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Various Pervasive Techniques in Fish Culture

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Abstract

Pervasive fish farming are gaining its importance and booming out in Today's world. Modernized fish farming has gained a lot of maturity and is attracting, increasing the interest in research community. There is a urgent need for modernized fish farms to increase the healthy fish survival rate in ponds. This review helps to provide a quick introduction of Pervasive Technologies, in addition we present most relevant research efforts made around the improvement of fish farms. We believe that this paper will pave the way for researchers to understand the behavior of all various pervasive fish culture techniques and importance of IOT based fish farming This review will help researchers to contribute for further relevant research works.

Keywords: pervasive, wireless sensor node, microcontroller, pillcam, gateway, base station, server

Introduction

Pervasive computing (Anis Ismail, Abd El Salam Al Hajjar 2011) is the growing trend in everyday objects so they can communicate information. The words pervasive and ubiquitous mean "existing everywhere". Calm technology, a technology that which informs but doesn't demand our focus or attention.Any time any where computing. Pervasive computing devices are completely connected and constantly available, when technology recedes into the background of our lives. The goal of researchers (Satyanarayanan 2001) working in pervasive computing is to create smart products that communicate unobtrusively. The products are connected to the Internet and the data they generate is

easily available. They share a vision of small, inexpensive, robust networked processing devices, distributed at all scales throughout everyday life and generally turned to distinctly common-place ends. These connections are fundamentally unlike those we associate with networks. Rather than using the network to connect computers that are being used directly by people, these appliances communicate over networks such that people do not directly monitor the communication between machines and programs. The majority of these communications will occur in an end-to-end structure that does not include human at any point. The major applications of pervasive computing are pill cam (a small bowl endoscopy) it is a tiny camera fitted with flashing LED light. It is designed to show the abnormalities in the body. Camera takes 18 images per second. We keep the sensors in various paths and connect it with the recorder. Another application is Interactive Flex Postures. Flex posture that communicates with the person automatically in a building and provide him information. This is a major application of pervasive computing. Body Area Networks is also an application of pervasive computing where sensors are implanted or wearable in the body for continuous monitoring of age old patients.

Need For Pervasive Fish Culture

In Aquaculture, the yields of fish or shrimp depend on the water characteristics of the aquaculture pond. In order to increase the fish survival rate and to grow healthier fish there is a need for pervasive fish culture. Remote fish farm monitoring through sensors is vital for healthier fish survival.

Classification of various pervasive techniques in fish farming

The following are various pervasive techniques in fish farming .These techniques uses various sensor nodes, microcontroller for interfacing.

A. Development of Wireless Sensor Node for Water Quality Monitoring in Intense Fish Culture.

Water Quality Monitoring plays a important role in fish farm management. This paper (Satyanarayanan 2001) consists of sensor nodes that include temperature sensor, pH sensor, and salinity sensor. The system uses ZigBee for transmission.

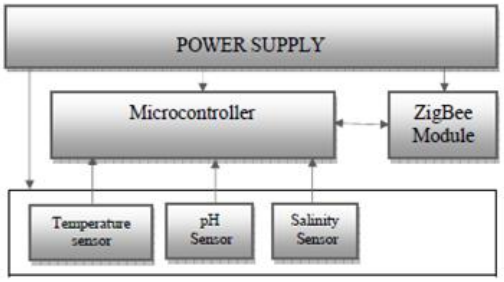

Fig 1: Architecture of Wireless Sensor Network

Figure 1 represents the Microcontroller used is LPC2148 and temperature sensor is LM35. The output of sensor converted to digital that easy connecting with microcontroller.

B.CPWS:An Efficient Routing Protocol For RGB Sensor –Based Fish Pond Monitoring System

Architecture uses RGB colour sensors (Nidal Nasser *et al* 2012) and provide a low cost real monitoring system to grow healthy wish and to avoid anomalies such as overflow or low water level and the death or disease of fish for unhealthy water.we monitor the water level and oxgen, pH, temperature and also introduced a protocol named "Clustering protocol for water sensor network" Features analysed are network energy consumption,network life time and number of data communications. This system uses RGB sensor to maintain the water quality.

Green color defines the healthy level of water. Blue color defines the low level of water and Green color defines the higher water level.

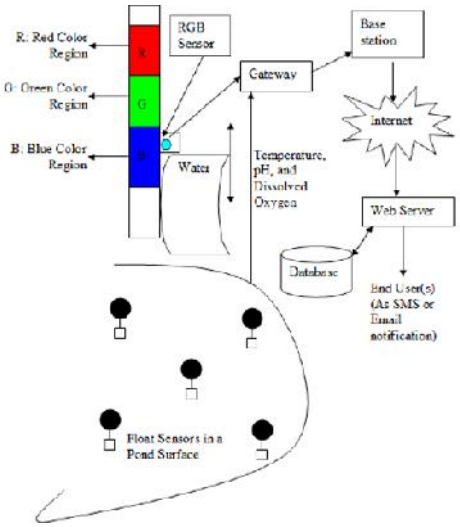

Fig 2: Architecture of Fish pond with float sensors and RGB sensors.

Figure 2 represents the Architecture of Fish pond with float sensors and RGB sensors .These sensors are communicated through the gateway and unnecessary redundant data can be removed.

