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I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.

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1. INTRODUCTION

Prediction has been one of the most important field that the humans have been trying to excel on it and figure out a way to give out the most accurate result. The more the accurate result the more dependent and guarantee we can have and brace the future comings of ours. A prediction or forecast is not something like a fortune teller, people in this modern era believe in facts and figures. Facts and figures are delivered when we pass some statistical data through a certain algorithm and the output will be more reliable and believable by the people of this era rather than depending upon some fortune teller prediction.

Weather forecast maybe a minor topic in Artificial Intelligence field but if we look into it then weather forecast is something that almost everyone looks up on weather widget on their phone, tablet or watches. I am also one of the people who want to know the weather for the next day and what's is going to be like so that I can prepare myself or plan accordingly. Not just for the next day, even when I wake up, I feel it's important to know what will be the weather like the whole day to brace myself for uncertainty of rain or thunderstorm that may hit my schedule for the day. Weather forecast has been playing and important role in our day to day life. Not just an individual need this or uses this, even business and other entities relies on an accurate weather forecast.

1.1 Aims:

- Research about weather forecast.
- Why is it important in today's world?
- Learn and gain proper idea of the concept that is used to solve and gain accuracy on weather forecast.

1.2 Objectives:

- Research about AI.
- Research about the concepts that i can use to solve the problem.
- Select a concept/algorithm.
- Explain how will I use the concept to solve the problem.

2. BACKGROUND

2.1 Research Conducted:

Artificial Intelligence has been in the hype in recent era though this has been a part of the technology for a long time and is responsible for the development and drastic upgrade of the technologies till date. AI can be defined as some algorithm or design and study of an intelligent algorithm. In 1956, it was defined as the science and engineering of making intelligent machines by John McCarthy. (ScienceDaily, 2018)

