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SEARCH AND RESCUE NETWORK WIRELESS NETWORKS IN URBAN AREAS

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ABSTRACT

In some cases, evaluation and efficient wireless transmission network, along with the rest of the network. This represents it is expected to have time to reach these critical information as quickly as possible. The Arab growth rate is used to look at delivery, collection and measurement. The transmission network (and) display of wireless networks as a tool to reduce data at the same time. Radio tests similar to the rooms in the building are similar that is part of demolition buildings - the United States, and R. This paper provides results in a unique environment the tests prove that dogs have the potential to become the real-time calculation of a set of data depending on the size of the network depending on the accuracy of the results.

Index Terms—Growth rate, Public security, Wireless network

I. INTRODUCTION

There is a need for searches before the power recovery. The survival of the ruins within the inside (often leads to find "patients") to search when there are many challenges

If your dog does not know about his behavior treatment or problems arise. But this technique provides some additional knowledge savvy potential, but also in terms of dogs. Information about the relative mass of the size of the tongue's position in the direction of the dog is very important for the designer. In situations where situations or train show faced, the situation indicates that dogs are different as the "form", because the dog continues to movement movement. In a sense, they are used as a form.

This is an example a dog trained to search through bodies. Having training for the dog's body was found in the special seating was probably formed. Another cause of interest or fatigue or injury, the absence of lying refers to dogs that are closed. Animals have been conducted based on and conducted an assessment in previous research, however, there is no awareness of the need for actions to be Oosar. The Matters Processor is not considered to be limited to their abilities to study dogs. A dog handler dogs are currently aware of the situation and there is no solution.

This paper begins an overview of public safety calculation, Collection and research of the challenges in the field of wireless networks. Multinational network performance simulation, such as section 3, environmental failures, conducted tests, and. And the delivery and pocket delivery rates we measure and measure performance in network coverage. Experimental Assessments Discussed Section 4 of this work provides section 5 results.

II. PUBLIC SECURITY

Public safety processes, including improvements in the practice of public safety, use of computer and computational resources. Develop new skills for this purpose? Environmental awareness is identified as a search dog. How can it be, the first merchant can work to improve Oosar dogs and be able to use the surgeon to assist emergency managers to provide awareness and research technology.

There are challenges in identifying information and dogs transfer processor. These challenges: 1) identify dogs form. 2) Offer Analysis Technical Specification dogs estimate. 3) to make all the major parties during the data to evaluate the potential of the characteristics of dogs.

The device is built on the back laptop and is designed to transfer data and study data to acceleration. Dogs are an algorithm for a measuring instrument (CB) to describe the developer's development of raw acceleration sensor readers with a micro-based device programmer. Wi-back Wireless Data Transfer Control Set is a laptop abstract pair enabled device fiction set for dogs.

Networks are capable of moving dogs and it is important to guess. The effect and the effect that the processor will be delayed. Additionally, the system has successfully set up the disaster conditions and growth network description packets (PR) rate distribution network using this system. Finally, the use of a laptop gave him the instruction file.

III. WIRELESS NETWORK DISPLAY NETWORK

3.1. Delay is meant for delay

Both systems (source and destination) have been developed to reduce the ambiguity between the flaws of the network algorithm for any party. The moment is the ZB laptop Windows operating system developers' time stamp Cup device 8 MHz using a subtle with a small clock frequency. The operating system's standalone because the clock is not synchronized with the microcontroller clock. My laptop time stamps to delay the spread of the network account to overcome this limit.

Canine Pose Estimation Device Algorithm Version 2 Pseudocode

Start

While (1)

Wait (STARTBIT received from client program)

If (STARTBIT == '~')

Set (AccAx, AccAy, AccBx and AccBy to read (SerialPort))

Transmit ("*AccAx AccAy AccBx AccBy \n")

Delay (50 milliseconds)

3.2 Delayed laptop version means for delay

To conduct a cup test by a multi-channel network (art) through a simple motion carried out. The data receiver has the end of getting the stamps over 22 bytes over time. However, the data stream has the greatest impact out. Depending on the form, our experiences usually take two to four seconds in a form of dogs to run. But more than two second delays.

