



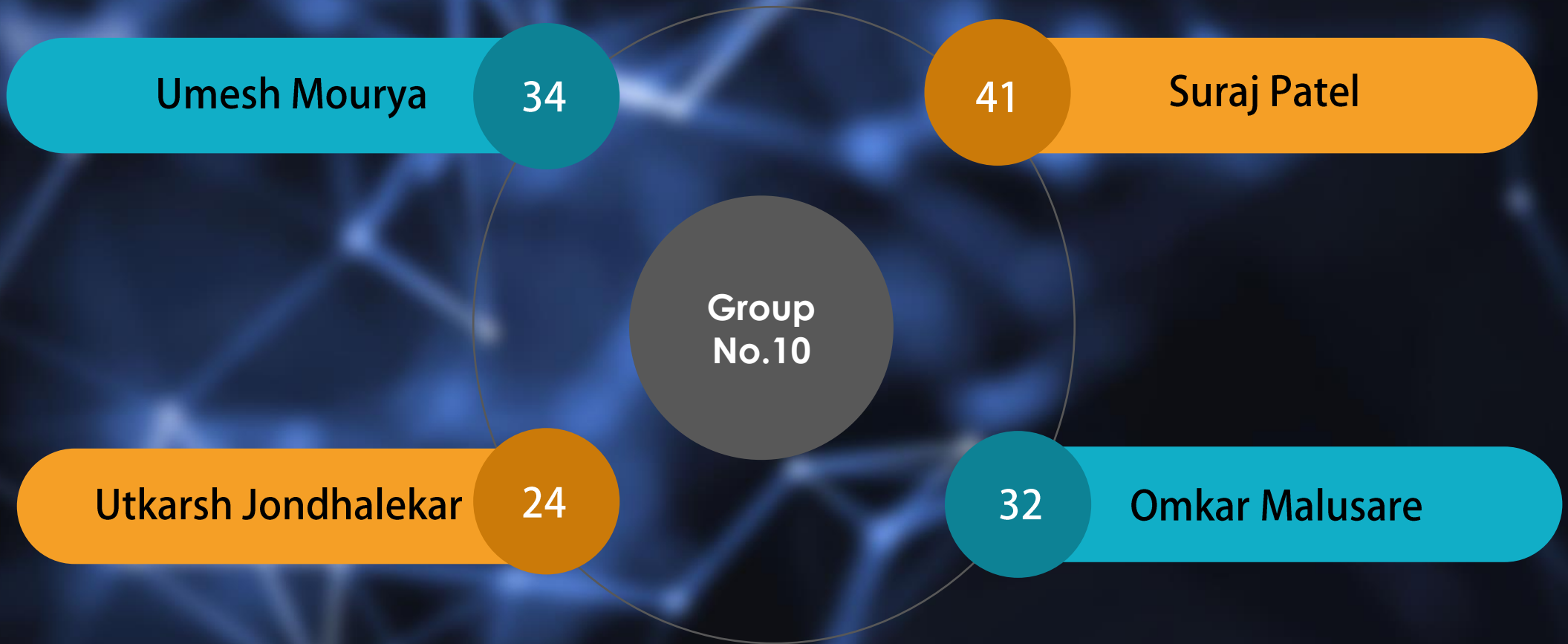
VIDYAVARDHINI's COLLEGE OF ENGINEERING AND TECHNOLOGY

