International Journal of Advanced Research Methodology in Engineering & Technology, ISSN 2456-6446
Volume 2, Issue 2, March 2018

Adressing the un-reachability problem using greedy algorithm in WSN

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***Abstract*— The unreachability problem (i.e., message is not received by the receiver) that exists in the greedy routing algorithms has been studied for the wireless sensor networks. Some of the current research work cannot fully resolve the unreachability problem, while there exists other schemes that can guarantee the delivery of packets with the excessive consumption of control overheads. Moreover, the hop count reduction (HCR) scheme is employed as a short-cutting technique to reduce the routing hops by listening to the neighbor's traffic, while the intersection navigation (IN) mechanism initiates to obtain the best rolling direction for boundary traversal with the adoption of shortest path criterion. In order to maintain the network requirement of the propound RUT (Resource Utilization Time)scheme under the non-UDG(Unit Disk Graph) networks, the partial UDG construction (PUC) mechanism is proposed to transform the non-UDG into UDG setting for a portion of nodes that facilitate boundary traversal. These three schemes are integrated within the GAR protocol to further enhance the routing performance with reduced communication overhead. The proofs of correctness for the GAR scheme are also given in this paper.**
Keywords— Unreachability problem, GAR protocol, HCR scheme.

I. INTRODUCTION

The sensor nodes can sense various events very effectively. The sensor network contains very large number of these sensor nodes. These sensor nodes may be connected to each other inside a network by any network structure. Some of the sensor nodes act as routers and gateways to pass the message from one particular sensor node to another sensor node. In order to pass the data there will be high consumption of bandwidth, energy and even power.

Therefore we design this project in such a way that we can minimize these three negative issues . These issues can be overcome by alternatively putting the sensor nodes inactive state and active state. In this paper the sensor nodes are randomly distributed over a particular area and each sensor nodes have certain transmission area to cover. The first step is to detect the instant neighbors. The sensor nodes should have direct wireless communication between them. Then the sensor nodes should establish the particular roots through which they can communicate with the other sensor nodes via any router or gate way. In order to communicate we need to first create communication between two sensor nodes.

The sensor nodes will be awake for a very short period of time. Therefore there can be heavy traffic in the channel or in the particular transmission area. This project presents a special neighbor discovery scheme that can be used to reduce the traffic that is being caused by the sensor nodes. Another important issue in the sensor network is that the sensor nodes despite of being static can change due to the following situation.

1) Loss of local synchronization due to accu mulated clock drifts.

2) Disruption of wireless connectivity between adjacent nodes by a temporary event, such as a passing car or animal, a dust storm, rain or fog. When these events are over, the hidden nodes must be rediscovered.

3) The ongoing addition of new nodes, in so me networks to compensate for nodes which have ceased to function because their energy has been exhausted.

4) The increase in transmission power of som e nodes, in response to certainevents, such as detection of emergent situations.

After resolving the four issues the sensor nodes can be there in two states. One is the Init state and the second is the normal state. Now in this project a main idea is to discover the links during the normal operation, and this is referred to as continuous neighbor discovery.

II. Related Work

Elyes Ben Hamida et al [1] introduces a hello protocol with regular sleep intervals .A node discovers only a subset of the nodes present ,their proposed system finally categorizes the average no of nodes a node can spot as neighbor node .

Flak Hermann et al [2] proposed a two different approaches ,a non deterministic scheme that guarantees collision free packet exchange and another one with constant weight codes .These techniques also implement probability and permutations for calculations .

Reuven Cohen et el [3] introduced the use of sensors which employs a simple protocol so that it helps in continuous discovery of neighbor nodes in a network which is not synchronous.

Michael et al [4] proposed a protocol called the "Birthday Protocols " especially for Neighbor discovery in Ad hoc networks which involves low energy process while deployment .

Sreekanth et al [5] came out with a survey on Neighbour node discovery in an Asynchronous network using wireless medium .This proposed systems involves sensor nodes in order to detect the hidden nodes consuming lesser power and network overhead .

III. Proposed Methodoloy

Before you begin to format your paper, firstwrite and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you.

