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# An Improved Face Tracking Method In Wireless Sensor Networks For Effective Recognization Of Target Node

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**ABSTRACT**

Existing work basically obliges sorting out gatherings of sensor hubs with estimations of a target's developments or precise separation estimations from the hubs to the target, and anticipating those developments. These are, notwithstanding, regularly hard to precisely attain to practically speaking, particularly on account of erratic situations, sensor shortcomings. With a specific end goal to address another following system, called Face Track, which utilizes the hubs of a spatial area encompassing a target, called a face. As opposed to anticipating the target area independently in a face, evaluate the target's moving to an alternate face. An edge recognition calculation to produce each one face further in such a path, to the point that the hubs can get ready in front of the target's moving, which significantly helps following the focus in an auspicious manner and recouping from uncommon cases, e.g., sensor shortcoming, loss of following. The ideal choice calculation to choose which sensors of appearances to question and to forward the following information. Reproduction results, looked at with existing work, demonstrate that Face Track accomplishes better following precision and vitality productivity. I additionally approve its adequacy by means of an evidence of-idea arrangement of the Imote2 sensor stage.

**Keywords** – Face tracking, wireless sensor networks, Sensor nodes.

## I. INTRODUCTION

The Wireless Sensor Networks (WSN) has gained a lot of attention in both the public and the research communities because they are expected to bring the interaction between humans and environments[1].WSN were originally developed for military purposes in battle field surveillance; however, the development of such networks has encouraged their use in healthcare, environmental industries and for monitoring or tracking targets of interest. Target tracking is one of the key applications of remote sensor systems. The WSN refers to a group of spatially dispersed and dedicated sensors for monitoring and recording the physical conditions of the environment and organizing the collected data at a central location[3]. WSN measure environmental conditions like temperature, sound, pollution levels, humidity, wind speed, direction and pressure. Optimal sensor selection algorithm was developed to select which sensors to query and dynamically guide the target information to a sink. Simulation results validated that the proposed approach[6] has better tracking accuracy, reduced localization error, and is robust to strong environment noise, while using a minimum number of sensors. In WSN the sensor nodes are classified into either a sensing node or a routing node [1]. The sensing node is responsible for collecting the information regarding the functionality for which the network was deployed[11]. The routing nodes are responsible for forwarding the detected information to the sink and share the information among the clusters as shown in the Fig 1.Based on the requirement the node can act as a routing node as well as a sensing node. In case of failure of the routing node, the sensing node closer to the sink or the neighbouring cluster performs the routing operation. The sensors are initially programmed before deployment to organize themselves into cluster and select the corresponding routing nodes. The main objective of a WSN is to provide reliable and accurate information regarding the environment in which the sensors are deployed[1]. Among the various applications of a sensor network, recent advances are with respect to target tracking. Target tracking is a challenging task due to failure of sensor nodes, high mobility of the target, processing of data acquired from multiple targets and multiple sensors at sink, communication between the sensors using wireless medium[3]. In order to present the various mechanisms developed for the purpose of target tracking using the target signal parameters such as Received Signal Strength (RSS) and Time of Arrival (ToA).

## II. LITERATURE SURVEY

"Modelling and Optimization of a Solar Energy Harvester System for Self-Powered Wireless Sensor Networks" ,Dondi, D. ; Dept. of Inf. Eng., Univ. of Modena & Reggio Emilia, Modena ; Bertacchini ,Brunelli, D. ; Larcher, L. In this paper[1], we have presented an optimization methodology allowing maximizing the efficiency of solar harvester for self-powered WSN devices. This methodology relies on com- pact models of both the PV module and the harvesting circuit, which implements an analog MPPT technique.

"On the Delay Performance of In-Network Aggregation in Lossy Wireless Sensor Networks", Changhee Joo, Member, IEEE, and Ness B. Shroff, Fellow, IEEE. In this paper[2], we concentrate on the ramifications of remote telecast for information collection in lossy remote sensor systems. Every sensor hub creates data by sensing its physical surroundings and transmits the information to an uncommon hub called the sink, by means of multihop correspondences. The objective of the system framework is to register a capacity at the sink from the data assembled by spatially dispersed sensor hubs.

"Industrial Wireless Sensor Networks: Challenges, Design Principles, and Technical Approaches", Vehbi C. Gungor, Member, IEEE, and Gerhard P. Hancke, Senior Member, IEEE. In this paper[3], specialized difficulties and outline standards are presented regarding equipment advancement, framework architectures and conventions, and programming improvement. Specifically, radio innovations, vitality reaping methods, and cross-layer outline for Iwsns have been examined. Moreover, IWSN principles are displayed for the framework managers, who plan to use new IWSN innovations for modern computerization application.