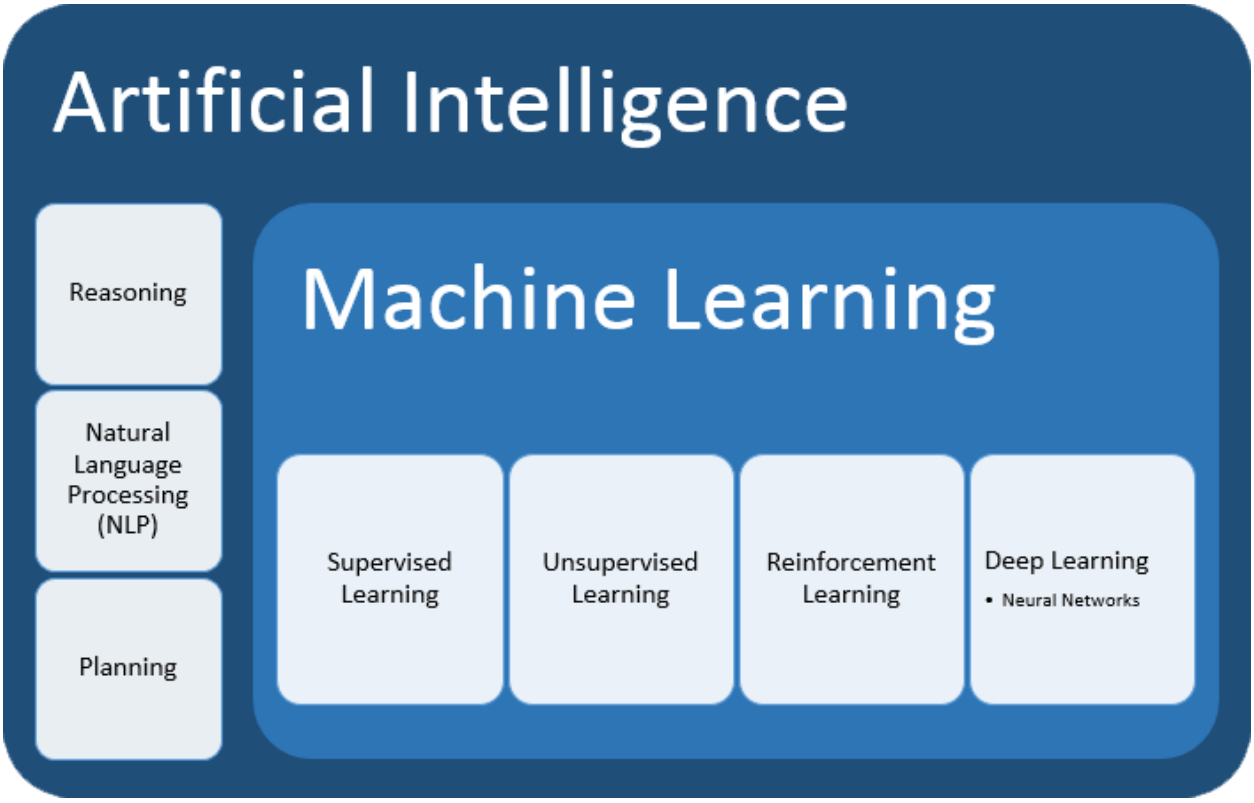

Figure 1 Artificial Intelligence (IBM , 2018)

Machine Learning is a part of Artificial Intelligence which uses data and analyze them to give an output. In Machine Learning data is trained with certain algorithms that give out a model and then users can give an input to that model to get the results. Machine Learning has four categories Supervised and Unsupervised Learning, Reinforcement Learning and Deep Learning. (IBM , 2018)

In this project I have chosen to research about Weather forecast which is a product of AI and due to which we have been cautious about the weather we will be facing from ahead

of time we are on. A small gain of accuracy of weather forecast can give us a huge advantage for an organization or an individual.

