Project Three: Optimal Workflow in a Workplace

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A Basic Company, Inc. has experienced a drop in their call center’s performance since moving into their new building. Commitment/Competence is not to blame for the lack of the department’s focus. After a recent meeting, it was discovered that the employee’s performance drop was due to the building’s fluctuation in temperatures throughout the day. The building as configured to blast cold air at certain times and shut off for other parts of the day, causing the employees to feel discomfort. This in turn, has led to the employees making do by either bundling up for warmth of installing fans to cool down. Major complaints were also made, such as “why is the office is freezing cold in the winter?” or “its summer, no way I should be burning up inside as well” or even “it’s hot outside, but it feels like its 20 below zero in here”. Management then decided to make a “simple” thermostat adjustment, however the finance team soon discovered that their HVAC costs increased steadily over the next few months. In turn, A Basic Company’s Senior Leadership Team decided to hire Optimal Analytics to fix the company’s dilemma on their energy cost increases. The reason for this hire was simple, Optimal Analytics deploys a highly skilled Data team that brings in a wide variety of experience and a proven track-record of achieving Optimal results.

Problem Statement: How to solve A Basic Company’s two-sided problem? How can we solve their issue of getting their call center back to their prior performance, while reducing their HVAC expenses? Optimal Analytics decided to place a drone in the office and measure the internal call centers weather over the next 72 hours. While also extrapolating predicted weather and the actual weather data provided by Dark Sky. The goal is to program through advance machine learning to begin predicting weather patterns and when to adjust the thermostat accordingly to help keep the departments employees comfortable and to also help reduce operating costs.

Hypothesis: By using linear regression, Optimal Analytics will be able to automate weather predictions for A Basic Company, Inc.

Null Hypothesis: Through the process it is discovered using linear regression is not the best way to use machine learning to automate the company’s thermostat.

As our prior project highlighted on a single day of weather gathering. Optimal Analytics will be gathering raw weather data in real-time over a span of three days within the company’s all center department. Using a raspberry pi computer equipped with Bosch Sensortech’s BME680 integrated environmental sensor we will measure this data against the data pulled from Dark Sky’s API for forecasted weather in the area and the actual weather for that given day.

Please note, that our data gathering will be different from others.

Dark Sky Data Set

* URL: <https://darksky.net>
* Extraction Protocols: Python API calls
* API: [https://api.darksky.net/forecast/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/37.8267,-122.4233](https://api.darksky.net/forecast/*******************/37.8267,-122.4233) (API key has been excluded)
* Available Parameters: Apparent temperature, atmospheric pressure, cloud cover, dew point, humidity, liquid precipitation rate, moon phase, nearest storm distance, nearest storm direction, ozone, precipitation type, snowfall, sun rise/set, temperature, text summaries, UV index, wind gust, wind speed, wind direction
* Loaded Parameters: Time, Temperature, Pressure, Humidity
* Access: requires an email address to obtain a trial api key and usage of a python script provided by the website

Drone Data Set:

* Technology: Raspberry Pi with a BME680 integrated environmental sensor
* Location: Zip 90032
* Available Parameters: Pressure, humidity, temperature, gas, altitude
* Loaded Parameters: Pressure, humidity, temperature, gas, altitude
* Access: Access to the listed technology and usage of a python script provided by Bosch SensorTech, manufacturer of the BME680