**Visualization of Map-based Data**

1. **Review of Related Literature**

Visualization of Data is a great way for people to be able to know how their data works without having to do much of an effort regarding it. Rows upon rows and columns upon columns of data and information can be stored easily in a spreadsheet but these data aren’t easy to understand without the help of some tools or a lot of skill with regards to the given information. For example, when you see the rise and fall of the values in the stock market for example, numbers could be dizzying in large amounts, and people have long since proven to understand and retain illustrations and visual cues better than other types of sensory input. Current technologies used in the display of location oriented datasets, for example rainfall forecasts, are of the following: a) using Geographical Information Systems(GIS) available to the public, for example Google Maps or Apple Maps. However, previous systems using GIS for these factors are limited due to the processing speed and the amount of data that GIS uses to display what is needed, therefore, a more basic visualization is needed for a more convenient use of the provided data.

Geographical Information Systems work in a variety of levels, and is used to power many different decisions that might affect a lot of people. GIS, put into simple terms, does four major things: 1) it creates geographical data, 2) manages geographical data, 3) analyzes these data and 4) displays it in the form of a map. Several different types of people contribute to make a GIS work, and that includes cartographers, land surveyors, analysts, programmers. Although GIS are incredibly useful for making these decisions, many GIS are already loaded with a lot of information about a lot of things across the globe and not specifically focused on the Philippines. This has good effects and bad effects to the visualization of data. A large quantity of data means that the length of time needed for the information to be loaded is longer but in this certain scenario where we only focus on the forecast per municipality per province in the Philippines, such amount of detail is not needed.

This is where SVG, D3JS and GeoJSON come in. D3JS stands for Data Driven Documents JavaScript. D3JS is a JavaScript Framework that was made for the display of and/or visualization of objects given a certain amount of data. Given that it is an open source JavaScript framework, simply sourcing the D3JS file would be all the preparation needed for your coding environment.

JSON behave similarly to objects in javascript and GeoJSON files are a subset of JSON. GeoJSON are relatively small files which have details about certain regions or provinces that would be useful in illustrating these said regions. There are different open source GeoJSON files in GitHub and other project platforms and could be used in a project without further need to use other resources. GeoJSON files have ‘features’ and some of these features may include the name of the certain region or the country or the geographic parent of the certain region but the most important part of the GeoJSON files is its *geometry.* The geometry of an object in a GeoJSON file has two important properties: 1) the type and 2) the coordinates. The type of the GeoJSON object is a structure that lets you know how the coordinates would be laid out or how much information you would be able to put in the coordinates. For example, a Point would only need two coordinates in the form of a Point while a LineString would need you to have an array of points. What we use in mapping geographical borders are the type MultiPolygon. A MultiPolygon is an array of array of array of Points. These points construct the region according to the coordinates of the widely-used Geographic Coordinate System (latitude and longitude), also called the e that you see in maps regular maps. The Philippines for example sits ~13 degrees north of the equator and ~122 degrees East of the Prime Meridian.

{

"type": "Feature",

"geometry": {

"type": "Point",

"coordinates": [121.7, 12.8]

},

"properties": {

"name": "Philippines"

}

}

Figure X. An Example of a GeoJSON object, type: Point

Angular JS is a robust JavaScript framework that works well with creating single-page applications due to it’s two-way binding of variables wherein changing that values on the HTML main file will reflect on the JavaScript controller file without the use of additional commands. Binding an html element to a variable inside the controller would guarantee that there would be no misplacement of their values so long as proper coding practices are used. Angular JS has been used in many different applications that we use daily. Good Examples of these are PayPal, Netflix and Youtube(for PS3).

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