Finally,complete content and organizational editing before formatting. Please take note of the following items when proof reading spelling and grammar:

A. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

B. Units

- Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive."
- Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.
- Do not mix complete spellings and abbreviations of units: "Wb/m2" or "webers per square meter," not "webers/m2." Spell units when they appear in text: "...a few henries," not "...a few H."
- Use a zero before decimal points: "0.25," not ".25." Use "cm3," not "cc."

C. Equations

The equations are an exception to the prescribed specifications of this template. You will need to determine whether or not your equation should be typed using either the Times New Roman or the Symbol font (please no other font). To create multileveled equations, it may be necessary to treat the equation as a graphic and insert it into the text after your paper is styled.

Number equations consecutively. Equation numbers, within parentheses, are to position flush right, as in (1), using a right tab stop. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in

$$a + b = \gamma \qquad (1)$$

Note that the equation is centered using a center tab stop. Be sure that the symbols in your equation have been defined before or immediately following the equation. Use "(1)," not "Eq. (1)" or "equation (1)," except at the beginning of a sentence: "Equation (1) is ..."

D. Some Common Mistakes

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific

constants, is zero with subscript formatting, not a lowercase letter "o."

- In American English, commas, semi-/colons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an "inset," not an "insert." The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively."
- In your paper title, if the words "that uses" can accurately replace the word using, capitalize the "u"; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones "affect" and "effect," "complement" and "compliment," "discreet" and "discrete," "principal" and "principle."
- Do not confuse "imply" and "infer."
- The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the "et" in the Latin abbreviation "et al."
- The abbreviation "i.e." means "that is," and the abbreviation "e.g." means "for example."

An excellent style manual for science writers is [7].

While previous works (Existing system) address neighbor discovery and continuous neighbor discovery as similar tasks, to be performed by the same protocol, we claim that they should be addressed by different protocols for the following reasons:

• For neighbor discovery, an aggressive protocol, one which requires the sensor to stay in active mode and expend a lot of energy until detection is usually acceptable. In contrast, continuous neighbor discovery a much more energy efficient protocol is needed.

• Neighbor discovery is usually performed when the sensor has no clue about the structure of its immediate surroundings. In particular, the sensor cannot communicate with the gateway, and is therefore unable to perform any useful task. Hence, energy consumption in this state is less of an issue. It is more important to detect the immediate surroundings as quickly as possible in order to establish a path to the gateway and to contribute to the operation of the network. In contrast, continuous neighbor discovery is performed when the sensor is already operational, in which case minimizing energy consumption is crucial.

• When the sensor performs continuous neighbor discovery, it is already aware of most of its immediate neighbors. It can therefore perform continuous neighbor discovery together with these neighbors in order to consume less energy. In contrast, neighbor discovery is an individual task that must be executed by each sensor separately.

In this project, we distinguish between neighbor discovery during sensor network initialization and continuous neighbor discovery. We focus on the latter and view it as a joint task of all the nodes in every connected segment. Each sensor employs a simple protocol in a coordinate effort to reduce power consumption without increasing the time required to detect hidden sensors.

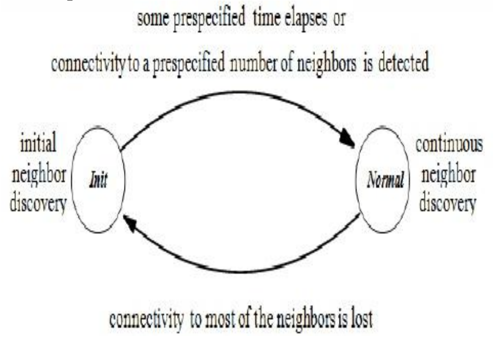
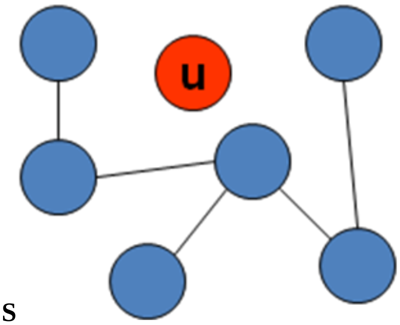


Fig 3.2 Continuous neighbor discovery vs. initial neighbor discovery in sensor networks

Figure 3.2 summarizes this idea. When node u is in the Init state, it performs initial neighbor discovery. After a certain time period, during which the node is expected, with high probability, to find most of its neighbors, the node moves to the Normal state, where continuous neighbor discovery is performed. A node in the Init state is also referred to in this paper as a hidden node and a node in the Normal state is referred to as a segment node.



