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RESEARCH ARTICLE

A Cryptography Inclusive Effective Handoff Model for Optimizing Handoff in WPAN

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Abstract— WPAN is restricted area network defined with energy limits and sensing limits. This network form is defined under controller devices. As the nodes moves outside the controller range, the handoff is performed. To optimize the communication and network integrity, it is required to minimize the communication loss during handoff. In this work, a secure and efficient handoff mechanism is provided. In first stage of this presented model, the cryptography authentication is performed to verify the node itself. To check this validity public key cryptography is applied. Once the node is verified, the node direction, speed, distance and load parameters are used to perform the handoff. The simulation results shows that the work has improved the network throughput and reduced the communication loss.

Keywords: WPAN, Security, Authentication, Key Based

I. INTRODUCTION

Wireless personal Area Network is the critical communication network defined in infrastructure driven private networks. It is generally implemented for specialized application areas such as hospitals, industries, home etc. The nodes in these networks are defined with small sensing range and energy specification. Because of these restrictions, the criticality of network increases. To provide the long range communication and to improve the strength of the communication, various controller devices are required to set over the network. The nodes within the controller range perform the communication within controller range. The nodes are also defined with limited memory and processing capability so that the decision about the handoff selection and routing decision can be performed. These network types generally have lesser communication as compared to other network forms but provide the reliable communication under infrastructure specifications. The constraint that controls the communication includes architectural specification, protocol restrictions and algorithmic approach adapted

for communication. The intelligent communication is here performed under the infrastructure specification and control. This network form includes three main communication constraints shown in figure 1.

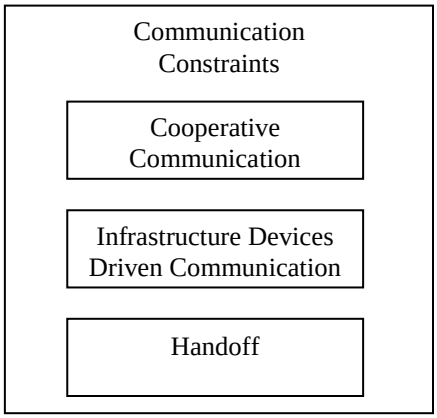

Figure 1 : WPAN Communication Constraints

A) Cooperative Communication

As the WPAN network is adhoc network defined in private area, the nodes are able to provide cooperative communication. The dense networks are appropriate for such kind of communication because of there is the requirement of other nodes of same type so that node adaptive data forwarding will be done. The cooperative communication does not require any extra infrastructure device so that the route generation and route optimization can be performed at any time instance. The cooperative communication is not restricted to any configuration or network form so that the communication can be applied to in more robust and scalable form. This network form also characterizes the constraints under area division so that the cost adaptive communication is performed. The design features of network do not reflect this communication type.

B) Infrastructure Device Integrated Communication

To cover up the sensing range limitations and energy restrictions, the infrastructure devices are placed over the network. This network form is defined under architectural constraints and restrictions so that the controlled communication will be performed. The controller devices are defined with accepted frequency range and form a structure. These infrastructure devices are specialized devices with more processing and memory capabilities. These nodes accept the data from range nodes and perform the communication with controller devices. The infrastructure devices also perform the aggregation of accepted range data so that more adaptive communication will be performed. This communication form provides the range adaptive communication so that the reliable and relatively acceptable communication is obtained from the work. The design feature adaptive and lost feature adaptive communication is provided by infrastructure driven communication.

C) Handoff

As the communication is controlled by controller devices and the nodes are mobile, the mobile nodes can move outside its controller range. As the switching of a node from one controller to other is done, the handoff is performed. Handoff can be either based on connection preserving method or connection switch method. In connection preserving method, the soft handoff is performed whereas in case of hard handoff, a new connection is established after breaking the previous connection.

In this present work, a secure and reliable communication is presented for WPAN network. The presented work model is based on the WPAN optimization at architecture level and constraint level. In this section, the WPAN network is explored along with different kind of communication. The communication categories are defined respective to relative characteristics. In section II, the work defined by earlier researchers is defined. In section III, the presented research methodology is explored. In section IV, the results obtained from the work are defined. In section V, the conclusion obtained from work is presented.

