A Project Report on

IOT Enabled Social Web Framework for Water Consumption Mointoring

Submitted in partial fulfillment of the requirements for the award
of the degree of

Bachelor of Engineering

in

Information Technology

by

Krutika Pawar(18204012)
Nakul Gagare(18204013)
Deeksha Kadam(18204007)

Under the Guidance of

Prof.Yaminee Patil

Department of Branch Name
NBA Accredited
A.P. Shah Institute of Technology
G.B.Road,Kasarvadavli, Thane(W), Mumbai-400615
UNIVERSITY OF MUMBAI

Academic Year 2017-2018

Approval Sheet

This Project Report entitled ***"IOT Enabled Social Web Framework for Water Consumption Mointoring"*** Submitted by ***"Krutika Pawar"(18204012),"Nakul Gagare "(18204013),"Deeksha Kadam"(18204007)***is approved for the partial fullfillment of the requirenment for the award of the degree of ***Bachelor of Engineering*** in ***Information Technology*** from ***University of Mumbai***.

Prof. Yaminee Patil
Guide

Prof. Kiran Deshpande
Head Department of Information Technology

Place:A.P.Shah Institute of Technology, Thane
Date:

CERTIFICATE

This is to certify that the project entitled ***"IOT Enabled Social Web Framework for Water Consumption Mointoring"*** submitted by ***"Krutika Pawar" (18204012),"Nakul Gagare" (18204013),"Deeksha Kadam" (18204007))*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology.***,to the University of Mumbai,is a bonafide work carried out during academic year 2017-2018.

Prof.Yaminee Patil
Guide

Prof. Kiran Deshpande
Head Department of Information Technology

Dr. Uttam D.Kolekar
Principal

External Examiner(s)

1.

2.

Place:A.P.Shah Institute of Technology, Thane
Date:

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

_____

(Signature)

_____

(Krutika Pawar - 18204012)
(Nakul Gagare - 18204013)
(Deeksha Kadam - 18204007)

Date:

Abstract

Water is one of the essential parts of life. Water quantity is one of the big problems to the world. In order to ensurethesafesupply ofthedrinkinganduseful waterfor differentpurposes ,the water should be monitored. The system is designed to monitor the supply of water to a particular area which can be detect the quantity of water supplied through that pump. This system design a real time monitoring of the quantity of water in using some sensor and software. The system having of several sensors is used to measuring physical of the water. The parameters flow sensor of the water can be measured. The measured values from the sensors can be processed by the controller. The Arduino model can be used as a controller.Finally, the sensor data can be shown on internet using WI-FI system. A system was configured as data analysis.

Contents

List of Figures

List of Abbreviations

ELK: ELastic,Logstash,Kibana
WHO: World Health Oraganisation
WD: Water Department
ICICET: International Conference of Informaton, Communication Engineering and Technology

Chapter 1

Introduction

Throughout the years, the world is facing water crisis that leads to water shortage due to theclimatechange, population increase, improvement inlivingstandardandalsoincreasing of industrial demand . The amount of water consumption suggested by World Health Organisation (WHO) is 165 liters per capita per day, however average of water consumption in Malaysia is higher than the recommended amount which is 210 liters per capita per day . As the country grows, water consumption among public community will also grows too. Water wastagecan be avoided if consumer use water prudently.Hence, one of the solutions is to limitunnecessary usage of water in their daily chores. The daily ,yearly as well as Monthly water consumption can be monitored and triggered by Water Department head.Looking at Current situation , Our World is of full of technologies the water is the basic and most important need to our lives.Currently, the water department is using the water pump to measure the supply of water to particular area and societies. In which, the pumps are fitted on the ground andaccording the measure is counted as per month . But in process the officers has to personally visit the area to take the reading of the meter. By using this technology ,we can send the reading to the authorized officer without personally visiting the area. The report can be generated the usage of water and the quantity of water consumed in a day.The water company can also utilize the system to automate polling the meter reading for monthly billing of water consumption in their client houses. This help to prevent late and inaccurate manual billing due to human error.Hence, obtaining information of daily water consumption is vital in order to control and analyze water supply and usage..

1.1 Elastic Stack Monitoring Service:

The Elastic Stack Monitoring service extends our commitment to improving product usabil - ity and quality of support by providing you with a dedicated monitoring cluster to host your Elastic Stack monitoring data.

Why this service?

1. Gathering various cluster information to diagnose the problem. And also needs to get a snapshot of your historical cluster monitoring data, and then manually restore it to diagnose the issue.
2. Now, with the Elastic Stack Monitoring Service, has direct access to your historical- mon-

itoring data as well as other relevant cluster information. This streamlines thediagnostic process and allows us to jump right into the more in-depth questions.
3. The Elastic Stack Monitoring Service, you will no longer need to create and manage a dedicated monitoring cluster on your own, which can greatly simplify your daily workflow and management.

How will this service work?

By opting in for this service, the Elastic Support team will create an Elastic Cloud cluster, and then send you the instructions for configuring your production Elasticsearch cluster to send its monitoring data to the Elastic Cloud cluster. With this service, it's as simple as logging into the hosted Kibana instance for both you and the Elastic Support team a new monitoring journey awaits.

1.1.1 Elasticsearch

Raw data flows into Elasticsearch from a variety of sources, including logs, system metrics, and web applications. Data ingestion is the process by which this raw data is parsed, normalized, and enriched before it is indexed in Elasticsearch. Once indexed in Elasticsearch, users can run complex queries against their data and use aggregations to retrieve complex summaries of their data. From Kibana, users can create powerful visualizations of their data, share dashboards, and manage the Elastic Stack.

1.1.2 Kibana

Searching, viewing, and visualizing data indexed in Elasticsearch and analyzing the data through the creation of bar charts, pie charts, tables, histograms, and maps. A dashboard view combines these visual elements to then be shared via browser to provide real-time analytical views into large data volumes in support of use cases such as: Logging and log analytics Infrastructure metrics and container monitoring Application performance monitoring (APM) Geospatial data analysis and visualization Security analytics Business analytics.Monitoring, managing, and securing an Elastic Stack instance via web interface.Centralizing access for built-in solutions developed on the Elastic Stack for observability, security, and enterprise search applications.

1.1.3 Logstash

Logstash is a light-weight, open-source, server-side data processing pipeline that allows you to collect data from a variety of sources, transform it on the fly, and send it to your desired destination. It is most often used as a data pipeline for Elasticsearch, an open-source analytics and search engine.

