The Mantis Climate Sensor And Scratch Programming

Connecting the Mantis Climate Sensor To Scratch

Steve Holmes

October 2015
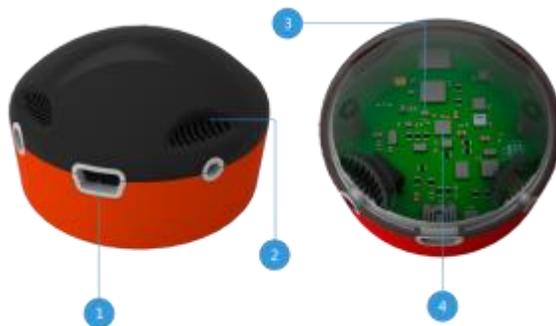
Introduction

The Mantis Climate Sensor:

http://www.mantisopenstem.com/climate-sensor/

The Mantis Climate Sensor transmits the following weather data over Bluetooth LE connection:

- Temperature
- Pressure
- Humidity
- Barometric Pressure
- Light and UV light index (lux)
- Dew Point

Scratch

The Scratch team have created a method for allowing devices to connect to Scratch known as Scratch extensions. The Mantis Climate Sensor has been connected to the Scratch programming environment via a dedicated Scratch extension. More info about Scratch extensions can be found at http://scratchx.org . Info on Scratch in general: https://scratch.mit.edu

The Mantis Climate Sensor Extension
The Scratch extension allows live weather data to be available in the Scratch programing environment. Young programmers can then create scientific experiments and draw conclusions based on the data. Furthermore, the Scratch programming paradigm allows the user to write their own programs to process, store, and display the data. Thus, the Scratch user learns about how write programs to allow computers to handle data.
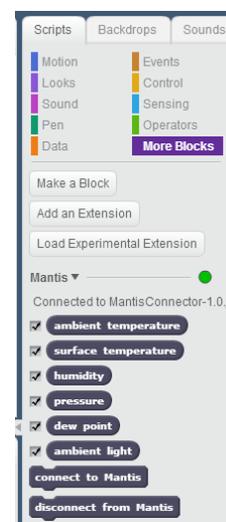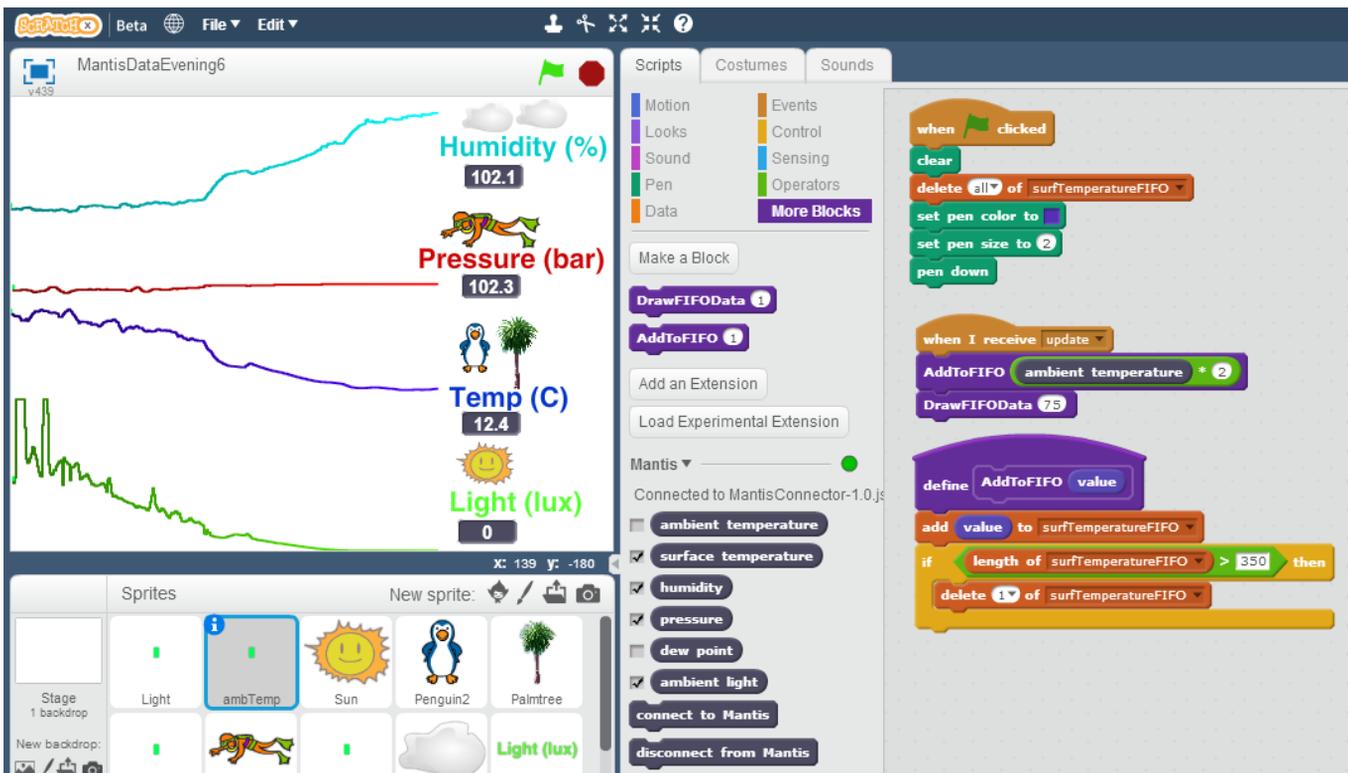
Experiment 1

