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Wireless Monitored Pet's Security System

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ABSTRACT: Wearable technology is spreading its roots all over the world these days so through this project we are trying to examine the ability of communication and control technology to improve human interaction with pets. The "wireless monitored pet's security system" is a device that uses advanced microcontroller that enable it to carry out multiple sensors associated with pet's safety. The concept focuses on making the pet's collar able to perform multiple functions such as GPS tracking, health monitor, temperature monitor, daily activity monitor etc. This collar is also equipped with alert system that can immediately notify the owner by giving all the information on their phone. The system contain SIM 808 module for communication.

KEYWORDS: Wireless; Control technology; Human interaction; GPS tracking; Health monitor

I. INTRODUCTION

"SHARING IS GOOD AND WITH DIGITAL TECHNOLOGY, SHARING IS EASY." BY RICHARD STALLMAN.

This statement indicates that the interaction of humans with devices is easy nowadays and wearable devices are added to it as they are smart, handy and easy to use. Not only humans but also animal should be benefitted by this advanced technology. Wearable technology is spreading its roots all over the world these days. This technology is the requirement for almost every pet owner these day as nowadays people have very busy schedule, they are not able to give full attention to their pets and is hard to ensure pets security when they are accidently left unattended by the owner. The freedom of pets is limited up to leash. The veterinarian is not able to analyses the problems of pets in accurate manner due to lack of daily activity monitoring information. Due to busy schedule the pet owner sometimes compromise with their pet's health which results into many health issues out of which the most common is obesity. To provide a suitable solution to the current issues, the pet monitoring system is needed to be smart.A smart pet collar is required for tracking, regular monitoring of their activities, feeding updates, alarm for environmental safety, etc.This project is using various parameters and by analyzing it the required data is obtained. It uses GPS technology for tracking purpose. The device uses motion sensing technology to monitor the pet's daily activities. It also monitors the surrounding temperature of the pets. This collar is also equipped with alert system that can immediately notify the owner by giving all the information on their phone. The system is equipped with SIM 808 module for communication. The goal of this project is to create a low cost, comfortable collar that can collect and monitor data from a dog collar that can help provide a veterinarian or an owner with important information. Many commercial products uses Bluetooth for communication but in this project we are using SIM 808 which is a combination of GPS, GSM and GPRS and allow owner to communicate with pet via messages.

II. RELATED WORK

[1] Auther uses advanced embedded technology. Intelligent pet collar aims to overcome the limitations of the current technology associated with the field of pet care.The concept of making smart pet collar focuses on multiple functions such as Good tracking, health monitoring using sensors, protection from rain, feeding alarm, daily activity checker, providing recorded voice command,etc.As other pet care devices,this also provide easy way to the owner and also the doctors to take care of pet's health.

