August 2025 Top 10 Read Article for Wireless & Mobile Networks

International Journal of Wireless & Mobile Networks (IJWMN) - ERA, WJCI Indexed

ISSN: 0975-3834 [Online] ; 0975-4679 [Print]

https://airccse.org/journal/ijwmn.html

Citations, h-index, i10-index

Citations 6036 h-index 37 i10-index 146

A Wireless Sensor Network Air Pollution Monitoring System

Kavi K. Khedo, Rajiv Perseedoss mand Avinash Mungur

Department of Computer Science and Engineering, University of Mauritius, Reduit, Mauritius

ABSTRACT

Sensor networks are currently an active research area mainly due to the potential of their applications. In this paper we investigate the use of Wireless Sensor Networks (WSN) for air pollution monitoring in Mauritius. With the fast growing industrial activities on the island, the problem of air pollution is becoming a major concern for the health of the population. We proposed an innovative system named Wireless Sensor Network Air Pollution Monitoring System (WAPMS) to monitor air pollution in Mauritius through the use of wireless sensors deployed in huge numbers around the island. The proposed system makes use of an Air Quality Index (AQI) which is presently not available in Mauritius. In order to improve the efficiency of WAPMS, we have designed and implemented a new data aggregation algorithm named Recursive Converging Quartiles (RCQ). The algorithm is used to merge data to eliminate duplicates, filter out invalid readings and summarise them into a simpler form which significantly reduce the amount of data to be transmitted to the sink and thus saving energy. For better power management we used a hierarchical routing protocol in WAPMS and caused the motes to sleep during idle time.

KEYWORDS

Sensor Networks, Routing Protocol, Data Aggregation, Air Pollution Monitoring, Data Fusion

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APPLICATION OF WIRELESS SENSOR NETWORKS FOR GREENHOUSE PARAMETER CONTROL IN PRECISION AGRICULTURE

D.D.Chaudhary[1] , S.P.Nayse[2] , L.M.Waghmare[3]
1 Sinhgad Institute of Technology, Lonavala, Dist. Pune. MS. India.
2 Ph.D. Scholar, Sant Gadgebaba University of Amravati. MS. India
3 Shri Guru Govind Singh Institute of Technology, Nanded. MS. India.

ABSTRACT

The technological development in Wireless Sensor Networks made it possible to use in monitoring and control of greenhouse parameter in precision agriculture. In last decades there have been tremendous advancements in technology for agriculture and growth of final yield. Due to uneven natural distribution of rain water it is very crucial for farmers to monitor and control the equal distribution of water to all crops in the whole farm or as per the requirement of the crop. There is no ideal irrigation method available which may be suitable for all weather conditions, soil structure and variety of crops cultures. Green house technology may be the best solution for this solution. All the parameters of greenhouse require a detailed analysis in order to choose the correct method. It is observed that farmers have to bear huge financial loss because of wrong prediction of weather and incorrect irrigation method to crops. In this contest with the evolution in wireless sensor technologies and miniaturized sensor devices, it is possible to uses them for automatic environment monitoring and controlling the parameters of greenhouse, for Precision Agriculture (PA) application. In this paper, we have proposed and analyse the use of Programmable System on Chip Technology (PSoC) as a part of Wireless Sensor Networks (WSN) to monitor and control various parameter of green house.

KEYWORDS

Greenhouse, Precision Agriculture, Programmable system on chip, Wireless sensor networks

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ANALYSIS OF CELL PHONE USAGE USING CORRELATION TECHNIQUES

DR. T S R M1, D. SIVA RAMA K 2

1Professor,Shri Vishnu Engg. College for Women,Bhimavaram. West Godavari dist,A.P,India
2Asst. professor,Swarnandhra Institute of Engg. & Tech.,Narsapuram. West Godavari dist,A.P,India

ABSTRACT

The present paper is a sample survey analysis, examined based on correlation techniques. The usage of mobile phones is clearly almost un-avoidable these days and as such the authors have made a systematic survey through a well prepared questionnaire on making use of mobile phones to the maximum extent. These samples are various economical groups across a population of over one-lakh people. The results are scientifically categorized and interpreted to match the ground reality.

