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IDENTIFYING HIDDEN CORRELATION OVER FUSION TECHNOLOGY APPLIED IN WIRELESS SENSOR ENVIRONMENT

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ABSTRACT

In now days we are using wireless sensor network (WSNs) have been traditionally tasked with the single applications, but now emerged with multiapplication paradigms. As the number of application in a WSNs increases, it also increases the WSN complexity and the amount of required transmitted messages.Multi-sensor hierarchical data fusion algorithm designed for multiple application environment. A major requirement in these networks is to save energy in order to extend the operational lifetime.

The system has identifies the correlation between sensor data to exploit knowledge and monitor the behavior of sensor, increasing their working lifetime and produce better results. The multi-sensor data's are collected and transmitted to the base station with energy saving options. The heterogeneous data hierarchically combines and transmits to the base station. And it also combines the data into hierarchical form to reduce the energy utilization. In the proposed system, a Multi-sensor Hierarchical data Fusion Algorithm (MHDF) is introduced that identifies patterns in data streams generated by distinct applications is proposed in order to find the best correlations to apply MHDFs. Wireless sensor data collection is performed in the proposed system .The multi-sensor data's are collected and transmitted to the base station with energy saving options. The system effectively collect the heterogeneous data hierarchically and combine to transmits to the base station.

1. INTRODUCTION

In recent years we have witnessed the emergence of multiapplication paradigms can be viewed as an integrated cyber physical system infrastructure for multiapplications.Sensors are commonly used by WSN applications monitoring the physical attributes such as temperature ,humidity,light,voltage etc..The data that can be transmitted by sensors and consist of time-series values, which are sampled over a certain time period. As the number of applications WSNs increases, it also increases the WSN complexity and the amount of required transmitted messages increases. Sensors are reply on batteries and the replacement of depleted batteries is not always desirable. A major requirement network is to save energy in order to extend the operational lifetime. In Proposed algorithm to identify hidden correlations among data streams produced by different sensors and to exploit such knowledge to monitor the behavior of sensors during their lifetime.

Those correlations in a multiapplication environment could indicate that different applications may share similarities in terms of sensing that could be used in MHDF to achieve better results in terms of data accuracy and energy efficiency.

Now let us consider two applications: a fire detection application and Heating, and Air Conditioning. Those applications can monitoring the similar data ranges in healthy case, so a single measurement could be used for both applications, The occurrence of the fire, the data ranges should be differ and this data cannot be considered similar anymore. And also the occurrence of a fire masks the real situation of the environment to a heating and Air Conditioning application. It is possible to enhance the MHDF accuracy.

Apply some appropriate MHDF technique over this data and after we can compress the stream. We proposes a data fusion algorithm that identifies application patterns in data streams in order to find the best correlations to apply MHDF.We have used a solution from sequence alignment techniques to find correlations between heterogeneous sequences of data. After finding the best correlation possible we apply a multiapplication MHDF technique to the correlated data. Thus we also enhance the accuracy in the data stream and also reduce the energy consumption.

2. RELATED WORK

The author's perspective [3], Monitoring heterogeneous wireless sensor is tested in an experimental environment based on the Building Management framework .This results show that the proposed approach is actually capable of identifying hidden correlations, is robust to environment variations and is sensitive to

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sensors faults. In [5] order to deal with multiple applications simultaneously in a context of shared sensor and Actuator Networks(SSAN).It allows the sensing infrastructure to be shared among multiple applications that can potentially belong to different users. In recent years emergence of the shared sensor and Actuator Networks was Farias [6], discussed about application specific design, allow the sensing and communication infrastructure to be shared among multiple applications. Today a growing amount of sensor data will be produced, from which useful information that can be extracted. However wireless sensors and actuators commonly reply on batteries as their energy sources, whose replacement is undesirable. Therefore reduce the amount of data to be transmitted in wireless networks. Thus saving energy, (MDF) can also enhance data accuracy in the SSAN scenario and make inferences that are not feasible from a single sensor. But the present adaptations of well-known MDFs to deal with multiple applications simultaneously in the SSANs context. Thus, discussed about Nakamura [24], they have used information fusion for wireless sensors networks. Surveyed the current state of the art of information fusion by presenting the known methods, algorithms, architectures, and models of information fusion, and discuss their applicability in the context of wireless sensor networks. And [25],discusses clear motivations and the benefits of multi sensor data fusion and particularly focuses on physical activity recognition, aiming at providing a systematic categorization and parameters affecting data fusion design choices at different levels.

3. PROPOSAL

In this section we present our multi-sensor hierarchical data fusion algorithm for DataStream in multiapplication and also apply a multiapplication to the correlated data and finally, compress the hierarchical format.

