Finding underground water leakage using K-nearest Neighbor approach based on network summarization

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Abstract:

Water distribution is generally installed through underground pipes. Monitoring the underground water pipelines is more difficult than monitoring the water pipelines located on the ground in open space. This situation will cause a permanent loss if there is a disturbance in the pipeline such as leakage. Leaks in pipes can be caused by several factors, such as the pipes age, improper installation, and natural disasters. Therefore, a solution is required to detect and to determine the location of the damage when there is a leak. so that we used water flow sensor . Water systems all over the world experience water losses. Leakage is the most common reason of water loss. This paper presents a study conducted for detection of water leaks, and identification of their respective locations in underground pipelines using Water flow sensor.

Keywords

Water distribution networks, leak localization, fault diagnosis,model-based methods,leakage detection, pipeline,water flow sensor.

1.Introduction

What is KNN?

An Algorithm (KNN) is a technology that uses moving taps as nodes in a network to create a signal network. KNN turns every participating tap into a wireless router or node, allowing taps approximately 100 to 300 meters of each other to connect and, in turn, create a network with a wide range. As taps fall out of the signal range and drop out of the network, other taps can join in, connecting flows to one another so that a signal Internet is created. It is estimated that the first systems that will integrate this technology are police and fire flows to communicate with each other for safety purposes.

Algorithm (KNN) play an important role in future tap-to-tap communication systems and related applications like self-organizing flow information systems (SOTIS), which are based on bPipecast transmission schemes. Data control

for KNNs has not been studied thoroughly so far - but this feature is extremely necessary for KNN applications and network performance. Due to the high mobility and the resulting highly dynamic network topology, Data control needs to be performed in a decentralized and self-organized way, locally in each KNN node.

2.Literature Review

Data occurs when too many sources are sending too much of data for network to handle. Data in a wireless sensor network can cause missing packets, low energy efficiency and long delay. A sensor node may have multiple sensors like light, temperature etc. with different transmission characteristics has different characteristics and requirements in terms of transmission rate, bandwidth, delay, and packet loss. Different types of data generated in heterogeneous wireless sensor networks have different priorities. In multi path wireless sensor networks, the data flow is forwarded in multiple paths to the sink node. It is very important to achieve weighted fairness for many WSN applications. In this paper they proposes a working based Data control for heterogeneous each application flow in multi path wireless sensor network. [1]

Heterogeneous applications could be assimilated within the same wireless sensor network with the aid of modern motes that have multiple sensor boards on a single radio board. Different types of data generated from such types of motes might have different transmission characteristics in terms of working, transmission rate, required bandwidth, tolerable packet loss, delay demands etc. Considering a sensor network consisting of such multi-purpose nodes, this paper proposes Prioritized Heterogeneous Flow-oriented Data Control Protocol (PHTCCP) which ensures efficient rate control for prioritized heterogeneous flow. This protocol uses intra-queue and inter-queue priorities for ensuring feasible transmission rates of heterogeneous data. It also guarantees efficient link utilization by using dynamic transmission rate adjustment. Detailed analysis and simulation results are presented along with the description of our protocol to demonstrate its effectiveness in handling prioritized heterogeneous flow in wireless sensor networks. [2]

This paper proposes a distributed and scalable algorithm that eliminates Data within a sensor network, and that ensures the fair delivery of packets to a central node, or base station. Fairness is achieved when equal numbers of packets are received from each node. Here they consider the scenario where we have many- to-one multihop routing. This algorithm exists in the transport layer of the traditional network stack model, and is designed to work with any MAC protocol in the data-link layer with minor modifications. This solution is scalable; each sensor mote requires state proportional to the number of its neighbors. Finally, they demonstrate the effectiveness of this solution with both simulations and actual implementation in UC Berkeley's sensor motes. But this solution is not applicable for many to many sensinging sensor network .in many to many sensing sensor network this solution will have more Data. [3]

In this paper we propose an efficient scheme to control multipath Data so that the sink can get working based throughput for heterogeneous data. They have used packet service ratio for detecting Data as well as performed hop-by-hop multipath Data control based on that metric. Finally, simulation results have demonstrated the effectiveness of their proposed approach**.** In this paper, they have presented an efficient multipath Data control mechanism for heterogeneous data originated from a

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single sensor node. But using this method they have some disadvantages for multiple node. Hence to avoid the problems fairness must be improve , analysis of the impact of other parameters on the proposed scheme's performance and implementing this scheme on a real sensor test-bed.[4]
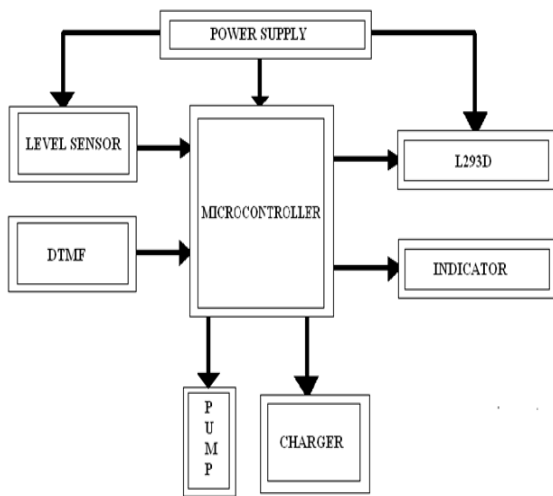
3.System architechture

Fig.3. system architechture

PIC16F876A IC Pin

PIC16F876A is the 28 pin IC, having 8bit inbuilt A/D converter with five input channels.Operating frequency is DC-20MHz, 2k bytes program memory and data memory is of 128bytes. In this PortA is used for the analog inputs, port B is used as output port for the LCD Display and on PortC there are 4 pins used for push-button and other 4 pins are used for the LED indication.

