

Experiment No-9

Subject-Computer Laboratory II-Industrial Internet of Things

Class-BE AI & DS

Aim: Write a program for performing industrial data analysis using relevant tools and techniques.

Software Required: Excel

Theory:

The Internet of Things (IoT) is a network of interconnected devices & gadgets that can collect & share data by themselves. IoT data analytics refers to the procedure of gathering, examining, and deciphering data produced by these devices to gain knowledge and make wise decisions. Data analytics uses bunches of hardware, software, and data science techniques to collect accurate information from massive data created by IoT devices.

Components of IoT Data Analytics

IoT data analytics involves four main components –

- **Data Collection** – IoT devices are embedded with various sensors that collect data on different parameters such as temperature, humidity, pressure, and motion. This data is transmitted to a central server or cloud platform for further processing.
- **Data Storage** – The data generated by IoT devices is massive and needs to be stored efficiently.
- **Data Processing** – IoT data analytics involves processing data to extract valuable insights. To make sure the data is correct, consistent, and prepared for analysis, data processing procedures including data cleansing, data transformation & data normalization are utilized.
- **Data analysis** – To find patterns and trends in the data, statistical & machine learning algorithms are employed.
- **Data Visualization** – IoT data analytics involves the use of data visualization tools to present insights and findings in a user-friendly and understandable

format. Visualization tools like dashboards, charts & graphs help to understand the data quickly and then make decisions in a very logical and practical way. So, they can give an informed decision based on the insights derived from IoT data analysis.

Procedure:

- 1.Download the IOT data from Kaggle.
- 2.For our practical we have downloaded the IOT data “Farm Temperature and Humidity” from Kaggle which is an 86 KB file in excel sheet.
- 3.The dataset consists of Temperature and Humidity reading which was captured using Moisture and humidity sensors for 3 months in 4 farms which were 1 km apart and the readings were taken after every 1 hr.
- 4.So first we will select the 1st column which shows temperature readings and we will consider 1-day readings from 12 am to 12 pm i.e., 24 hrs.
- 5.Then click on Insert and click on Recommended Graphs and select any graph which will show the graph.
- 6.For longer cycle we can take 2 days data so select 48 hrs reading.
7. Then again click on Insert and click on Recommended Graphs and select any graph which will show the graph.
- 8.In the same way follow the same procedure for Humidity readings, which is the 2nd column and like wise you can try for next columns and so on.

Observation:

- 1.From the 24 hrs reading (1 day), from the graph we can infer that it shows a peak in temperature at 12 o'clock, which indicates the temperature is maximum. And then it comes down and at night the temperature falls.
- 2.For the 48 hrs reading (2 day), from the graph we can infer that it shows a peak in temperature at 12 o'clock, which indicates the temperature is maximum. And then the temperature falls, it shows a minimum temperature at 24 i.e., at 12 pm which indicates that at night the temperature falls.
- 4.On the 2nd day the peak is at 36 (24+12), i.e., at 12 again the temperature shows maximum value.

5. Since we stay near the equator this is the pattern we get, but the temperature might vary from location to location.
6. The Humidity data shows how much humid the weather is.
7. We can select the scatter plots to get a clear understanding of the graph.
8. The scatter graph for 1 day reading shows that at night the humidity increases.
9. For 2 days, humidity graph follows a cyclic pattern.
10. We can see this interesting fluctuation around 13 i.e., at 1 pm Humidity falls and for the next day at 37 (24+13) i.e., at 1 pm it shows similar fall in humidity.
11. So in this way we can infer a lot of things from graph.
12. So students can visualize the graph and check out what they can infer from the graphs and write them as observations.

Conclusion: In this way we have performed IOT data analysis of Farm Temperature and Humidity using Excel tools and techniques.

OUTPUT (Graphs)