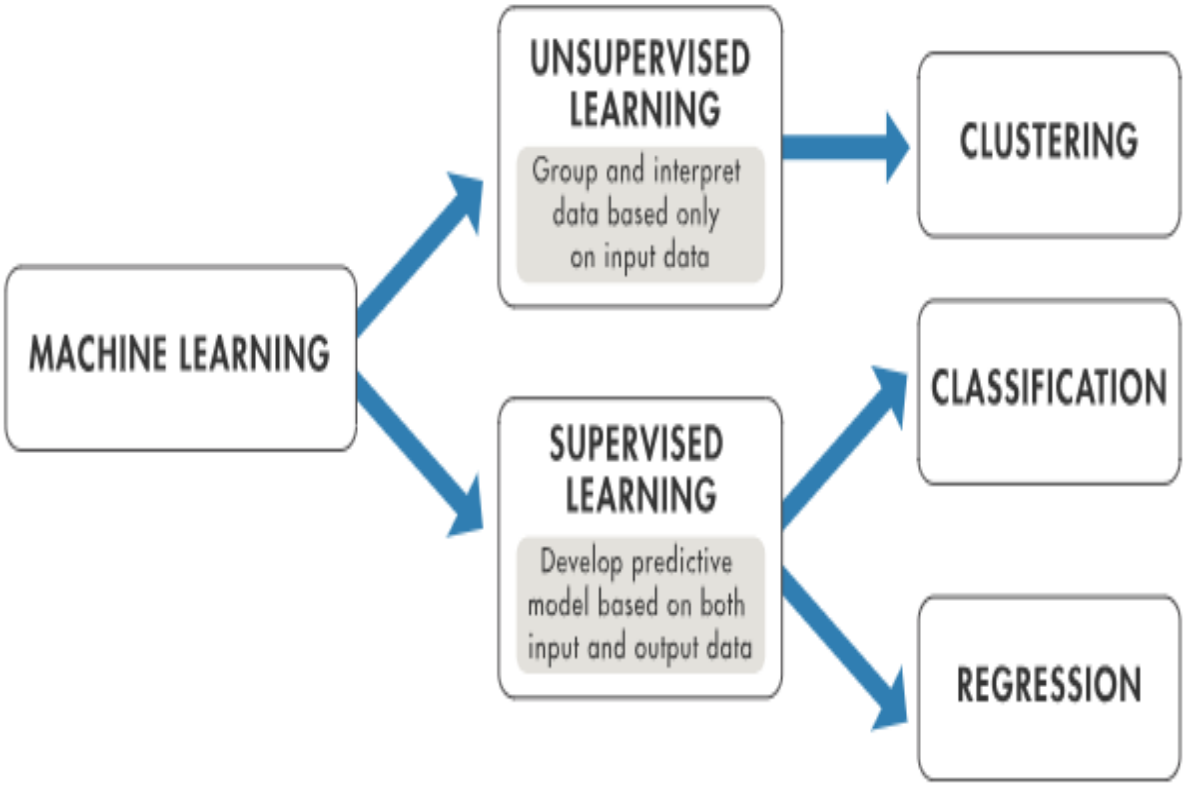

Figure 2 Machine Learning (The MathWorks, Inc., 2019)

2.2 Research on similar system or works:

Weather Forecast is not something that I thought of it first, this has been done by many agencies in the world. People have been trying to develop a model with high accuracy and a reliable system to predict. There are already many models for weather forecast such. Korea Meteorological Administration has issued different types of weather forecast like short, medium and long-range weather forecast. In 1999 Korea Meteorological Administration began to run numerical weather prediction (NWP). Such Models are already out there giving out some accurate result to us. Below figure 3 shows a general idea how weather forecast is done but there is no state of algorithms used in it though some certain algorithms are being used to make models and predict the data fetched to tis such kind of systems. (KMA, 2009)

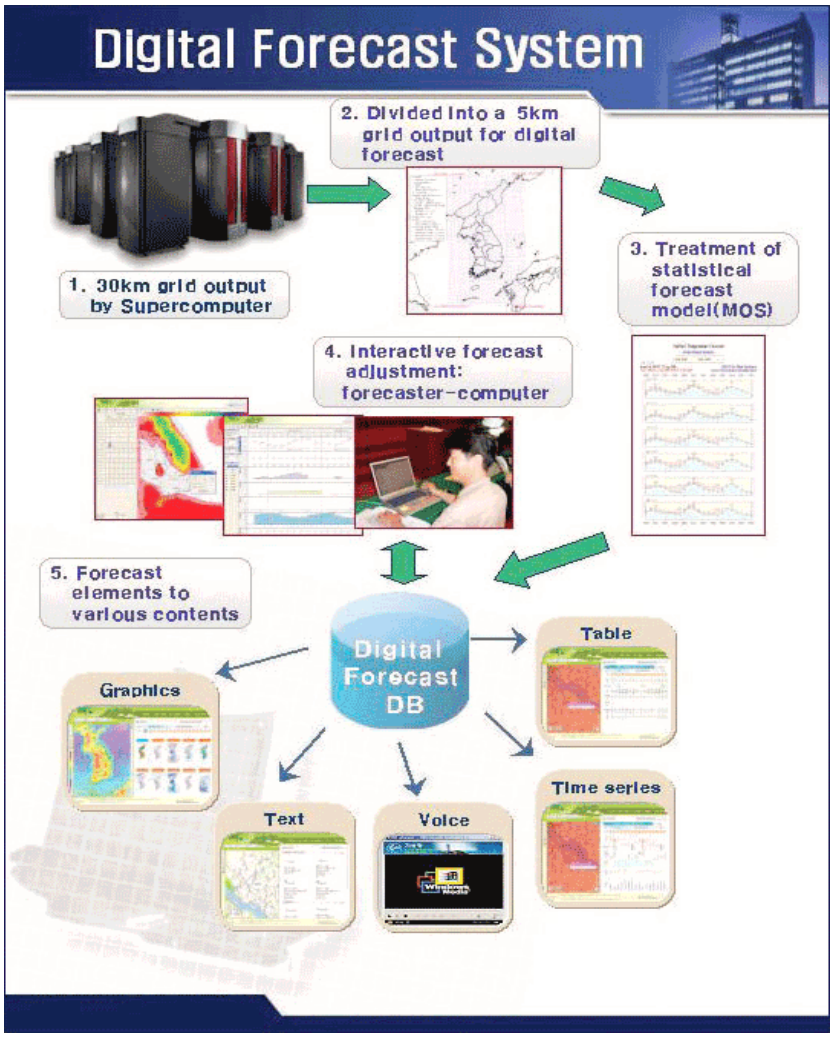

Figure 3 Weather Forecast System (KMA, 2009)