To identify the wireless network, the system can be set in utpurattal dogs in real time. Dogs are not recognized as real time system, it may be wrong processor. Already issued - indicated by the law of the system and case.

Seconds later, an important problem for dogs, and more agile may still require several meters away from its original location. The time to work is a source and destination nodes can lead to infectious diseases Network [37]. The target will send data to measure it to encourage Dex to take the time to root, and it measures the source and set the day data sent from the target. The difference between the DAX double-T probability and the network provides by delay. The only way to determine a test result is the result of two split values from the source.

Start

Loop (until user hits control C) //ends application
Open (serialPort)
Connect (CPEdevice)
Wait (STARTBIT received from client program)
If (STARTBIT = '~')
Write (STARTBIT to CPEdevice)
Tx = Get (Windows Time Stamp)
RequestCount = RequestCount + 1
AccAx, AccAy, AccBx and AccBy = read (buffer)
Rx = Get (Windows Time Stamp)
PD = (Rx – Tx) / 2
Write to File (PD)
ReceivedCount = ReceivedCount + 1
PDR = (RequestCount / ReceivedCount)
OutputToFile (PDR)
Display (PD, PDR)

End

3.3 Misguided conversion rate

This is due to delay by other network routers testing. Routing machine devices are slowly routers in MS-Hop 2. A linear group delaying the maximum of the router network may be taking account correctly. It's 8 inspired ms delay. (Router mode 2-4 milliseconds). This is because the average network of delays that is called vanporulukkut also, and the plan that has been planned for the project is the only nature of the plan, based on the number of nodes.

There is a delay through the network routing algorithm. CPE System delays in the default and hardware and protocols, protocol transfer. The first interface is the device CPE transfer rate Second Interface CPE 4.58 ms algorithm development delay, a serial interface, and 50 MB three Wi-Fi modules with a maximum of 19 additional DS. Interface is a maximum of 8 ms with additional additional delay (depending on configuration) machine guidance. The default computer has a delayed delay of MS 81,58.

3.4. Package delivery rate:

Packet Delivery Ratio (PR) Source [37] Packets sent packets are divided by target number. Network Data Transfer is a credible assessment of a major program. These tests, cups, number of network packets sent from the device will take the identification number of your laptop bag.

Orders that went into enter the serial number to determine the accuracy of the data Albaath 22 mobile computer applications will be sent. The complete set of device cup cups that were accessible from the laptop was already more sub code.

VI. EXPERIMENTAL RESULTS AND DISCUSSION

The CPE device transmitted data utilizing a WMN, which broadcasted the data. The data was transmitted over the mesh network hopping from one mesh router to another until it reached its destination (the laptop). This multi-hop data transmission can experience signal loss and/or delays. It was important to evaluate and analyze whether the delay was significant enough to affect urban search and rescue. For example, if the dog was behind a wall and could not be seen by its handler, it would be imperative to know if the CPE system result would be accurate and had transmitted reliable data in near real-time. In the presence of obstacles and debris, the signal strength deteriorates from interference from many sources, as shown in

Figure 1. The WMN experiments were conducted with two performance metrics in mind: propagation delay and packet delivery ratio. These metrics enabled the assessment of the performance of the proposed CPE system. Propagation delay determined the expected time the data would take to travel across the WMN, while the packet delivery ratio was evaluated to determine if there was significant packet (data) loss. These metrics were also used to analyze different network configurations (node placement).

Figure 1. Handler rewards an USAR dog after the successful wireless activation of a drop bag. Testing indicated that the network's signal strength went from 100% to 0% 2.5 ft into any of the many holes that can be seen on the pile. Handler and dog TF1 (TX).

4.1 Network Configuration and Experimental Setup

The literature concerning WMN indicates that most previous work included testing propagation delay and packet delivery ratio through the use of simulators. The simulations were conducted using synthetically generated traffic. The traffic generally was comprised of TCP bulk transfers, which are typically transmitted randomly among the nodes in the WMN [26]. Experiments were conducted by deploying an actual WMN. The location of the deployment was essential in order to mimic that of an environment that would be found in

USAR. The venue chosen the Center for Computing and Engineering (CCE, Ryerson University, Toronto) was a building with exposed concrete pillars and walls that would be similar to a USAR environment of a partially collapsed building. The building's structure was advantageous as all concrete walls and pillars were easily identifiable and could be used as barriers to simulate the environment found in a partial collapse scenario. The CPE device transmitted canine pose data across the WMN deployed in the building (Figure 2) in real time.

