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Risk Management of Using Wireless Sensor Networks In Development Plans

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ABSTRACT

As a new generation of network, wireless sensor networks have a wide application in supervising, controlling and monitoring jobs in managing development plans. Since using this networks are in direction of information exchanges, so it has some disadvantages along its Benefits. These disadvantages cause a kind of uncertainty and unclarity in systems which are under management of these networks. The aim of this paper, while considering these conditions, recognize the risk of applying these networks and minimize them by using intelligent systems.
KEYWORDS: Iintelligent Mmanagement, Rrisk Mmanagement, Wireless Ssensor Nnetworks.

1. INTRODUCTION

Using low cost sensor nodes in recent years has permitted the sensor nodes to utilizable in several fields, such as environment monitoring, environment security and rescue missions. One of their most basic sections is high demand for data access. Quick data access is a challenging and discussable subject in this area of applications. There have been a lot of solutions and features proposed in the literatures for quick access to data [2].

Wireless sensor networks are a new generation of networks which usually consist of low cost (cheap) nodes and they link wirelessly. The main objective of these networks is collecting information about the environment surrounding network sensors. These networks operate as the nodes gather required information and then send them toward the receiver. General difference of sensor network with ad-hoc network is their low process and limited energy sources, which in this cased caused data access to become one of the main and discussable problems, in these networks [3, 4].

As risk, there are some presented definitions for risk management term, which, of course, they all include same meaning and concentrate on risk management. Risk management is the process of recognition, evaluation and controlling of potential random risk, which are personally be the consequence of that loss or no change in current situation. Risk manages the risks by, controlling them and providing financial compensations which had happened despite of loss control [5]. In fact the key element in efficient management system in a systematic method to recognize risks and evaluate them for providing required information in order to take a proper decision for measurements and apply necessary actions to reduce risk[6].

2. Risk management

2.1. The goals of sensor networks risk management

The most important goal of risk management is helping organizations in management of their sensor networks that are related to its mission and the goal of sensor network risk management is the risks related to wireless sensor networks and this is possible as follow as:

- Providing more safety to those sensor networks that have responsibility of process and transfer the information of system.
- Help system management in upgrading sensor network because of provisions due to risk management operations.

Generally it is possible to count risk management goals as follow:

- System viability
- Thrift in development costs
- Maintain an acceptable level of uncertainty and concerns
- Incomes stability
- Continues organization growth.
- Perform social duties, and damages not being limited to organization itself

2.2. Benefits and importance of risk management of sensor networks

Risk management helps mangers to be capable of reduced their economic and operational costs and helps them to make the best decisions. One good method for risk management, if implements properly, can help system manager in recognition of control factors, and implement required safety to realize system goals and consequently can generate organization viability and keep it safe from hazards of small and large risks.

In short, the benefits of risk management can be a count as follows:

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- Increasing efficiency and performance of facilities.
- Easing cost reduction; action speed; reduce time.
- Enhanced safe communication through control on system, recognize duties due to project into projects or system and helped to realize the goals in time.

2.3. Risk and its types

Different definitions of risk has been provided in variety of references, which, of course, they all includes a Unite concept. Some of them are noticed as follows:

- Risk is deviation of events which could happen during a specific period in a specified situation. This definition means, if on only one event is possible then the deviation and risk zero.
- And in other terms, in this case there is no probability and the future is completely predictable.

Somewhere else risk is defined as allows:

Occurrence of a bad event or a disaster means anything that prevents organizing to aiming its goals or reduced its ability in its direction and can be as one of the following cases:

- Events don't occur as they are expected to.
- Good events and good things do not happen.

Another definition of risk is mentioned as follows:

- In general term, risk is the negative effect caused from vulnerability whit considering its "effect" sand Occurrence " probability" in a system process.
- Potential and existing vulnerability of system and applied controls in system, are subjected to analysis and evaluation due to calculation of an event "probability" (i.e. in an information technology system).
- Also, "effect" points the size of incurred loss or damage which depends on accuracy sensitivity and importance of data and system components:

And finally a general definition for risk has been stated as follows:

The occurrence probability of damage and loss, whether financial or non-financial as a result of a job (work).

2.4. The importance of risk management while using wireless sensor networks:

As a vulnerable wireless sensor network become more capable it can inhabit risk by hiring more complex tool and can reach lower level of risk by buying risk from other consumers. At the other hand, the consumers which don't have enough risk inhabitance potential loose the chance of profitability inevitably due to their disability to face the risk coherence with these opportunities and forces to accept the insufficient profit. Other country's experience shows that, although increases the risk potential but it is never enough for risk being successful.

