Modelling and Design of Soft and Hard Computing in Industrial Applications

K.Malathi[#1], V.Sujatha [*2]

[1]*Scholar, Dept of Computer Applications, S.A Engineering College,Chennai*
kmathigopi@gmail.com
[2] *Assistant Professor, Dept of Computer Science, S.A Engineering College,Chennai*
sujatha@saec.ac.in

Abstract— Soft Computing (SC) is a collection of methodologies which aims to exploit dispensation for vagueness, doubtful, and partial truth to achieve robust, tractability and low total cost.. Neural networks have given good predictive performance in several application areas, include pattern recognition, signal dispensation, time sequence dispensation, control problems and image processing. A sensor management system based on soft computing technique has developed and implemented in the flight control system of commercial aircraft.This improves the quality of the consolidated signal and reduces transient due to sensor failures.

Keywords— *N*eural networks; Soft computing; Sensor management.

1. Introduction

Soft computing is a compilation of methodologies which aspire to develop tolerance for ambiguity, uncertainty, and partial truth to achieve robust, tractability Soft and low total cost. A sensor management system based on soft computing techniques has develop and implement in the flight control system of a small commercial aircraft. Fusion of soft and hard computing in industrial application: In the fusion of SC and HC, the roles between different methodologies should be assigned based on their individual advantages and disadvantages. In Engineering problems ,such imprecision,uncertainty,time variation,or disturbances of the system.

On soft computing techniques in various areas: Soft Computing refers to the science of reason,think and deduction that recognizes and uses the real world phenomena of grouping, membership, and classification of quantity under study. In fact, soft computing main characteristic is its intrinsic capable to create hybrid system that is based on the integration of constituent technologies. Hybrid computing is the combination of hard computing and soft computing which having their intrinsic merits and demerits. Fusing soft and hard computing for fault management in telecommunications systems:Artificial neural networks is one of the main techniques in soft computing. Neural networks have given good predictive performance in several application areas, include pattern recognition, signal dispensation, time sequence dispensation, unconfirmed clustering, visual of complex data, data compress and image processing.

Incorporate soft computing technique to a probable intrusion detection system: There are a lot of industrial application can solve competitive by hard computing, while still need the lenience for vagueness and doubtful that can be exploit by soft computing. Recent proliferation of computer communication infrastructure has opened the era of data process based on computer and raise concern about computer security. In this paper, a novel intrusion detection system that reduce raw audit data using SOM model user normal behaviors using HMM and detect anomaly by combining several model with fuzzy logic.

2. Existing System

The improved conventional sensor management method is in the quality of consolidated signal and result in reduction of transient due to sensor failure. Since it adds the ability to identify the failed sensor in duplex operation and to detect sensor failure in the simplex operation. This has been demonstrated by means of closed-loop simulation examples using realistic aircraft model. Final evaluation of the soft sensor management system and TS Fuzzy model based virtual sensor has taken place with pilot-in-the-loop simulations at the Research Flight Simulator of the NAL.

3. Proposed System

I am going to use of virtual sensor to identify a multiple sensor failures and extension of the soft sensor management approach to actuator management. The virtual sensor activates the sensor management system to determine the failed sensor in duplex operation.

4. Methodology

4.1 Birds Eye View of Wireless Sensor Network

Sensor network can be viewed as exterme exploration of 2 generals in computing:

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- Miniaturization
- Interconnection

Individual sensor nodes are small devices run on limited memory equipped with micro controller used for embedded devices.

4.2 High Price Tag Communication

The of Energy Sensor nodes use for communication is more higher than the amount.That used for sensing and computation.

4.3. Application of Sensor Network:

Today Sensor network have found application in many diverse fields such as, *Military Applications* - Terrainscanning, imaging, Surveillance.
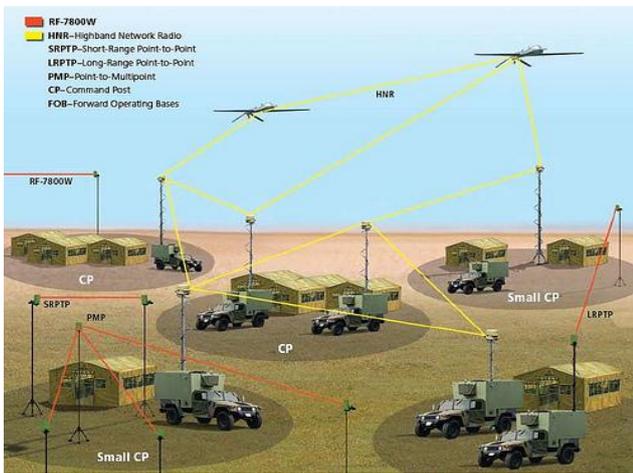