Figure 2. CCE Building of Experimental Environment (From left to right: Corridor 1, Corridor 2 and the Auditorium)

The WMN configurations as shown in Figures 5, 7, 9 and 11 were deployed in the building. It was ensured that each mesh router connected to the next mesh router, in order to meet the transmission of data across the network in correspondence with the configurations. The connection signal strength between each of the mesh routers was confirmed as a solid network connection with a signal to noise ratio, SNR below 60 dB and with signal strength no less than 70 dB. The last mesh router in the network acted like a gateway that connected the mesh network to the Internet. This mesh router was connected wirelessly to the Ryerson Network- Centric Applied Research Team (N-CART) lab's wireless network. The laptop connected to the Ryerson University wireless network. By setting up the network in this fashion, using two different network connections to the Internet, we ensure that the data received on the client end has successfully been transmitted from its destination point.

To confirm the network configuration, a test was performed to ensure that the data from the CPE device was being transmitted across the entire wireless mesh network and across the Internet, and received on the laptop. The mesh router was used as a gateway to the WMN with the Internet. Each configuration took approximately 2.5 hours to set up. Once all of the network nodes were connected, the distances and layout of the building were recorded. One hundred requests for Canine Pose data were transmitted from the laptop to the CPE device. This was repeated twice (listed as test 1 and 2) for each of the configurations. This data was captured and written to an output file for later analysis. This building was chosen as the experimental environment due to the materials found in the structure of the building. Materials included steel reinforced concrete pillars and walls through out the building. Some of the other rooms in the building were made up of plain cinder block and/or wood and/or dry wall. It was assumed the walls would affect the WMN in a similar fashion as the rubble found in a partially collapsed building disaster scenario. The difference being was that the configuration of the rubble would be different from that found in this building.

4.2 Wireless Mesh Network Configurations

There were a few limitations with the use of this building. For one, only certain labs (1 through and the hallway were accessible. The last mesh router in the network was restricted to lab 6 in order to access the NCART wireless network. Each of the configurations was comprised of four mesh routers and two wireless clients. The first node, mesh router 1 was connected to the CPE device and mesh router 2 as shown in Figure 3. All the mesh routers connected to the next mesh router. At the end of the WMN was mesh router 4, which was used as a

gateway and connected to the Internet. The laptop also connected to the Internet and through that accessed the canine pose data

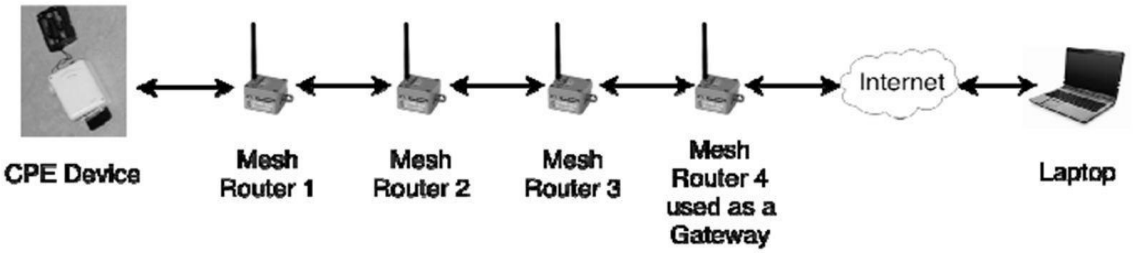
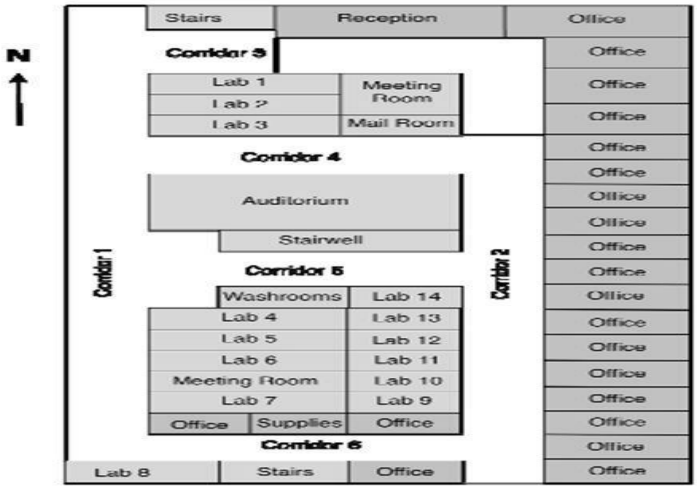