Power supply

Requirement of power supply is the main task, power supply of +5V and +12V is required for the circuit. The supply of +12V needed for the Relay connections. And 7805 which has given +5V to the

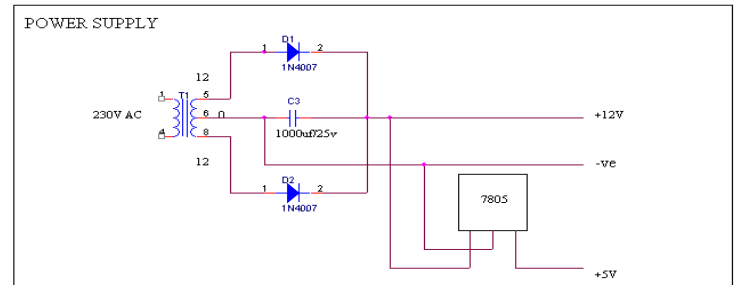circuit. There is requirement of the IN4007 zener diode and capacitor of value 1000uF/25V.

Fig 4.2 Power supply

Microcontroller:-

PIC16F876A is the 28 pin IC, having 8bit inbuilt A/D converter with five input channels.

4.Methodology

Water flow sensor

Water flow sensor consist of a plastic valve body,a water rotor,and a holl-effect sensor,when water flows through the rotor,it speed changes with different rate of flow.the holl-effect sensor outputs the corresponding pulse.

PUMP

To re circulate water in chamber AC pump will be utilized.

Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts.

Resistors

A resistor is a two-terminal electronic component designed to oppose an electric current by producing a voltage drop between its terminals in proportion to the current, that is, in accordance with Ohm's law:

Serial IEEE 802.15.1

Serial is a wireless technology standard for exchanging data over short distances (using short-wavelength radio transmissions in the ISM band from 2400–2480 MHz) from fixed and signal devices, creating personal area networks (PANs) with high levels of security. We are considering that our KNN operates through these modules.

Leakage Sensor

The sensor is basically a thermometer on a chip, designed by National Semiconductor. Instead of using mercury or another fluid, it relies on a property of diodes that causes the breakdown voltage of the diode to increase with temperature. This relationship is linear and predictable, making the sensor a very accurate temperature sensor, with a voltage output that is linearly proportional to temperature.

LCD Display

LCD is a type of display used in digital watches and many portable computers. LCD displays utilize to sheets of polarizing material with a liquid crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them. LCD technology has advanced very rapidly since its initial inception over a decade ago for use in lap top computers. Technical achievements has resulted in brighter displace, higher resolutions, reduce response times and cheaper manufacturing process.
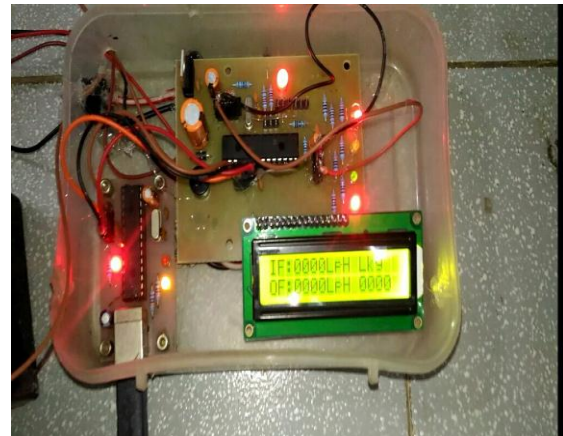
4.1 Software Methodology

What is dot net?

Dot net is a system which can be used in development of application

In this project we are using Visual basic .net (VB.net) 2008 platform.

Visual basic .net is a multipurposecomputer programming language from Microsoft that is suitable for most development needs.

What is framework?

It is a software which mask the functionality of the operating system and make the code to execute under its control. It provides the feature like platform independency, security, memory management.

In VB.net to design form1 we used various toolboxes like menu strip, group box, etc. Coding of each toolbox used is created at back end of the designed form.
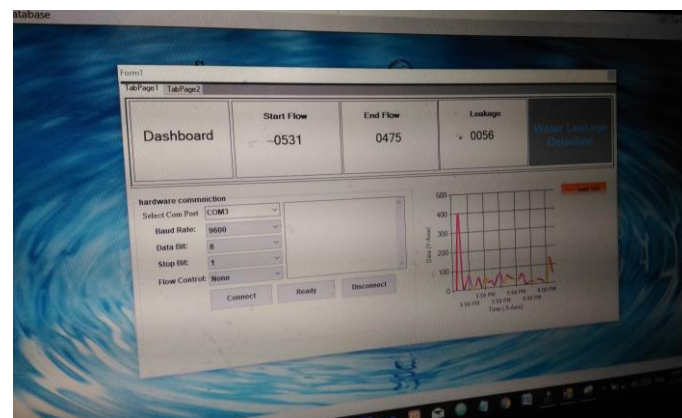
5.Conclusion and future scope

LEAKAGE FINDING is a hop-by-hop upstream Data control protocol for KNN.

(1) LEAKAGE FINDING achieves high link utilization and flexible fairness;

(2) LEAKAGE FINDING achieves small buffer size; therefore it can avoid/reduce packet loss and therefore improve energy-efficiency, and provide lower delay with the improvement in throughput capabilities for KNN..

Therefore LEAKAGE FINDING is energy efficient and provides lower delay. It is also feasible in terms of memory requirements considering the configurations of today's multi-purpose motes. Thus in future this work can be greatly useful on integrating end-to-end reliability mechanism and further improvement in fairness for LEAKAGE FINDING.

5.1Future scope

- Roof Gardens
- Lawns
- Agriculture Lands
- Home Gardens

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