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Study Of Animal Health Detection Techniques

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Abstract: *In previous year it is difficult to detect the internal health problem of Animals. Outer health problem we detect easily by examine it and cure it. But it is difficult to detect the internal issues because they are speechless we can't examine properly what is exact problem or issue. By the latest technology like Bioscope sensor, wearable belt, Pulse detector etc. it became easy to detect the health issue of animals. In earlier periods the symptoms are not recognized easily it takes more days to recognize the exact problem. The latest technologies are the Quantified Ag system, by using which we examine easily.*
Keywords: *Bioscope, Pulse detector, Wearable belt*

I. Introduction

Now a days the population get increases, and as increase in human population the animals population get decreases .To maintain the animal population it become necessary to take care of all animals if they are diary animals or else. Animal plays a very vital role in universe and it is mandatory to keep take care of animals. And some peoples are financially only depend on diary animals .They do their business using the diary animals. And without the animals universe become unattractive so to maintain the animal century it is necessary to handle the health issue of animals. And now days some people adopt the animal and take care of them at home. In various home a cat, dog, hen, cow, buffalo etc. are common. And because of taking care by self-animals become healthy .As per the business purpose or normally it become necessary for good people to take care of animal because they are speechless animal. Some time they also suffer from various problems .Some time the animals get ill or any other problems are occurs with them and they are speechless to tell what the problem is. To improve the health of animals some important points can be take like in proper time it get find out and in less time it get cure without delay . It is a most important discussion topic of animal health detection in proper time.With the help of latest technology it become easy to detect the problem of animals and in accurate time it get recover .With the help of those sensor by which it become easy to detect the problem . The technology invent the sensors ,wearable belt and thermometer by using which detection of problem become easy and for doctors to analyze issue and do well treatment and in limited time it solves properly.Monitoring of health issue of animals become easy by those devices which get use to analyze the problem by using which detection of any problem become easy it cure before it become a large issue. And disease get remove in correct time there are various types of internal disease which is not able to understand for doctors that what the exact disease is? And because of speechless animals again it is a big problem to understand their problem and solving that problem.By those sensors or by wearable belt the disease or problem get monitored by examine movements of animals sitting position of animals by breathing and by various ways.

Using the latest technology we use some sensors or devices by which we detect the problem and solve it properly and prevent it from spreading. Because if the tissues get spread it become difficult to detect the tissue on various animals.And also the tissues spread in human body some time and it became a big issue to prevent everybody from such problem. In previous day the plagueattacks playsa very vital role to spread disease and it is an un-preventable is harms .In 1890s this disease can takes place in world at the time of Mahatma Jyotibaphule. If at that time these techniques are present then we prevent it from spread and save the various lives. But now using the latest machines or by the devices which tell everything about the health of animals we prevent it from spreading saves the life of animals as well as human being. By using the sensors or wearable belt the all thing become easy. Either the sensors or we say chip are inserted in animal body which tell the changes of in body and that sensors are attach with the computers by which monitoring the any changes inside body become easy and after that the actual decision can be made. And in proper time the treatment can be done and save the life of animals.And by using the wearable belt we can notice the pulse and by examining the pulse rate also it become easy to test the health of animals .And also by using the respiratory sensor the respiratory system can be monitored and we take care of the respiratory system of animals as per the system we provide proper food for them. In this way the all things can be get used by their specific need and they get apply and work properly on animals health.And taking care of animals become easy. With the help of GUI graphical user interface the value get display on screen by which we take decision.

A. Sensors and Wearable Belts

By using the sensors and wearable belt it become easy to detect the level of protein, glucose in body and on the basis of which the issue get detect easily. The ability to detect firstly the level of the required things in animal body and if any important required fuel is absent we provide it immediately and save the life.And by the wearable belt the pulse rate can be detect easily Pulse rate also tell about the health and condition of body .And also by thermometer the temperature of body can be monitored.By connecting the various devices together to work it properly in a one single chip all things get integrate at one to work it properly.While the demand for real-time detection of diseases using the sensors and devices are ever more urgent to maintain the healthy life of animals.