Chapter 2

Literature Review

1.IoT based water management :

Published in: 2017 International Conference on Nextgen Electronic Technologies: Silicon
to Software (ICNETS2)

Authors :

1. Chanda Rajurkar
Embedded System, VIT Chennai Campus, 600127, India

2. S R S Prabaharan
School of Electronics Engineering, VIT Chennai Campus 600127, India

3. S. Muthulakshmi
School of Electronics Engineering, VIT Chennai Campus, 600127, India.

Review :

This project focuses on monitoring of use of water, consider, by one block of house in a flatsystem, where at the partition of pipeline from where the water gets diverted to various part of a block. Methods/Statistical analysis: Water places a vital role for living beings in their day to day lives. The earth's 71 percentage is covered by water is a ubiquitous fact. Among which Oceans has approximately 96.55 percentage and 3 percentage is considered to be freshwater, again out of which only 0.08 percentage is accessible direct to human use and rest is preserved in tundra regions and in different form on and in the earth surface which is very difficult to abstract for the human purposes. From this it states that only 0.08 percentage is available as fresh water for human being to make use for drinking, domestic purposes, sanitation, manufacturing, leisure, agriculture etc which gets recharged by rain and snowfall 1. Findings: According to scientists and organizations as IPCC (Intergovernmental Panel on Climate Change), state has come, since a long time, where water management as such implies to maximizing use of water and minimizing the wastage of water and thus preventing the domino effect cycle arises as wastage of water. The sensors will sense the flow of water to each pipe which ultimately tells the usage of water at one block ideally. This water usage data would be sent to cloud using the IOT (Internet of things) space. This cloud data would be sent to the concern resident's person's mobile app (application) reporting the water used and alerting the user to limit the water use if it gets extended to the limit usage set by municipal government or corporation. If the limit gets extended the user have to pay accordingly. This will be real time operation. The objective of doing so is for limiting and minimizing

the usage of water for an average of per person. And secondly, the cloud data will be used as statistic data for use of water at every seasons that is winter, summer and monsoon so that measuring steps for water management can be taken with the appropriate statistics, yielding an avenue for predictive measure. Improvements/Applications: To appraise the IOT based water management, it can be ramified as diligent, frugal for water management in a symbiotic parity way, which will constrict the water resource evenly according to the in situ factors.

2. Monitoring of Industrial Water Usage by using Internet of Things.

Published in: 2018 International Conference on Information , Communication, Engineering and Technology (ICICET)

Authors:

1.Sourabh Jadhav
Center for P.G. Studies, Visvesvaraya Technological University, Belagavi

2.Sneha Vijay Patil
Center for P.G. Studies, Visvesvaraya Technological University, Belagavi

3. T.C. Thanuja
Center for P.G. Studies, Visvesvaraya Technological University, Belagavi

4. M.P. Shivu
FluxGen Engineering Technology, Bangalore

5. Ganesh Shankar
FluxGen Engineering Technology, Bangalore.

Review:

This paper focuses on monitoring the amount of usage of water in the milk processing unit and generates report of the daily water usage in each processing section. The system keeps track of the purchased water, water in reservoir and overall usage of water in the milk industry. The flow sensors will sense the flow of water in each pipe which ultimately tells the usage of water at one block ideally. The level sensor senses the level of water into the reservoir and tells the availability of water into the reservoir. This water usage data would be sent to the cloud using the Internet of Things (IoT) space. The cloud data is computed and generates pattern of the data input and provides a detailed water consumption chart on the desktop as well as smart phones.Industrialization impacts directly on the development of country. Water is essential for industries.The industrial water usage keeps on rising and in the year 2025 to 2050 it will reach around 8.5 and 10.1 percent of the total freshwater . Use of water in the industries for many purposes such as fabricating, washing, cooling, processing, diluting, or product transportation; take in water into a product etc . Compare to other industries, consumptions of water is high in the food sector. One of the major food industries in India is Dairy industry and India is at first rank in the list of maximum major milk producing nation . Dairy industries need high quality and a reliable supply of water. Large volume of water is used in milk processing unit, mostly in pasteurization, homogenization of fluid milk and the production of dairy products such as butter, cheese, milk powder etc. Most of the milk processing unit use “Clean In Place” (CIP) system which pumps clean-

ing solutions through all equipments. At modern dairy processing plants, the milk: water ratiois 1:2.5 liters. However, the expected ratio is 1:0.7 liters . Thus, to achieve such a low consumption not only advanced equipments are required, but also very good housekeeping and awareness among both employees and management is also required. Monitoring water use is the regular collection of information about the total amount of water drawn from all sources for any use during a given period. For the water consuming industries it is important to monitoring usage of water for planning for minimize and awareness of water use .

3. Smart Water Monitoring System using IoT.

Published in: International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 10 — Oct 2018.

Author:

Gowthamy J, Chinta Rohith Reddy, Pijush Meher, Saransh Shrivastava, Guddu Kumar.

Review:

Currently drinking water is very prized for all the humans. In recent times water levels are very low and water in the lakes are going down. So its too important to find the solution for water monitoring and control system. IoT is a solution. In recent days, development in computing and electronics technologies have triggered Internet of Things technology. Internet of Things can be describe as the network of electronics devices communicating among them by the help of a controller. The IoT is a collection of devices that work together in order to serve human tasks in a efficient manner. It combine computational power to send data about the environments. These devices can be in form of sensors, appliances, embedded systems, and data analysis microchips. This paper present a low cost water monitoring system, which is a solution for the water wastage and water quality. Microcontrollers and sensors are used for that system. Ultrasonic Sensor is used to measuring water level. The other parameters like pH, TDS, and Turbidity of the water can be calculated using different corresponding sensors. This system use the flow sensor which can measure the water flow and if the necessary quantity of water flow through the pipe then water flow can be stopped automatically. The calculated values from the sensors can be processed by the Microcontrollers and uploaded to the internet through the Wi-Fi module (ESP 8266). Analysis we can do by this process, how much water is used in certain time, in a day or in a month.