The Evening Cool Down

We wanted to see how the weather data changed during the second half of the day. At 2:00 pm we placed the Mantis Climate Sensor outside and connected it up to the PC and Scratch using the Bluetooth LE connection.

We set the sample rate at 1 minute and ran the experiment until 8:00 pm. Each point on the graph represents a data reading taken at one minute intervals over the whole afternoon/evening.

Experiment 1 Observations
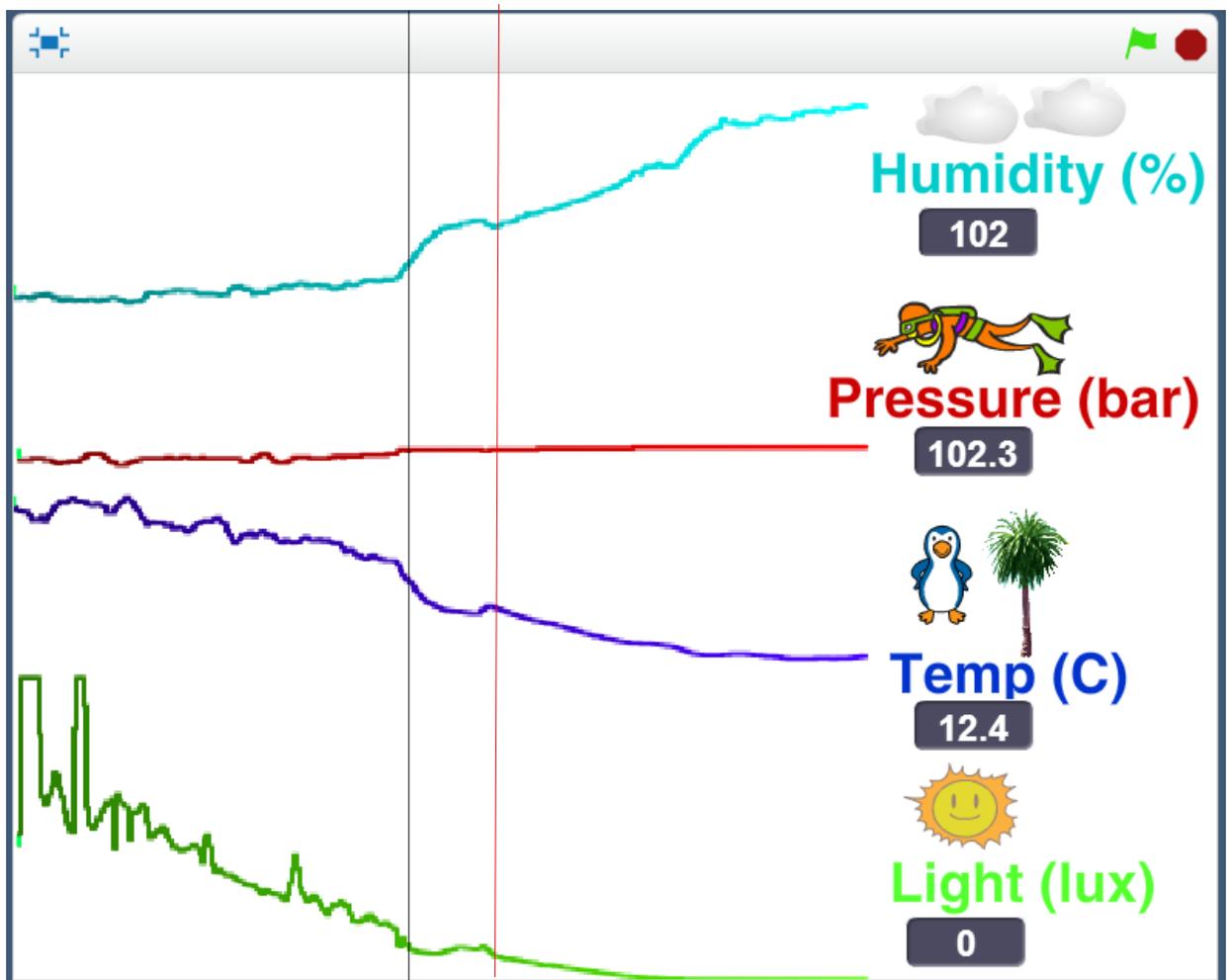
The black line in the graph indicates a time (4pm) when a cloud passed over. The light took a steep drop and caused the temperature to drop and the humidity to rise.

