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OPTIMUM POWER ALLOCATION IN SENSOR NETWORK FOR ACTIVE RADAR APPLICATION

[1]G.Preethi M.Phil., [2]Mrs.K.Anbumathi M.Sc ., M.Phil.,

[1] Research Scholar, Department of Computer Science, Bharathiyar Arts and Science College for Women's, Deviyakurichi, Salem.

[2] Assistant Professor, Department of Computer Science, Bharathiyar Arts and Science College for Women's, Deviyakurichi, Salem.

Abstract

The power allocation problem in distributed sensor networks that are used for target object classification. In the classification process, absence, presence, or the type of a target object is observed by the sensor nodes independently. Since these local observations are noisy and thus unreliable, they are fused together as a single reliable observation at a fusion centre. The fusion centre uses the best linear unbiased estimator to accurately estimate the reflection coefficient of target objects. We utilize the average deviation between the estimated and the actual reflection coefficient as a metric or defining the objective function. First, we demonstrate that the corresponding optimization of the power allocation leads to a signomial program which is in general quite hard to solve. Nonetheless, by using the proposed system model, fusion rule and objective function, we are able to optimize the power allocation analytically and can hence present a closed form solution. Since the power consumption of the entire network may be limited in various aspects, three different cases of power constraints are discussed and compared with each other. In addition, a sensitivity analysis of the optimal power allocation with respect to perfect and imperfect parameter knowledge is worked out.

1. INTRODUCTION

A computer network or data network is a telecommunications network that allows computers to exchange data. In computer networks, networked computing devices pass data to each other along data connections. Data is transferred in the form of packets. The connections (network links) between nodes are established using either cable media or wireless media. The best-known computer network is the Internet. Network computer devices that originate, route and terminate the data are called network nodes. Nodes can include hosts such as personal computers, phones, servers as well as networking hardware. Two such devices are said to be networked together when one device is able to exchange information with the other device, whether or not they have a direct connection to each other.

2. LITERATURE REVIEW

The goal of this work is to propose a distributed detection method for a network of radars interchanging their measurements through pulse-position intonation. The proposed approach does not need the presence of a fusion center and it is then fully decentralized. The decentralized approach is based on a distributed agreement mechanism.

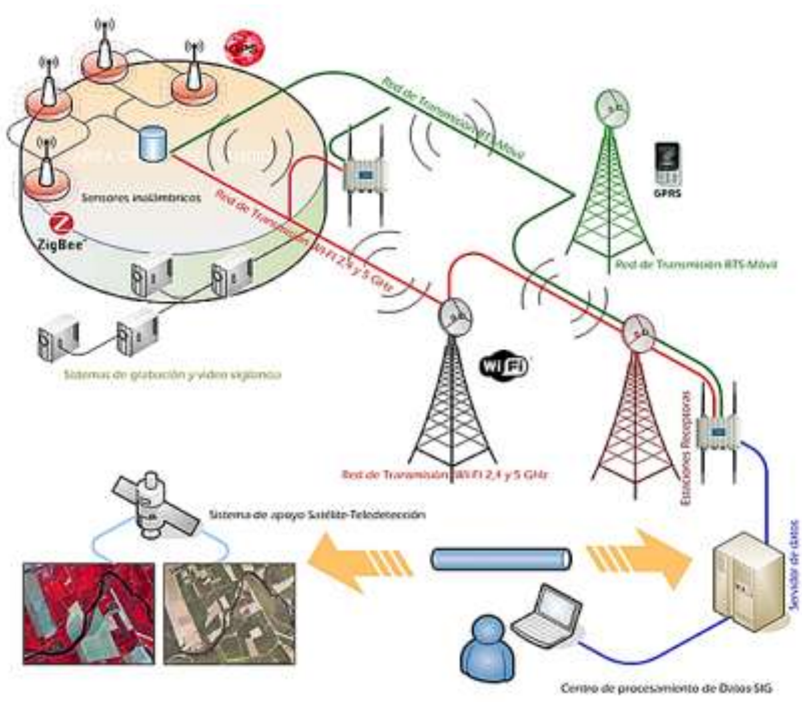

Fig: 1.1 Network communications

We avoid this inconvenient by appropriately modifying the consensus algorithm to make it suitable for communications over deafening channels. We investigate the performance of the proposed system considering the attendance of both observation and communication noise present in the interaction among the radars. In particular we show that even with a non-coherent incorporation the whole system is able to achieve a understanding gain equal to the number of radars.

