ISSN 2395-1621

ADVANCED RESCUE SYSTEM FOR SOLDIERS USING RSSI

[#1]Hanwate Pratiksha Khadu, [#2]Jadhav Namrata Anand,
[#3]Jadhav Shweta Ravindra

[#1]pratikshahanwate96@gmail.com
[#2]namratajadhav063@gmail.com
[#3]sjadhav30726@gmail.com

[#123]Electronics and Telecommunication Department
Savitribai Phule University Pune,
BVCOEW, PUNE.

ABSTRACT

The scope is to design a soldiers rescue system using RSSI used to detect the location of soldiers in rescue operations using the signal strength received from the nodes of the WI-FI(esp 8266) network. RSSI is a range based approach and is most suitable for location estimation. Technique here refers to establish nodes using ESP 8266 transceivers on the war filed and at base station . This system could establish reliable communication between two nodes and hence location precision is high. This technique has high accuracy over existing systems like GPS for location tracking and is cost effective. This method is highly suitable for rugged and terrestrial areas like forest canopies where usually GPS is unreliable.

KEYWORDS: Robot:, Battery: 12V 1A dc, DC Motor : 60 RPM, DC driver IC : L293D

ARTICLE INFO

Article History

Received: 28th May 2018

Received in revised form :

28th May 2018

Accepted: 1st June 2018

Published online :

5th June 2018

I. INTRODUCTION

RSSI is a range-based approach in location estimation. Because of the hardware and energy requirements this is the most convenient method. GPS has many disadvantages, not only in terms of hardware and battery power, but installing GPS receiver in a large scale deployment would be expensive. RSSI estimate position without any extra hardware. Also RSSI estimates distances between nodes in a highly irregular, dynamic environments in forests with dense canopies.

The signal strength is estimated from the wireless network nodes like ESP8266 and Zigbee. Recent research works shows that technology is best suited communication protocol with low energy, long battery life and where secure networking is required. Our system provides a means to integrate electronic components in to a wearable form, with components and the interconnections become the intrinsic part of the fabric. The main scope is to increase the overall localization accuracy. The proposed approach is also focused on error control. Most of the recently proposed techniques address only one the one aspect provided above. Our task is to integrate all this into a single system.

II. LITERATURE SURVEY

Location detection systems, is classified into two categories, system that require install infrastructure and autonomous systems. Infrastructure systems transmits and emit signals installed from the nodes that are established on the physical environment and all information are send to the central server and only the server estimates the distance. But autonomous systems are configured such that each system can independently determine their location. We evaluated various methods like ultrasonic, laser, and infrared in terms of power consumption accuracy and range. IR is limited to maximum range they cover hence to employ it on a large scale is difficult. Laser is directional, accurate but it is not cost effective and consume more power. Ultrasonic sensors estimate distance with less error and can measure up to 40 feet but it needs up 120 sensor readings per 360 degree scan which would increase cost. Hence in our work we employed ESP which appears to be best for our application. There are

two types of approaches, range-based and range-free. Range-free approaches rely heavily on network connectivity. However with increase in node density location detected become imprecise. On the other hand range-based approach susceptible to noise and is cost effective and estimate location with high accuracy. RSSI has shown good accuracy and less computational cost in many recent works. However RSSI is susceptible to multi-path fading, interference that may result in great fluctuation. The system developed from reviewing various existing systems, by including the needed features and eliminating different kind of disadvantages in them.

PROBLEM STATEMENTS

Rescuing the soldiers without endangering human life.

III. METHODOLOGY

First, a routing protocol must exist that can connect and pass messages in from the initial location of the robot to its final destination, by creating hot-spot using ESP-8266.

Mobile nodes have more resources for sensing and computing and can move to particular locations to perform more complicated missions such as rescuing the soldiers in war, rescue the people in Accidents, Exploring on others planets etc.

On switching the bot on, the bot will decide a centre point .

The robot will calculate RSSI value of the object by travelling forward for 8sec and further coming back to the centre point.

The same procedure is carried on for the rest three sides.

The values of all four sides are compared and best is chosen.