KEYWORDS

Correlation coefficient, Coefficient of Determination, Probable Error, Standard Error of Correlation coefficient.

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PRACTICAL PARTIAL DECODE AND FORWARD ENCODING SCHEME FOR RELAY CHANNEL

Zouhair Al-qudah

Communication Engineering Department, Al-Hussein bin Talal University, Ma'an, Jordan.

ABSTRACT

In this paper, a source-destination pair, which is augmented by a half-duplex relay, is considered. Two practical partial decode and forward encoding schemes are proposed. In these transmission schemes, the relay may decode the source's signal either partially or completely. In each encoding technique, two- phase transmission scheme is developed in which the relay can partially listen to the source in the first phase until it can generate the source's message and then, in the second phase, forward it to its destination. By employing these transmission phases, the achievable rates are obtained . Rigorous numerical examples are presented to i) show the value of power allocation between the source and the relay, and ii) optimize the length of the listening phase.

KEYWORDS

Relay Channel, Power Allocation, Partial Decode and Forward.

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IOT-BASED ACTIVITY RECOGNITION WITH MACHINE LEARNING FROMSMARTWATCH

Nassim Mozaffaric, Javad Rezazadeha,c, Reza Farahbakhshb, John Ayoadea

aKent Institute Australia, Sydney, Australia
bInstitut Mines-Te´le´com, Te´le´com SudParis
cIslamic Azad University, North Tehran Branch

ABSTRACT

Human activity recognition(HAR) with wearable Internet of Things (IoT) sensors can be beneficial for the elderly and patients monitoring. Smartwatches are the most accessible IoT devices that play an important role in human activity monitoring. The structure of an activity recognition system involves a platform that holds wearable sensors. Under the background, many platforms such as distributed sensors and smartphones and the combination of them have been investigated but platforms are still one of the main research challenges. Smartwatches can be more comfortable for the elderly and patients, therefore our research is focused on a smartwatch as an emerging IoT platform and machine learning method. The smartwatch attached to arm as the main position then was compared to other positions. We considered machine learning methods to present the smartwatch as a reliable platform in order to recognize activities, also we considered k-nearest neighbor and decision tree as two popular machine learning methods for activity recognition. We evaluated the performance with the confusion matrix and then we used accuracy and f1-score metrics for the result of our experiment. The metrics show accuracy and f1-score almost 99% as the performance of smartwatch on arm position.

KEYWORDS

Activity Recognition, SmartWatch, Machine Learning

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BROWSER GAMES FOR ONLINE COMMUNITIES

Juha-Matti Vanhatupa

Department of Software Systems, Tampere University of Technology, Tampere, Finland

ABSTRACT

Games played directly inside the web browser have many benefits. Browser games do not need software installation. Furthermore since the web has become the ultimate collaboration environment, the games are available for numerous players that can play in collaborative fashion. Through history online communities have birth alongside with browser games. Nowadays online communities have achieved massive user numbers and those can be important part of the browser game itself. This article targets at analyzing and categorizing of browser games. We also discuss financial opportunities relating to browser games and technologies used in those.

KEYWORDS

Browser Games, Game Analysis, Online Communities

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IMPLEMENTATION OF APPLICATION FOR HUGE DATA FILE TRANSFER

Taner Arsan, Fatih Günay and Elif Kaya

Department of Computer Engineering, Kadir Has University, Istanbul, Turkey

ABSTRACT

Nowadays big data transfers make people's life difficult. During the big data transfer, people waste so much time. Big data pool grows everyday by sharing data. People prefer to keep their backups at the cloud systems rather than their computers. Furthermore considering the safety of cloud systems, people prefer to keep their data at the cloud systems instead of their computers. When backups getting too much size, their data transfer becomes nearly impossible. It is obligated to transfer data with various algorithms for moving data from one place to another. These algorithms constituted for transferring data faster and safer. In this Project, an application has been developed to transfer of the huge files. Test results show its efficiency and success.

KEYWORDS

Network Protocols, Resource Management in Networks, Internet and Web Applications, Network Based Applications.