"Local Node Selection for Localization in a Distributed Sensor Network", Kaplan,L.M, U.S Army Res.Lab, Adelphi, MD, USA, Aerospace and Electronic Systems, IEEE Transactions on (Volume:42 ,issue:1).This paper[6] discusses a new localized resource manager for a wireless sensor network of bearings-only sensors. The new localized management method is almost as effective as GNS in terms of balancing the trade-off between energy usage and localization accuracy.

"Target Tracking in Wireless Sensor Networks Based on the Combination of KF and MLE Using Distance Measurements", Xingbo Wang ; Sch. Of Control Sci. & Eng., Shandong Univ., Jinan, China ; Minyue Fu ; Huanshui Zhang, Mobile Computing, IEEE Transactions on (Volume:11, Issue:4 ),In this paper[10], we present a new target tracking approach which avoids the instability problem and offers superior tracking performances. We first propose an improved noise model which incorporates both additive multiplicative noises in distance sensing. We then use a maximum likelihood estimator for prelocalization to remove the sensing nonlinearity before applying a standard Kalman filter.

"Global Node Selection for Localization in a Distributed Sensor Network",Kaplan, L.M. ; U.S. Army Res. Lab., Adelphi, MD, USA, Aerospace and Electronic Systems, IEEE Transactions on (Volume:42 , Issue: 1 ), This work[6] considers the problem of selecting the best nodes for localizing (in the mean squared (MS) position error sense) a target in a distributed wireless sensor network. Each node consists of an array of sensors that are able to estimate the direction of arrival (DOA) to a target. Different computationally efficient node selection approaches that use global network knowledge are introduced. Performance bounds based on the node/target geometry are derived, and these bounds help to determine the necessary communication reach of the active nodes.

"Dynamic Convoy Tree-Based Collaboration for Target Tracking in Sensor Networks", Wensheng Zhang ; Dept. of Computer Sci. & Eng., Pennsylvania State Univ., University Park, PA, USA Guohong Cao, Wireless Communications, IEEE Transactions on (Volume:3 , Issue: 5 ), This paper[4] studies this issue by proposing techniques to detect and track a mobile target. We introduce the concept of dynamic convoy tree-based collaboration, and an optimal solution which achieves 100% coverage and minimizes the energy consumption under certain ideal situations. Considering the real constraints of a sensor network, we propose several practical implementations: the conservative scheme and the prediction-based scheme for tree expansion and pruning; the sequential and the localized reconfiguration schemes for tree reconfiguration.

## III. RELATED WORK

### PROBLEM IDENTIFICATION

WSN are occasion built frameworks that depend in light of the aggregate exertion of a few micro sensor hubs. Solid occasion location at the sink is focused around aggregate data gave by source hubs and not on any individual report. Thus, traditional end-to-end dependability definitions and arrangements are inapplicable in the WSN administration and would just prompt a waste of rare sensor assets. Notwithstanding, the nonappearance of dependable transport inside and out can genuinely weaken occasion discovery. Henceforth, the WSN ideal model requires an aggregate anticipate to-sink unwavering quality thought instead of the customary end-to-end idea. Keeping in mind the end goal to address this need, another dependable transport plan for WSN, the occasion to-sink solid transport (ESRT) convention. The existing System WSN [5] consists of spatially distributed autonomous sensors to monitor physical or environmental conditions and to pass all the collected data through the network to a main base station. Here the wide-area surveillance and reconnaissance using mobile sensor networks (MWSN) having more problem. The problem[2] is the sensors are static, and the sensors are mobile, how to plan the trajectory of the mobile sensors so these two have can't able to monitoring the all node positions and getting coverage problem in WSN.

### LOSS DETECTION

The packet loss can be far more common in WSN than in wire line networks, loss detection mechanisms have to be carefully designed. A common mechanism[9] is to include a sequence number in each packet header. The continuity of sequence numbers can be used to detect packet loss. Loss detection and notification can be either end-to-end or hop-by-hop. For several reasons, the end-to-end approach [8] is not very effective for WSN The control messages that are used for end-to-end loss detection would utilize a return path consisting of several hops, and this is not energy efficient. Control messages[4] travel through multiple hops and could be lost with a high probability due to either link error or congestion. End-to-end loss detection inevitably leads to end-to-end retransmissions for loss recovery. However, end-to-end retransmission consumes more energy than hop-by-hop retransmission.

## IV. SETTING THE SCENE

The tracking framework, called Face Track, which employs the nodes of a spatial region surrounding a target, called a face. Detecting the movements of the target using face track. Sensors are assumed to be homogeneous and the sink is assumed to be a user, where the system is controlled. Hence, Instead of predicting the target location[1] separately in a face, we estimate the target's moving toward another face.

a introduce an edge detection algorithm to generate each face further in such a way that the nodes can prepare ahead of the target's moving, which greatly helps tracking the target in a timely fashion.

