R.V. COLLEGE OF ENGINEERING
BENGALURU-560059
(Autonomous Institution Affiliated to VTU, Belagavi)

"6LoWPAN BASED LEAK DETECTION AND CONSERVATION"

PROJECT REPORT

Submitted by

Amith Raj S N	**1RV13IS005**
Anirudh Nagraj	**1RV13IS008**
Utkarsh Jain	**1RV13IS059**

Under the Guidance of

S. G. Raghavendra Prasad
Assistant Professor
Department of Information Science and Engineering,
R. V. College of Engineering

in partial fulfilment for the award of degree
of
Bachelor of Engineering
in
Information Science and Engineering
JAN-MAY 2017

R.V. COLLEGE OF ENGINEERING, BENGALURU – 560059
(Autonomous Institution Affiliated to VTU, Belagavi)

DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

CERTIFICATE

Certified that the project work titled **'6LoWPAN Based Leak Detection and Conservation'** is carried out by **Amith Raj S N (1RV13IS005)**, **Anirudh Nagraj (1RV13IS008)**, **Utkarsh Jain (1RV13IS059)** who are bonafide students of R.V College of Engineering, Bengaluru, in partial fulfilment for the award of degree of **Bachelor of Engineering** in **Information Science and Engineering** of the Visvesvaraya Technological University, Belagavi during the year **2016-2017**. It is certified that all corrections/suggestions indicated for the internal assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed by the institution for the said degree.

Signature of the Guide	**Signature of the**	**Signature of the**
Prof. S.G. Raghavendra Prasad	**Head of the department**	**Principal**
Assistant Professor,	**Dr. N K Cauvery,**	**Dr. K N Subramanya**
Dept. of ISE, RVCE	Head of Department	Principal,
	Dept. of ISE, RVCE	RVCE, Bangalore

External Viva

Name of Examiners	**Signature with date**
1	
2	

R.VCOLLEGE OF ENGINEERING, BENGALURU – 560059
(Autonomous Institution Affiliated to VTU, Belagavi)

DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

DECLARATION

We **Amith Raj S N, Anirudh Nagraj, Utkarsh Jain** students of Eighth Semester B.E, Department of Information Science and Engineering, **R.V.College of Engineering, Bengaluru-560059**, bearing USN: **1RV13IS005, 1RV13IS008, 1RV13IS059** respectively, hereby declare that the project titled **"6LoWPAN Based Leak Detection and Conservation"** has been carried out by us and submitted in partial fulfilment of the program requirements for the award of degree in Bachelor of Engineering in **Information Science and Engineering** of the **Visvesvaraya Technological University, Belagavi** during the year **2016-2017**.

Further we declare that the content of the dissertation has not been submitted previously by anybody for the award of any degree or diploma to any other University.

We also declare that any Intellectual property rights generated out of this project carried out at R.V.C.E. will be the property of R.V.College of Engineering, Bengaluru and we will be only one of the authors of the same.

Place: Bengaluru
Date:

Name of the Students	*USN*	*Signature*
Amith Raj S N	**1RV13IS005**	
Anirudh Nagraj	**1RV13IS008**	
Utkarsh Jain	**1RV13IS059**	

ACKNOWLEDGMENT

The project is the result of the encouragement of many people who helped in shaping it and provided feedback, direction and valuable support. It is with hearty gratitude that we acknowledge their contributions to our project.

Firstly, we would thank our internal project guide **Prof S.G. Raghavendra Prasad**, Assistant Professor, Information Science & Engineering, RVCE for his immeasurable help and words of wisdom, and for never letting our commitment levels dip.

We would like to thank **Dr. N. K. Cauvery**, Head of Department, Information Science & Engineering, RVCE for her valuable suggestions and expert advice.

We also thank **Dr. K. N. Subramanya**, Principal, RVCE who has been inspirational and always encouraging us to come up with new ideas and implement them.

We deeply express our sincere gratitude to **Mr. Hari Babu Pasupuleti, Mr. Tulasi Dwarakanath V and Mr. Harikrishnan VS,** Center for Development of Advanced Computing, Bengaluru, for their able guidance, regular source of information and assistance with the hardware throughout this project.

Many thanks to the laboratory staff, **Mr. Raghavendra N and Mr. Dileep Kumar K** in particular for allowing us to use the facilities and helping when things did not go according to plan.

Last but not the least, we wish to thank our good friends and classmates, and family members, for their encouraging words and actions and their valuable suggestions towards the project.

Amith Raj S N	1RV13IS005
Anirudh Nagraj	1RV13IS008
Utkarsh Jain	1RV13IS059

ABSTRACT

Water is an abundant resource yet a scarce one. There are major causes for this scarcity Experts say that, on an average, about 15% of rain water is tapped through systems while wastage accounts for 30% of the total water supplied. Water leakage creates a risk of a multitude of health problems affected by dampness including asthma. Internal water leaks from pipes cause an untold amount of damage to the home including damage to walls and floors. The main focus of this project is on one of the key factors that lead to water scarcity and that is the water leakage.

In today's internet enabled world, connected devices lead to better solutions; this is the motivation for the project where using a flow sensor water leakage is detected and is communicated wirelessly using 6LoWPAN protocol. 6LoWPAN stands for IPV6 over Low power Personal Area Network. The main aim of the project is to use the underlying technologies surrounding 6LoWPAN and prevent wastage of water by detecting the leak by using a cost effective and an efficient system.

The design of the project involves the information sensed by the flow sensors, communicated wirelessly between the motes. The devices used here are C-Motes (designed by Center for Development of Advanced Computing), a flow sensor, a 5V supply and a Logic Level Converter (LLC). The leakage detected by the sensor is sent to the transmitter mote which communicates it to the coordinator mote where the data is uploaded to server and an email and a text message alert is sent to the user. A website is provided for the users to view the statistics and charts of the leakages.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

6LoWPAN	IPv6 over Low power Wireless Personal Area Network
MSP	Mixed-Signal Processor
IP	Internet Protocol
CCS	Code Composer Studio
IDE	Integrated Development Environment
GNU	GNU's Not Unix
GCC	GNU Compiler Collection
LLC	Logic Level Converter
GUI	Graphical User Interface
LED	Light Emitting Diode
DFD	Data Flow Diagram
CFD	Context Flow Diagram
HTML	Hypertext Markup Language
CSS	Cascaded Style Sheets
PHP	Hypertext Preprocessor
RAM	Random Access Memory
IEEE	Institute of Electrical and Electronics Engineers