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All the data can be collected from the collar as the information is sent over the mobile application of the owner. All the updates and the notifications can be seen on the owner's smartphone.Intelligent pet collar provide various features like Location tracking,Voice training,Activity monitor,Feeding alarm,Virtual leash,Rain sensing.It also support voice training as the owner can feed the voice into the collar. The app is provided with one button "call pet", with the help of this button the pet will be able to listen to the recorded voice and act respectively. This feature is very useful police And fire squad dogs. This project is using Bluetooth which does not provide long distance communication so the monitoring of pet will be confine to a perticular area only. The GPS system in the collar is limited by cellular range due to which it renders useless if the range is lost. [2]The interaction between human and physical devices and devices in the real world is gaining more attention, and re- quires a natural and intuitive methodology to employ. Thus, how to raise and grow pets in an easy way has been the important issue these days. This study examines the ability of computation, communication, and control technologies to improve human interaction with pets by the technology of the Internet of Things. This work addresses the improvement through the pet application of the ability of location tracking and help the pet owners to raise their pets on the activity levels and eating control habits easily. Extensive experiment results demonstrate that this proposed system performs significantly help on the kidney disease and reduce the symptoms. This study not only presents the key improvement of the pet monitor system involved in the ideas of the Internet of Things, but also fulfills the demands of pet owners, who are out for works without any problem. [4]Regular feeding is one of the problems in dog's maintenance. Owners often forget to feed their pets because of their work. Smart Dog Feeder is the answer to these problems. This device can provide regular feeding without disrupting owner's work. Owners can monitor feeding process with their Android smartphone virtually. Smart Dog Feeder can give authentication with RFID, set the time of feeding and amount per serving through Android smartphone, send feeding report if eaten or not and dog arrival when the feeding time has arrived. Each and Every setting about time of feed, amount, stock and waiting time can be set on Android phone with minimum requirement of Jelly Bean version and has been installed with Appliance Hub application. Smart Dog Feeder has, feed schedule, stock information, timing and name of owner from server uses MQTT protocol. All data will be sent in JSON format and will be processed by Smart Dog Feeder, Android and server. Smart Dog Feeder will save all the information and schedule and set the RTC alarm which will notify whenever the feed time has arrived. Authentication process is done by verifying RFID tag which is attached to the collar of the dog. Food will be provided according to owner's setting and will be measured by load cell. Experiment is done by checking punctuality, delivery of settings, portion congruence and notification with the devices. The result of experiment is Smart Dog Feeder will receive messages and notification from server and do feeding at the proper time. Further development can be done by adding other devices in Appliance Hub system.

III. SYSTEM OVERVIEW

A. *Main part of the system:*

The main part of the wireless monitoring system consists of Arduino Nano, temperature sensor, rain sensor, GSM+GPS+GPRS module and accelerometer.

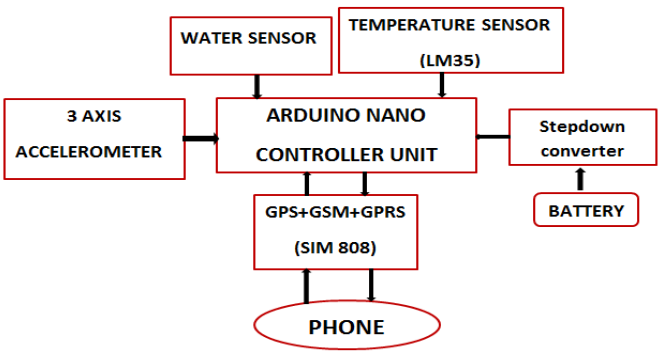

Fig.1: Basic block diagram of wireless monitored pet's security system

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B. *About the system:*

The wireless monitored pet security system is a device that can be attached to the pet collar to monitor a pet . The smart system is user friendly and will allow the user to monitor several important information about the pet in real time. The device will be powered by battery. The wireless monitored pet security system will monitor the surrounding temperature of the pet, the location of the dog , rain detection and the actvity of the dog with an accelerometer. All these sensors will be on the collar around the neck . Arduino Nano will be used to connect with each sensor to process the data that is collected from each sensor. The wireless monitored pet's security system will have a SIM808 on the collar that will send the data from each of these sensors on the owner's mobile phone after a request from the owner phone. The SIM808 will be used to process and display the data in real-time on mobile phones. The temperature and accelerometer data will be displayed as numeric data. The GPS data will show the location of the collar. The rain sensor will alert the owner if pet is drowing or getting wet in the rain. With the hardware components, the wireless monitored pet's security system can be an efficient tool for both pet owners and veterinarians to monitor and track data about a pet.

C. *Processing of data*

This device works on the SMS request of the mobile phone. The owner will provide a request message to a number and the respective function will get activated. In accordance with this request there will be a reply of respective information.

• If the owner sends a message as '1', then the device resends a message of its location which will help the owner to get location of their pet so that they can easily track them whenever needed.