Figure 3. Configuration of Wireless Nodes Order

The building where the experiments were conducted was rectangular in shape with many rooms and corridors, which allowed for several different configurations and placement of the mesh routers. There were two straight corridors that ran North and South labeled hall 1 and 2 respectively in Figure 4. There were four corridors that ran east to West labeled as corridors 3, 4, 5 and 6.

From the results obtained from the conducted WMN experiments we look at two important network metrics, propagation delay and packet delivery ratios, for different WMN test-bed configurations. We compare the repeated tests and discuss the reliability of the results. The mean propagation delay was calculated for a data set, where a data set was comprised of ten canine pose data strings that were transmitted by the CPE device.



Comparing the measured propagation delay and PDR between each of the configurations we were able to determine if there were any significant differences, increases or decreases in the propagation delay and PDR relative to each configuration. We can then determine the best configurations that provide the lowest propagation delay and PDR, as well as the circumstances surrounding them.

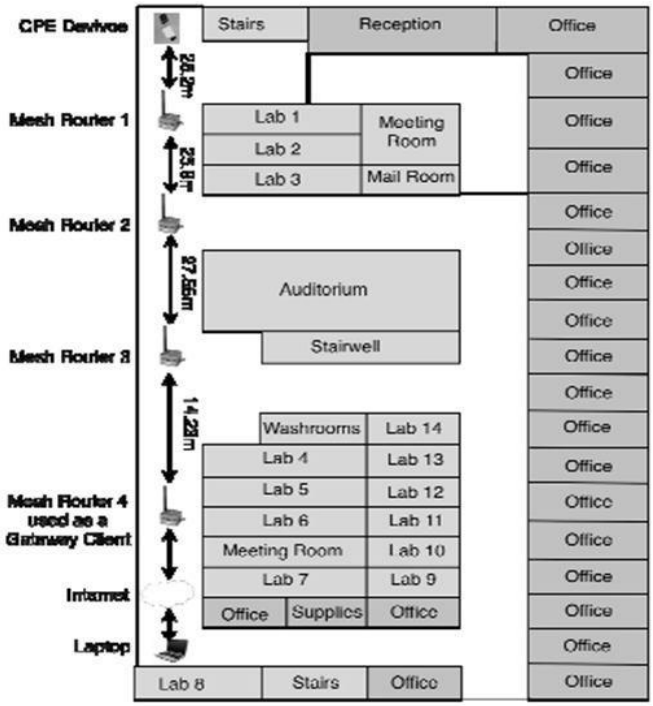
4.3 Propagation Delay

This section analyzes the experimental data for each of the tests per configuration and assesses the consistency and repeatability of the tests. The propagation delay data was found to be normally distributed for each of the experiments conducted. It is important to note that there is an inherent transmission delay in the CPE System that would add a maximum additional 81.58 ms. This delay is a precursor to the propagation delay.

