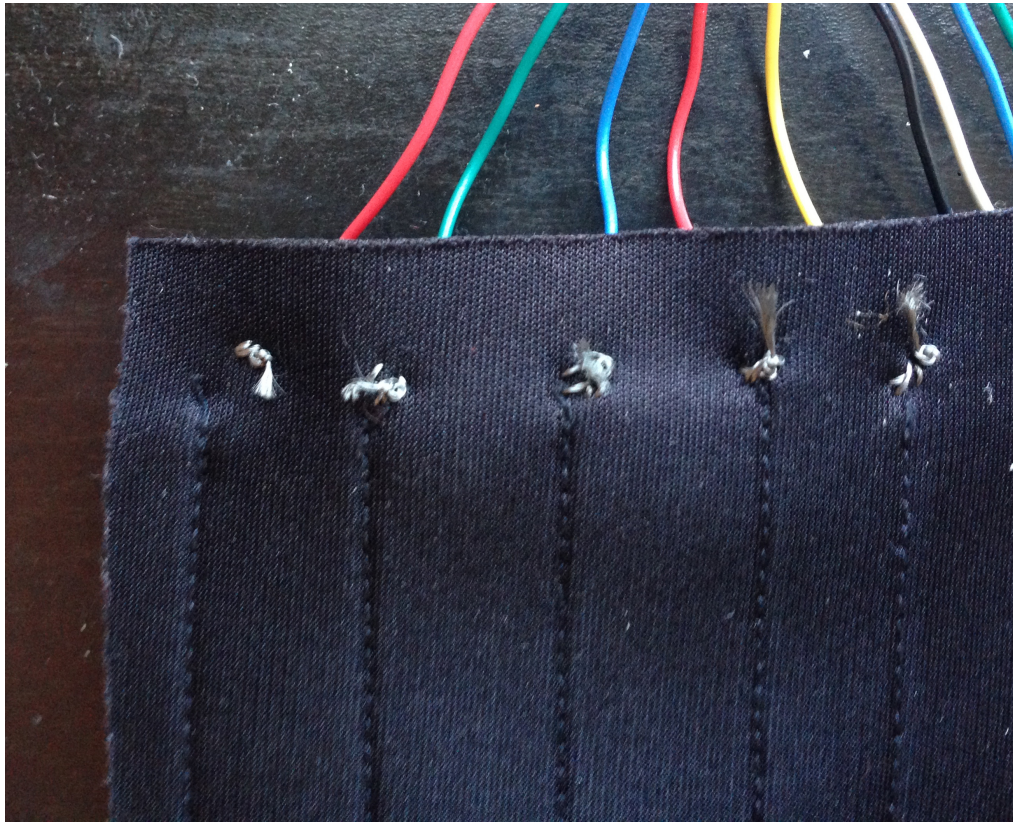


3. Cut the solid core wires with the looped ends to length, making sure that they are all able to reach from the capacitive sensor board to the conductive thread traces that you will connect them to. Strip the ends, and solder them onto the capacitive touch sensor. Clip the bottom ends to make sure that they don't touch one another and disrupt the circuit. Similarly, solder new solid core wires to the pins that connect to the micro controller, which you will hook up according to the setup, which can be found here: https://learn.sparkfun.com/tutorials/mpr121-hookup-guide?_ga=1.145284596.1951760593.1421815180