Segment S

Fig 3.3 Segment with hidden nodes and links

The main idea behind the continuous neighbor discovery scheme we propose is that the task of finding a new node u is divided among all the nodes that can help v to detect u. These nodes are characterized as follows:
(a) They are also neighbors of u
(b) They belong to a connected segment of nodes that have already detected each other
(c) Node v also belongs to this segment.

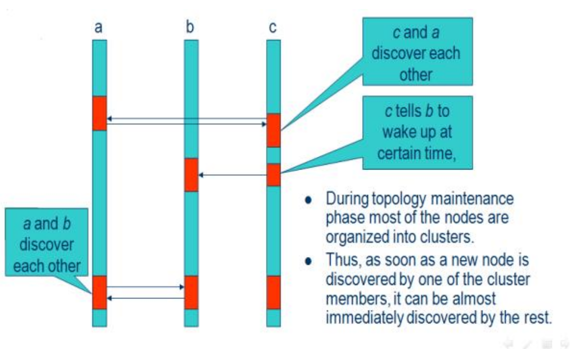


Fig 3.4 Efficient Continuous Neighbor Discovery Model

In this continuous neighbor algorithm, assigning HELLO message frequency to the nodes of the same segment. If a hidden node is discovered by one of its segment neighbors, it is discovered by all its other segment neighbors after a very short time. Hence, the discovery of a new neighbor is viewed as a joint effort of the whole segment.

IV. Experimental Results

The neighbour node discovery using greedy algorithm in WSN has four modules.

Module 1: **Client – Server**

Client – Server computing is distributed access. Server accepts requests for data from client and returns the result to the client. By separating data from the computation processing, the compute server's processing capabilities can be optimized. Often clients and servers communicate over a computer network on separate hardware, but both client and server may reside in the same system.

Module 2: **Detecting all hidden links inside a segment**

This scheme is invoked when a new node is discovered by one of the segment nodes. The discovering node issues a special SYNC message to all segment members, asking them to wake up and periodically broadcast a bunch of HELLO messages. This SYNC message is distributed over the already known wireless links of the segment. Thus, it is guaranteed to be received by every segment node. By having all the nodes wake up .almost at the same time. for a short period, we can ensure that every wireless link between the segment's members will be detected.

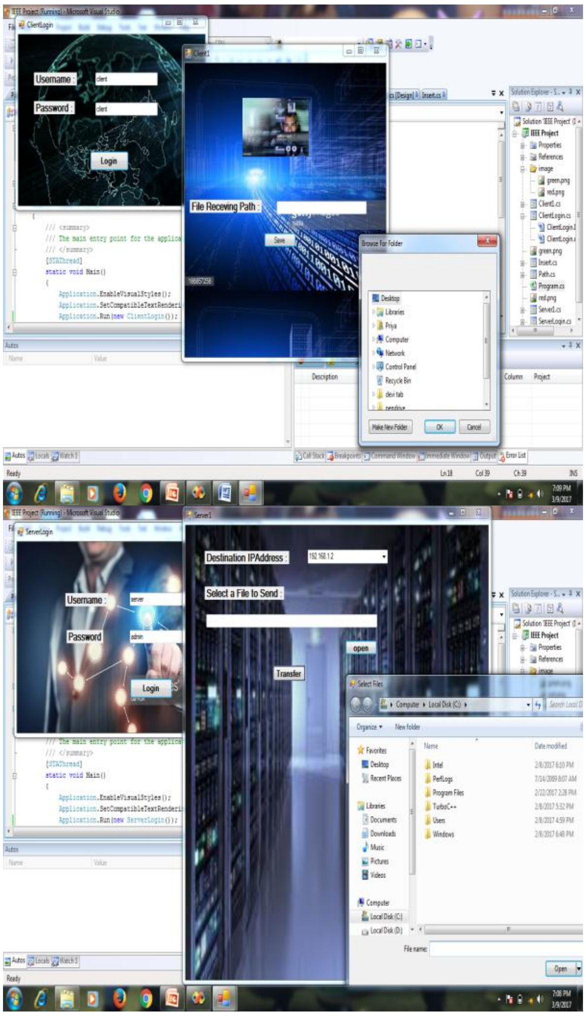
Module 3: **Detecting all hidden links outside a segment**