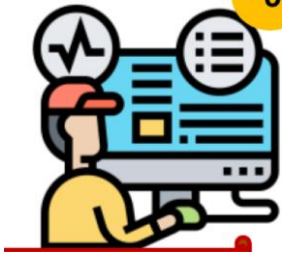
Mini Project Topic

FAILURE DETECTION AND PREDICTIVE MAINTENANCE OF SHAFT USING MACHINE LEARNING

Under the Guidance of : Prof. Kamlesh Bachkar

Team Members





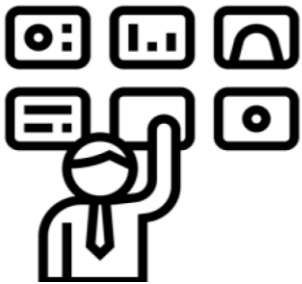
Automated Maintenance

Connected Machines



Introduction

Remote Monitoring



Predictive Analysis



➤ Literature Review

SR. NO.	NAME OF AUTHORS	JOURNAL	YEAR	SUMMARY
1	J.-Y. Hsu et al	Wind Turbine Fault Diagnosis and Predictive Maintenance Through Statistical Process Control and Machine Learning	2021	The study demonstrates that, by data mining and modeling, the failures of wind turbines can be detected, and the maintenance needs of parts can be predicted. Model results may provide technicians early warnings, improve equipment efficient, and decrease system downtime of wind turbine operation. INDEX TERMS Decision trees, fault diagnosis,
2	A. M. Umbrajkaar	Vibration Analysis of Shaft Misalignment Using Machine Learning Approach under Variable Load Conditions	2020	In this paper, emphasis is given on machine learning-based approach for condition monitoring of shaft misalignment.)is work highlights combined approach of artificial neural network and support vector machine for identification and measure of shaft misalignment.
3	Sujit S. Pardeshi , Abhishek D. Patange , R. Jegadeeshwaran, and Mayur R. Bhosale	Tyre Pressure Supervision of Two Wheeler Using Machine Learning	2020	From this paper we have developed knowledge about data acquisition system (DAQ)In house development