Chapter 3

Project Design

Proposed System Architecture/Working

Architecture:

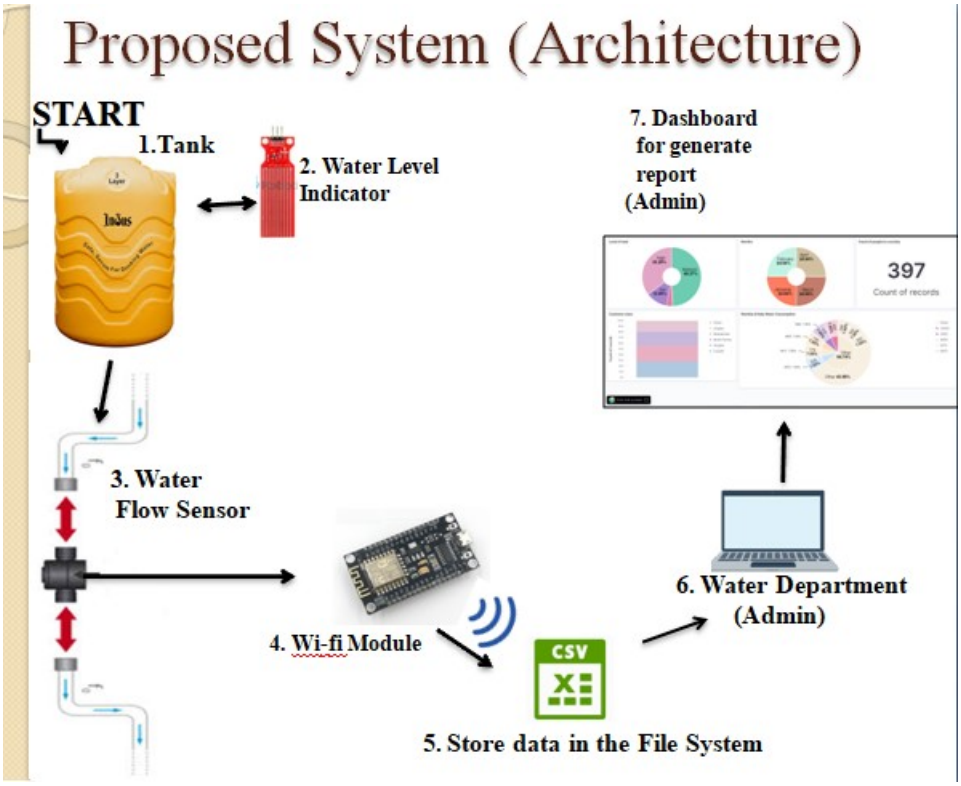

Figure 3.1: Architecture of IOT Enabled Water Mointering System

Working:

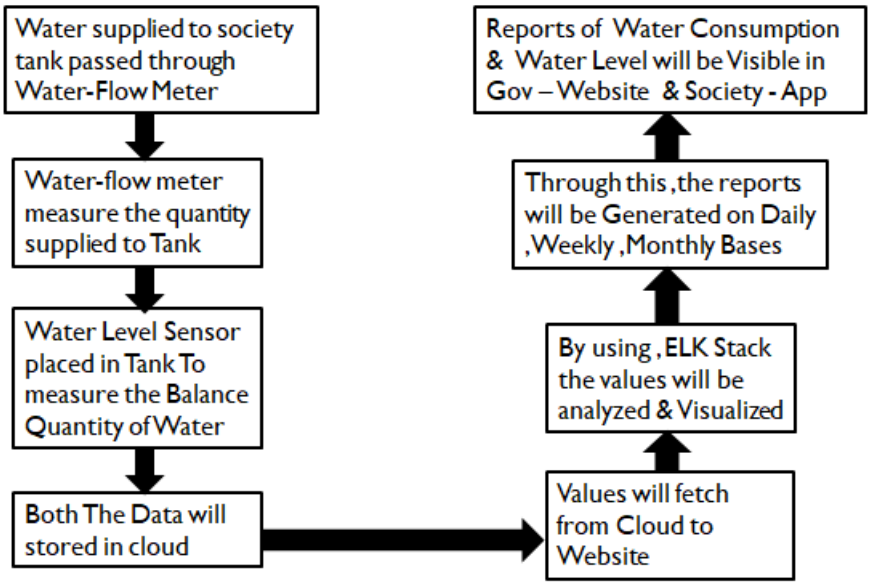

Figure 3.2: Working of IOT Enabled Water Mointering System

Brief about above figures i.e 3.1 & 3.2 :

In above figures we are trying to explain how our project is going to work .Figure 3.1 is a architecure of a project .Step by Step we will be going to explain the working.

Step 1: It start from a tank of a society in wihich water level indicator and water flow sensor will be attached or we can say it will be fix in the tank of society ,from that we can get to know how much water is in the tank after & before water supply to houses of the society.

Step 2: After that all data from waterlevel indicator will be send to cloud or make a csv file for analysing,for that we are going to use elastic cloud or csv file.

Step 3: Stored data in the cloud or csv file will be access by only water department for measuring /reading the data to generate report .

Step4 : After getting data from cloud or csv file, water department will be creating a dashboard for Visualizing .

Step 5: After creating a dashboard water department will generate a report .that will be send to society secretary.

From this we can get to know how much wastage of water we do yearly,montly& daily from the dashboard.

Chapter 4

Project Implementation

Arduino Circuit Diagram which will be attach in tank.

