Mobile-Based Animal Vaccination System for Sri Lanka

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Abstract - Traditionally, animal vaccination is done by a veterinary doctor and the issue of vaccination record book/card is maintained by the pet owner. However, there are many issues in the traditional system, such as damaging the record book, forgetting to vaccinate their pets, and the veterinary doctor requiring to update manually. Although lots of pet care apps are available, hardly any pet vaccination app is found in other countries. Even in Sri Lanka, there is no digitalized method in the pet vaccination process. The mobile-based animal vaccination system covers the whole process of animal vaccination, and it can be used as a digital vaccine card. The system provides vaccine stock management, pet owner registration, pet profile maintenance, reminder alerting, and appointment management, event notifying, and reporting. Further, emergency and insurance claiming facilities available in the system have not been previously implemented for animals. Pet profile transferring is also possible in the system. The mobile-based animal vaccination system is developed using the ionic framework, and Geofencing is used to locate pet food and pet product shops. The system enhances the animal vaccination process in Sri Lanka, and the automated process will be a great benefit for pet lovers as well as veterinary professionals.

Keywords: animal vaccination, vet clinic, IT in health

I. INTRODUCTION

Traditionally animal vaccination is done by a veterinary doctor and issue vaccination record book. Pet Owners have to maintain the vaccination book (similar to the baby card) to prove that the animal has been vaccinated when an emergency occurs. The record book could be damaged or lost and hard to carry always during a visit to the veterinary doctor or veterinary clinic with the pet(s). Due to busy schedules, pet owners may forget to vaccinate their pets in the stated period. Similarly, there are many issues faced by pet owners and veterinary doctors during the vaccinating process. The veterinary doctor requires to carry out some documents related to animal vaccination. Veterinary doctors also require to update vaccine details and manage vaccine stocks manually and if the vaccination record book is lost, no other way to trace the history of the treatment, vaccine details, and pet's health.

There are lots of pet care apps in other countries. However, there is no digitalized method in the pet vaccination process in Sri Lanka or other countries. The mobile-based animal vaccination system can use as a digital vaccine card. The system come up with vaccine stock management, pet owner registration, pet profile maintenance, reminder alerting, and appointment management, event notifying, and reporting. Further, an emergency clicks and insurance claiming facilities available in the system have not been implemented before for animals. Pet profile transferring is also possible through the system.

Most of the pet care apps are focused only on pet owners but the mobile-based animal vaccination system enhances the quality of the animal vaccination process and provide better service to the pet owners, veterinary doctors, and veterinary hospitals or clinics.

The main aim of this project is to digitalize the process of animal vaccination. So, it will help to reduce diseases caused by animals and all the paper-based cards and forms from the process.

II. RELATED WORK

There are some vaccine apps to prevent diseases from animals (Andrew D. Gibson, 2015). But here we are focusing on the health of an animal.

Mission rabies app is implemented in Ranchi, India as a method of mass vaccination (Gibson, 2015). Over 20000 people die from rabies each year in India and according to their survey over 70% of people are affected by rabies from an infected dog. This bespoke smartphone app "Mission Rabies" was developed to facilitate data entry and team management too. here they are mainly targeting stray dogs and infected dogs. Thus, other domesticated animals are do not cover through this. Vaccinated dogs were marked with non-toxic paint along the top and back of the head to allow for identification of past vaccination surveys and prevent repeat vaccination.

Research on the vaccination of dogs in Sri Lanka was conducted by Professor Indira Silva (Silva, 2016). In the study, it was discovered infections, diseases, and types of vaccinations use for dogs in Sri Lanka. Further, she recommended dog vaccination, and the dog is considered the main target for rabies elimination in the research.

Method and system for providing animal histories and tracking inventory drug usage is a research which is done for providing up to date health histories of animals to identifying the animal and a data entry device coupled to a computer for recording the Indica elements (Bortolotti, et al., 2013). This system display health records, location, the net amount of drug taken for animal treatment from the inventory. The veterinary doctor also uses a computer for data insertion. It is not practical when the doctor is visiting the animal.

Multi-user system authoring, storing, using, and verifying animal information is a research which is done by Barrs Lewis, Tom Mayer, John Shorrock. A secure centralized repository for storing animal characteristic information, owner information, health information provided by a multiplicity of different user classes (Lewis, et al., 2003). A unique animal identification code used and stored in the database. The code serves as a primary key for an animal's electronic records and allows a records table easily associated with a particular animal. This is one of the best ways for legal issues because it has an authoring process. But this solution doesn't address mobility.

Some Sri Lankan researchers adopted existing technologies to create an electronic platform for rabies surveillance (De Silva, et al., 2017). Information entered by trained clinical staff and patient data is deployed in real-time. An automated short message service (SMS) alerts inform patients for vaccination follow-up, appointments and informs public health inspectors about an incident of animal bites. But intense to improve the completeness of surveillance and treatment, greater public engagement is needed and the cost for training and support staff is high in this project.

Web and mobile-based surveillance systems for humans and animals are conducted in the Kilosa district of Tanzania. The major objective of this project is to investigate an approach and practices to improve the communication of rabies surveillance information at different levels (Kipanyula, et al., 2016). The researcher has especially focused to establish the significance of applying a human sensor web system to strengthen the rabies surveillance system. They found that domesticated dogs are considered as the main transmission agent of rabies from animal to humans. Although this method has been implemented and little success has been recorded due to poor coverage, usually less than 25% during vaccine campaigns resulting from budgeting constraints, poor infrastructure, and poor response from dog owners in a rural setting where does dogs are considered valueless animals.