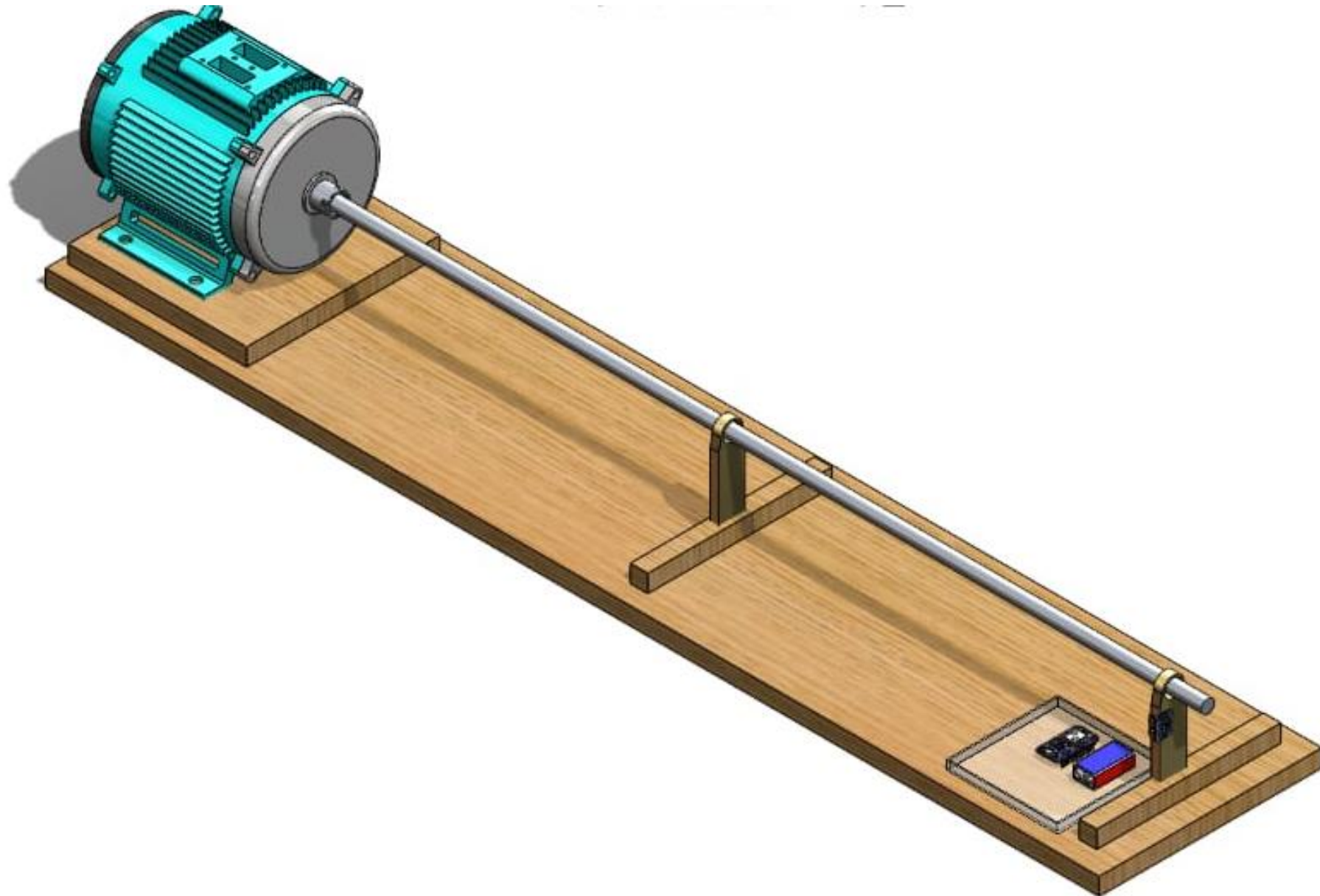
SR. NO.	NAME OF AUTHORS	JOURNAL	YEAR	SUMMARY
4	Prof. Tania Cerquitelli	Creation of a Machine Learning model for the Predictive Maintenance of an engine equipped with a rotating shaft	2020	The literature of the paper give us the brief knowledge about the process of detection of failure In various Shaft
5	Zeki Murat Cinar,Abubakar Abdussalam Nuhu,Qasim Zeeshan,Orhan Korhan Mohammed Asmael and Babak Safaei	Machine Learning in Predictive Maintenance towards Sustainable Smart Manufacturing in Industry 4.0	2020	This paper presents a comprehensive review of ML techniques applied in PDM of industrial components.Several ML algorithms were reviewed and presented.
6	Ahmed Al-Ajmi, Yingzhao Wang * and Siniša Djurović	Wind Turbine Generator Controller Signals Supervised Machine Learning for Shaft Misalignment Fault Detection: A Doubly Fed Induction Generator Practical Case Study	2021	This paper suggest gives information about modal selection for study of data and training of modal . It includes schematic diagram for modal selection .
7	Natalia F. Espinoza-Sepulveda Jyoti K. Sinha	Robust vibration-based faults diagnosis machine learning model for rotating machines to enhance plant reliability	2021	This paper has proposed 2 step approach for data collection and analysis.In first step both healthy and faulty data were collected and analysed while in second step faulty data was analysed for different types of fault such as shaft misalignment, shaft bow , looseness and rub

Progress till Sem 6

- **Assembly of Mechanical and Electric Component**
- **Testing of ADXL345 for vibration sensing and data transferring to Node MCU,**
- **Transferring of collected data to excel via data streamer**
- **Collection of data from actual assembled model**
- **Data Visualization**
- **Application of Machine learning model to the visualized data.**