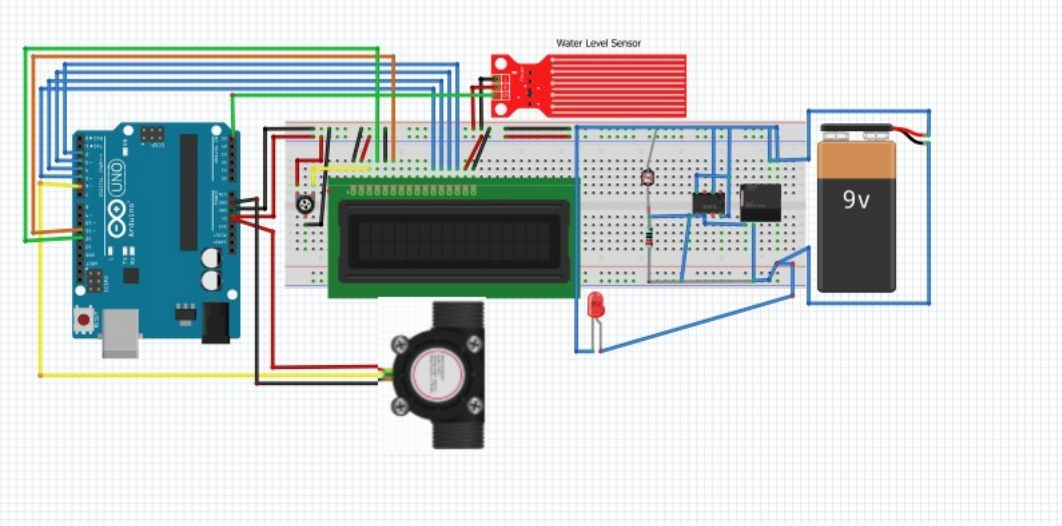

Figure 4.1: Circuit Diagram for measuring water in tank

Code:

```
#include ¡LiquidCrystal.h ¿
LiquidCrystal lcd(12,11,5,4,3,2);
int resval =0;
int respin =AS;
void setup()
{
lcd.begin(16,2);
lcd.print("water level:");
}
void loop()
{
```

```
lcd.setCursor(0,1);
resval= analogRead(respin);
if(resval¡=100)
{
lcd.println("Empty");
}
else if (resval¿100 && resval¡=300)
{
lcd.println("Low");
}
else if (resval¿300 && resval¡=330)
{
lcd.println("Medium");
}
else if (resval¿330)
{
lcd.println("High");
}
delay(1000);
}
```

Elastic , Kibana & Logstash.

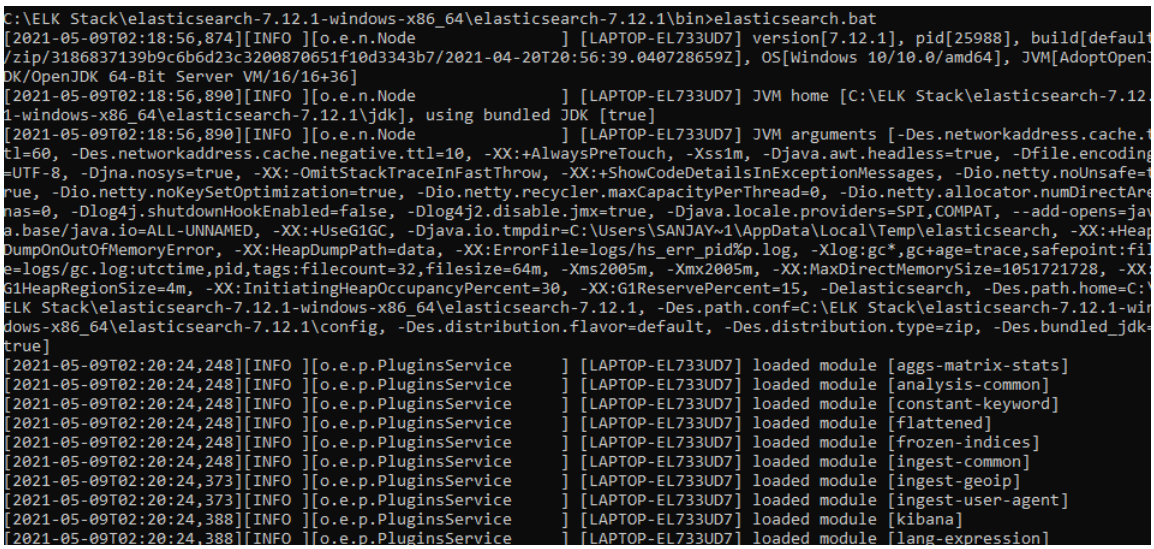

Figure 4.2: Elasticsearch Running on Command promt

Command to Run:
C:/ELK Stack/elasticsearch7.12.1windowsx8664/elasticsearch7.12.1/bin/elasticsearch.bat

Elasticsearch.

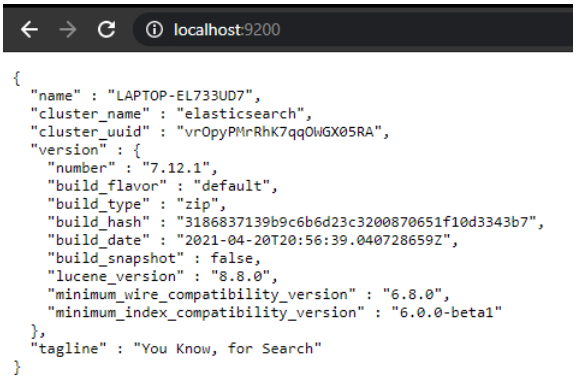

Figure 4.3: Elasticsearch Running on localhost in browser

In Browser:
Run curl http://localhost:9200/ or Invoke-RestMethod http://localhost:9200 with PowerShell

Kibana.

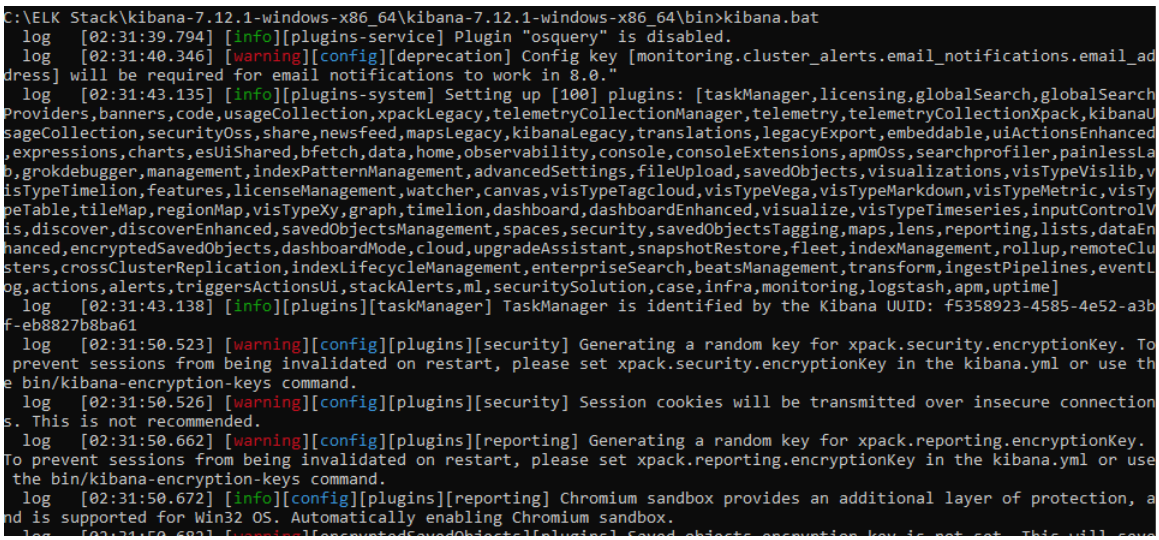

Figure 4.4: Kibana Running on Command promt

Command to Run:
C:/ELK Stack/kibana7.12.1windowsx8664/kibana7.12.1windowsx8664/bin/kibana.bat