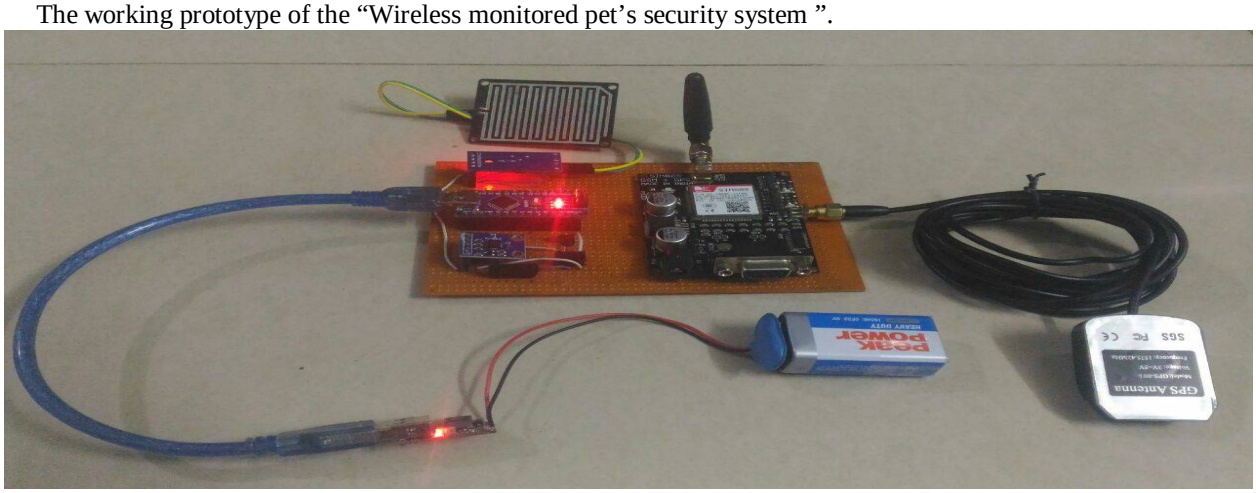
• If the owner sends a message as '2', the device resends a message of total steps walked by the pet till that time. This value is an approximation of steps to measure its activity level. Also a command is set so that at the end of the day the total footsteps count is messaged to the owner so that the owner can monitor the overall activity level of the beloved pet.

• If the owner sends a message as '3', the device resends a message of the surrounding temperature. Whenever this request is made the value of surrounding temperature will be messaged on owner's number. It will ensure that the pet is in proper environmental temperature.

There exist two other functions which work parallel at the background of the device. The first function will notify the owner about the non- ambient condition when the pet is drowning or in heavy rain, the device will automatically sends a "water emergency" message on the owner's phone. The second function will notify the owner about the circumstances where the temperature is exceeding about the normal temperature from the defined temperature, the device will automatically sends a "temperature emergency" message on the owners phone which will help the owner to save the pet from various conditions like burning, heatstroke, etc.

IV. WORKING PROTOTYPE

The working prototype of the "Wireless monitored pet's security system ".



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V. RESULTS

The wireless monitored pet's security system is able to monitored the pets. It gives all the information such as GPS location, surrounding temperature of the dog and also the pet activity. The following results show the send and receive messages and also the information we got on phone.

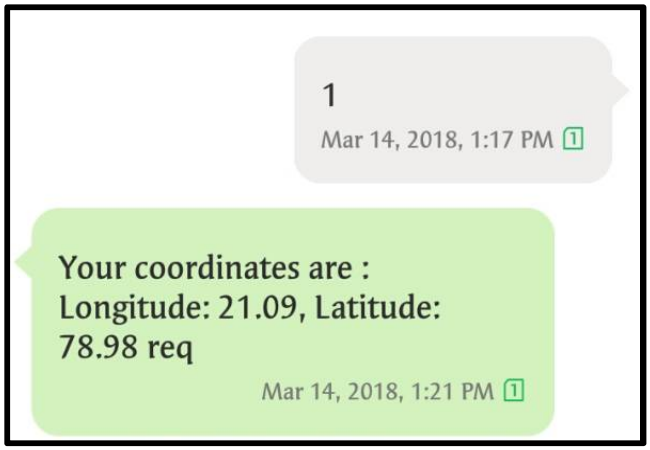

Fig.2:GPS location on mobile phone

The GPS data sent by the system via SMS to the smart phone is as shown in fig 2. This GPS data gives us the latitude and longitude of the device. This data is entered in "Google Maps" to pinpoint the location of the pet.

