

Combination of RFID with Wireless Sensor Network for tracking and monitoring animals

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Abstract

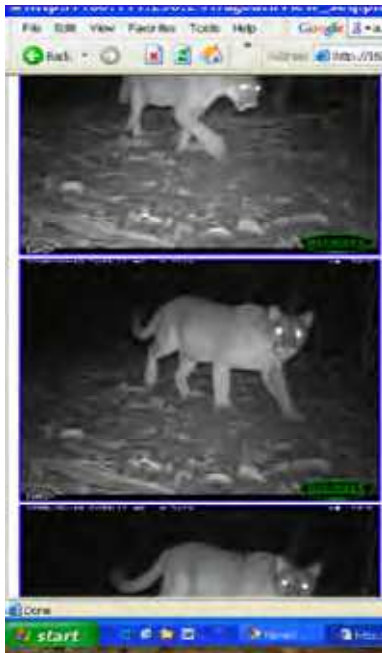
Movement of animal and distribution is to critical important for addressing environmental challenges with invasive species .A motion sensor based camera traps offer a visual sensor for record the present location of animal and species .Today modern digital cameras traps that record video present new analytical opportunity but also new data management challenges . The paper is describing the experience with a yearlong terrestrial animal monitoring system at Barro Colorado inland ,panama .The data which is record from the camera network shows the spatio – temporal dynamic of terrestrial animal and mammal activity at the site data relevant to immediate science question and long term conservation issues.

Pervasive computing concept is targeting the development for solution of better perception for event in intreted areas. Since 90's efforts of scientific are being applied on the development of wireless

sensor network technologies and their application such as environment monitoring, surveillance and security .Before RFID technology emerged commercial applications demanded advanced technology for object identification .The RFID technology firstly applied for indoor solutions then combined with common outdoor WSN solutions in order to provide a better monitoring system. We are proposing a architecture which is applied at animal monitoring applications.

Introduction

Movement of animals and organism in their envorment lies in the heart of ecological field research. This is a critical importance for addrnsing enviornment challenges with the including invasive species, infectious diseases, climate and land use change. Key defining character for most animals is movement.



We have two basic options for record the animal motions .For example a GPStag, and records the movement of all organisms across it.Lagrangain approach follow the animal tracks.

In recent advanced technology are allowing the development for small computational devise which have a lost coast products, low energy consumption and wireless communication. We are expecting to leave in a totally connected environment with a constant monitoring and information exchange. For animal tracking system wireless sensor network and radio frequency identification plays a important role for tracking system. Human have a great applicability on a large outdoor environment such as object tracking and habitat

monitoring while the commonly applied to indoor areas such an industries production process. Some application can be improved by the integration of both technologies.

Wireless sensor network (WSN) create a very active research area. The network consists of low coast compact devices with sensing and processing capability. This is connected among themselves from a wireless medium for perform distribution and sensing of cooperative task. The sensor is able for operate the dynamic condition. it can adept to themselves for the environment and need to operate for the most cases where we want an unattended mode (without external interference and control).Above decide features will works at autonomous principals . These all character sticks make the WSN a powerful platform for processing data collected from wide environment. The designing for efficient architectures and algorithm to be applied for WSN solution which will depend on the application requirement. A start point for the task is refers to phenomena for the monitored, for impact on the sensor to be applied and the data needed for the application. For Common monitoring system application cane used ordinary sensors, such as vibration and temperature to detect some event.

Radio frequency identification (RFID) is a wireless technology for object or living beings unique identification through tags. The technology is start for applied bar-code substitution in industrial and commercial. RFID design is comprised if RFID tags and readers. Tags are a small chip with radio and antenna for wireless communication. The tags depend on the reader interrogation and receive the energy to respond back. More independent power source. Passive tag has the advantage of longer lifetime but they have lower communication range .Active tags can work for longer distance and can store the dynamic data. RFID reader is responsible for identification acquiring and further storage and processing of collected data from tags.

This paper is proposing the both technologies by extending the radio frequency identification for an open area with wireless sensor network. The main motive for this application is animal detection and identification I their habit we are integrated different architectures according to animal behavior.