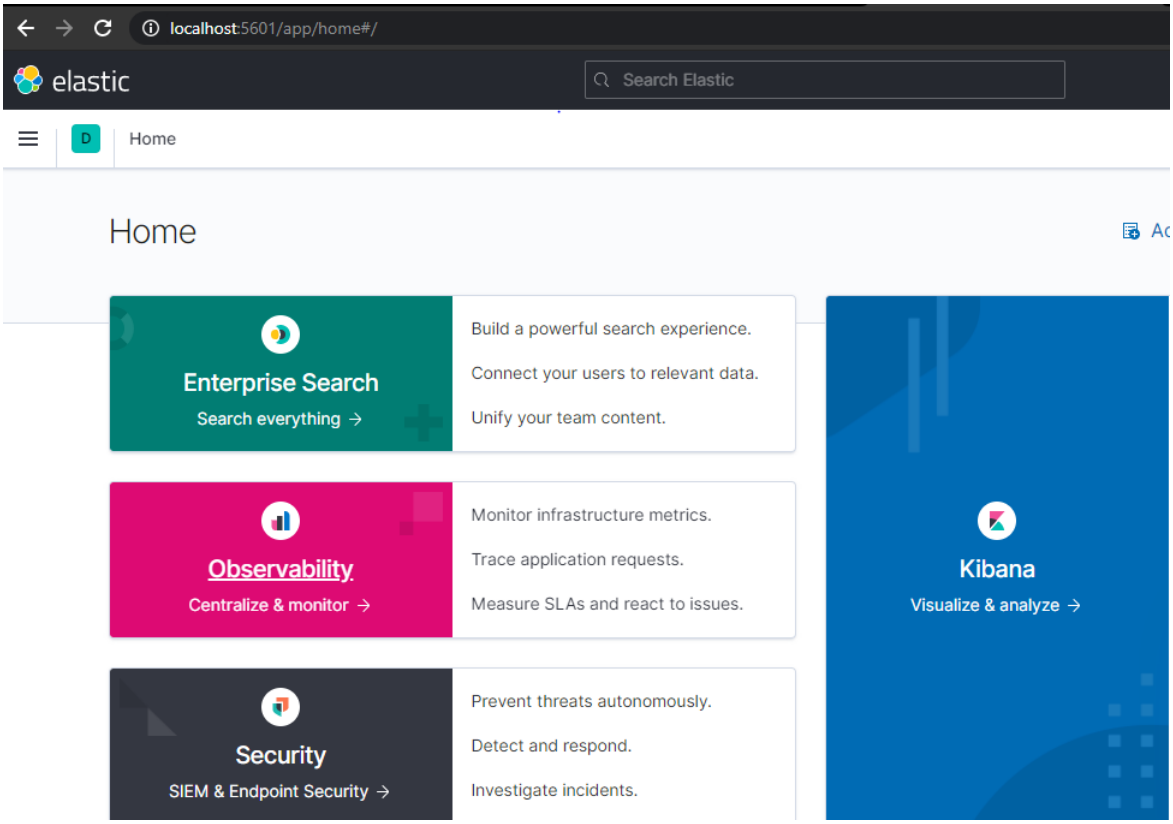

Figure 4.5: Kibana Running on localhost in browser

In Browser:
Point your browser at http://localhost:5601

Logstash.

logstash.conf file:

input {
file{
path =¿ "C:/ELK Stack/logstash7.12.1window-x8664/logstash7.12.1/bin/*.csv"
start_position =¿ "beginning"
sincedb_path =¿ "NULL"
}
}
filter {
csv {
separator =¿ ","
columns =¿ ["Postal Code","Customer Class","Litres per day","Consumption Litres Per Month","Level Of Tank"]
}
}

output {
elasticsearch {
hosts =¿ ”http://localhost:9200”
index =¿ ”data”
}
stdout{}
}

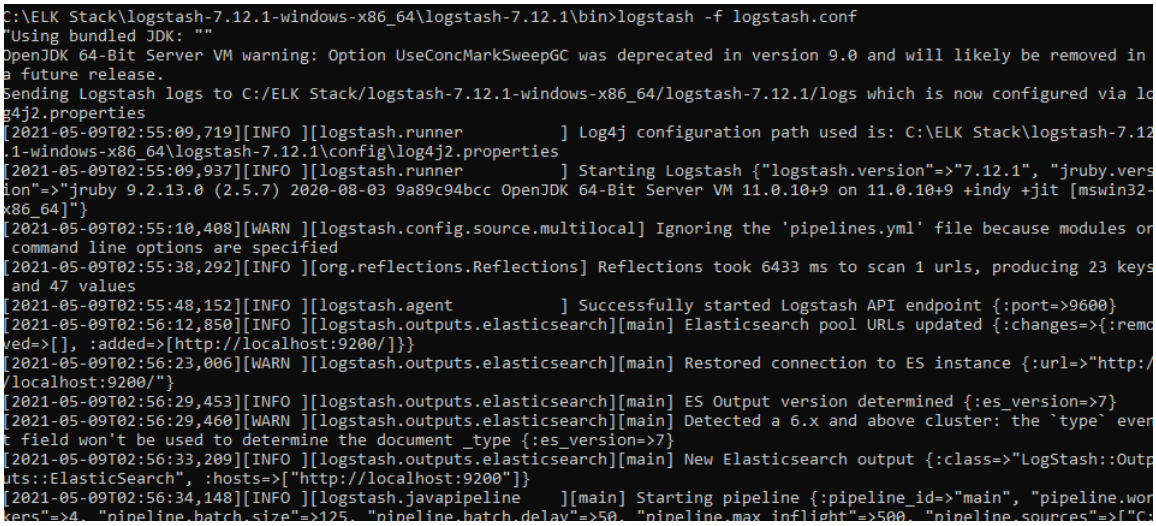

Figure 4.6: Logstash Running on Command promt

Command to Run:
C:/ELK Stack/logstash7.12.1windowsx8664/logstash7.12.1/bin/logstash -f logstash.conf
Creating Visualization filter in kibana