The most important goal of risk management is helping the organization risk management of sensor networks related to its mission. And the goal of risk management of sensor network is the risks related to the wireless sensor networks and this is possible as follows:

- Providing more safety to those sensor networks that have responsibility of process recording and transfer the information of system.
- Help system management in upgrading sensor network, because of provisions due to risk management operations.

In order to reduce damages or in a better term , enhancing costs in a job cycle of a machine , a suitable condition should be approached, in which there is a balance between differences costs, including costs due to component destruction and displacement in one hand, and costs due to apply controlling and monitoring methods in other hand.

In a system, which risk management is running, in order to develop maintenance management it is essential that in the facilities place modern equipment's for accurate monitoring and supervising along with complete and develop managing system based on risk calculation?

2.5. Risk control

This level risk management process explains how to recognize a suitable method for controlling risk, evaluate this method, and finally use the best method for controlling and reducing risk. But in fact the result of performance of prior levels will be revealed if an accurate evaluation of existing risks on a system exists it is possible to design and provide proper controlling methods with existing risk compatibility.

Actions that are not related to risk control, different methods can be considered based on demanded terms for risk management, which includes:

- Methods based on removing risk
- Methods based on reducing the amount of risk
- Methods based on transporting risk
- Methods based on accepting risk

3. Managing sensor networks intelligently

Using only intelligent controlling methods probably reduces or solves communication problems in a specific time and for one system or operation of organization. To reach a stable and consistent state made of different operational of units, it is necessary to gather system information simultaneously. Monitoring techniques are responsible for gathering this

information [6]. But it should be considered that the gathered data are not profitable by their own, unless a specific program exists for using them and for identifying and develop controlling methods [7, 8].

In other hand useful and valuable information are those that will be used in the future operational units. The correlation place between monitoring and intelligence methods and the way of using gathered information in action are intelligent management [9].

Intelligent management of Wireless System Networks, in fact, is that part of the general managing systems, which, are in relation with the development, apply, review and maintenance of communication problems based on phase, neural network, ant colony algorithm and generic algorithm methods. So a program will be useful and applicable in its can make a reasonable relation with other system parts and in other hand use its data as proper as possible [10].

Sensor network management includes the following advantage for those organizations and industries that use it:

- Satisfying health safety law and environmental cases.
- Reducing the damages and dangers.
- Increasing the machine availability and productivity.
- Reducing costs.

Sensor network scheme in intelligence management programs provides a structural field for recognizing risks with internal relations makes and develops suitable risk control scale. Failures resulted from this type of management is the main source of risk in the networks. So, intelligent management strategy of wireless sensor networks is being produced in Industry's, which, their format for implementing intelligence management system is applicable in other industries. Predicting distraction rates of sensor networks is along with uncertainty and this uncertainty can be reduced by using intelligent management system that is consisted of before-incident and after-incident management. But, the amount of inspection cost will be high, certainly, but it seems, cost can be maintained at the logical level by using risk inspection methods of these networks based on risk. The main problem in intelligent management of wireless sense or network is risk, risk management produces processes that consist of risk recognition and analyzes, choose a rate for risk control and then studying system performance. Risk management with a Computer Systems cannot replace company's managers or inspectors. With this expression of relation between intelligence management and risk its can be stated that risk management and evaluation is a suitable tool for obtaining required data intelligently or sensor network management.

4. **Conclusions**

This paper discussed about introducing risk while using wireless sensor networks of information systems and the steps of recognize, reduction and evaluation was argued expressly. But while speaking of wireless sensor networks, we should know that we are speaking about the system that is very sensitive and dynamic because it's dealing with the most important sources of organization, named information. In addition we continuously face new advantages and challenging properties that cannot be ignored necessarily. So, in such environments, risk management practice should be repeated continuously as a cycle to be able to bring assurance to consumers of Wireless Network Systems. As reduction in number of sensor network threads with the help of management methods in order to system repairing and inspection not only prevent potential financial damages but also economically and productively is affordable and prevents wasting time, capital and human resources. In intelligent management program, other aspects of it, such as role of human resources, and also making an active and usable data, rather than economical cost of intelligence management and controlling methods, will be considered. But it is necessary to note that, in any organization based on type of activity and the range of sensitivity, using these networks face different levels of risk, and the risk management process must be implemented for it.

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