An Efficient Model For Real-Time Drop box Tracking System Using WSN

Reshma Date ,Pratiksha Gadilkar,Komal Nalwade,Priyanshi Kumari
B.E Student, Computer Engineering Department,
SKN Singhad Institute of Technology & Science, Lonavala, India
Under the Guidance of: Prof Mahesh Gosavi SKNSITS,Lonavala.

Abstract

With technological advances in the telecommunications sector, everything around the world would like to be connected seamlessly anytime, anywhere through the best network. WSN have the potential to become the pervasive sensing technology of the future WDTS is a Smart letter box system where we are going to track whether there is any letter is dropped in the drop box. When somebody drops letter in letter box then LED connected to output stops glowing indicating that you have letter. To detect the presence of a letter we have used a LDR and a source of light which has resistance of about 1 mohm in total darkness and 2-5kohm in bright light. This gives you a visual alarm when somebody drops a letter in drop box. By using Arduino and LDR,It will update the postman or Post office manager regarding, in which letter drop box has letter through our system on Postman Mobile Dashboard by using GPS. So it will save time of postman of unnecessary visiting.This paper provides systematic exploration of existing research and suggest further research direction

Keywords-: *T-tracking, detection, DFL, tracking, RSS, Compartmental model, LED,WDTS*

Introduction:

Wireless sensor network are distributed autonomous sensors to monitor physical or environmental conditions such as temperature, sound, pressure and cooperatively pass their data through the network to main location. The networks are bidirectional also enabling control of sensor activity. The development of wireless sensor network was motivated by military applications such as battlefield of number of sensor nodes from several hundreds or even thousands surveillance. Every sensor node is equipped with transducer, microcomputer, transceiver and power source. The microcomputer processes and stores the sensor output. The transceiver receives commands from a central computer and transmits data to that computer. The power for sensor is derived from battery. The advantage of WSNs over conventional loggers is the "Live" data feed that is possible. The major challenge in WSN is to produce low cost and tiny sensor nodes. There are many companies producing WSN hardware. Many of the nodes are still in research and development stage. Sensor nodes are consist of processing unit which is having limited computational power and limited memory. Wireless sensor network(WSN) has important applications like remote environmental monitoring and target tracking this is enabled by availability. The design of WSN depends on the application and it considers factors such as applications design objectives cost, hardware environment and design constraints.

Literature Survey:

Geometric filter algorithm uses geometric objects such as line segment, points and circle to represent shadowed links ,possible target locations which reduces the number of computations and storage.GF uses the prior information to improve the tracking results making it most robust to noise. To remove the outlier links and points a circular prior region is used. It maintains the computational efficiency and improve the location estimate. The prior region is used to assign the weights to maintain computational efficiency and it improves the location estimate. The weight are based on the amount of swallowing experienced by the links. And distance of intersection point to the prior location estimate. The main contribution of this paper are:

1. It uses the device free location. The GF algorithm uses geometric objects such as line segments and points a circle which represents shadowed links , probable locations and point filter.

2. It build the circular prior region by using the prior location estimate.
   a. Remove outlier links
   b. Remove improbable target location
   c. Assign distance dependent weights to probable target location.[5]

We design the T-tracking algorithm, It find out the problems of target tracking through the prediction of localized areas (faces) which shows how to organize nodes into faces to track a mobile target.We develop a set of tracking algorithms that are completely distributed in nature, where we can put it into practice two mobile nodes under the static WSN. we provide the "face prediction" which gives high QOT by using a simplified kinematics-based prediction. The QoT is ensured even when the localization is not so accurate. To save energy in each time step of tracking,We design a sensor state transition model.We evaluate the performance of t-Tracking in extensive simulations. The problems that comes in t-tracking in two aspects. One aspect is to investigate more practical issues using the concept of faces as localized areas for tracking, mainly in the case of a target localization by two nodes. Another aspect is to check the proposed scheme in different tracking situations. For instance, intruders like people are moving toward the fence (or border) of a surveillance region and are taking different directions. In this instance, it can be consider the edge crossing between the monitor and backup as the border crossing of the surveillance region[2]. An efficient target tracking mechanism (*ETT*) for a single target which dynamically wake up in a distributed manner with the minimal number of working sensors in which the user-defined tracking quality is satisfied