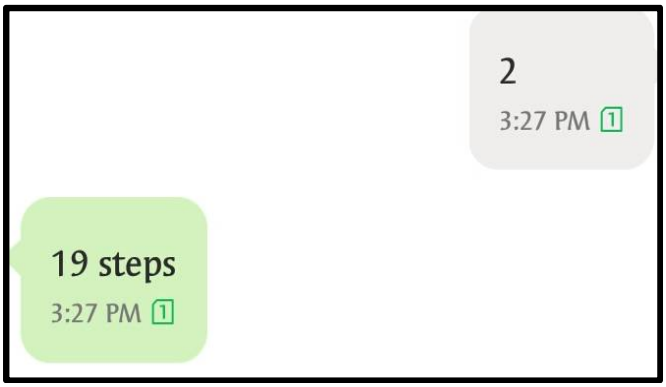

Fig. 3:footsteps received on phone

The accelerometer data send by the system via SMS to the smart phone is shown in fig 3 by which we can actually predict the daily activity of the pet. This data will also help us to predict our pets health.

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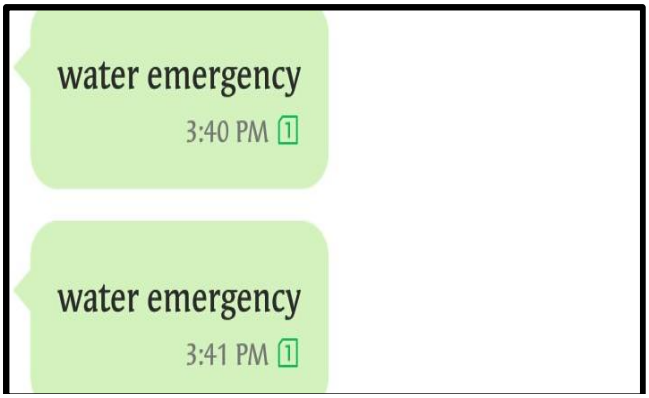

Fig. 4: water emergency alert on phone

Fig 4 shows the SMS alert obtained on the phone when the rain sensor in the system is triggered.

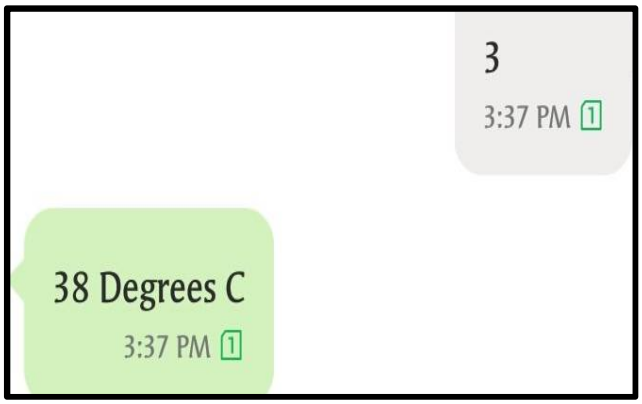

Fig 5: surrounding temperature of pet on phone

The temperature sensor data send by the system via SMS to the smart-phone is as shown fig 5. This data gives us the surrounding temperature of the pet.

VI. Conclusion and Future Work

A complete system for monitoring the pet's by using wireless sensors has been achieved and has promising futuristic application. It is capable of monitoring pet activity level, the surrounding temperature and also able to track the pet location in real time and all these information we get on our phone without any difficulties.
Implementing the location zone service which will notify if the pet is out of predefined zone. Future work could include researching the alternatives to extend the battery life. Advance plans could look for cheaper wireless technologies to monitor the pets. Implementing more features like attaching a camera, sensors for health care, bark sensor (ultrasonic sound) sensors or modules to train the pets is possible and achievable.

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