II. RELATED WORK

The presented work is defined the network communication under architectural constraints and reliability vector. The clustered switch handoff is here provided for restricted WPAN network. This network form is controlled under authentication mechanism using cryptographic approach and the soft handoff mechanism is provided to perform the reliable network communication. The work presented by earlier researchers is discussed in this section. Ammar A. Bathich[1] has defined a work on vertical handoff using WiFi and WiMax networks. Author provided the technological improvement in the network under seam less handover. Author presented the interference and noise affected communication in clustered network form. The work also evaluate the downlink and uplink formation to control the handoff over the network. Another work on handoff optimization was provided by Maximilien Mouton[2]. Author defined the work for vehicular area network and defined a range coverage analysis approach for optimizing the communication in the network. Author presented the mobility and speed driven communication to resolve the connectivity issues so that the reliable communication will be formed within network. Dawei Mu[3] has presented an analytical study and communication so that the network evaluation under multiple vectors will be done. Author optimized the vehicle network and provided the traffic load analysis so that the accurate communication in the network will be formed. SuYoung Lee[4] has provided a work on heterogenous network to utilize the network bandwidth and available communication resources so that the service driven communication will be formed. Author provided the WiMax network baed telecommunication under multiple estimation and resource allocation so that the effective communication over the network will be formed.

Do-Hyung Kim[5] has provided a work on infrastructure driven veritical handover under latency vector. Author optimized the communication under interfacing criteria so that the performance aspects of network will be obtained. Author provided the information gain to provide reliable communication under aspect estimation. Hongwei Liao[6] has provided the work on handoff optimization for vehicle area network. Author control the communication under broadcast communication with range parameters so that the latency reductive communication and packet loss reduction during communication will be obtained. Kuan-Lin-Chiu[7] provided the physical parameter based analysis approach for controlling the communication in wide area. Author provided the effective results in disconnected network and reduced the packet loss during communication. Bo Liu[8] has provided a work on heterogenous network to form vehicle handover over the network. This network form is defined under weighted communication form with seamless handover over the network. The network convergence architecture is here provided under analytical behavior so that the handover performance will be improved. Author performed the bandwidth analysis to provide the effective communication results. Hugues Silva[9] has provided a work on service driven architecture on cell network to provide the effective network coverage and to provide the handoff under the packet loss and latency observation. Author optimized the network interoperability so that the communication aspects will be optimized. Asif Aziz[10] has provided a work on fuzzy adaptive vertical handover to optimize WLAN communication. Author provided the mobility driven communication under handoff parameters to control the communication and service aspects.

III. RESEARCH METHODOLOGY

The work is here applied under zigbee protocol optimization for WPAN network. The work is here defined to provide the authentication adaptive communication under handoff process. The work is here defined at the architecture level and communication level constraints. At first, the architecture level specifications are here provided by providing the infrastructure adaptive network. The network is divided in smaller segments and each segment is controlled by the specialized infrastructure device. The infrastructure adaptive communication is here performed under coverage range analysis. The work has performed the communication within and outside the coverage range. The basic work model for this work is shown in figure 1.

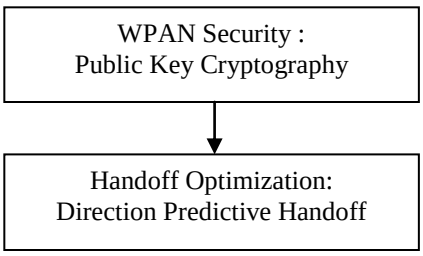

Figure 2 : Proposed Model

As the network is defined with restricted constraints, the complete network is divided in smaller zones or sub networks. Each sub network is controlled by the controller node. This controller node is responsible to provide the authenticated network communication. Once the communication constraints are decided, the authentication check is performed by the controller node. During the handoff process, when node switches from one region to other, the significance of this authentication process is increased. After provided the authentication, the next work is to identify the valid controller for a node as a node moves outside its current coverage range. In this work, direction predictive constraints satisfaction approach is defined for selection of controller Node. The work flow of this work is given here under