Solidworks Model



COMPONENTS USED IN DESIGN

MOTOR

SHAFT

BEARINGS

To rotate the shaft connected to motor

ADXL

TO MONITOR VIBRATION PARAMETER

BASE PLATE

TO KEEP THE EXPERIMENTAL SETUP

NODE MCU

FOR Computing

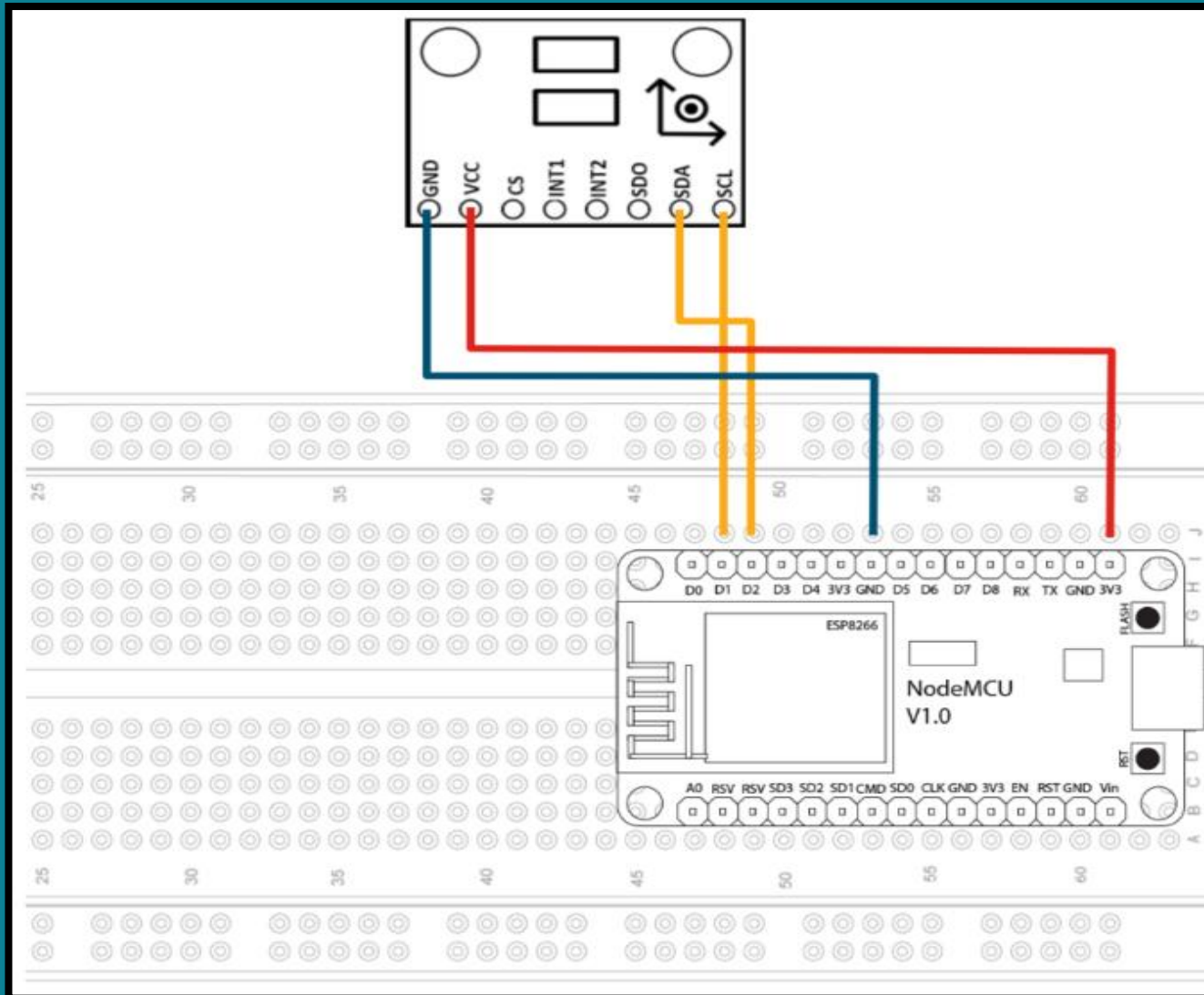
VOLTAGE VARYING DEVICE

TO CHANGE RPM OF MOTOR

Working

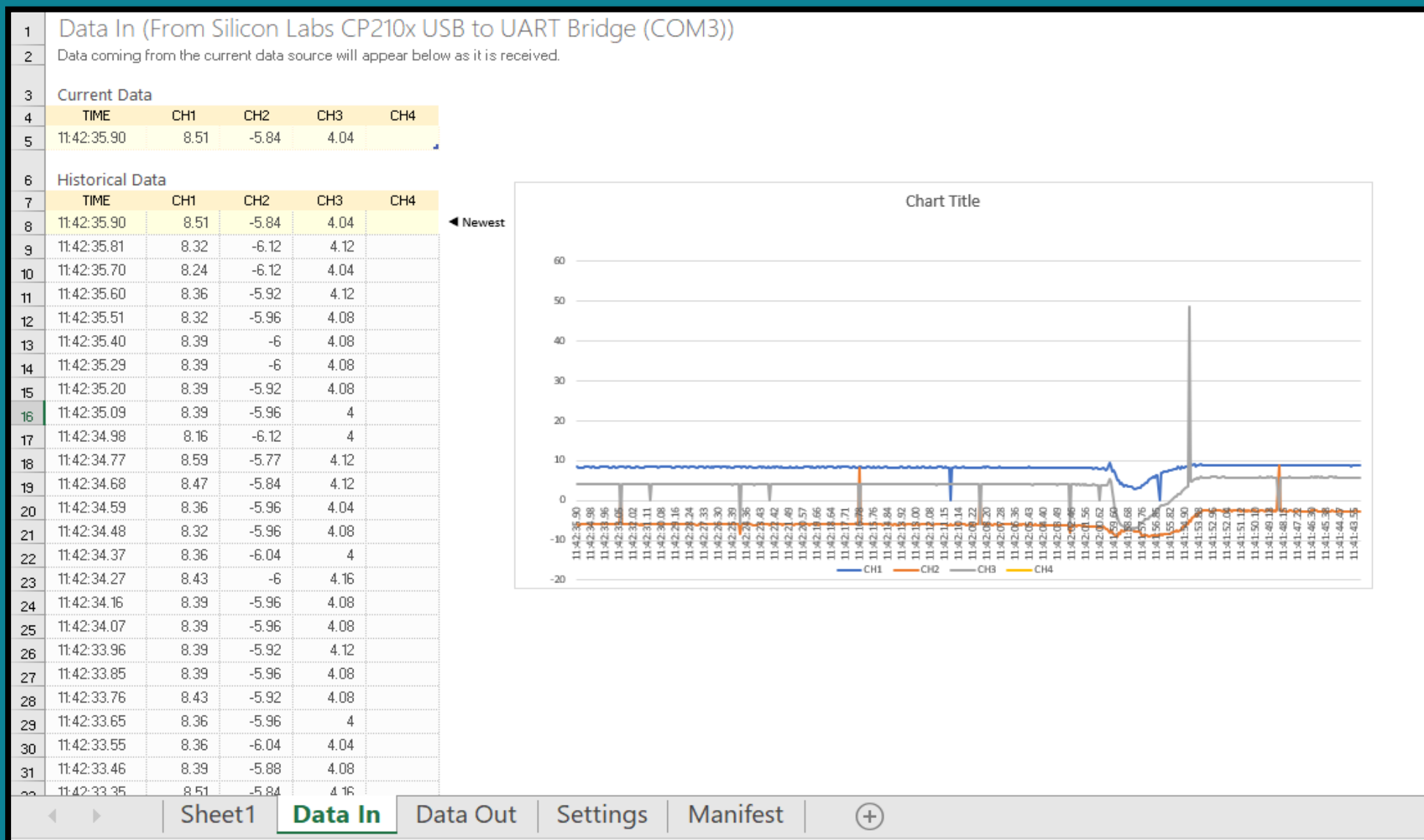
- **Sensors will be used to monitor and collect data.**
- **The data collected will be passed to Arduino**
- **Arduino is chosen because it supports inbuilt Wi-Fi. Hence data can be directly stored to cloud storage over the internet**
- **Cloud Storage that will be used for storing data . It supports data storage along with visualizations. Once sufficient amount of data is collected it can be exported into Excel**
- **Pre-processing steps such as exploration, cleaning and transformation of dataset will be done using Python.**
- **Machine learning prediction models can be used for predictive maintenance of motor and to predict failures in motor.**
- **Visualization of the data can be done using Python Modules**