3. SOLUTION

AI has been a game changer in the field of technology bringing the capability of finding solutions for the day to day problems. Being able to generate some facts through a certain algorithm and finding a pattern to predict things makes AI a perfect medium to forecast weather for us. An algorithm is nothing without giving it some data. A set of data of weather should be fetched into an algorithm of AI to let it find a certain pattern. That pattern will help us with the prediction of weather. Though the output will not be 100% accurate but even slightest accuracy can help to believe in the prediction and change the future and fate of the human kind. (Joshi, 2018)

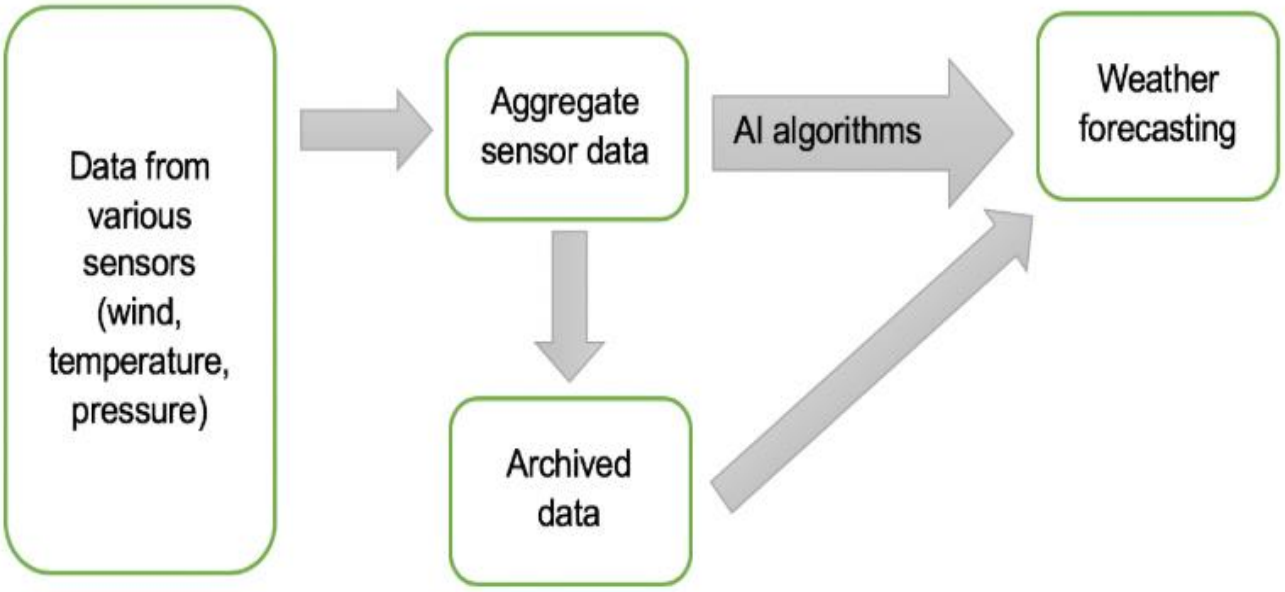

Figure 4 AI for Weather Forecast (Joshi, 2018)

Weather forecast can be done using multiple algorithms from Machine learning such has Decision Tree, Linear Regression, Neural Networks, Clustering. I have chosen Clustering which is a part of Unsupervised Learning. (Expert System, 2018)

3.1 AI Algorithm:

The approach that I will be taking is Unsupervised Learning which is a category of Machine Learning. Unsupervised Learning is mostly used when analyzing a sequence,

data mining for sequence and pattern mining. One of the frequent and common method of this is cluster analysis. (The MathWorks Inc, 2019)