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COMPARING VARIOUS CHANNEL ESTIMATION TECHNIQUES FOR OFDM SYSTEMS USING MATLAB

Raghad K. Mohammed

Department of Basic Sciences, College of Dentistry University of Baghdad, Baghdad, Iraq

ABSTRACT

This paper compares the performance of various channel estimation techniques for OFDM systems over quasi-static channels using MATLab. It compares the performance of five channel estimation techniques, these are: decision directed (DD), linear interpolation, second-order interpolation, discrete Fourier transform (DFT) interpolation, minimum mean square error (MMSE) interpolation. The performance is evaluated in terms of two widely-used performance measures, namely, bit-error rate (BER) and the mean square error (MSE) for different levels of signal-to-noise ratio (SNR). The OFDM model is explained and implemented using MATLab to run different simulations. The simulation results demonstrate that the DD channel estimation provides the lowest BER and MSE as compared to interpolation techniques, at the cost of extra processing delay and comparatively sensitive to channel variations between OFDM symbols. Also, the MMSE interpolation outperforms all other interpolation techniques.

KEYWORDS

OFDM, pilot-based channel estimation, pilot allocation, direct decision, interpolation channel estimation, LS, MMSE, MATLab

For More Details : https://aircconline.com/ijwmn/V11N3/11319ijwmn02.pdf

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A MODIFIED IEEE 802.15.6 MAC SCHEME TO ENHANCE PERFORMANCE OF WIRELESS BODY AREA NETWORKS IN E-HEALTH APPLICATIONS

Md. Abubakar Siddik1 , Most. AnjuAra Hasi1, JakiaAkter Nitu1, Sumonto Sarker1, Nasrin Sultana1 and Emarn Ali2

1Department of Electronics and Communication Engineering, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh
2Department of Computer Science and Engineering, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh

ABSTRACT

The recently released IEEE 802.15.6 standard specifies several physical (PHY) layers and medium access control (MAC) layer protocols for variety of medical and non-medical applications of Wireless Body Area Networks (WBAN). Themedical applications of WBAN hasseveral obligatory requirements and constrains viz. high reliability, strict delaydeadlines and low power consumption.The standard IEEE 802.15.6 MAC scheme is not able to fulfil the all requirements of medical applications of WBAN. To address this issue we propose anIEEE 802.15.6-based MAC schemethat is the modification of superframe structure, user priorities and access mechanism of standard IEEE 802.15.6 MAC scheme. The proposed superframe has three access phases: random access phases (RAP), manage access phases (MAP) and contention access phase (CAP). The proposed four user priorities nodes access the channel during RAP using CAMA/CA mechanism with a large value of contention window. The proposed MAC scheme uses RTS/CTS access mechanism instead of basic access mechanism to mitigate the effect of hidden and expose terminal problem. Moreover, we develop an analytical model to evaluate the performance of proposed MAC scheme and solve the analytical model using Maple. The results show that the modified IEEE802.15.6 MAC scheme achieve the better performance in terms of reliability, throughput, average access delay, energy consumption, channel utilization and fairness compared to standard IEEE 802.15.6 MAC scheme in Ehealth applications.

KEYWORDS

Analytical model, CSMA/CA, IEEE 802.15.6, MAC Parameters,Markov chain, Maple, WBAN

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SIMULATION AND VERIFICATION TWO YAGI-UDI AND S-BAND SATELLITE DISH GROUND STATION ANTENNAS FOR LEO NANOSATELLITES COMMUNICATIONS

Vahid Rastinasab And Victor Hu

[1]Department of Electrical and Information, BIT, Beijing, China
[2]Department of Electrical and Information, BIT, Beijing, China

ABSTRACT

Ground station antennas are a part of TTC system, generally, Yagi-Udi antennas and Parabola dish antenna are using in Earth segment to communicate with LEO small satellites, this paper uniquely presents the three huge antennas of a ground station which are communicating with some microsatellites with view window above Beijing, China. The ground station contains two Yagi-Udi antennas for VHF/UHF and an S-band dish antenna for reception of payloads data. For verification feasibility of the antennas, simulations have been accomplished according to the antennas requirements. Eventually, the simulations assisted to recognize the matched commercial ground station antennas based on comparison of the simulations with commercial antennas and the matched ones are chosen for the implementation on the ground station.

KEYWORDS

Amateur radio antenna, Telemetry and Tracking, Yagi-Udi antenna, parabolic dish antenna, ground station antennas

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