**Tracking accuracy:**
To observe tracking accuracy[3], I analyze tracking error found (TEF) and tracking ability rate (TAR). TEF is defined as an averaged error found in meters by all of the nodes that are involved in tracking. TAR is the metric that can show the degree of successful tracking in a system against all the difficulties, such as the presence of high TEF, or faults in the WSN. TAR also includes sensors duty cycles. The number of successful tracking events divided by e is called the TAR, which reflects the tracking accuracy.

**Energy efficiency:**
The mainly evaluate the total energy cost required by the number of sensors per tracking event. Through the EECP compared the performance of Face Track with existing protocols.

**Fault Tolerance:**
To provide any countermeasures, the first step a system must perform is to detect that a specific functionality is or will be faulty.

**Fault Recovery:**
After the system has detected a fault, the next step is to prevent or recover from it.

## V. DESIGN METHODOLOGY

In this to measure the sensor node, accuracy of node distance which addresses the sensor fault.

## FACE TRACKING

**Design of Face track**

i) Movement detection through polygon tracking
ii) Fault Tolerance and Tackling Loss of Tracking

Optimal face tracking algorithm is used for face track accuracy. It selects which sensor going to address that node. Tracking speed can be achieved within the span of time.

## FAULT TOLERENCE

Typically, WSN planarization [11] is no mistake Support tolerance. Therefore, built at the beginning of May of polygons when monitoring can protect. If a node cannot run to Pf target moves then there is a failure of a link between the node and also wireless channel fluctuations, monitoring interrupted.

## PERFORMANCE ANALYSIS

In this section, we briefly review some of the performance issues, the algorithm complexity, energy costs, and Face Track the WSN energy efficiency. A major purpose of the limit of Face Track is the cost of the necessary energy to the edges of polygons. About Translated angle mechanism, is to reduce the energy cost of each monitoring message transactions event, and the choice of optimal node.

## DEVELOPING METHODOLOGIES

To evaluate the performance of the Face Track framework via simulation. To carry it OMNet ++ v3.3p1 Castalia simulation environment.

The focus is on two aspects of the simulations[9] carried out with the goal of finding the movements of polygons. To accurately monitoring and surveillance to monitor the accuracy of Analyze tracking Found Error (TEF) and monitoring capacity ratio.The error is defined as an average of all the meters TEF Monitoring nodes is involved. Tar[7] is the metric A system for monitoring the degree of success that can display The existence of such high TEF, against all difficulties, WSN or faults. Tar more sensors, committed Cycles. Destination sensors, in a trajectory that moves the corresponding duty cycles to e events think. Successful monitoring events that divided the number by e is Tracking accuracy to reflect the Tar. Cost of Energy[12] is estimate the total energy and energy-efficiency, the number of sensors required to monitor the event and energy efficiency with EECP and compared the regulations of the face track with performance.

## EDGE DETECTION ALGORITHM

An edge may be defined as a set of connected pixels that forms a boundary between two disjoints regions. Edge detection plays an important role in digital image processing and practical aspects of our life. Avoiding the fault tolerance [2], while it generates the face. It recovers the node during repair. On comparing them we can see that canny edge detect or performs better than all other edge detectors on various aspects such as it is adaptive in nature, performs better for noisy image, gives sharp edges , low probability of detecting false edges etc. It is less sensitive to noise, adaptive in nature, resolved the problem of streaking, provides good localization and detects sharper edges as compared to others. It is consider as optimal edge detection technique[5] hence lot of work and improvement on this algorithm has been done and further improvements are possible in future as an improved canny algorithm can detect edges in color image .

## VI. TARGET DETECTION

Fig1-shows that the detection movements of a target using the face tracking in wireless sensor networks. Sensor node and target takes place for detection movements.