In this paper “A Distributed and Energy-Efficient Framework for Neyman-Pearson Detection of changeable Signals in Large-Scale Sensor Networks” To address the challenges inherent to a difficulty of no-nonsense interest of Neman-Pearson detection of fluctuating radar signals using wireless sensor networks. We propose in this paper a disseminated and energy-efficient framework. Such structure is scalable with respect to the network dimension and is able to greatly reduce the self-possession on the deepest fusion center. It assumes a clustering infrastructure and addresses signal processing and communications related issues arising from diverse layers. This framework includes a distributed scheduling procedure and a distributed routing protocol. Which enable sensor nodes to make their own decisions about information transmissions without requiring the knowledge of the network global information. In this structure energy efficiency manifests itself at different network layers in a distributed fashion and an intelligence of sense of balance between the detection presentation and the energy efficiency is also attained.

In this paper “Channel Capacity Related Power Allocation for Distributed Sensor Networks with Application in Object Classification” The network is used to classify target objects. In the well thought-out scenarios, the absence, the presence or the type of an object is observed by the sensors independently. Due to noisy communication channels the interfered explanation are combination into a reliable global decision in order to increase the overall classification probability. An approach based on information speculation that aims at maximization of the communal in succession is in employment. It enables the analytical allotment of the prearranged total power to the sensor nodes so as to optimize the overall classification probability. Furthermore, we make understandable the feasibility of object arrangement by using the introduced power allocation procedure in ultra-wide bandwidth signaling and energy-efficient systems.

3. PROPOSED SYSTEM

In proposed system model, fusion rule and objective function, we are able to optimize the power allocation analytically. Since the power consumption of the entire network may be limited in various aspects.

System model

Transmitter Module

The transmitter sends a packet to the receiver and waits for its acknowledgment. Based on error-detection results, the receiver generates either a negative acknowledgment (NACK) or a positive acknowledgment (ACK) for each received packet and sends it over a feedback channel. If an ACK is received transmitter sends out a next packet; otherwise, if an NACK is received, retransmission of the same packet will be scheduled immediately and this process continues until the packet is positively acknowledged.

Receiver Module

In GBN-ARQ, the transmitter sends packets to the receiver continuously and receives acknowledgments as well. To preserve the original arriving order of packets at the receiver, the system has a buffer referred to as the resequencing buffer to store the correctly received packets that have not been released.

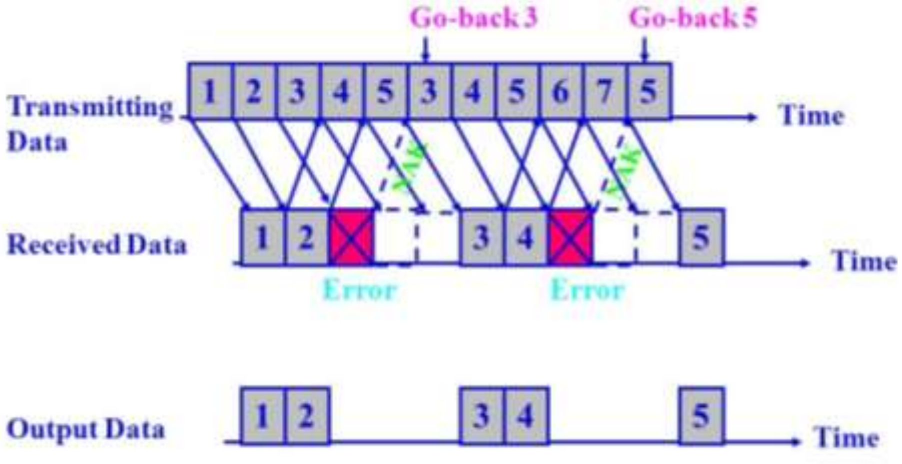

Fig: 1.1 ARQ Received Data

Packet Segmentation Module

Each data packet in the system is identified by a unique integer number, referred to as the sequence number. The transmitter has a buffer referred to as the transmission queue to store packet segments waiting for transmission or retransmission. The transmission queue is assumed to have an infinite supply of packets referred to as the heavy-traffic condition in relative studies in segments.