Modules

a. Node initialization:

The system simulated the proposed scheme by Matlab,in the project ,20 sensor nodes are placed randomly.

b. 2. Data Collection:

The data collection module allows the user to upload data for the sensor data fusion process. The proposed system collects data from an excel file. Then the file will be converted into a data file.

c. Node Grouping for data fusion:

The wireless sensor network is created as a heterogeneous way, which contains different types.

d. Accuracy calculation:

After the data fusion, the proposed system finds theperformance evaluation in terms of precision, recall and accuracy measures.

Accuracy calculation=Measured value-accepted value/accepted value.

Algorithm:
MHDF:

Input: sensor network info, sensor node N, data streams D. Time stamp Ti, sensor symbol Ln.

Output: Data Fusion Records Df.

a. Node initialization (n), assign symbol for every sensor id Ln
b. Read the data streams S=s1,s2…Sn
c. From every node n, get data D.
d. Append Ln on Di
e. Group nodes based on symbols G (LG,PG)=sim((ni,Lni,Di,Ti), (ni+1,Lni+1,Dii+1, Ti))
f. Assign the groups in a hierarchical manner using timestamp and Group.
g. Fuse data

```
cont_final = 0;
For (i =0; i < length(S)-1; i++):
For (j = 0; j < length (Si);j ++):
If Si [j] .type == Si+1[j].type:
F = apply_fusion (Si[j], Si+1[j]));
S_final[j].append (F)
Else:
```

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S_final[j].append (Si[j]);
S_final[j].append (Si+1[j+1]);
j++;
h. Compression DATA
S_final = Apply_compression (S_final);
Return (S_final);
i. END

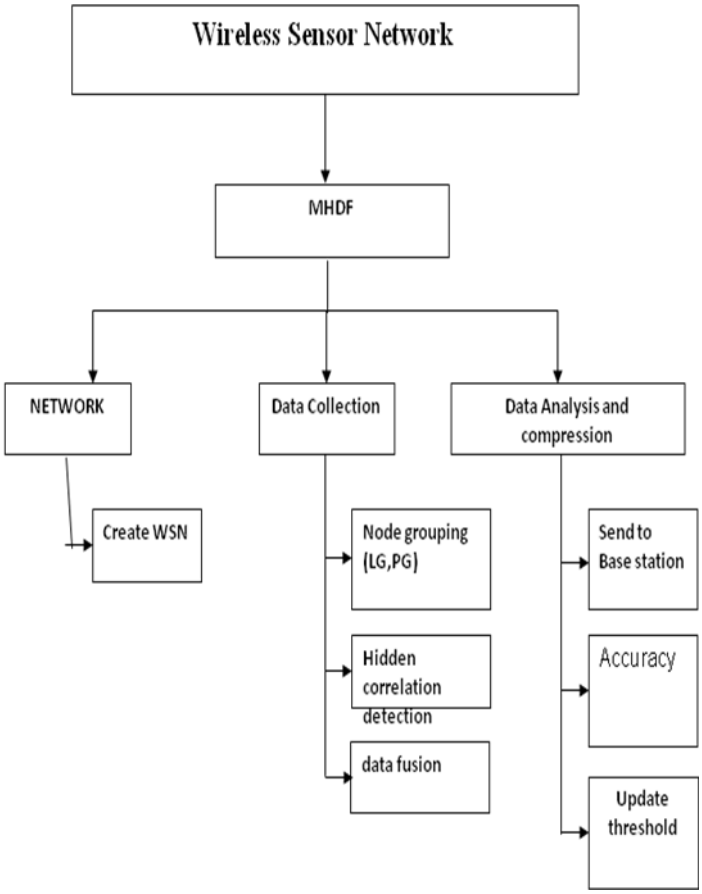
4. EXPERIMENTS

To evaluate the proposed algorithm performance under a reaalistic scenario, we implemented the algorithm in real sensor nodes and run a set of tests under the context tailored for WSNs.The goal of the tests is to evaulate the concerned system performance metrics: Working lifetims and accuracy.

5. ENVIRONMENTAL CONFIGURATION

Environmental monitoring can be used for animal tracking, forest surveillance, flood detection, and weather forecasting. It is a natural candidate for applying WSNs, because the variables to be monitored, e.g. temperature, are usually distributed over a large region. One example is that researchers from the University of Southampton have built a glacial environment monitoring system using WSNs in Norway. They collect data from sensor nodes installed within the ice and the sub-glacial sediment without the use of wires which could disturb the environment. Another example is that researcher's from EPFL have performed outdoor WSN deployments on a rugged high mountain path located between Switzerland and Italy. Their WSN deployment is used to provide spatially dense measures to the Swiss authorities in charge of risk management, and the resulting model will assist in the prevention of avalanches and accidental deaths.