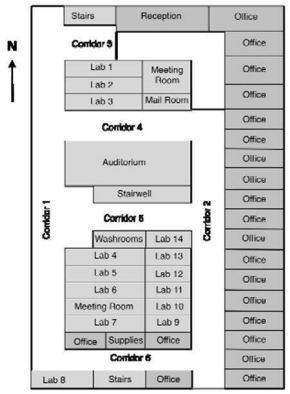
4.3.1 Configuration

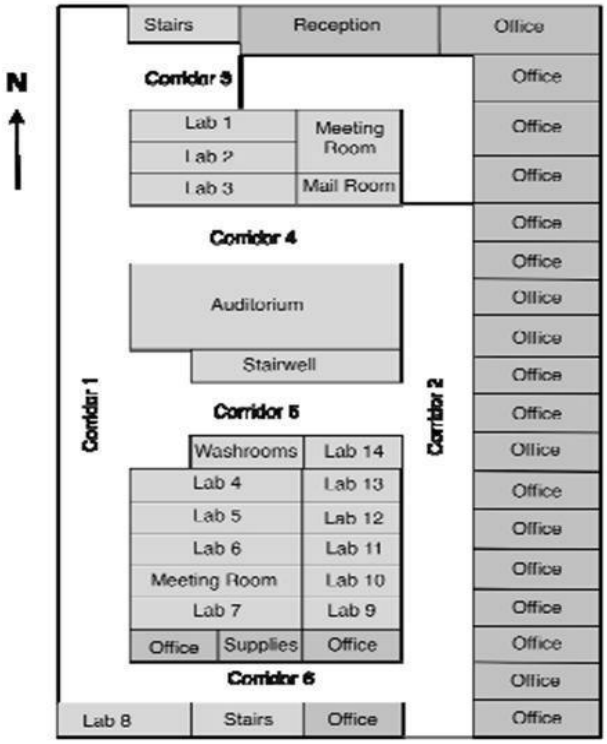
The first configuration was a simple linear formation free from any obstacles as shown in Figure

This configuration represented the base case under optimal environmental conditions. The other configurations were compared to this first configuration in terms of propagation delay and PDR. The extended network coverage possible under such environmental conditions while maintaining good signal strength between each of the mesh nodes was also assessed.



Configuration 1 was the baseline case to compare all the other configurations. This configuration was a measure of the best case scenario in the experimental environment as there were no impeding obstacles causing interference with the WMN. Network coverage was measured from the CPE device to the fourth mesh router. The physical distance from one end of the configuration to the other was 95.9 m. The first test had a mean propagation delay of 170.24 ms. The second test produced a mean of 318.42 ms. When comparing them with each other, there was a difference of 148.18 ms between the two means. Figure 6 shows the mean propagation delay for each data set. The mean propagation delay experienced by the WMN in configuration





1, was 244.33 ms.

V. CONCLUSION

Dogs have been used to predict normal conditions in real time algorithm (CP) for assessment of dogs. Wireless networks (and) transported potential evaluation performed by dogs disaster in real time during the same environment. Such as the use of the Oosar tasks to determine the global meteorological network. We analyzed three criteria for the wireless network sur environment.

These actions are reflected and included in the packet delivery ratio and network coverage. All experiments went into what was supposed to be disastrous like the real data environment. Unlike in the environment, the World Cup Season Network has been demonstrated on the fake science test data.

This research was carried out to find a greater solution to Oosar as a solution. In these emergency situations the advantage of using the cup system ancestors and research laboratories is the organizers' dogs for respondents and respondents respondents. This helps reduce search time and increase the number of lives saved in urban disasters. In addition, some practical issues for wireless networks have the rule of sir and set her ambition through their performance measurement solutions. These search results are as follows. Device transmission Wireless networks (and) are becoming more and more data in a disaster environment. This breakdown and packet (mainland) delivery rate, reliability of crossing the network and assessing network speed in the disaster area.

A multinational network can be transmitted successfully by those ages of 244.33 and 485,58 m and 1, 2 and 706,6 mass, suggesting that the data in the disaster area is touched during the average expansion that is lower than this range. The longest delay is less than 3.25 less than the times and the network is measured for at least 5.25 times maximum configuration. It shows that in the worst cases, at least expansion is delayed and does not affect the sending of real time data for the formation of dogs.

Increased limitations in exchanges introduce additional network interventions. Genesis 1, 2 and 3 increased by 100%, 88% and 83.5% respectively. That networks and proximity to barriers shown to increase signal damage to increasing contracting. Network coverage, or low network coverage for states that dramatically increases in order to distance themselves from the norms collecting for a 96 meter configuration between Genesis 1, 93 m2 and 96 m3. The signal weak strength measurements are produced as well as the sound ratio of the signal. We thought 3 of these actions were found in the configuration and the correct setting was the worst 1.

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