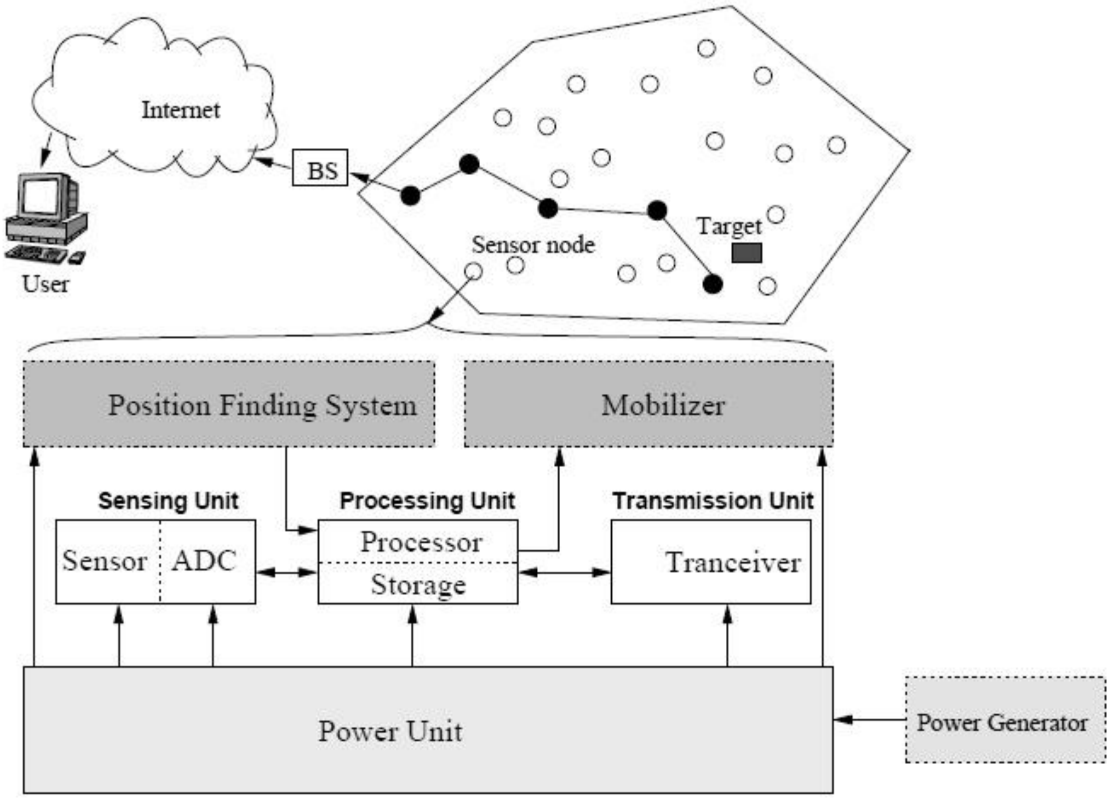


**Fig-1: System Architecture**

## NETWORK SIMULATION

In communication and computer network research, network simulation is a technique where a program models[11] the behaviour of a network either by calculating the interaction between the different network entities (host/routers, data links, packets, etc) using mathematical formulas, or actually capturing and playing back observations from a production network. When a simulation program[6] is used in conjunction with live applications and services in order to observe end-to-end performance to the user desktop, this technique is also referred to as network emulation.

## NETWORK SIMULATOR

A network simulator is a piece of software or hardware that predicts the behaviour of a network, without an actual network being present. The network simulator is the program in charge of calculating how the network would behave. Such software may be distributed in source form (software) or packaged in the form of a dedicated hardware appliance. Users can then customize the simulator to fulfil their specific analysis needs. Simulators typically come with support for the most popular protocols in use today, such as IPv4, IPv6, UDP, and TCP.

**USES OF NETWORK SIMULATORS**

Network Simulators serve a variety of needs. Compared to the cost and time involved in setting up[2] an entire test bed containing multiple networked computers, routers and data links, network simulators are relatively fats and inexpensive. They allow engineers to test scenarios that might be particularly difficult or expensive to emulate using real hardware – for instance, simulating the effects of a sudden burst in traffic or a DoS attack[3] on a network service to test new networking protocols or changes to existing protocols. Network simulators, as the name suggests are used by researchers, developers and QA to design various kinds of networks, simulate and then analyze the effect of various kinds of networks, simulate and then analyze the effect of various parameters on the network performance. Sensor node and target takes place for detection movements. A typical network simulator encompasses a wide range of networking technologies [11] and helps the users to build complex networks from basic building blocks like variety of nodes and links. With the help of simulators[1] one can design hierarchical networks using various types of nodes like computers, hubs, bridges, routers, optical cross-connects, multicast router, mobile units, MSAUs.

## VII. CONCLUSION

The main functionality of a surveillance WSN network is to track an unauthorized target in a field. The challenge is to determine how to perceive the target in a WSN efficiently. In order to proposed a unique idea to achieve a WSN system for detecting movements of a target using polygon (face) tracking[1] that does not adopt any prediction method. Evaluation results demonstrated that the proposed tracking framework can estimate a target's positioning area, achieve tracking ability with high accuracy, and reduce the energy cost of WSNs. From the framework, two facts can be highlighted emphatically: 1) the target is always detected inside a polygon by means of brink detection, and 2) it is robust to sensor node failures and target localization errors.

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