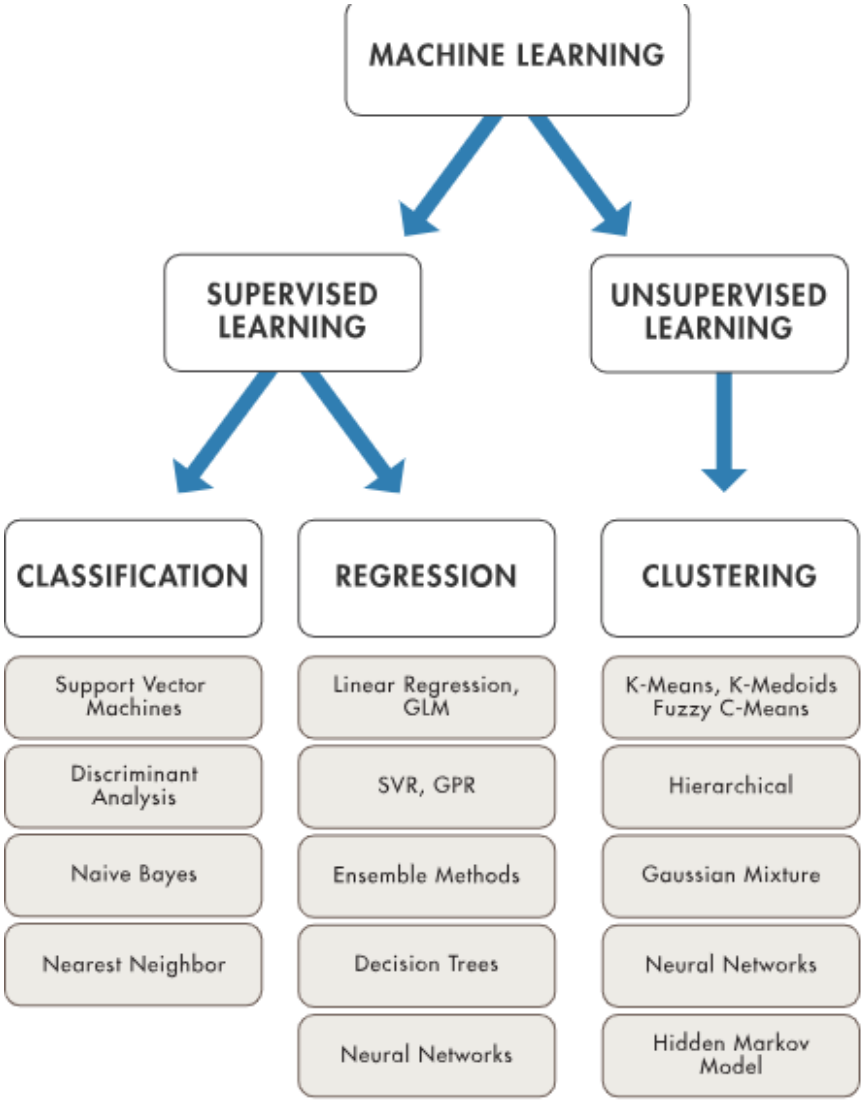

Figure 5 Detailed Machine Learning algorithms (The MathWorks Inc, 2019)

A common method of unsupervised learning, Clustering will be my approach to the solution for making a weather forecast system using certain data sets. In this clustering algorithm the data are manipulated I such a way that there are groups of data and this grouping is done with the similarities and these are assigned into clusters for the further process. (Kurama, 2018)