B. Bioscope

A variety of methods are used to detect the level of antibiotics in thebody to avoid health hazards. Sensors are the most prevalent method or we say mechanism and configuration of sensors is very simple andeasy to understand, and provides fast, accurate detection of antibiotics.Sensors work with the help of a recognition element and a transducing device. The recognition element works on the mechanism of affinity-pairing, such as enzyme/substrate and antibody/antigen receptors (Fig. 2). The transducer detects any contact between such pairs by producingdetectable electrical signals in response to biological activity,which is later analyzed. The use of biosensors is limited in the field currentlymainly because the biological sensing element is affected by differentfactors, including environmental factors and type of molecules. [A]

C. Thermometer

Monitor body temperature – detect fever, heat stroke, hypothermia, etc.

D. Pulse rate detectable belt

Monitor heart rate – identify high and low pulse rates and irregularities.

E. POSITIONS

Monitor the body posture of your pet and follow trends to identify pain, recovery from injuries, and more

II. Monitoring Jaw Movement

To know the mouth problem of animals by the help of jaw we detect the problem of mouth teeth Jaw movements define the behavior of the cattle, and there various way to detect the problem they are-

Acoustic analysis of grazing behavior has been shown to accurately identify chewing and biting, and therefore can be used to estimate the food intake of cattle (Lace and WallisDeVries, 2000). Acoustic analysis allows differentiation of three types of jaw movements: chew, bite and chew-bite, and microphones can be used to record the jaw sounds of a grazing animal (Ungar and Rutter, 2006). The data can be used to classify ruminating behavior (Benvenutti et al. 2016; Navon et al., 2013) and are especially helpful in monitoring animal wellbeing. [b]

Acoustic sensing of jaw movements can be classified based on the microphone location and acoustic system classification. Detailed analysis of the systems currently in use is elaborated in Figure. Some systems are simple and detect jaw movements based on 10-minute recordings of grazing sessions on a camera, with an accuracy of 94% (Herinaina et al., 2016; Navon et al., 2013). Signal patterns are analyzed by the machine-learning algorithms to determine intervals between jaw movements, intensity of each jaw movement (observed as a peak in the time domain), their duration, and their integration in a sequence of behaviors (Navon et al., 2013). The discrimination is based on the signal patterns produced during biting and chewing in a 1- kHz sound window: peak frequency, peak intensity, average intensity and their duration (Lace et al., 2000). Clap ham and colleagues have demonstrated a fully automatic Chew-Bite Real-Time Algorithm for detection and classification of incentive events during cattle grazing. The system consists of a directional wide-frequency microphone facing inwards on the forehead of the animal, and coupled with the signal analysis and decision logic algorithm, it can detect and analyses bites and chews with an accuracy of 94% (Clap ham et al., 2011). Milone et al. have reported the detection and classification of bites, chews and chew-bites with the help of the Hidden Markov model, which estimates the sequences of bites, chews and chew-bites using acoustic spectrum characteristics like decibels, by each sound. The successful classification is reported to range between 61% and 99% (Milone et al., 2012). [c]