6. MODULE ARCHITECTURE



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7. RESULT

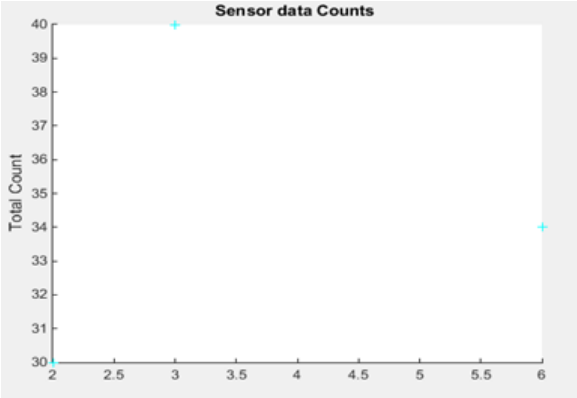

Fig.1: Sensor data count initialization

This graph indicates as the data count region on the initialization.In the X- axis indicate as the measured value and the Y-axis indicates as the Assumed value.

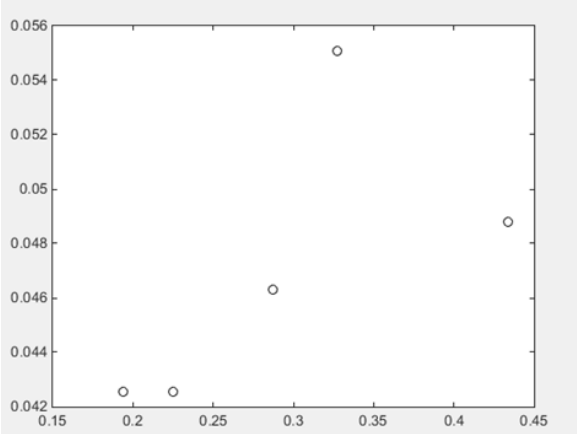

Fig.2: Sensor Node data display

This graph indicates all the all data will be display and also plot the value of each data of the sensors node.

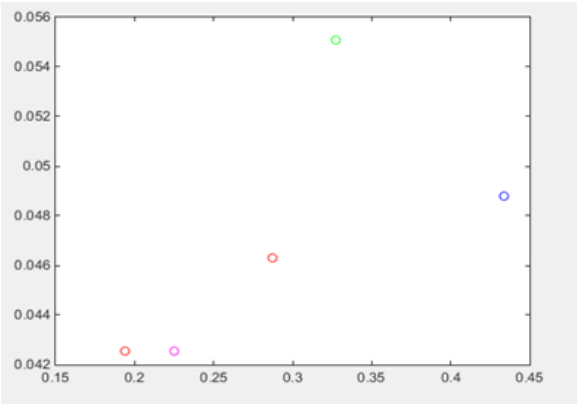

Fig.3: Sensor data plot

All Sensor node data will be plot in the each colour of the different sensor node arrange the aggregation of the data.

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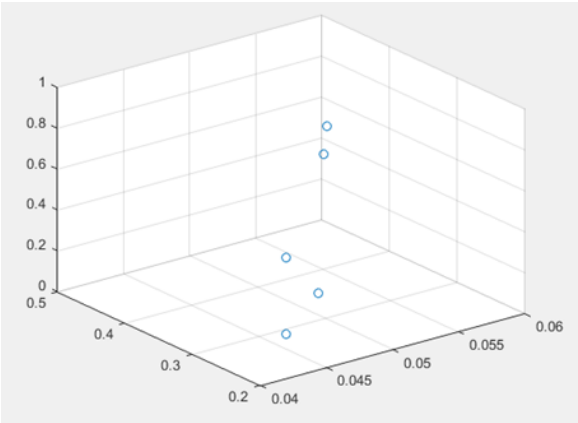

Fig.4: Multi dimensionl aggregated data

The multi dimensions contain a set of unique values that identify and categorize data. They form the edges of and thus of the measures within the data.Because measures aretypically multidimensional single value in a measure must be qualified by a each dimension measure of the each data.

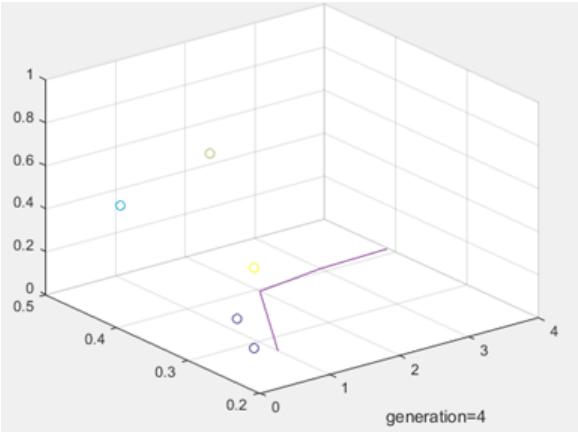

Fig.5: Aggregated data and its sequence are display

All the data will be aggregated on the multi dimensions of the each plot value.

8. CONCLUSION

In this paper we presented a Identifying hidden correlation over fusion technology applied in wireless sensor environment that identifies application patterns in data streams in order to find the best correlations to apply MHDF.After finding the best correlation possible we apply a multiapplication MHDF technique to the correlated data and finally, we compress the data stream.

As future works we intend to perform information fusion in data at higher level than features, but in decisions performing integration procedures.

References

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