A survey of rabies antibodies in confined, hunting & roaming dogs in Nigeria is a research which is done by Daniel Oluwayalu. In this study, the researcher mentioned that vaccination is the most cost-effective method to eliminate rabies and the importance of keeping dog vaccine histories and demographic data (Oluwayelu, 2015).

E-surveillance in animal health is a system that is implemented by using mobile tools (Madder, et al., 2013). Short Message Service (SMS) is using for disease reporting. After the development of smartphones and tools has expanded, the probabilities of data collection have expanded. According to the research domestic animals are also very important for preventing diseases like rabies from the world.

Therefore, there should be a personal vaccination system and vaccination has proven to be a boon

for animal health as well as human health. Most of the researches is focused on mass vaccination. Thus, it will raise demand for a personal animal vaccination system for the guardian as well as for the veterinary doctor.

III. RESEARCH METHODS

Nearly eight (8) similar types of systems were studied during the literature review to identify the user requirements and the implemented features. Interviews are used to collect requirements from the sample. Sample (N=350) consists of veterinary doctors, veterinary clinic staff, and pet owners. In addition, observation of the work environment supports to implementation most practical solution. It helps to understand the process and bottlenecks of the current process easily.

The system is developed using an ionic framework. Ionic is the open-source hybrid mobile app development framework. Most people carry a smartphone these days for their daily activities. Hence, the mobile-based solution is very much feasible in implementation.

IV. RESEARCH METHODS

Below table 1 indicates the inputs, processes, and output of the system.

Table 1. Input, Processes, and Output of the Animal Vaccination System

Input	Processes	Output
• Accept the user's registration with their pets • Inventory stock inputs • Health record inputs	Store user details, pet details, health records in real time. Enable users to request for their appointments. Pushing reminders and notifications. Inventory Management.	• Display past records • Display reminders and notificatio n • Display profiles • Display reports

The mobile-based animal vaccination system provides three (3) views to the Pet Owner, Veterinary Doctor, and Veterinary Hospital/Clinic as illustrates in below Figure 1.

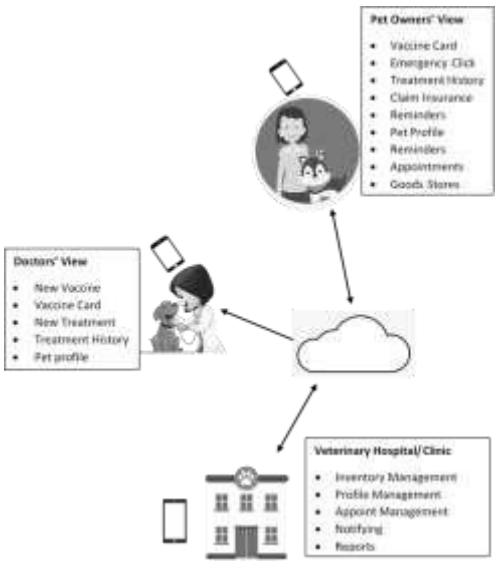

Figure 1. Overview of Mobile-based Animal Vaccination System.

Figure 2. Admin login

Figure 3. Pet Owner Dashboard

The pet owners able to make reminders and alerts. Emergency Click facility helps pet owners to call for a pet ambulance when an emergency occurs. Pet owners can transfer pet profile, vaccine, and treatment history to another person when selling or for any other reason.

Pet insurance is now available in Sri Lanka and pet owners can directly contact an insurance agent and claim for losses easily through the app with the novel feature of insurance claiming. Further, pet owners can find nearby animal food shops and pet product shops located. This feature developed is developed using Geo-fencing and it notifies shops around a 10m radius through a notification.

In veterinary doctors' view, the veterinary doctor can enter the vaccine details and treatment details, update the pet's health condition, and also view past records related to the pet's health and treatment/vaccinations.

Veterinary hospitals/clinics can maintain stock management, profile, and appointment management through the app. Veterinary hospital/clinic view provides to send notifications to their clients/pet owners about special events/notices. The system provides different types of reports related to daily operations and stock management.

The main user interfaces as follows:

Figure 4. Pet Owner profile search

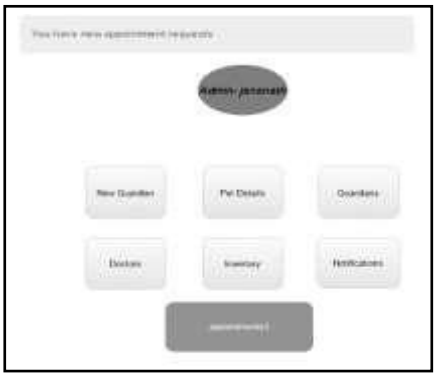

Figure 5. AdminDashboard

V. CONCLUSIONS

Traditionally animal vaccination in Sri Lanka is done by a veterinary doctor and issue vaccination record book. The Pet owner has to maintain that book (similar to the baby card) to prove that the animal has been vaccinated in case of an emergency. The record book could be damaged or lost and hard to carry always during visit the doctor with the pet(s). Due to the busy schedules of pet owners/guardians, they might forget to vaccinate their pets in the stated period. Similarly, during the vaccinating process, the veterinary doctor requires to carry some documents related to the vaccination. Veterinary doctors require to update vaccine details and manage vaccine stocks manually. Likewise, there are many issues in the current animal vaccination system.

At present, everyone carries a smartphone for their day-today activities. Hence, it is feasible to implement a mobilebased solution for animal vaccination to enhance the process. Digitalization of the veterinary process will be a great benefit for pet lovers as well as veterinary professionals. Because they can keep track of their animals without any hesitation. The online payment function will be implemented later as it will be useful to pet owners.

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