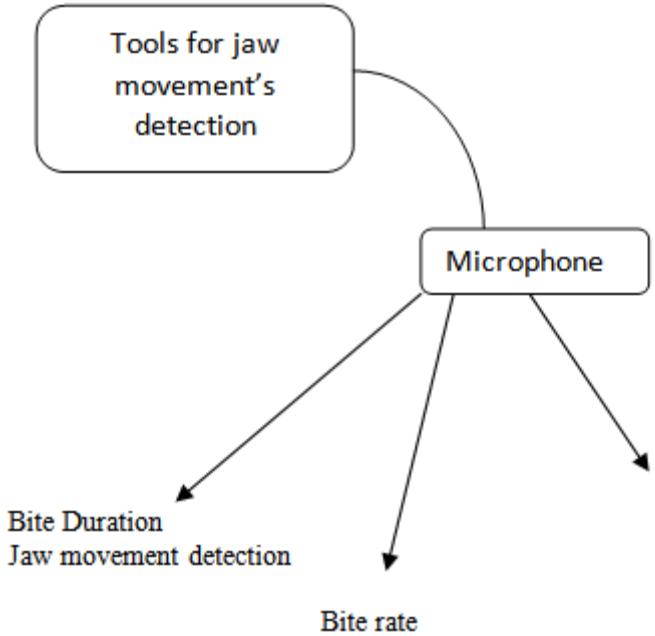

Figure 1: For Jaw Movement

III. Breath Analysis Sensors

Disease diagnosis by identification of volatile organic compounds (VOCs) has long been of interest to researchers, as it offers a non-invasive methodology. VOCs can be found in the breath, blood, faces, skin, urine and vaginal fluids of animals as well as humans (Burciaga-Robles et al., 2009; Garner et al., 2009; Spinhirne et al., 2004). These compounds are produced by a number of biochemical reactions, pathogens, and host pathogen interactions and are affected by a 456 number of biological variables such as age, actions, and biochemical pathways (Sethi et al., 2013). Breath monitoring provides a non-invasive and easy approach to determine the physiological and general health status of animals. Advances in sampling methods, like solid phase and needle trap micro-extraction, and developments in techniques for representative breath sampling (Turner et al., 2012) can be coupled with modern analytical technologies (spectroscopy techniques and electronic noses) to allow for precise analysis of breath composition at an unprecedented level (Pereira et al., 2015b). One of the key challenges that require important attention is the statistical analysis and data interpretation of large and potentially heterogeneous datasets collected from research on the exhaled breath composition from animals.

IV. Sweat Analysis

Sweat analysis is also a one of the important best technique to know more about the animal's health. Wearable Sweat analyzer has not yet been made commercial, mainly because of the size of the equipment. However low cost robust designs have been developed in laboratories .Methods for collecting sweat include using an electrical current to drive a chemical stimulant into the skin but there is a need for methods that not only collect the sweat but also analyze the monitor the sweat throughout the day as requirement.Recent development made in sweat analyzer aim to restrict the size of the system so it is easy to wearable and also easy for handle.

V. Voice Detection And Bee Analysis

By the voice also we examine the health of animals whether they are normal or not. By examining the frequency of voice or some change in voice observing the voice the treatment can be done on that basis.

Honeybees produce a variety of different sounds as a means to communicate with the colony. The sounds have characteristic low fundamental frequencies between 300 and 600 Hz (Barth et al., 2005). Honeybees' sounds have specific frequencies within this range for a number of reasons. Both the range of sound frequency and the acoustic signal pattern determine the meaning of the sound. An accurate quantification of these signal patterns can give valuable information on the hive health (Qandour et al., 2014) [d]. Electronic systems for management of beehives have been developed lately and combine hive acoustics monitoring with measurement of parameters like brood temperature (Kridi et al., 2016), humidity, hive weight and the weather conditions of the apiary[e]. Dietlein et al. have developed a system for automated continuous recording of sound emission by honeybees as a measure of their activity (Dietlein, 1985). The specific sounds from the hives are

useful in providing information on colony behavior, strength and health, and the data from the monitoring device can be accessed remotely from any internet enabled device (Bromenshenk et al., 2015; Evans, 2015; Meikles and Holst, 2015). Other systems are being developed that integrate visual, acoustic and beehive monitoring systems and share them with the environmental monitoring platform (Figure 6). These systems can help in collecting and analyzing the data on bee behavior for biologists (Chiron et al., 2013).

