



Sensor Pod

Taiwan Forestry Research Institute (TFRI)

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August 17, 2012 (Week 8)

Proposed Research

- To set up an Android-based system that will monitor the aspects of a rainforest, such as humidity, temperature, and wind direction.
- Use Samsung Galaxy Nexus to capture audio, pictures, and videos.
- Use DataTurbine to send any captured media from the rainforest to different stations for more analysis.
- Use an IOIO board to maintain and be the basis of the sensors.

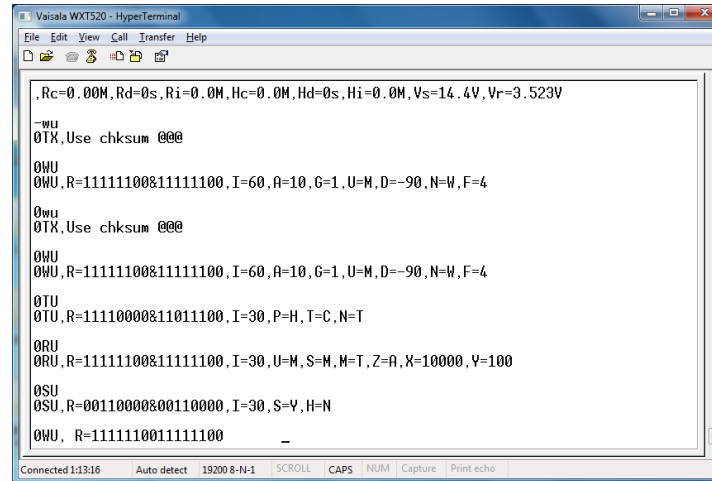


Progress (for Week 8)...

- Went back to LHC from the 13th-14th. Set up the system at Weather Tower 3, but with the old Vaisala from UCSD.
 - The new one we got in Taipei was working, but not correctly configured. The data log gathered from the sensors could not be parsed properly unless they were in the proper format (that is, all sensor data should be in one line of the data log with the same timestamp). Because the sensors were gathering data at different rates, different sensor data would be saved on different lines with different timestamps. The Vaisala Configuration Tool was too buggy, so I ended up using a terminal emulator (HyperTerminal) to configure the weather station. Unfortunately, there seems to be one more bug: temperature/humidity values from the Vaisala are correct on the data log, but are incorrect when viewed in RDV.

...Progress (for Week 8)

- The only thing that had been changed properly with the Vaisala Configuration Tool was the baud rate (target baud is 9600, and default baud was 19200).
 - The most important variable that needed to be changed was the communication setting (to polled ASCII).



```
Vaisala WXT520 - HyperTerminal
File Edit View Call Transfer Help
, R=0.00M, Rd=0s, Ri=0.0M, Hc=0.0M, Hd=0s, Hi=0.0M, Vs=14.4V, Vr=3.523V
-WU
0TX, Use checksum @@@
0WU
0WU, R=11111100&11111100, I=60, A=10, G=1, U=M, D=-90, N=W, F=4
0WU
0TX, Use checksum @@@
0WU
0WU, R=11111100&11111100, I=60, A=10, G=1, U=M, D=-90, N=W, F=4
0TU
0TU, R=11110000&11011100, I=30, P=H, T=C, N=T
0RU
0RU, R=11111100&11111100, I=30, U=M, S=M, M=T, Z=A, X=10000, Y=100
0SU
0SU, R=00110000&00110000, I=30, S=Y, H=N
0WU, R=1111110011111100
```

- Gave a tutorial on how to set up Eclipse to view the code and how to install and run the applications. How to understand and read the code was a bit hard to explain clearly enough for them, especially since they were complete beginners to coding, and coding for Android is a little different from regular Java as well.
 - They now know how to set up Eclipse, two ways for installing applications (through source code and apks), what to run after the phone is connected to the board, and how to view data logs. They also know which files to modify in case they want to add more sensors or change sampling rates. All the information is inside a ppt for their reference.
 - I did want to have an earlier tutorial on how to set up the software side (after they had learned how to make the board for the first time in Week 3), but unfortunately, everybody had a busy schedule at the time... perhaps it would've been easier to understand a little bit at a time?

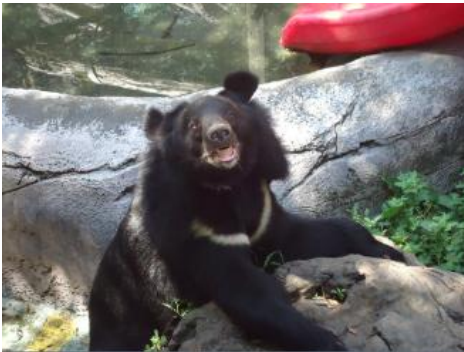
Plans (for Week 9)

- Work on final report.
- Check on the system, which is being left on over the weekend, on Monday to see how the battery is being drained.
- Try to figure out why the Vaisala humidity and temperature sensors are showing incorrect data after being sent to the server.

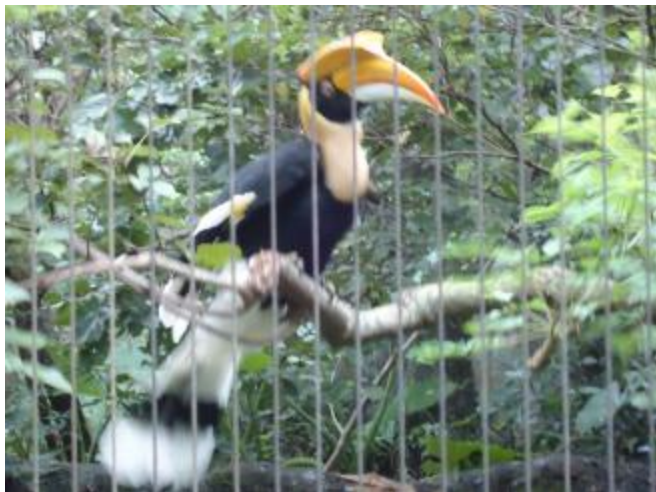
Final Results

- The system works for at least five hours before the phone runs out of battery. Data is stored, parsed, then sent to the LHC server via the phone's DataTurbine, where it can then be viewed and mirrored properly (aside from the Vaisala temperature and humidity sensors; I am pretty sure the humidity graph mistakenly displays the temperature graph, but I'm not sure what the temperature graph displays).
- Vaisala WXT520 can be configured properly without use of the provided Vaisala Configuration Tool program, using a terminal emulator called HyperTerminal. Although I was told which commands could configure the weather station, it was my first time using a terminal emulator, so I had to do some research on how to set up the connection and how to send the commands, too! (For example, the `<cr><lf>` tags after a command confused me until I realized that they simply represented a line break.)
- The biggest roadblock is still the phone's battery (it's set on the lowest brightness + sleep after 15 seconds). When I tested with only dtControl (camera + audio capture) and mirroring data to my computer, there was no battery drain... but when the system takes the sensors and car batteries/solar panels without camera capture into account, there is battery drain.

Culture



Culture



Acknowledgements

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Thank you all very much for having me! ☺