Fig.1: Sensor used in militry

Medicine - Remote monitoring of patients,especially Elderly; skin implants for early identification of various illness and measurements of blood parameters,wearable computing, Swallowable capsules or video imaging of the insiding of patients body.
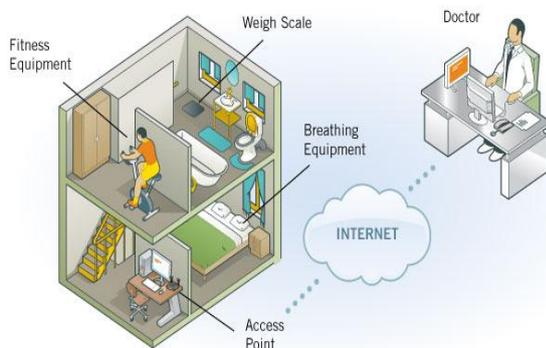

Fig.2: Sensor used in medicine

Auto mobile traffic - Sensors in cars and traffic infrastructures for congestion monitoring and prevention of road accidents.
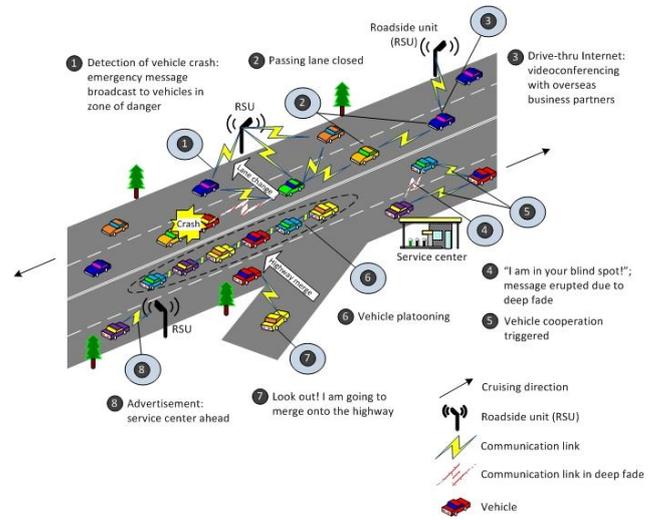

Fig.3: Sensor usrd in automobile traffic

Home automation - Temperature and humidity measurements,air conditioning automatic control,alarm systems,etc.
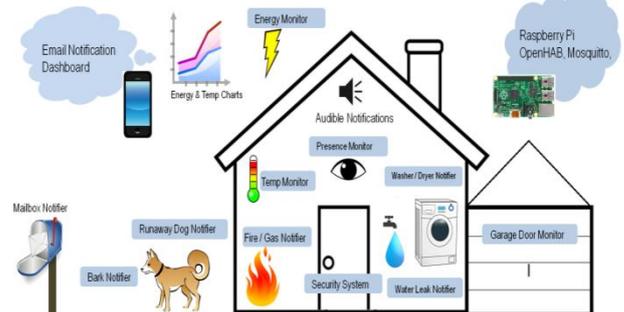

Fig.4: Sensor used in home

Agriculture - Automatic control over water sprinklers etc..tracking of cattle movement.

Fig.5: Sensor used in agriculture

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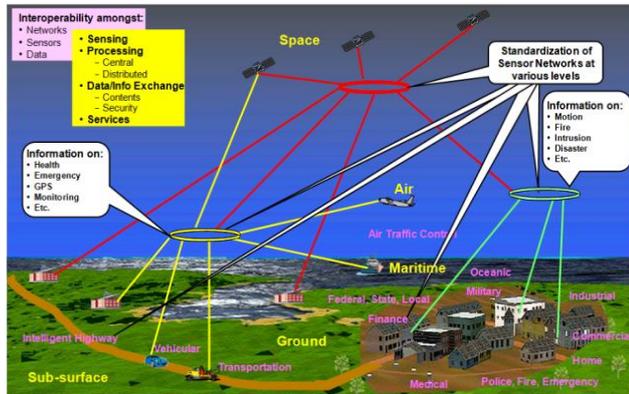*Environmental issue* - Monitor for hazardous gas, early Earth quake and fire detection.

Fig.6: Sensor used in Environment

Sensor management occurs some other topics:

- Positioning and Localisation
- Routing
- Time synchronization
- Security

Using the Virtual sensor, the sensor management system is even capable of identifying a failure of sensor.

5. Conclusion

In this article, we presented an overview on the soft computing technique. The development of soft computing progress in several disciplines include physics, Energy conservation, chemistry, biology and science must be aware of this roles and greater advancement of soft computing in the future. Fault management means dealing efficiently with the sheer volume of alarm event traffic using sensor management, the research will focus on the use of virtual sensor to identify multiple sensor failures and extension of soft sensor management to actuator management.

6. Future Scope

This Virtual sensor network is not upcoming to single sensor network. I assured to use a single sensor to mutiple application in many diverse fields. Using single sensor, the sensor management system is even capable of identify the failure of sensor networks.

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K.Malathi is holding a under graduation degree Bachelor of Computer Application from sanghamam college of Arts and science and pursuing post graduate on master of computer Appliction from S.A Engineering college.This is a part of curriculam covered under in(MC7413)Technical Seminar and Report writing.