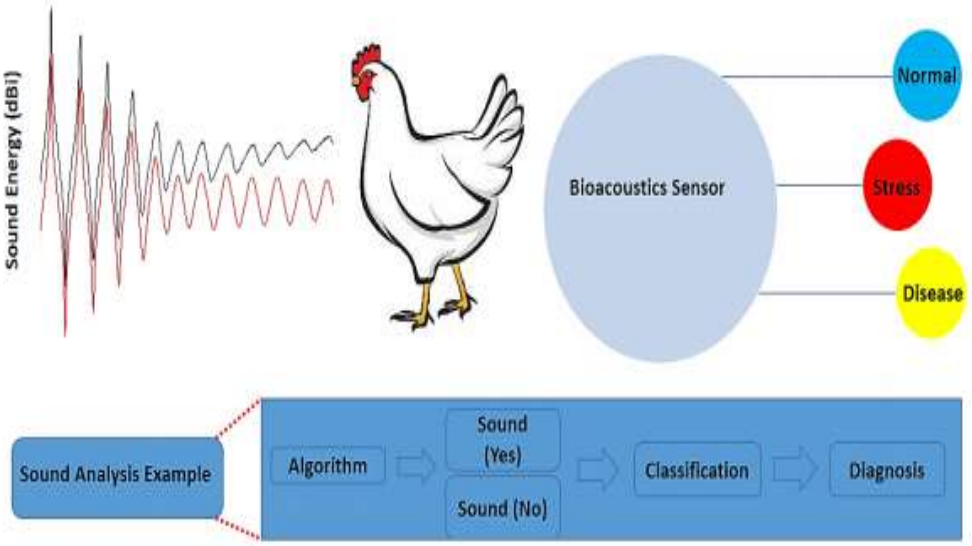

Figure 2: voice detection

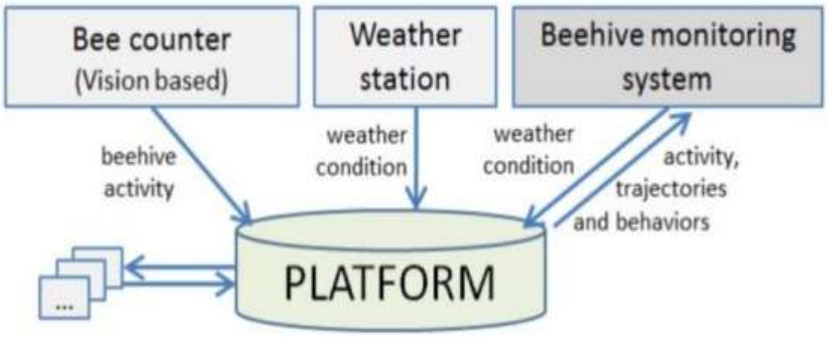

Figure 3: Bee health detection

VI. Analysis Of Tears

For continuous glucose monitoring Metabolites in tears can provide information about the concentration of these metabolites in blood and provide a non-invasive continuous monitoring technique. Iguchi et al. have reported the development of a flexible, wearable aerometric glucose sensor using immobilizedglucose oxidase on a flexible oxygen electrode (Pt. working electrode and Ag/AgCl counter/reference electrode). The biosensor is fabricated using Soft-MEMS techniques onto a functional polymer membrane (Iguchi et al., 2007). Others are working towards the development of a biosensor for self-monitoring of tear glucose and are currently in the animal testing stages (La Belle et al., 2014) (Yonemori et al., 2009).

VII. Food And Mouth Detection Technique

Rapid initial diagnosis of foot-and-mouth disease virus (FMDV) is essential for faster diagnosis. Several biosensors have been developed recently to provide portable systems for the diagnosis of FMDV. These have been reviewed extensively by Niedbalski (Niedbalski, 2016). The systems developed include lateral flow immune-chromatographic (LFI) for the detection of antibodies against FMDV proteins (Yang et al., 2015; Yang

et al., 2013) to detect FMDV serotypes O, A, Asia 1, SAT 2 and non-serotype-specific FMDV. Several FMD-specific real-time RT-PCR (rRTPCR) assays have been made into portable mobile platforms for in-field detection of FDMV. These include the Cepheid Smart Cycler Real-time PCR machine (Harps et al., 2002), and the BioSeeq-Vet (Smiths Detection). Genie I, a portable platform, also allows for the on-site detection of viral RNA by reverse-transcription loop-mediated isothermal amplification (RT LAMP) (Waters et al., 2014). Recently, rapid identification of FMDV has been reported using SpectroSensTM optical microchip sensors. Selective identification of FMDV is conducted in minutes and displayed as a yes/no readout using a hand-held device (Bhatt et al., 2012). Infrared thermography (IRT), a quantitative method for the assessment of body surface temperature, can be useful for the early detection of FMDV in the field. Temperature screening can be used to isolate potentially sick animals at an early stage and prevent the spread of disease. Microarrays, designed for laboratory diagnosis of FMD, offer greater screening capabilities for FMDV detection and can be regarded as an alternative to classical diagnostic methods. However, the apparatusneeds to be miniaturized and made portable before it can be used directly in the field.