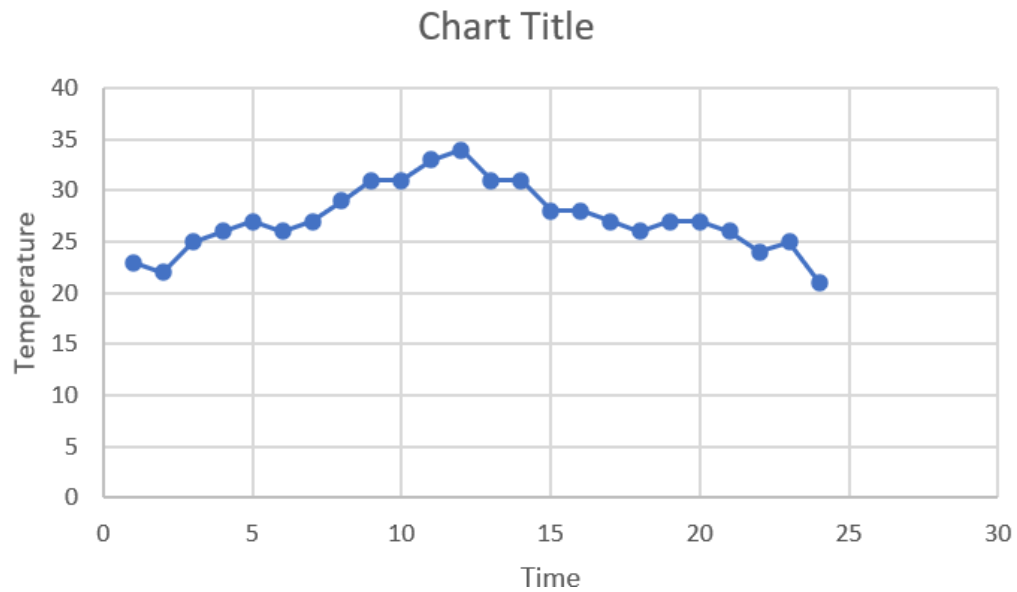


Fig.1-Scatter plot for 1 day reading of Temperature

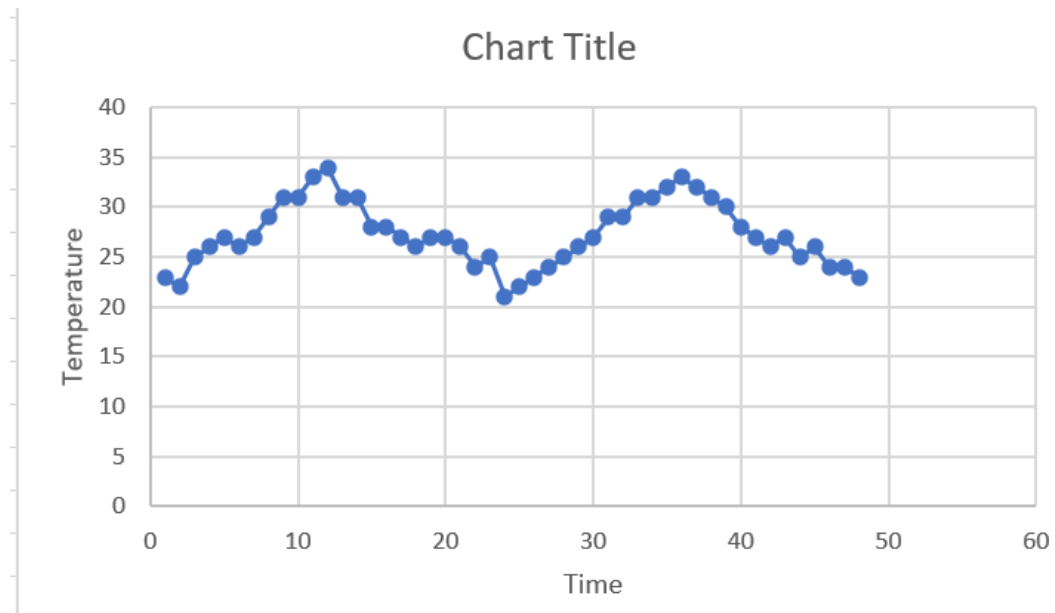


Fig.2- Scatter plot for 2 days reading of Temperature

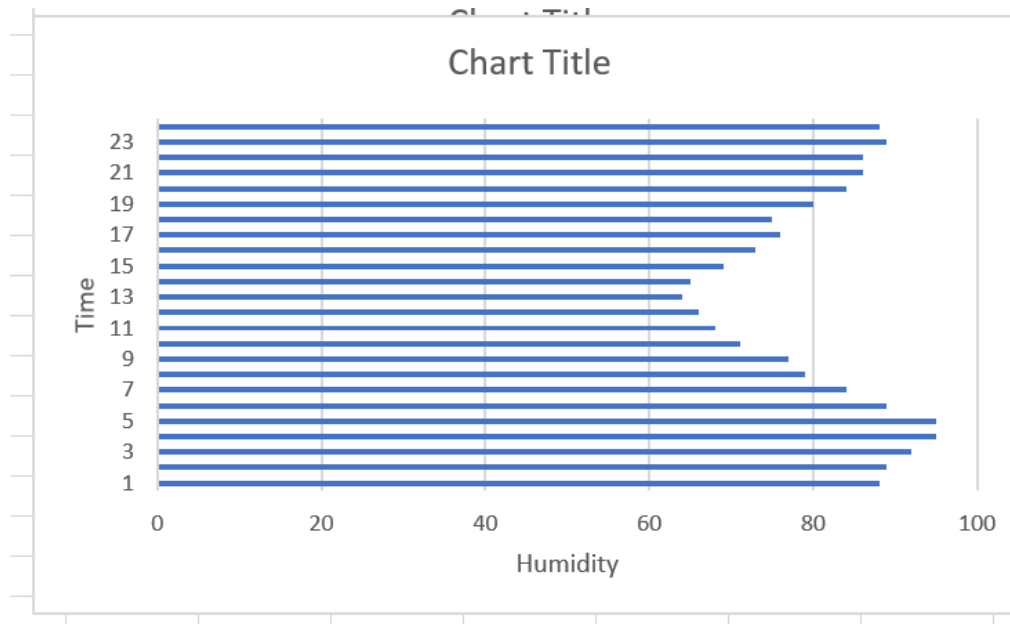


Fig.3-Clustered Bar graph for 1 day reading of Humidity.