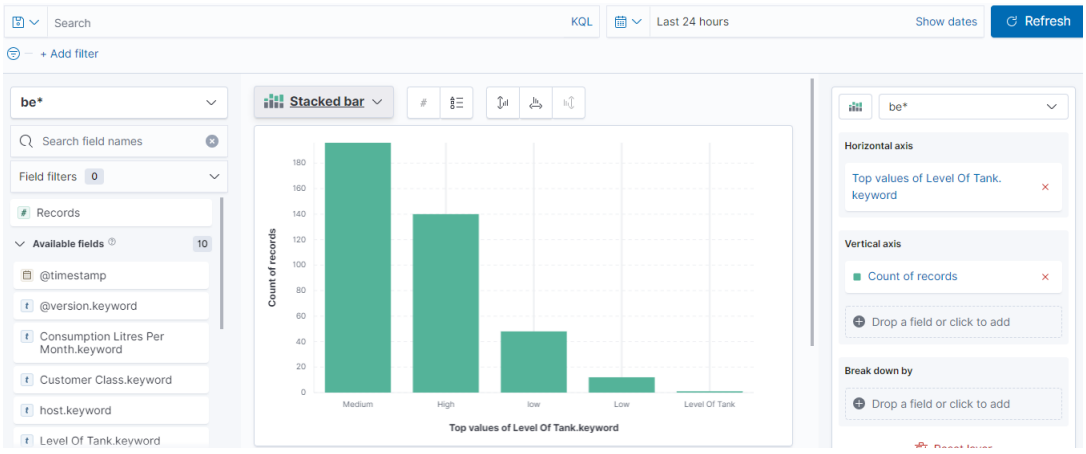

Figure 4.7: Visualization filter via bar charts or pie charts

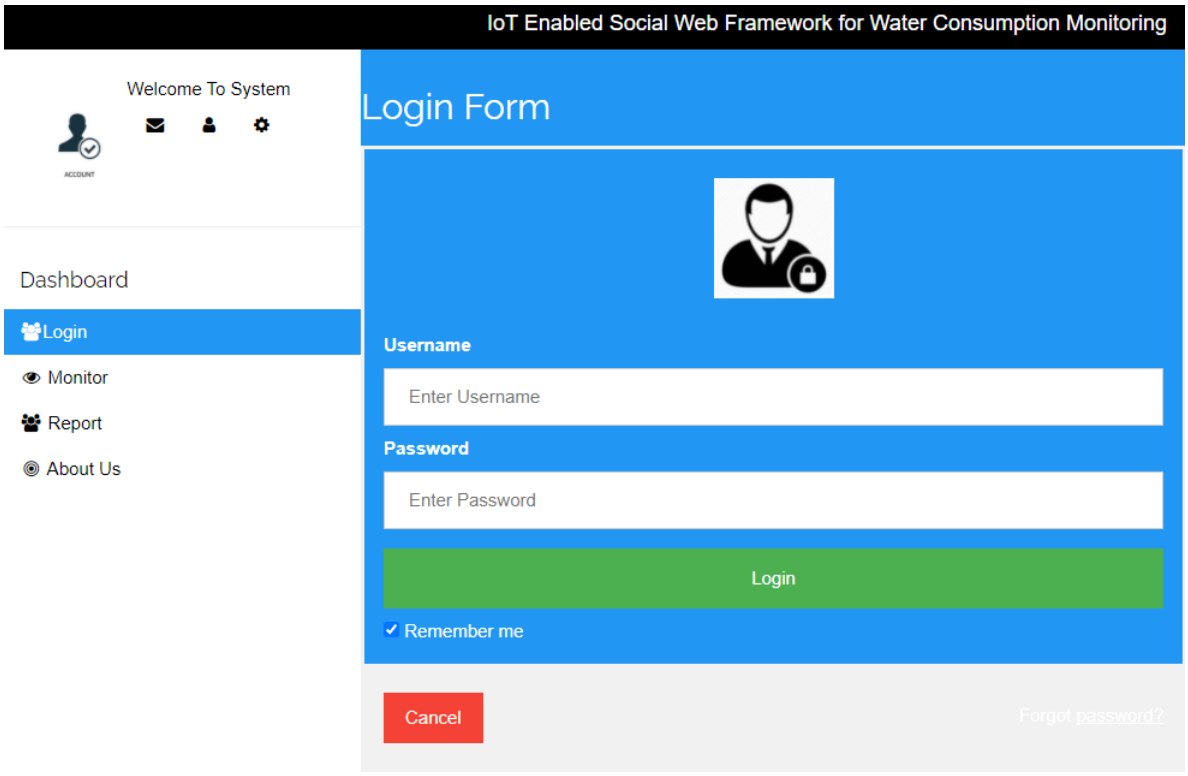

Figure 4.8: Website for Water Department Admin

```
<!DOCTYPE html>
<html>
<title>Water Monitoring</title>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">
<link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Raleway">
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/font-awesome
<style>
html,body,h1,h2,h3,h4,h5 {font-family: "Raleway", sans-serif}
</style>
<body class="w3-blue">

<!-- Top container -->
<div class="w3-bar w3-top w3-black w3-large" style="z-index:4">
  <button class="w3-bar-item w3-button w3-hide-large w3-hover-none w3-hover-text-light-grey" onclick="w
  <span class="w3-bar-item w3-right">IoT Enabled Social Web Framework for Water Consumption Monitoring<
</div>

<!-- Sidebar/menu -->
<nav class="w3-sidebar w3-collapse w3-white w3-animate-left" style="z-index:3;width:300px;" id="mySideb
  <div class="w3-container w3-row">
    <div class="w3-col s4">
      <img src="acc.jpg" class="w3-circle w3-margin-right" style="width:100px">
    </div>
    <div class="w3-col s8 w3-bar">
      <span>Welcome To System <strong> </strong></span><br>
      <a href="#" class="w3-bar-item w3-button"><i class="fa fa-envelope"></i></a>
      <a href="#" class="w3-bar-item w3-button"><i class="fa fa-user"></i></a>
      <a href="#" class="w3-bar-item w3-button"><i class="fa fa-cog"></i></a>
    </div>
  </div>
```