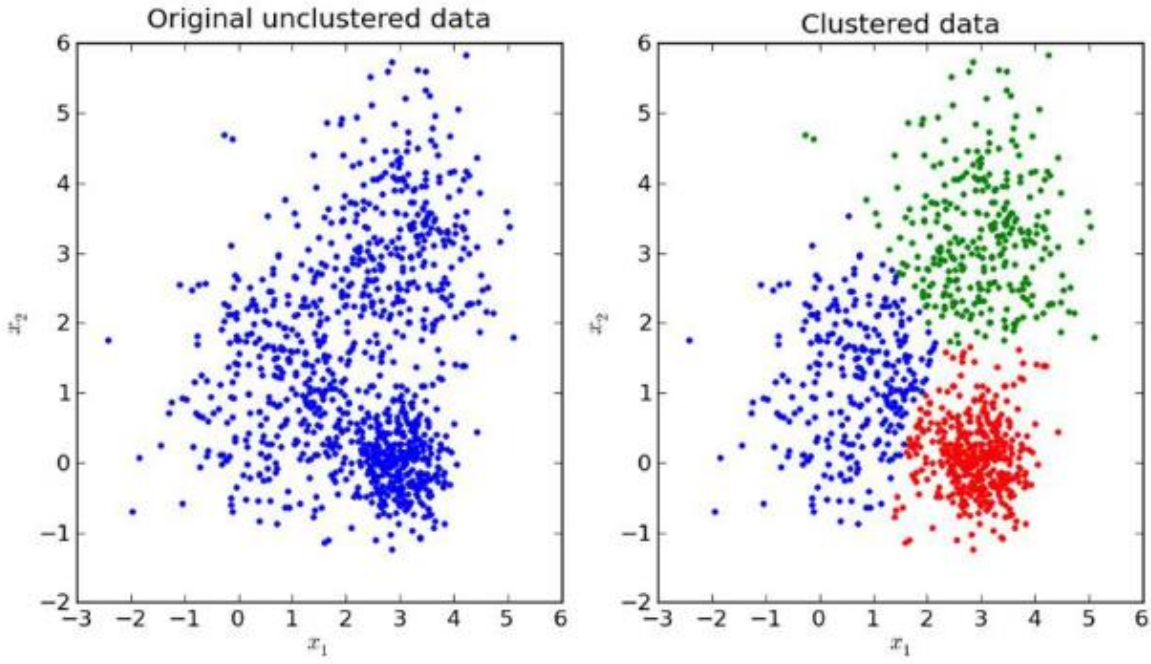

Figure 6 Clustering (Kurama, 2018)

Clustering also has different types of algorithm such as K means and hierarchical clustering being the most common among all the types. Choosing one of these clustering techniques I will be solving the solution and creating a system to forecast weather. The Data sets for the algorithm will be extracted from Kaggle. Below are the diagram explaining the K means clustering and agglomerative clustering.

3.2 Diagrammatical Representation of Algorithms:

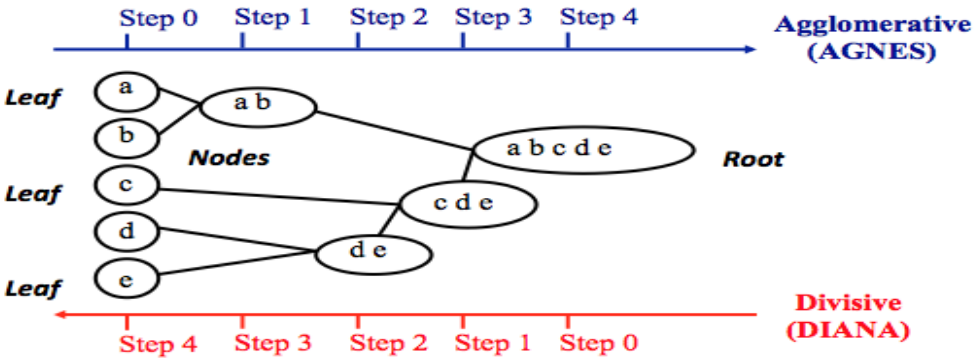

Figure 7 Agglomerative Hierarchical Clustering (Kassambara, 2018)