Tracking animals

It is not a innovation, it is very important for know about the environment that where the

animals live to preservation and maintenance the natural recourses. The Argos system was developed for track animals in its habitat large areas. This system is relies at satellites which is around 850km above the earth surface. It is possible to geometrically establish the location of the transmitter, velocity, light intensity, activity daily pattern, cardiac rhythm and others. Determined location accuracy depends on various factors: vegetation cover, land use, rainy day and slope were different. There are second methods also for track the animals which is cellular technology. It has many advantages like steadily increasing coverage of the network around the world and the continual advanced in speed of data trough cellular networks. This technology has some disadvantage also. Couple of wireless sensor was augmented with actuator for stimulate the animals such as vibration, sound and also a low level electric soak. Braodcast data in WSN picked up by the relay and sent to the server, where the users can see the animal information.

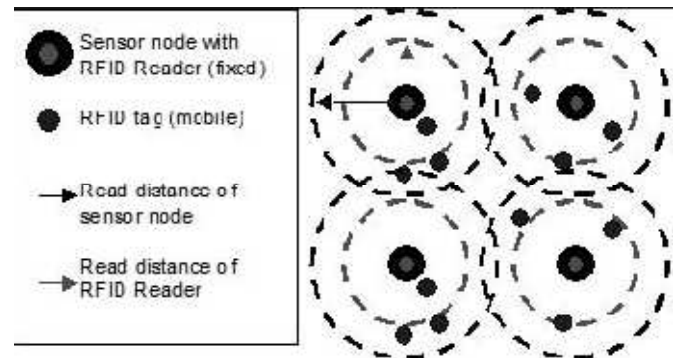
Integrated technologies

Lei Zhang describe a technology of RFID and WSN, Which combines the two technologies. Firstly mix RFID tags and

then sensor nodes in the same environment. Station information from tags and sensor nodes transmit it to local host PC or remote LAN. This is disadvantage in an open environment.

Long range tags

The architecture is better for central mobile among the object. The mobile object disperse and will be impracticable for identify the central cellphone object and for subordinate object that will be close. For this we have a low density while the monitor object will be remain in the way from the others and they become not appropriate for practical use of passive RFID tags. The active RFID tags can be read at a long distance like one hundred meters or more. The architecture is composed for active RFID tags and sensor with ability for read the content of RFID tags. Around the environment each sensor node is fixed while the object will tracking and monitoring. The sensor node with a RFID tags reader containing the 3 parts :- A part at which make use of kinds of sensor (Temperature, pressure), A part of reading which gathers data from RFID tags and Radio transceiver part which sends data for the sink node.



Long range tags

Sensor node with RFID Reader (fixed) - Special Node

This type of sensor node contains a RFID tag reader that allows collection of data from tags and it will transmit through WSN to the node of sink.

Active RFID tag (mobile)

Most commonly WSN sensor node uses In mobile object for track and monitor the object. This system contains only RFID tags which will be fixed in the mobile object. For tracking and monitoring some active RFID tags can store the temperature data and can transmit to reader for real time. The sensor node with RFID reader (fixed) has two read distance. One of them read distance from RFID reader for collect data from tags as the second is responsible for ad-hoc network. The sensor will work in self networking, self configuration, self diagnosing, self-healing

in decentralized manner that maintain the best connectivity and communicate message via multi – hop.

Short range tags

The architecture id better use where possible to recognize a central mobile object among in others. Passive RFID tags distribute them for take advantages in this situation. We want to recognize a central mobile object that will be powerful candidate to have special node with the ability to read RFID tags.

Sensor node with RFID Reader (mobile) - Special node

This sensor node should be fixed in the central mobile objects;

Sensor node (fixed) this sensor nodes are distributed in the area;

Passive RFID tag (mobile):- This passive RFID tags are fixed in the subordinate objects.

Conclusion and Future Work

The paper proposing the proposal for two heterogeneous architectures for integrates

the technologies WSN and RFID. This study was presented for a model of Nondeterministic pushdown automata (NPDA), which made their validation through its state and transitions .The model represent a collection of states node ad add on RFID transceiver. The project is intended for a large project aimed at the implementation of wireless network sensor and geo reference database management system (DBMS) in monitoring and specimens of terrestrial fauna .Our object for study is the population of species for promotes saguninus bicolor popularly which is known as sauim – de – coleira. This experiment will be directly for the habitat of animals. We can test the proposed architecture for a scenario with great density of trees and a warm and humid climate. The next step for this work includes better represent the behaviors of the system presented in the paper.

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