Figure 4.9: Website Code:

```
  <hr>
  <div class="w3-container">
    <h5>Dashboard</h5>
  </div>
  <div class="w3-bar-block">
    <a href="#" class="w3-bar-item w3-button w3-padding-16 w3-hide-large w3-dark-grey w3-hover-black"
    <a href="1-login.html" class="w3-bar-item w3-button w3-padding w3-blue"><i class="fa fa-users fa-f
    <a href="2-monitor.html" class="w3-bar-item w3-button w3-padding"><i class="fa fa-eye fa-fw"></i>
    <a href="3-report.html" class="w3-bar-item w3-button w3-padding"><i class="fa fa-users fa-fw"></i>
    <a href="4-about us.html" class="w3-bar-item w3-button w3-padding"><i class="fa fa-bullseye fa-fw"


  </div>
</nav>


<!-- Overlay effect when opening sidebar on small screens -->
<div class="w3-overlay w3-hide-large w3-animate-opacity" onclick="w3_close()" style="cursor:pointer" t

<!-- !PAGE CONTENT! -->
<div class="w3-main" style="margin-left:300px;margin-top:43px;">

  <!-- Header -->
  <header class="w3-container" style="padding-top:22px">
    <h5><b><i class="fa fa-dashboard"></i> Dashboard</b></h5>
  </header>
<head>
<meta name="viewport" content="width=device-width, initial-scale=1">
<style>
body {font-family: Arial, Helvetica, sans-serif;}
form {border: 3px solid #f1f1f1;}

```

Figure 4.10: Website Code:

```
input[type=text], input[type=password] {
  width: 100%;
  padding: 12px 20px;
  margin: 8px 0;
  display: inline-block;
  border: 1px solid #ccc;
  box-sizing: border-box;
}

button {
  background-color: #4CAF50;
  color: white;
  padding: 14px 20px;
  margin: 8px 0;
  border: none;
  cursor: pointer;
  width: 100%;
}

button:hover {
  opacity: 0.8;
}

.cancelbtn {
  width: auto;
  padding: 10px 18px;
  background-color: #f44336;
}

.imgcontainer {
  text-align: center;
  margin: 24px 0 12px 0;
```

Figure 4.11: Website Code:

```
</style>
</head>
<body>

<h2>Login Form</h2>

<form action="/action_page.php" method="post">
  <div class="imgcontainer">
    <img src="login.jpg" class="imgHeight" alt="Avatar" class="avatar">
  </div>

  <div class="container">
    <label for="uname"><b>Username</b></label>
    <input type="text" placeholder="Enter Username" name="uname" required>

    <label for="psw"><b>Password</b></label>
    <input type="password" placeholder="Enter Password" name="psw" required>

    <button type="submit">Login</button>
    <label>
      <input type="checkbox" checked="checked" name="remember"> Remember me
    </label>
  </div>

  <div class="container" style="background-color:#f1f1f1">
    <button type="button" class="cancelbtn">Cancel</button>
    <span class="psw">Forgot <a href="#">password?</a></span>
  </div>
</form>
<script>
```

Figure 4.12: Website Code:

```
// Get the Sidebar
var mySidebar = document.getElementById("mySidebar");

// Get the DIV with overlay effect
var overlayBg = document.getElementById("myOverlay");

// Toggle between showing and hiding the sidebar, and add overlay effect
function w3_open() {
  if (mySidebar.style.display === 'block') {
    mySidebar.style.display = 'none';
    overlayBg.style.display = "none";
  } else {
    mySidebar.style.display = 'block';
    overlayBg.style.display = "block";
  }
}

// Close the sidebar with the close button
function w3_close() {
  mySidebar.style.display = "none";
  overlayBg.style.display = "none";
}
</script>
</body>
</html>
```

Figure 4.13: Website Code:

Chapter 5

Result

The Kibana Dashboard page is where you can create, modify, and view your own custom dashboards. With a dashboard, you can combine multiple visualizations onto a single page, then filter them by providing a search query or by selecting filters by clicking elements in the visualization. Dashboards are useful for when you want to get an overview of your logs, and make correlations among various visualizations and logs. Over here we are mointoring water tank as well as consumption of water on daily,monthly basis.

