

Abstract

*In recent years smart technology has thrived a lot , with the assistance of smart technology we can create human life easier in smart environment, smart agriculture, smart grid fields with monitoring purposes. These Smart Systems can be established with the sensor node platform which can sense and communicate. Wireless Sensor Network (WSN) comprises of these sensor nodes encompassing simple processors, low power consuming antennas and numerous detectors. In this work the smart sensor technology is going to be used to monitor the activities of animals to detect the natural disasters like earthquake, floods and hurricanes. There is documented confirmation that animals can provide primary warnings about natural disasters so, the animals are going to be monitored by smart sensors and then modeling there calculated information on SPNs. The sensor nodes are being treated as sensor agents. Sensor Agent Nodes will be distributed randomly in virtual grid of animals. This thesis aids the theoretical framework for monitoring animals in virtual grids and predicting their next move by learning their behavior. The Q-learning algorithms have been applied on sensor node so that they can predict the next move of animals. This framework will generate an alarming situation if it finds the movement of animals abnormal or they start migrating the observing virtual grid. In this theoretical smart structure, smart image sensors along with temperature .pressure and sound sensors have been used. If the movement of animals exceeds the normal threshold value then the information will be passed to the base station to carry out the disaster management activities. This thesis models this framework on Stochastic Petri Net for its modeling and analysis. Monitoring of animals then can be modeled by Stochastic Petri Nets (SPNs) efficiently. SPNs are found to be powerful in modeling performance of computer systems with a wealth of numerical solution techniques; it is very interesting to explore their applicability in wireless systems. **Index Terms** – smart sensors, wearable sensors, non-wearable sensors, accelerometer, pedometer, Zigbee technology, Image sensors, RFID tags, ambient sensors, geo-location devices, SPNs.*