IV. ARCHITECTURE

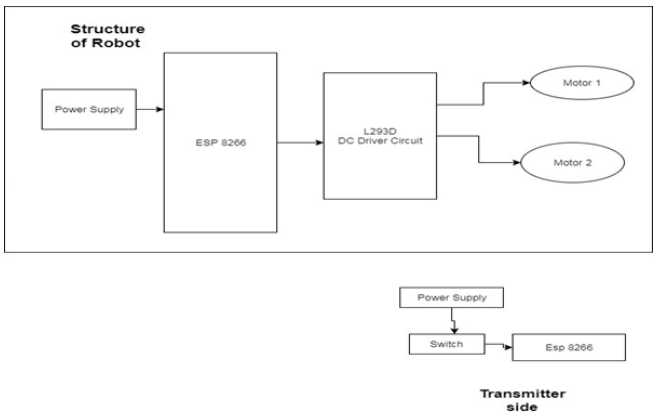
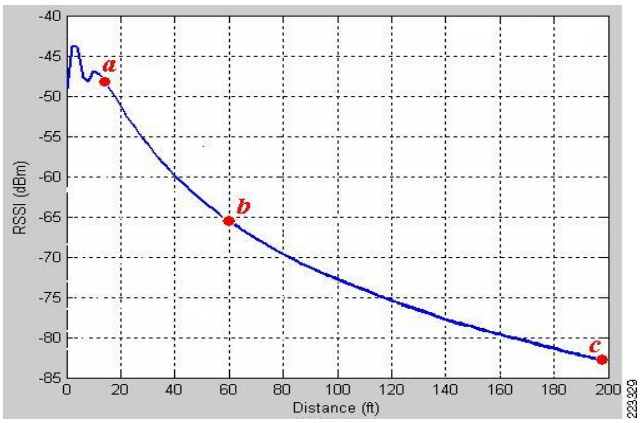


Fig 1. System architecture

V. RESULT

From the below statistics a plot between distance vs RSSI curve shows nonlinear relationship.as distance increases RSSI value decreases. i.e., if the distance between the two nodes is large then RSSI value is more and vice versa. The bot traces the path and reaches to the accurate location and travels back to the base station.



VI. CONCLUSION

In this project, we explore RSSI based location tracking system using ESP8266. The algorithm proposed algorithm compensates for ruggedness and irregularity of RSSI value in forest areas. Moreover the algorithm provides less computational cost and less time to execute. Also this system consumes less battery power and has high accuracy over existing systems like GPS for location estimation. The algorithm proposed is much simple which reduces the complexity of the implementation in the hardware.

REFERENCE

[1] A. Zanella, N. Bui, A. Castellani, and L. Vangelista, “Internet of Things for Smart Cities,” IEEE Internet Things J., vol. 1, no. 1, pp. 2232, Feb. 2014.

[2] R. D. Taranto, R. Raulefs, D. Slock, T. Svensson, and H. Wymeersch, “Location-aware communications for 5G networks,” IEEE Signal Process. Mag., vol. 31, no. 6, pp. 102112, Nov. 2014.

[3] Sigfox, “http://www.sigfox.com,” 2014, accessed: October 2016.

[4] Lora alliance, http://lora-alliance.org, 2015, accessed: October 2016.

[5] S. Gezici, Z. Tian, G.B. Giannakis, H. Kobayashi, A.F. Molisch, H.V. Poor, and Z. Sahinoglu, “Localization via ultra-wideband radios,” IEEE Signal Processing Mag., vol. 22, no. 4, pp. 7084 2005.

[6] Z. chen, F. Xia, F. Bu and H. Wang, "A localization method for the Internet of Things," Springer Super computing, pp. 657674, Sep 2013

[7] S. Fang, T. Lin, and K. Lee, "A Novel Algorithm for Multipath Fingerprinting in Indoor WLAN Environments," IEEE Trans, Wireless Comm., vol. 7, no. 9, pp. 3579-3588, Sep. 2008.

[8] W. Farjow, A. Chehri, M. Hussein, X. Fernando, "Support vector machines for indoor sensor localization," In IEEE Wireless Communications and Networking Conference (WCNC), Mar. 2011, pp. 779783.

[9] S. Yiu, M. Dashti, H. Claussen, F. Perez-Cruz, "Wireless RSSI fingerprinting localization," Signal Processing (2016).

[10] S. Bozkurt1, G. Elibol, S. Gunal and U. Yayan "A Comparative Study on Machine Learning Algorithms for Indoor Positioning," INISTA, 2015 International Symposium, pp. 1-8, Sep. 2015.

