Hurricane Path Finder Documentary

By: Michael Lau

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If Any Questions, Email: hkmike1997@outlook.com

The path of a tropical storm is always erratic, but what causes its movements? Is it the wind, the atmosphere pressure, or luck that pushes the storm around?

Synopsis:

How many deaths occur each year due to hurricanes? The answer to that question is 20,000 according to CNN. What if people could know the path of a hurricane? What is the relationship between wind fields and the path of the hurricane? By referencing a chart of the global wind fields against the path of a real hurricane, it is possible to see that hurricanes were affected by these winds. MIT (Massachusetts Institute of Technology) and NOAA (National Oceanic and Atmospheric Administration) both made their own model that is accurate to the real path which makes it a possible project. In the article, Movement of Hurricanes, it stated that, “The path of a hurricane greatly depends upon the wind belt in which it is located”. This means that the hurricane is moved mostly by the trade winds in the area. As for now, our technology would predict 656 miles off from the landfall says MIT. This confirms that the winds are moved by wind fields or Easterlies. If the wind fields are related to the path of the hurricane, then the hurricane is affected by the wind fields because the wind pushes the hurricane in a direction.

The path of the hurricane is affected in different ways. Such examples would be the atmospheric pressure. Another major feature that affects the hurricane path is the wind fields, it is the wind fields that blow the hurricane in different directions depending on the location of the wind. According to HurrcaneScience.org, “In general, hurricanes are steered by global winds.” This means that the path of the hurricane is moved by the wind fields. To calculate this the use of vector equations is necessary. If there is a way to find the path of the hurricanes, what kind of predicting tools are there?

The nearest the world has to a working hurricane predicting program is “CLIPPER” (as said in “Hurricane Forecast Computer Models”). However, it is somewhat accurate, CLIPER predicts 656 miles from the landfall 5 days prior to reaching land. Some models like CLIPER uses the data from previous hurricanes, the wind speeds, and other means to find the direction of the hurricane, but what if the wind fields were what is really affecting the path of the hurricane. Comparing the path of Hurricane Harvey from express.co, the hurricane in 2017 that did considerable damage to the area had a correlation to the current wind patterns and its path. Soon by looking at the other paths, it showed that the paths were affected by a hurricane. This makes it easier to calculate on a laptop, but what should be used to make the calculations?

There are many ways to make the calculations: by physical trial, programming, or by a supercomputer. If the experiment uses physical models, the models will not be accessible to everyone and will not have a very accurate result. The other option is using a computer program, it is accessible to many people, even to those who have only a computer. The programming tool most fit for this task is an Arduino because it can be used for calculations and is cheap to buy anywhere.

A hurricane would push people to find a better and easier to access hurricane calculator. If it is the trade winds that affect the path of the hurricane, it makes it easier to calculate on a smaller computer. A hurricane is very hard to predict; however, a minor problem such as a small wind will turn the direction of the hurricane. If the path of the hurricane is affected by the global wind fields, the path will be the same as the real hurricane, then the hurricane is pushed by the winds. This method will be tested on a microcontroller. The objective of this project is to recognize how the wind fields affect the path of a hurricane.

Materials:

1. Arduino Uno
2. Arduino Upload Cables
3. Arduino IDE
4. Computer (Preferably Windows)
5. Internet Access
6. Computer Storage

Procedures:

Use code from GitHub (By Crypto2119)

1. Open GitHub and download “Hurricane Path” repository
2. Download the Arduino IDE
3. Import code to IDE
4. Plug in the Uno to the pc by the D-shaped Cables
5. Press Ctrl + U to upload to board
6. Open the Serial Monitor
7. Fill in the questions
8. Results will pop up

How to Setup the Arduino:

Open the Arduino Software

Click on “Boards”

Set Board to Geniuno/Uno

Click Upload Speed

Select 15000 Upload Speed

Press Ctrl+U to Upload Program

Where to find it?

The programming software used to make this project is in <https://www.arduino.cc/en/Main/Software>. Once in the website, scroll down until the screen says, “Arduino Installer” and click. The program should download, when the program is finished downloading, open the file and setup for the computer. Once the software is done, then it is time to find the Arduino.

The Arduino is a very easy tool to find, it can be found at the local electronics store. If the local store does not have an Arduino, then use online services such as Amazon to get the processor. The Arduino already comes with the upload cable so there is no use in looking for one. The software is posted on GitHub under the URL <https://github.com/crypto2119> . Just click on the project file “Hurricane Calculator” and download repository. Open the file in file explorer and find the .Ino file. If the computer asks for how to open the file, then click on the “Arduino IDE” button.

How to Use:

Plug in the Uno with the Upload Cable into the D-Shaped hole. Upload the program to the Uno (as said above). If it does not work, then check for the green light when the device is turned on (If none, then the current board is defected). Open the serial monitor in the IDE, the magnifying glass in the top right corner of the screen. The Uno will request the data for the calculations in the monitor. After answering all the questions, the hurricane path and other data will pop up in a graph. The information in the screen will predict the path of the hurricane. Remember that the world’s best predictor (CLIPPER) will predict 655 miles from the real location.

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Program Downloads:

-<github.com/crypto2119>: The location of the predictor tools

-<arduino.cc>: The IDE downloader