➤ Circuit connection and data collection

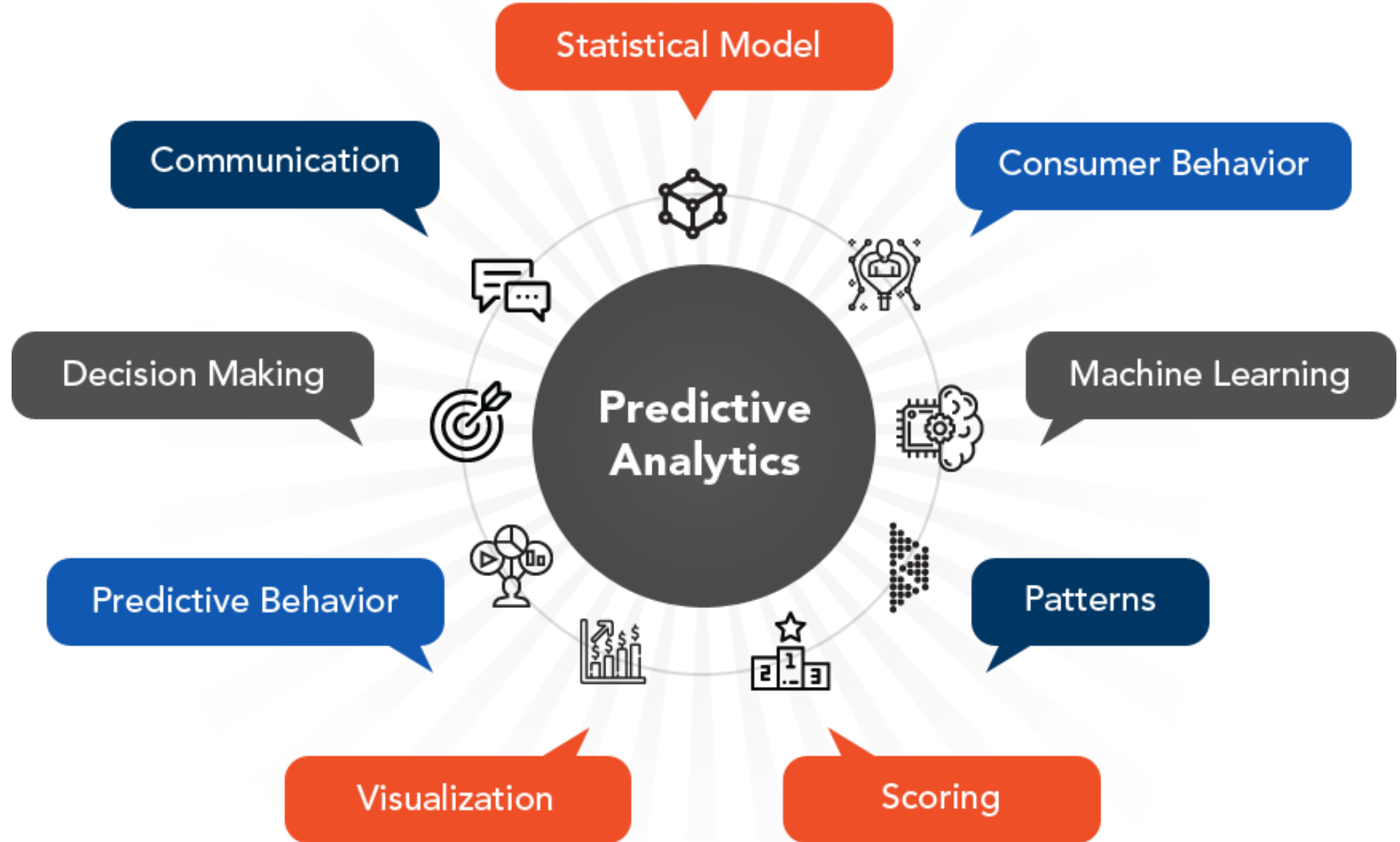


ADXL345	NodeMCU
VCC	3V3
GND	GND
SDA	D2
SCL	D1

➤ Data output in Excel Data streamer



➤ Predictive Analysis





Thank You