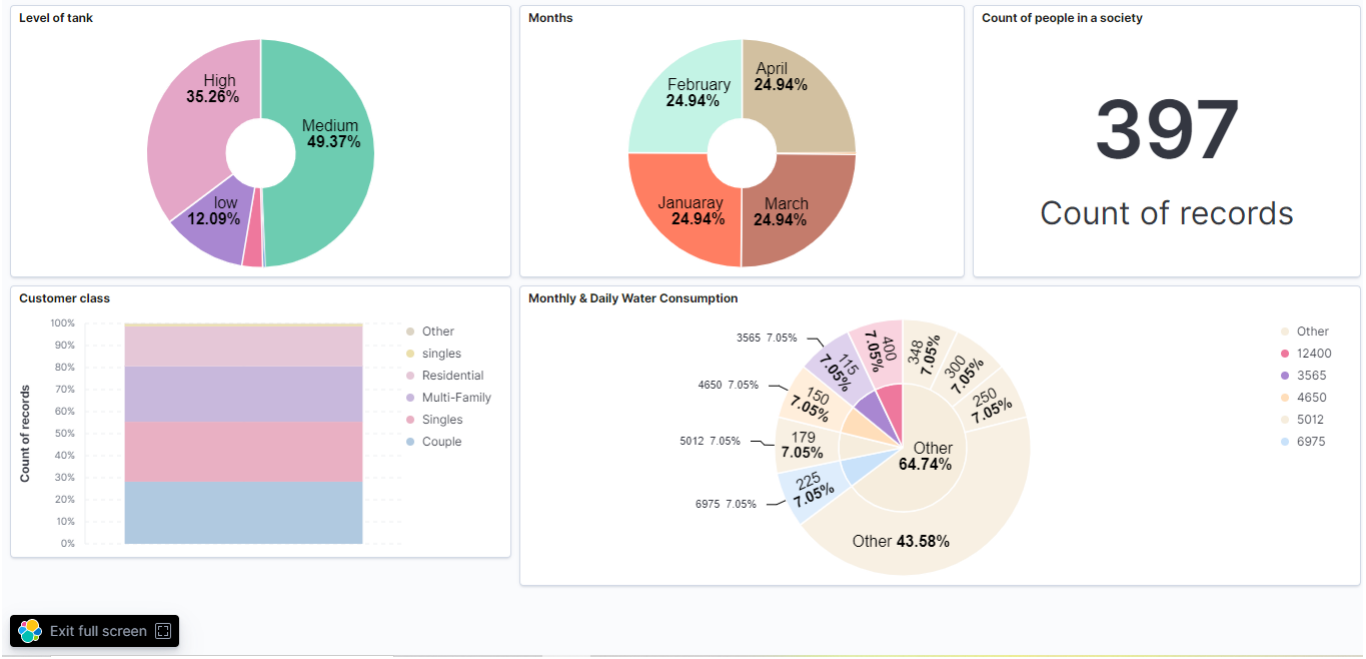

Figure 5.1: Dashboard Created in kibana

Chapter 6

Conclusions and Future Scope

The Internet has changed the size of life involving virtual interaction. IOT has the potential to feature new dimensions enabling smarter objects communications. The proposed system is a water level monitoring system with different levels indicated. System design and architecture which has been implemented in our project is very cost effective, a simple strategy to monitor the water level system . Saving water is also essential now-a-days looking over it we have created this idea.

Future Work can involve the analysis of water level during a particular area in order that the wastage of water is prevented. In future we are also planning to add PH scale to find out the quality of water, the quality of water, etc. It also symbolysis when the water level is as per requirement below or low.

Bibliography

[1] Che Soh, Z. H., Shafie, M. S., Shafie, M. A., Noraini Sulaiman, S., Ibrahim, M. N.,& Afzal Che Abdullah, S. (2018). IoT Water Consumption Monitoring & Alert System. 2018 International Conference on Electrical Engineering and Informatics (ICELTICs)(44501). doi:10.1109/iceltics.2018.8548930

[2] Siddula, S. S., Babu, P., & Jain, P. C. (2018). Water Level Monitoring and Management of Dams using IoT. 2018 3rd International Conference On Internet of Things: Smart Innovation and Usages (IoT-SIU). doi:10.1109/iot-siu.2018.8519843

[3] Jadhav, S., Patil, S. V., Thanuja, T. C., MP, S., & Shankar, G. (2018). Monitoring of Industrial Water Usage by using Internet of Things. 2018 International Conference on Information , Communication, Engineering and Technology (ICICET). doi:10.1109/icicet.2018.8533822

[4] Rajurkar, C., Prabaharan, S. R. S., & Muthulakshmi, S. (2017). IoT based water management. 2017 International Conference on Nextgen Electronic Technologies: Silicon to Software (ICNETS2). doi:10.1109/icnets2.2017.8067943

[5] Perumal, T., Sulaiman, M. N., & Leong, C. Y. (2015). Internet of Things (IoT) enabled water monitoring system. 2015 IEEE 4th Global Conference on Consumer Electronics (GCCE). doi:10.1109/gcce.2015.7398710

Appendices

Creating a Dashboard on kibana need to install ELK Stack Product i.e Elasticsearch, Kibana ,Logstash.In this Project we are using arduino for that we need arduino software IDE that will be attach to object from which we will get data to visualize as well as analysis.

Appendix-A: Arduino Software IDE Download and Installation

1. Download https://www.arduino.cc/en/software/

2. Place arduino-1.8.13-windows.zip in your desired directory; like C:/Program Files.

3. Install the software by doing next and choose the directory .

4. Installation completed of Arduino-1.8.13 IDE.

Appendix-B: Elastic Products i.e Elastic, Kibana ,& Logstash

1. Copy this link for downloading ELK https://www.elastic.co/downloads/

2. After opening this link you will get to see Products of Elastic ,Find Elasticsearch and then click download (if you didn't find it https://www.elastic.co/downloads/elasticsearch)

3. You will ge to see different zip fle for different OS .If you are using windows ,then click elasticsearch-7.12.1-windows-x8664.zip. Downloading started .

4. Extract zip file in your desired directory; like C:/ELK .

5. Do this process for Kibana as well as for Logstash ,extact in same folder were elasticsearch is extracted.

6.After Extraction of zip file open command promt (Admin) to run one by one.

7.To run Elasticsearch go to bin copy the directory . In command Prompt write cd paste directory ; like C:/ELK Stack/elasticsearch-7.12.1-windows-x86-64/elasticsearch-7.12.1/bin) /elasticsearch.bat and run it

8.Run curl http://localhost:9200/ or Invoke-RestMethod http://localhost:9200 with PowerShell

9.page will load with some detail of elasticsearch ;like version ,hosts etc
10 Dont close elasticsearch after after page load keep it running for kibana
11.Open config/kibana.yml in an editor.Set elasticsearch.hosts to point at your Elasticsearch instance

12. In command prompt run cd C:/ELK Stack/kibana-7.12.1-windows-x8664/kibana-7.12.1-windows-x86-64/bin/kibana.bat

13.Point your browser at http://localhost:5601. Kibana will start.

14.To run Logstash create a conf file ; like logstash.conf save it anywhere in you system.

15.Run bin/logstash -f logstash.conf in command promt.

Acknowledgement

We have great pleasure in presenting the report on **IOT Enabled Social Web Framework for Water Consumption Mointoring.** We take this opportunity to express our sincere thanks towards our guide **Prof.Yaminee Patil** Department of IT, APSIT thane for providing the technical guidelines and suggestions regarding line of work. We would like to express our gratitude towards his constant encouragement, support and guidance through the development of project.

We thank **Prof. Kiran B. Deshpande** Head of Department,IT, APSIT for his encouragement during progress meeting and providing guidelines to write this report.

We thank **Prof. Vishal S. Badgujar** BE project co-ordinator, Department of IT, APSIT for being encouraging throughout the course and for guidance.

We also thank the entire staff of APSIT for their invaluable help rendered during the course of this work. We wish to express our deep gratitude towards all our colleagues of APSIT for their encouragement.

Student Name1:Krutika Pawar
Student ID1:18204012

Student Name2:Nakul Gagare
Student ID2:18204013

Student Name3:Deeksha Kadam
Student ID3:18204007

Publication

Paper entitled **"IOT Enabled Social Web Framework for Water Consumption Monitoring"** is presented at **"My Easy Chair"** by **"Krutika Pawar , Nakul Gagare , Deeksha Kadam & Prof . Yaminee Patil".**