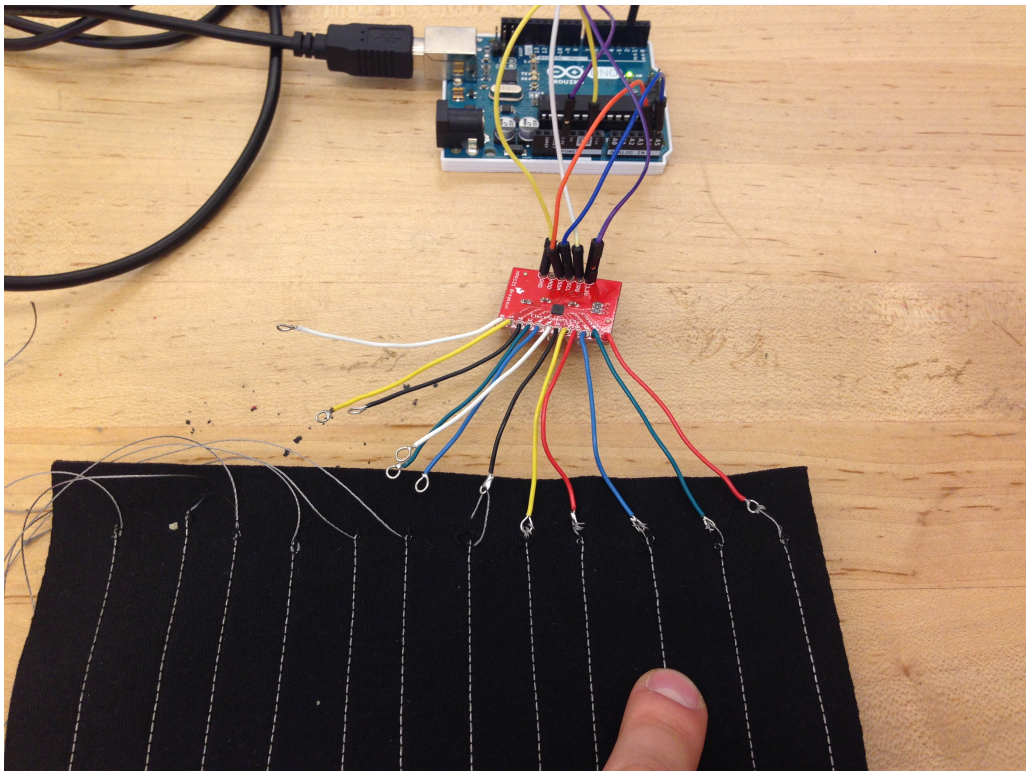


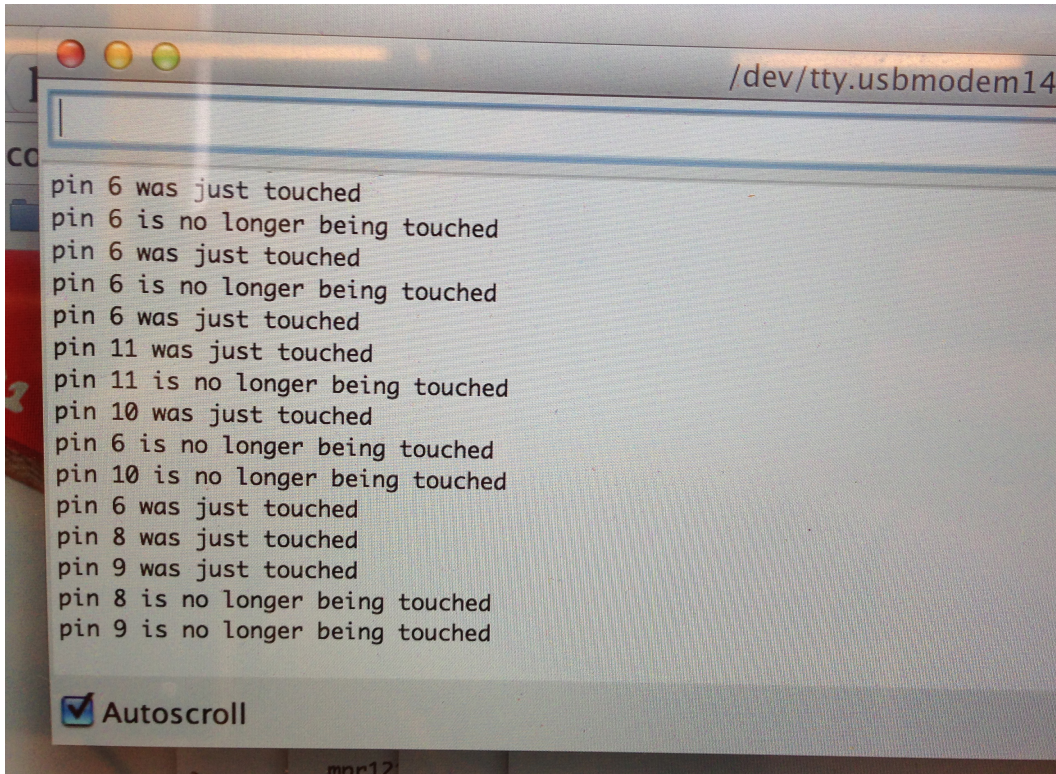
4. Hand sew the ends of the conductive thread onto the corresponding loop of the wires connected to the sensor board. Make sure to make several loops to ensure a strong connection. Trim the leftover thread to make sure that there are no loose ends touching the other traces.





5. To test your switches, you can use the same link as the hookup guide for the capacitive sensor, and download the code that will read and sense which sensor is being touched. Hook up your micro controller to the computer and upload the code. Making sure your sensors are not touching, open your serial monitor and touch a conductive trace - it should detect your touch!



A terminal window with a title bar containing three colored window control buttons (red, yellow, green) and the text "/dev/tty.usbmodem14". The terminal displays a series of text messages indicating touch events on various pins. At the bottom of the terminal, there is a checkbox labeled "Autoscroll" which is checked. The text in the terminal is as follows:

```
pin 6 was just touched
pin 6 is no longer being touched
pin 6 was just touched
pin 6 is no longer being touched
pin 6 was just touched
pin 11 was just touched
pin 11 is no longer being touched
pin 10 was just touched
pin 6 is no longer being touched
pin 10 is no longer being touched
pin 6 was just touched
pin 8 was just touched
pin 9 was just touched
pin 8 is no longer being touched
pin 9 is no longer being touched
```

6. Once you have your conductive traces, code and hookup ready, you can then take a step further and add components, such as leds, and code to create switch demands using the touch sensors!