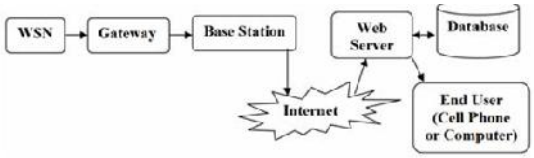

Fig 3: Architecture of the Entire Fish pond Monitoring System

Figure 3 represents the entire Architecture of fish pond monitoring system. It contains wireless sensors Communicated through the base stations through sensors. Data are collected in the database and monitored by the end-user through a computer or cell phone. Sensors are placed in the fishfarm and

they all together form a Wireless Sensor Network and they are communicated through the gateway via base station .Web server is communicated with the saved database and Data are accessed through online. Data are communicated through the end user through cellphone or computer.

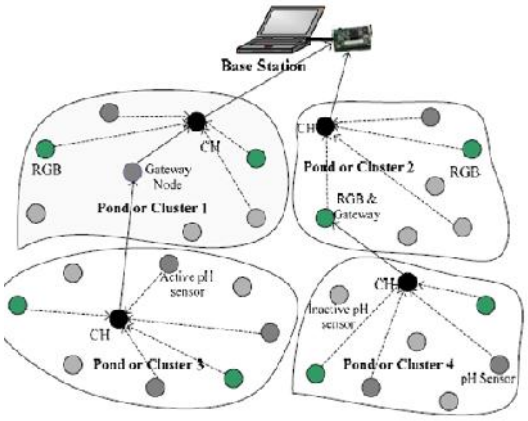

Fig 4: CPWS Routing Protocol

Figure4 represents the CPWS routing protocol .These protocol is designed in order to maintain the topology (Ayaz & Azween 2009) for various ponds. These sensor nodes form a clusters with cluster head and gateway nodes.

C.Application of Wireless Sensor Networks In Marine Environment Monitoring.

Marine environment monitoring (Xu *et al* 2014) is a vital problem during the past decade; various marine environment monitoring systems have been developed. Wireless Sensor Networks is a promising alternatives for monitoring marine environments since they have a number of advantages such as unmanned operation, easy deployment, real-time monitoring, and relatively low cost. This system uses, a common architecture of WSN-based oceanographic monitoring systems, a general architecture of an oceanographic sensor node, sensing parameters with sensors, and wireless communication technologies. This system contains sensor nodes, microcontroller and the data can be integrated and analyzed through data gathering and data collection techniques.

D. Wireless Sensor Network System to Monitor the fish farm

Two modules sensor and wireless module are used to monitor the fish farm. temperature and pH sensors are used (Kirankumar *et al* 2013). Asynchronic Wired Serial Polling Communication is used. Sending data bit by bit over a single wire without clock it synchronizes with the internal bard rate clock. Extra bits can be added such as start, stop, parity bard rate .Zigbee standard is used because

when comparing with Bluetooth, zigbee power consumption is lesser and battery life extendibility is one year.

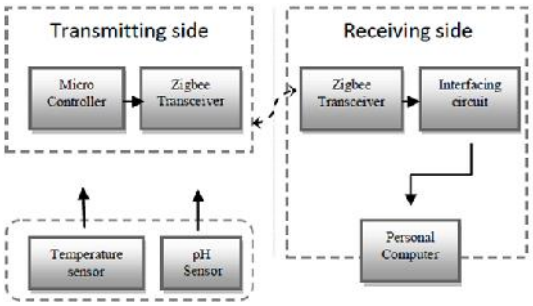

Fig 5: Transmitting and receiving side with sensors

Figure 5 represents the transmitting and receiving side with sensors fixed as floating in the pond. (Lopez *et al* 2010)These data are collected and stored in the personal computer.

E. Design and Deployment of Aqua Monitoring

System Using Wireless Sensor Networks.

In aquaculture fish, shrimp farms (Agrawal & Dharma 2003) the yield depends upon the water characteristics of aquaculture pond. For maximizing the yield of fish dissolved oxygen, temperature, salinity, turbidity, pH level, alkalinity and hardness, ammonia and nutrient levels should be monitored with sensors at regular intervals. These parameters can vary a lot depending on the external environmental conditions. Hence a timely analysis of these parameters are noted. This system consists of transmitter and receiver stations, GSM module for communication. The result is viewed through the mobile phones. This system is very helpful for shrimp farmers.

Inference

Due to the increase in healthy fish survival pervasive fish farming is mandatory. Temperature Sensor, Liquid Level Sensor, pH sensor, Dissolved Oxygen sensors are used. Microcontroller is used to collect and integrate data from the sensors. Database is maintained to store the data. They are communicated through the base stations and the sensors values are collected at regular intervals. They are monitored for the healthy fish survivals abnormalities are easily identified and necessary steps are taken to avoid the casuality of fishes.

Conclusion

In this paper, various pervasive techniques for intense fish farming have been reviewed (Xu *et al* 2014). The pros and cons of each method have been analyzed. We also have discussed the need for pervasive fish farming and the real time implementation of sensors are analyzed. In future using sensors an efficient remote live monitoring systems can be implemented. We believe that the need for pervasive fish farming is important.

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