VIII. Salivary Detection

Saliva sampling for disease and other biochemical markers of physiological health is an attractive alternative to blood sampling, as it is non-invasive in nature (Bandodkar and Wang, 2014). The method is particularly useful for animal monitoring and disease diagnostics, as blood collection from animals is considered to be a stress inducer and may have an impact on the biochemical parameters being diagnosed. The ability to collect and immediately analyses the salivary samples on-site provides numerous advantages for field applications. Biomarkers in saliva can be helpful in numerous ways, e.g.: (i) early detection and diagnosis of diseases; (ii) in supporting the decision-making processes for animal handling; and (iii) to monitor the progression of disease (Mallon et al., 2014). However, it must be noted that current analysis procedures, if applied to saliva, would require huge amounts of salivary probes for the biochemical assays. Although saliva sampling using oral fluid collectors and commercial devices (Mottram et al., 2004) is generally safe and convenient to use and provides a sufficient homogeneous sample with low viscosity, it still presents several shortcomings, such as (i) the requirement of supervision; (ii) the need to follow the procedures carefully to ensure sample adequacy; and (iii) it is a time-consuming process. Moreover, the assays for biomarkers in saliva have to be calibrated against the assays for blood samples to ensure the sensitivity of detection 737 and the robustness of the assays.

IX. Monitoring Animal Behavior

Monitoring movement and behavior can provide information on an animal's activity and wellbeing. A top-view camera can provide vital information if the animal is low-weight. Motion detection technology and video recording coupled with the Gaussian Mixture Model (GMM) can be used to gather information on animal size and identify low-weight animals (SA Et Al., 2015). MooMonitor integrates information on cow estrus, as well as data on rumination, [f]feeding and levels of activity. It makes use of wireless sensors for the two-way transmission of data. Other technologies, such as Herd Navigator™ and the Afimilk Silent Herdsman also serve the same purpose. The Silent Herdsman is a wearable technology and monitors all activities of cattle to analyses their behavior. Any changes in an animal's behavior pattern can be used to identify the estrus cycles and onset of disease/sickness[g].

X. Decision Support System

As per future aspect to maintain the animal population is most important thing as per the increase in human population the demand of diary product is increase as increase in population. As this future aspect to maintain the animal life is mandatory on this basis some decision can be taken by which those devices are come to prevent the animal life.

This integration of will be handled by decision support systems, with the help of detection technique which, to be most effective, must be robust under varying conditions; include technologies for rapid (automated) data collection via wireless data transmission systems (Ruiz-Garcia et al., 2009) (i.e., animal and environmental sensors); have substantial computing capacity for data analyses; have systems optimized to inform decision making and be reasonably easy to operate. The next breakthrough will be for these systems to use 'real-time biometry,' functioning in real time to monitor and control genotype, environment, wellbeing, productivity and animal product quality.

XI. Monitoring Data Analysis

Monitoring of real-time responses of animals while they suffer from problem like fever, change in blood circulation , respiratory system , blood pressure(BP), The sensors help to help to investigate or to find out

the exact problem is on , the basis of which we give a proper treatment allow a necessary diet . Advances in wearable belt or sensors that are flexible to tell the problem.

Sensors	***Application***	***Reference***
Grazing/Feeding Behavior	Pressure sensing	(Braun et al., 2013; Nydegger et al., 2010; Pahl et al., 2016; Rutter et al., 1997)[2]
Breath analysis		
Cortisol	Animal stress (cattle)	(Kim et al., 2011; Yamaguchi et al., 2013) Reviewed in (Singh et al., 2014)[3]
Disease		
Foot & Mouth Disease	Swine	(Gajendragad et al., 2001; Gomes et al., 1999; Niedbalski, 2016; Salomon et al., 2014; Yang et al., 2015; Yang et al., 2013)
Wireless Monitoring Beehive management		
Monitoring bee health beehive environment	Bees	(Bromenshenk et al., 2015; Evans, 2015; Meikles and Holst, 2015)

Table 1: Sensors application in animal health monitoring

XII. Conclusion

This is a big issue of animal health which is a very important part of nature. For preventing the animals from various diseases we see various sensors devices with the help of these devices it become easy to handle the animal'shealth.

By using the GUI it become easy to see the problem what the exact disease or problem is and in real time in proper time it get detect and cure it in time and preventthem from spreading.

By the various sensors byvoice Recognization bytesting posture detect a problem.

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