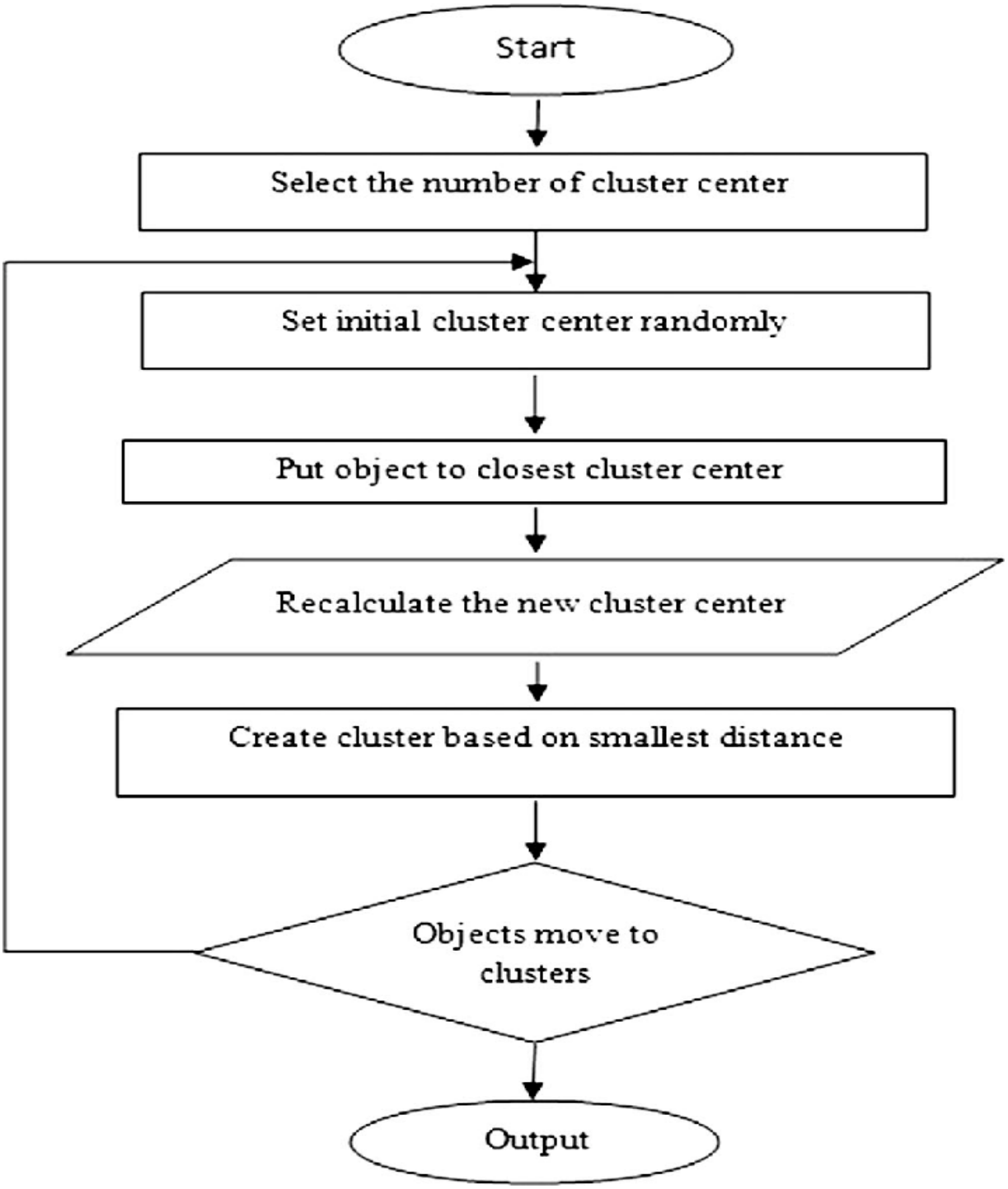

Figure 8 K means Clustering Flowchart (Alkawaz, 2014)

4. CONCLUSION

Weather forecast has been playing a vital role directly or indirectly in each and every one of our life. Knowing what we will be facing in ahead of time is something big to achieve to the human race. Whether its about planning a vacation, trip or setting a routine and plans for the day knowing the weather can be very helpful for the individual.

AI has opened the door for us to explore and do the unimaginable things and discover and reach to the new heights of the possibilities in our life. With given sets of data collected from the past AI algorithms can mine these data and find patterns and predict the future. A weather forecast system will be developed similarly, a set of data collected can be used and fetched into algorithms to find some distinct pattern and gives out the prediction accordingly to that pattern. AI has many branches such as Natural Processing Language, Machine Learning, problem solving and searches. Machine Learning is the category is decided to be implemented to solve this problem. Machine learning is a huge sector with supervised and unsupervised learning. The algorithm to solve the problem can be cluster analysis which is a common method of unsupervised learning. The further work will be choosing a clustering type and developing a model which can manipulate the data being fetched to it and predict with high accuracy. K means clustering or agglomerative clustering will be implemented to develop a model for the weather forecast.

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