Energy Conservation When the Target Not Entering the Monitoring Region:

In the initialization phase the ETT only wakes up boundary sensors. For energy conservation. All the other sensors stay in sleeping state In addition, the boundary sensor that monitors the longer boundary segment has assigned the higher priority to participate in the monitoring task to minimize the number of working boundary sensors. Most works did not consider the situation that target does not enter the monitoring region.[3]

Energy Conservation When the Target Entering the Monitoring Region:

ETT of The target detection phase aims to wake up the minimal number of the neighboring sensors of the target detected sensor. All the other sensors stay in sleeping state for energy conservation. Satisfying the User Defined Requirement of Tracking Quality: The proposed ETT guarantees the tracking quality which meets the user-defined quality requirement.[3]

Challenging issue in the development of wireless sensor networks (WSN) is Location and tracking of the sensor node. This is used in a several applications including location-based services, network optimization, and environment characterization. To compute the position of the node in a 2D/3D space Location methods are used. In general, these methods utilize the knowledge of the locations of a small subset of nodes which are called anchors. Localization of sensor node is limited to a single unknown target by expectation-maximization algorithm. Conventional localization methods are based on received signal strength (RSS), time difference of arrival (TDOA), time of arrival (TOA) and direction of arrival (DOA).Sensor node localization using RSS gives a minimum cost solution. Real-time tracking of sensor node using RSS is suggested in. However, this method does not require node velocity. visible light communication and accelerometer is used for RSS-based positioning system . This method does not consider the case of directed non-line-of-sight (NLOS) or non-directed NLOS conditions. Localization method by using TOA and TDOA requires highly accurate synchronization. DOA-based methods require a special hardware.That is used to estimate the angle at which the signal arrives at the antenna array. The localization algorithms can be divided as range-based and range-free methods. inter-node distances are utilizes by Range-based methods , but they provide good location resolution where the range-free method uses connectivity information and location. In range-based method measuring the distance between node and anchor is difficult because we need an accurate propagation model. Range-free localization methods are based on geometric configuration of sensor nodes or distance-hop.

Localization algorithms can also be further divided on the mobility of nodes. Tracking in a mobile sensor network includes continuous localization of the node over time. Estimation of node velocity and past location information which improves the estimated location accuracy. However, integration of cognitive features in a mobile sensor network using multi-sensor data is mostly required. In this multi-sensor data like visible light, acoustic signal and radio signal is developed . It must be stated that the data from different sensors provides different node location accuracies.

Inter-nodal distance estimation using received signal power in an indoor environment is provides the error because of an inaccurate propagation model. Previously , a log model for the attenuation of signals in the context of indoor and outdoor node localization has used. In regression based second degree and third degree methods using non-linear least square approach is described. Since, these methods are based on polynomial modelling; it is difficult to extrapolate outside the range of observations. Moreover, polynomial models have poor interpolator and asymptotic properties. Development of an efficient propagation model is very important in this context. Additionally, combining the advantages of range-based and range-free methods using a distributed cognitive WSN architecture has explored in earlier work. This is specifically under skewed LOS and NLOS data conditions. A method for sensor node tracking that provides advantages is developed in this work. Hence, an efficient compartmental model is developed herein for node tracking over cognitive wireless sensor networks. The proposed method is distributed and uses both the advantages of range-based and range-free methods. Under the information of LOS and NLOS data conditions it utilizes spatio-temporal and is usable when both static and mobile anchors are used[4]

Conclusions:

In this paper we studied, different methods of localization approach and survey of researches. Our proposed system is expected to provide smart way for detecting, tracking of drop box system by using LED and LDR. It gives significant performance and cost effective solution by using arduino processor. And By using cognitive approach of GPS it will provide accuracy in tracking

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