Stop & Wait ARQ Module

Stop & Wait ARQ protocols achieve reliable transmission of packets over intrinsically unreliable channels such as loss wireless links; they have been extensively used in the next-generation wireless packet data networks to provide high-speed data integrated with voice services. In a modern high-speed wireless data network, however, multiple parallel channels between adjacent transmitter–receiver pairs are often created using advanced wireless communication technologies.

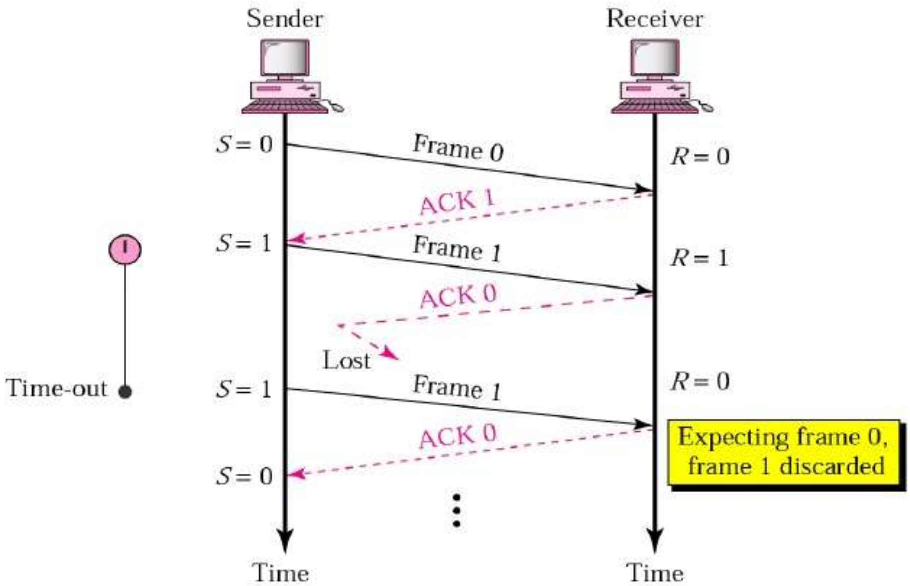

Fig 1.2 Stop and Wait

Gilbert Elliott Module

ARQ-in over parallel channels with both possibly different time-invariant error rates and the Gilbert–Elliott model, the mean resequencing buffer occupancy and the mean resequencing delay increase with the average error rate and the number of parallel channels even though the mean resequencing buffer occupancy decreases with the variance in the error states. In future work, we can apply the modeling and analytical approach presented in this paper to conducting performance studies on the selective-repeat ARQ protocol over parallel channels with time-varying channel models.

Channel Module

A multi channel data communication system, in which a transmitter– receiver pair communicates data packets, the dynamic assignment rule always outperforms the static assignment rule for both channel models. IID channels and Markov channels in the following two sections steady-state analysis is based on the dynamic assignment rule and simulation results of the average resequencing buffer occupancy for the static assignment rule are presented.

CONCLUSION

The dynamic assignment rule always outperforms the static assignment rule for both channel models. For MSW-ARQ-in over parallel channels with both possibly different time-invariant error rates and the Gilbert–Elliott model, the mean resequencing buffer occupancy and the mean resequencing delay increase with the average error rate and the number of parallel channels even though the mean resequencing buffer occupancy decreases with the variance in the error states. In future work, we can apply the modeling and analytical approach presented in this paper to conducting performance studies on the selective-repeat ARQ protocol over parallel channels with time-varying channel models.

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