The red line indicates when the sun came back out and the temperature rose and the humidity fell because of the warmth of the light.

As it got dark, the temperature fell and the humidity rose at a steady rate.

The pressure stayed relatively constant as it was a nice day because we were in the middle of a high pressure system.

The Mantis Climate Sensor in Action

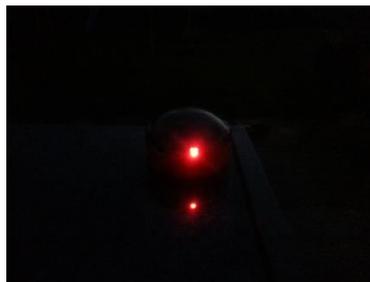Time Lapse of the Afternoon's Data Gathering:

2PM

5PM

8PM

Just to be sure, we charged the Mantis CS while it was working:
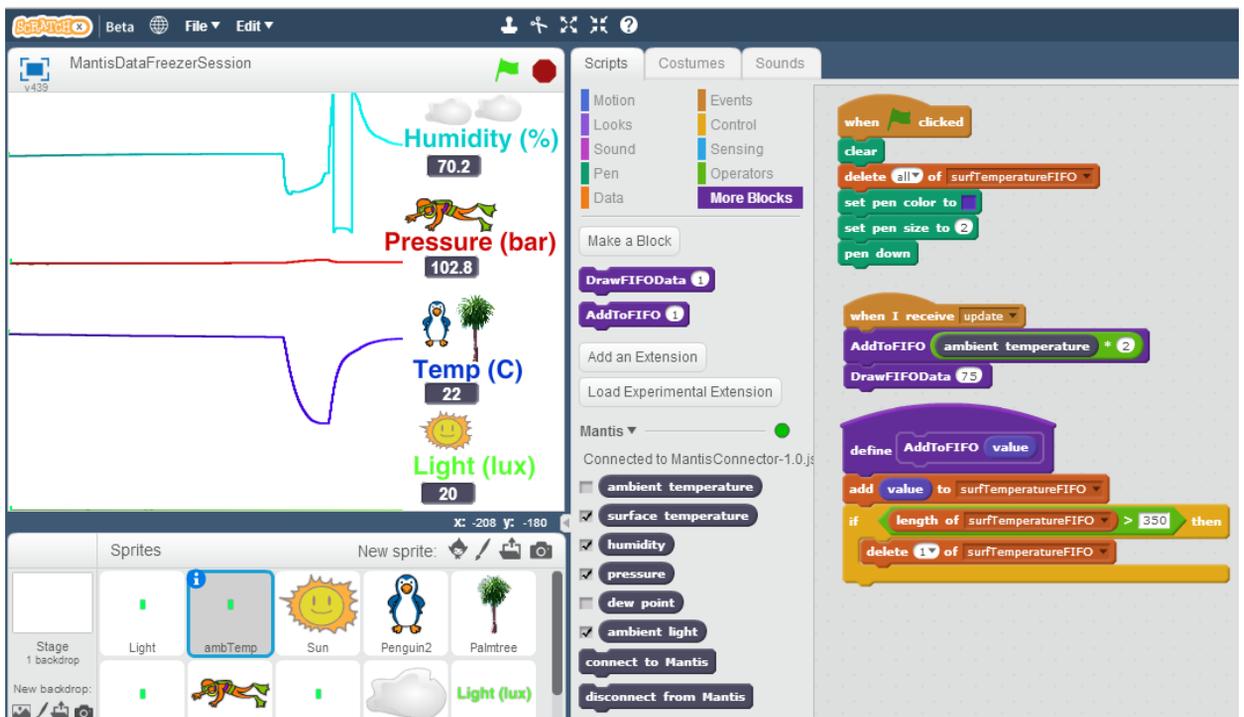
The Mantis CS uses a BlueTooth Low Energy connection, so it can run for a long time

Experiment 2

The Deep Freeze

We put the Mantis CS into the freezer to see how it would behave when the temperature went from room temperature to below freezing and then back again:

Observations:

- The temperature dropped rapidly but thawed out more gradually.

- The humidity is low in the freezer.

- The humidity sensor did some strange things as it thawed out. We noticed that condensation had formed on the Mantis CS when it was first taken out of the freezer. So the humidity locally went very high for a while the condensation was present.