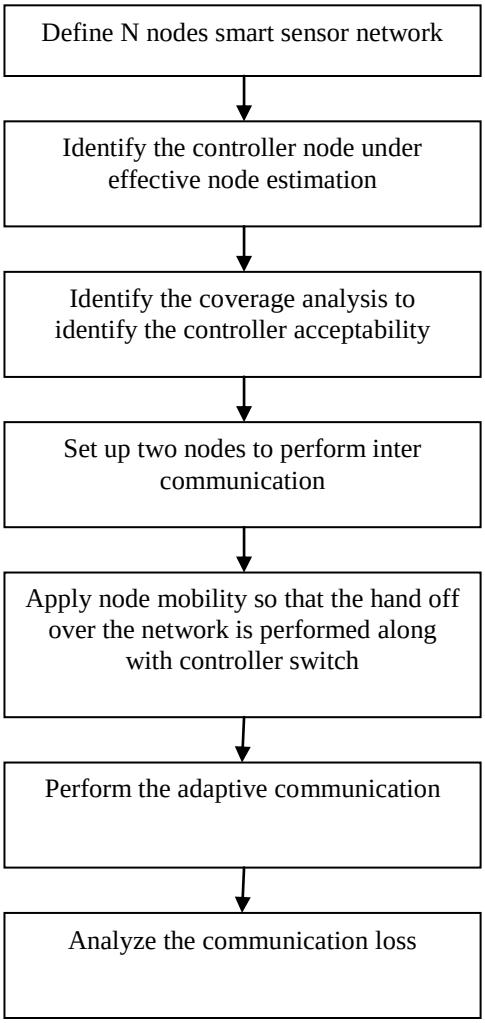

Figure 3 : Work Flow

The work is here defined to optimize the handoff adaptive communication in restricted WPAN network. The work flow is defined and the simulation is performed on random network. The network parameter adaptive simulation results are discussed in next section.

IV. RESULTS

The presented work is simulated in NS2 environment. The nodes are placed at random location and the controller selection is also obtained from the work. The mobility adaptive communication is performed under handoff inclusion. The network is formed with energy specific mobile nodes. The zigbee protocol is applied to perform the communication and communication route. The algorithmic approach is defined to perform the communication handoff. The simulation results are here obtained in terms of communication throughput and communication loss.

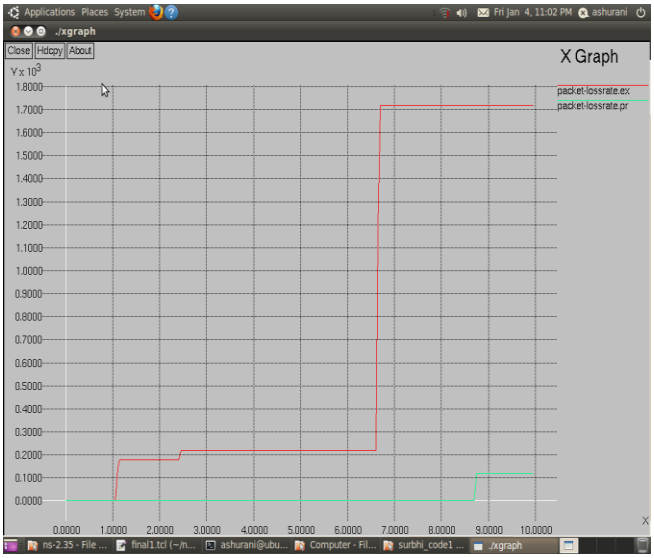

Figure 4 : Communication Loss Rate Analysis

Here figure 4 is showing the analysis of work under loss rate parameter. The figure shows that the presented work has reduced the communication loss and improve the network reliability.

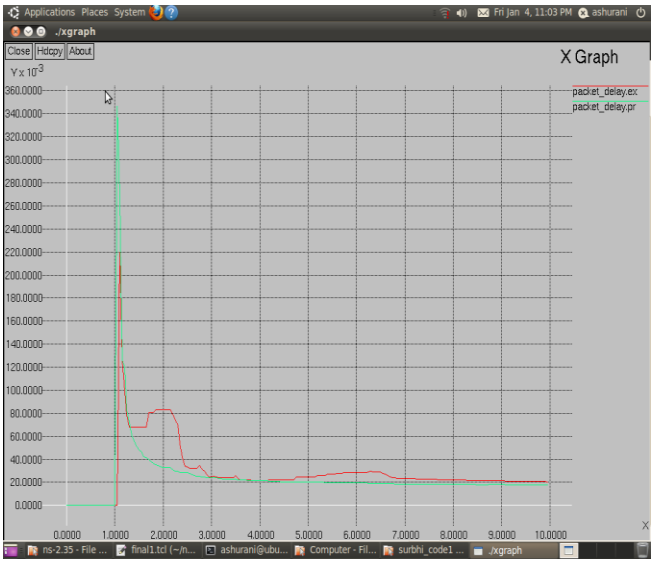

Figure 5 : Communication Delay Analysis

Here figure 5 is showing the analysis of work under communication delay parameter. The figure shows that the presented work has reduced the communication delay so that the network effectiveness is improved.

V. CONCLUSION

In this paper, an improvement to the WPAN network is provided under handoff process. The communication is here provided under security and reliability vector. The security is here integrated under authentication vector whereas the reliability is obtained by reducing the communication loss over the network. The simulation results show the effectiveness of this work.

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