Tracking the Weather

Alexander Celeste

Independent Project at
Avalon High School in
Saint Paul, MN

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Final Conclusion

- My data is inconclusive

- I'd need months of data being logged 24/7

- My data logging period only lasted the end of Fall 2008

- The reports are only accurate to the location the data was taken

- You may think the reports aren't accurate because of your location vs. the tracking location being far apart

Final Conclusion cont.

- My core question was "How accurate are the weather reports that we trust daily?"

- This can't be answered definitively with my data

- That may still be the case with months of data

- The extended forecasts could only possibly be accurate within 3 days, not the full 5 days they predict

Just Some Data

- 24 data points of light

- 24 data points of temp

- 48 data points total

- Just barely scrapes the surface of all the collected data

Date/ Time	Light (%)	Temp (F)
Oct 12, 2008 8:08 PM	32	73.5
Oct 13, 2008 12:03 AM	25	71.2
Oct 13, 2008 6:48 AM	27	68.9
Oct 14, 2008 6:55 AM	30	37.9
Oct 14, 2008 12:00 PM	92	66.7
Oct 14, 2008 5:10 PM	70	53.6
Oct 15, 2008 7:20 AM	50	45.8
Oct 15, 2008 12:00 PM	95	77.1
Oct 15, 2008 3:35 PM	84	57.5
Oct 20, 2008 7:25 AM	52	41.9
Oct 20, 2008 12:00 PM	83	88.1
Oct 20, 2008 4:10 PM	79	55.2
Oct 21, 2008 7:15 AM	39	31.9
Oct 21, 2008 12:00 PM	83	80.3
Oct 21, 2008 5:05 PM	76	51
Oct 22, 2008 7:20 AM	29	40.4
Oct 22, 2008 12:00 PM	76	44.2
Oct 22, 2008 4:10 PM	64	42.4
Oct 23, 2008 7:20 AM	35	42.9
Oct 23, 2008 12:00 PM	88	59
Oct 23, 2008 4:10 PM	77	56.1
Oct 24, 2008 7:20 AM	28	47.1
Oct 24, 2008 12:00 PM	80	52.5
Oct 24, 2008 4:20 PM	83	55.7

Data Collection Statistics

- Parts of 9 nonconsecutive days

- 98.7 hours of data collection time (4.11 days)

- 1,200 data points of each type collected

- That's 2,400 data points total

- The data was collected every 5 minutes during each session
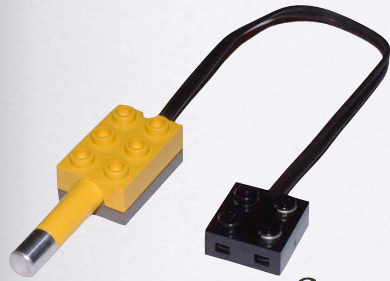
Temps Offset

- Some temps were off by up to 10 degrees to that of WeatherUnderground for the same timestamp

- One possible reason: the setups were different

- For some areas I directly contradicted WeatherUnderground's suggestions

- This is partly because I didn't know the correct way at first

- I then didn't change it so that my data location stayed consistent

- This fully accounts for the temperature data offset

RCX Hardware Description

- Not professional hardware

- Technically it was manufactured and marketed as a toy

- I (at least) purchased the school version that made it more apt to do data logging

- I got it over 3 years ago

- Called Lego Mindstorms RCX

- I used the Robolab 2.9.4 Labview 8.0-based software

Key Disadvantages

- The obvious ones being that it was just loosely able to complete the task

- And that it was very unprofessional

- As well as the not-so-obvious ones

- It requires a steady stream of power to hold anything in memory

- The software is designed for the older generation of Macs
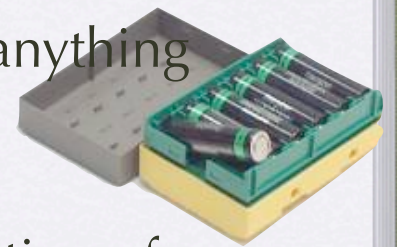
Systems Integration Branch (SIB)

- Manages and makes regional policies for the integration, utilization, operation, and management of computers, electronic weather equipment, telecommunications, and facilities

- Manages final phases of equipment installation and provides maintenance support for Radar, Satellite, Integration Systems, Upper Air Rawinsonde Equipment, and Surface Observation Instrumentation

- Provides regional management for national programs

Beaufort Scale

- An easy way to find the wind speed from human-observable properties

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	**On Land**
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

Personal Weather Stations

- The program for WeatherUnderground to let anyone supply their website with weather data

- In order for accurate readings you need to follow explicit setup instructions

- Temp sensor out of direct sunlight and in wind flow, 5 feet above any surface and 50 feet from any pavement

- You get a choice of what software to use with the equipment: Virtual Weather Station, Weather Display, Weather View 32, WSWin32, WeatherLink

Cause-and-Effect

- The standard states to explain the cause-and-effect of the atmospheric and hydrologic processes of Earth

- Atmospheric cause-and-effect is pretty well explained and proved with just the data that I collected and the analysis

- Pressure and temperature changes determine wind and cloud properties

- This determines the weather for any given point on Earth

Cause-and-Effect cont.

- The hydrologic cycle is a core component to the atmospheric cycle

- Referred to as the water cycle, it is the cycle that explains and defines the movement of water

- Clouds are formed of water

- There is the connection between the two cycles

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- The Weather Channel. "Weather Glossary." Weather Glossary. 5 Aug. 2008. The Weather Channel. 20 Oct. 2008 <http://www.weather.com/glossary/>.

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- WunderWiki. "PWS - Personal Weather Stations." WeatherUnderground. 2 Aug. 2007. WUnderground. 14 Oct. 2008 <http://wiki.wunderground.com/index.php/pws_-_personal_weather_stations>.

Websites to Look At

- My website accompanying this project: http://alex.clst.org/avalonprojects/trackingtheweather

- WeatherUnderground: http://www.wunderground.com/

- National Oceanic and Atmospheric Administraron: http://www.noaa.gov/

- Weather Channel Glossary: http://www.weather.com/glossary/