# Task1: Implementation of Prediction Algorithm using Neural Network

Programming Language: Java or C# or Matlab or Python

Problem description: we have some data (sample is shown in Table 1) as attached in excel document “**DataSet.xlsx**”.

Table 1: Sample Data Set

|  |  |  |
| --- | --- | --- |
| **Temperature** | **Humidity** | **Energy Consumed** |
| 30 | 17 | 57.9 |
| 17 | 12 | 36.2 |
| 91 | 10 | 138.4 |
| 96 | 15 | 148.9 |
| 3 | 13 | 17.3 |
| 65 | 18 | 107.6 |
| … | … | … |

We want to have an intelligent algorithm using Neural network that can predict output (consumed energy) based on given input (temperature and humidity values) i.e. you need to consider Temperature and Humidity as input parameter and Energy consumed as output parameter.

You shall implement Neural Network Algorithm to predict consumed energy for given input parameters. We have 100 records in the sample data set. You shall use initial 70 records for training of your neural network and remain 30 records for testing. Report accuracy of your results for training phase and testing phase in terms of mean square error.

# Task2: Implementation of EdgeX-based edge computing environment

Language: Any language

Installing and configuring the EdgeX ([www.edgexfoundry.com](http://www.edgexfoundry.com)) and developing device based on CoAP to communicate with EdgeX-based gateway.

Results: Using visualization to illustrate the results of EdgeX-based device and data management.

# Task3: Formulation for Optimization Problem

Formulate the given problem and suggest an optimization formula

(No implementation required)

Problem Description: Consider a water tank on a roof top that needs to be refilled with an electric pump when water level in the tank gets below certain threshold. The electric pump can operate with variable flow rate and its power consumption is directly proportional to flow rates. Furthermore, we also consider time variant pricing for electricity billing i.e. same power consumption during different day time will be charged differently. Assume peak pricing policy around mid-day time and gradual decrease in pricing near morning and evening.

The home users need is to quickly refill the tank with minimum electricity bill. Your task is to formulate the given problem and suggest an optimization formula to fulfill given user requirements. You need to consider three parameters (a) tank water level (b) pump flow rate (c) pricing rate at current time.

Consider any further relevant assumptions or constraints if needed. Your assumptions or constraints must be valid in given problem scenario and you need to clearly mention that.