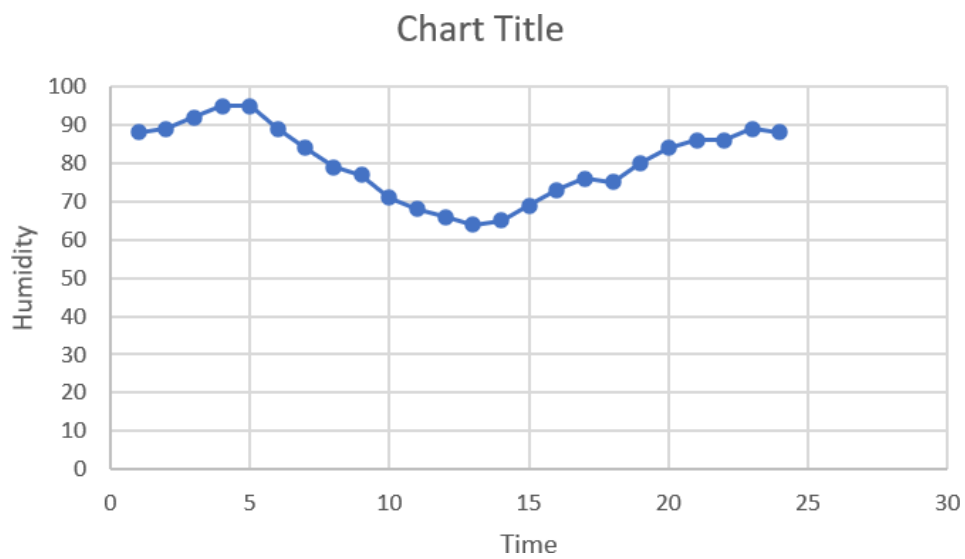


Fig.4- Scatter plot for 1 day reading of Humidity.

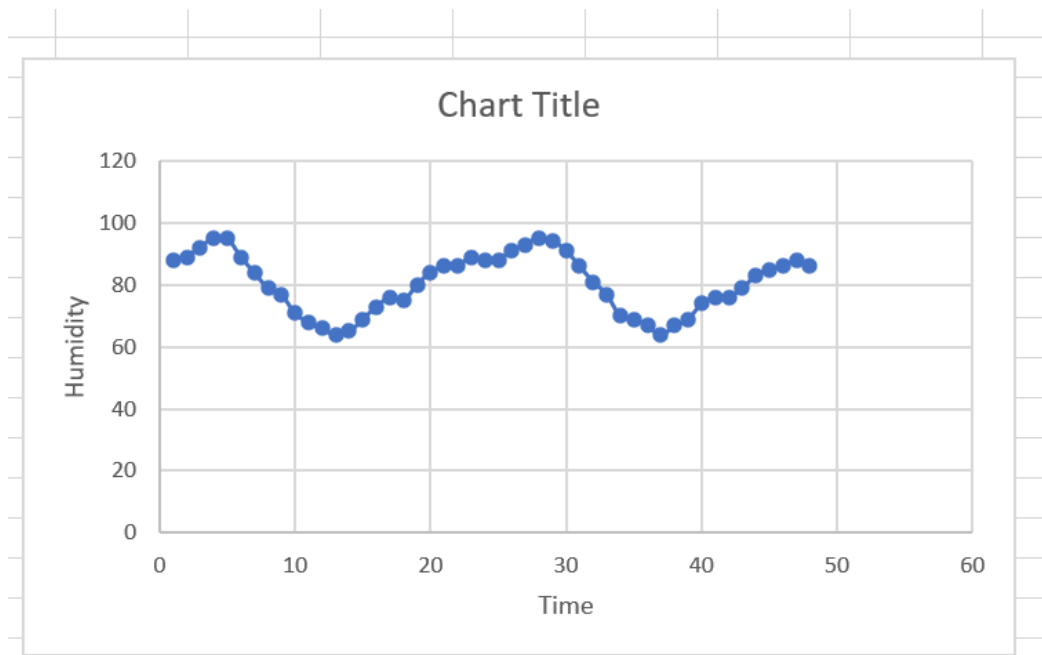


Fig.5-Scatter plot for 2 days reading of Humidity.