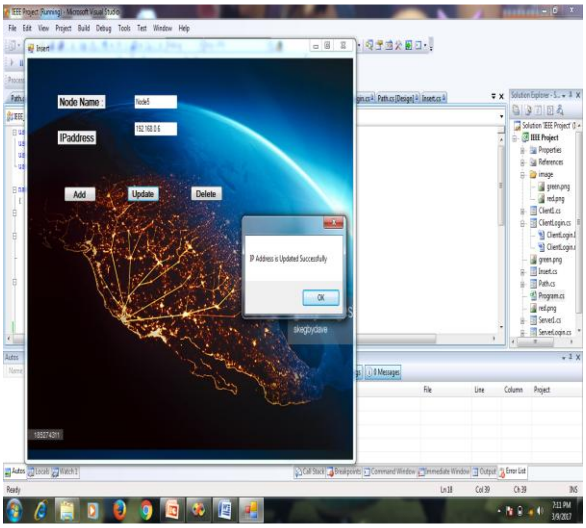
A random wake-up approach is used to minimize the possibility of repeating collisions between the HELLO messages of nodes in the same segment. Theoretically, another scheme may be used, where segment nodes coordinate their wake-up periods to prevent collisions and speed up the discovery of hidden nodes. Since the time period during which every node wakes up is very short, and the HELLO transmission time is even shorter, the probability that two neighboring nodes will be active at the same time.

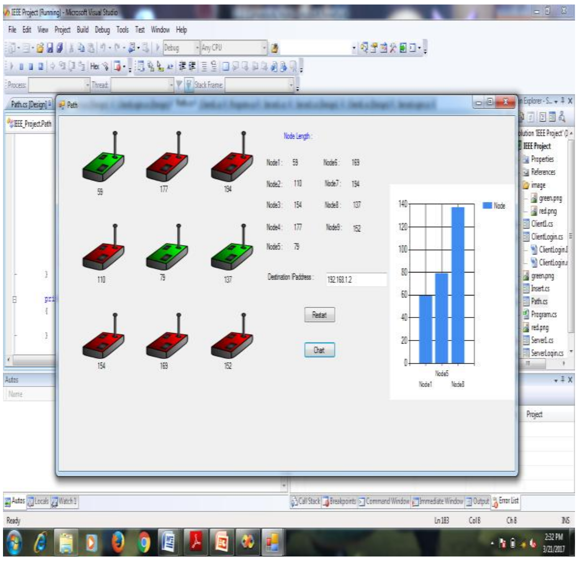
Module 4: **Neighbor Discovery Model**

Neighbor Discovery is studied for general ad-hoc wireless networks. A node decides randomly when to initiate the transmission of a HELLO message. If its message does not collide with another HELLO, the node is considered to be discovered. The goal is to determine the HELLO transmission frequency, and the duration of the neighbor discovery process.

V. SCREEN SHOTS







VI. CONCLUSION AND FUTURE WORK

We exhibit a new problem in wireless sensor networks, referred to as ongoing continuous neighbor discovery. We argue that continuous neighbor discovery is critical even if the sensor nodes are static. If the nodes in a connected segment work together on this task, hidden nodes are guaranteed to be detected within a certain probability P and a certain time period T, with reduced expended on the detection. We showed that our scheme works well if every node connected to a segment determine the in-segment degree of its possible hidden neighbors. We then presented a continuous neighbor discovery algorithm that determines the frequency with which every node enters the HELLO period. We simulated a sensor network to analyze our algorithms and showed that when the hidden nodes are uniformly distributed in the area.

We intend to validate the proposal in real world setup to assess the performance of the system by increasing number of nodes in large scale environment.

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