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WeRescue: An initiative to prevent another epidemic

Rakhi Bharadwaj
rakhi.bharadwaj@vit.edu
Vishwakarma Institute of Technology, Pune, Maharashtra

Ranjana Burange
ranjana.burange19@vit.edu
Vishwakarma Institute of Technology, Pune, Maharashtra

Aniruddha Bargaje
aniruddha.bargaje19@vit.edu
Vishwakarma Institute of Technology, Pune, Maharashtra

Deven Bhadane
deven.bhadane19@vit.edu
Vishwakarma Institute of Technology, Pune, Maharashtra

Shubham Bodake
shubham.bodake19@vit.edu
Vishwakarma Institute of Technology, Pune, Maharashtra

ABSTRACT

Bird flu, aphtha, BSE, and other major epidemics have happened on a regular basis since the 1980s. Some researchers also believe that the COVID-19 outbreaks we've seen in the last two years are originated from bats. The World Organization for Animal Health has more than sixty diseases that affect livestock and more than ten diseases that harm poultry and fowl on its list of specific diseases. Many people became infected with bird flu and other diseases as a result. However, no method for identifying and preventing epidemics exist. So, increasing awareness about a disease that is spreading in a certain location can be accomplished by alerting health officials about the circumstance and cases that are happening nearby. But, how can this be managed to accomplish? Hence, in this overview of challenges, we have proposed a system that will prevent and minimize suspected outbreaks with the help of web technology and data analysis.

Keywords: *Authentication, Data Visualization, Outbreaks, Web Technology, etc.*

1. INTRODUCTION

The global livestock and poultry population is growing rapidly in order to meet the increasing demand for meat and dairy products from the expanding human population. Effective methods for preventing and controlling serious animal and bird diseases, such as migrant propagation, epidemic monitoring and warning, emergency procedures, immune isolation, and so on, are almost inherently connected to geographic information. Both wealth and a scarcity of data make it difficult to predict livestock and bird diseases. International trade is a major motivation for countries to report and control infectious risks, as losing a "disease-free" status can have significant economic effects. The Covid-19 that we experienced in the year 2019 has had a global impact. Researchers and practitioners can just use machine learning to analyze large amounts of data to predict the spread of COVID-19 and other diseases to serve as an early warning for a potential pandemic and to categorize vulnerable populations. Here we introduce WeRescue: An initiative to prevent another epidemic. With the use of data analysis and visualization tools, the proposed solution can be used to prevent and suspect outbreaks, and also improve communication between health officials and volunteers.

2. LITERATURE REVIEW

The Maharashtra government, as well as other states, have implemented schemes and policies to prevent epidemics. Maharashtra's policy proposals include the State Scheme, District Planning Committee Scheme (DPC), National Livestock Mission Scheme under the Centrally Sponsored Scheme, and many others. [10]

Assam's government has implemented many initiatives to prevent animal and bird diseases. The Directorate of Animal Husbandry and Veterinary provides assistance for states for the control of animal diseases (ASCAD), the National Project on Rinderpest Eradication (NPRE), the National Animal Disease Reporting System (NADRS), and many more schemes and initiatives. [1]

The Netherlands government launched a portal to raise awareness of animal and bird welfare and to let people contact the appropriate Medicinal Unit to investigate the situation. [4]

3. METHODOLOGY

3.1 Technologies, languages, and libraries

Domain: Web Development and Data Analysis
Platform used: Visual Studio Code/Atom
Languages: HTML, JavaScript

Technologies used:

- Front-end

HTML:
It is a hypertext markup language used to create the front-end (the part which users can see and interact with) of the portal.

CSS:
CSS stands for Cascading Style Sheets and is used to design and format the look of a website.

JavaScript:
JavaScript is a programming language designed to provide users with a dynamic and interactive experience. JavaScript is used to write the majority of the project's functions and features.

EJS:
EJS is a basic templating language that uses plain JavaScript to build HTML markup. It has helped us to include JavaScript functionalities in HTML pages for this project.

- Backend

Node.js: Node.js enables the building of fast web servers in JavaScript by bringing event-driven programming to web servers. It's a programming language that's used to create websites and back-end API services.

Express.js: Express.js is a Node. js web application framework that is free and open-source. It is used to quickly and easily design and create web apps.

Mongoose: Mongoose is a MongoDB and Node.js Object Data Modelling (ODM) module. It manages data associations, does schema validation, and is used to translate between objects in code and their MongoDB representations.

- Database:

MongoDB:
MongoDB is a NoSQL database management system that provides high performance, high availability, and autonomous scaling.

- Data Analysis and Visualization

Plotly.js: Plotly.js is a library that helps to create makes graphs and charts easy to use in JavaScript applications. In this project, it is used to visualize data in order to predict the intensity of a crisis.

3.2 System Architecture

Fig-1: System Architecture

3.3 Project Design

In this project, there are essentially two modules: one for health officials and another for volunteers. The health officials module is designed for health officers who are responsible for directing the various investigation teams. With the necessary information, health officials can log in/sign up. They can see and review the posts that have been received from a specific region after logging into the system. They will be able to view visualization plots and charts that have been generated automatically into the system. If they discover anything suspicious, a team will be assigned to investigate and then Disease control and follow-up are required. Volunteers can register on a portal in the volunteer module. If volunteers come across any cases in the locality, they will report them to the health officials via the WeRescue portal. After that, visualisation would be carried out to assist health officials in suspecting outbreaks. If there is a risk of an epidemic, the WeRescue portal will alert local officials, who will then take the necessary disease control and follow-up actions.

3.3 System Flow-Chart

Fig-2: System flow illustration

3.4 Testing and Results

Volunteer Module:

Fig.3. Home Page of the portal

This is the portal's home page. Volunteers and health officials will be able to log in and sign up for the system, as well as navigate to different sections, via this page.

Fig-4: Login feature for Volunteers

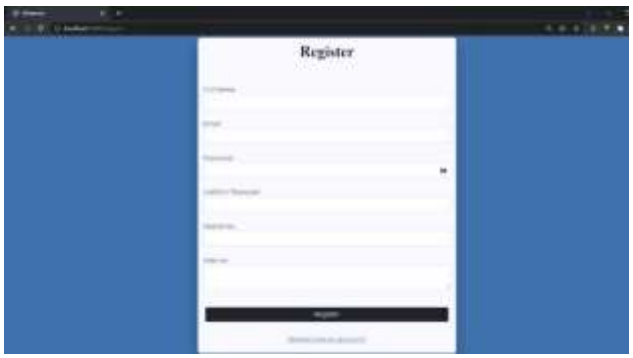

Fig-5: Sign up feature for Volunteers

These are the login/sign-up screens for volunteers who would like to register on the portal.

Fig-6: Create a post feature to report the cases

This feature will allow volunteers to report cases by filling out necessary details such as the address where the case occurred, a description of what happened, and pictures of the bird or animal concerned.

Fig-7: Illustrates status of posts that are submitted along with edit profile feature

After successfully logging into the system, the volunteer will be able to update his or her profile as well as publish posts to report on the cases that are happening. Here, he/she will also be able to see the status of the post means if the case is reviewed or not yet.

Health Officials Module:

Fig-8: Login/Sign-up feature of Health Officials

These are the login/sign-up screens for health officials to register on the portal.

Fig-9: Edit profile feature for Health Officials

After successfully logging into the system, health officials will be able to edit his or her profile by adding the information needed.

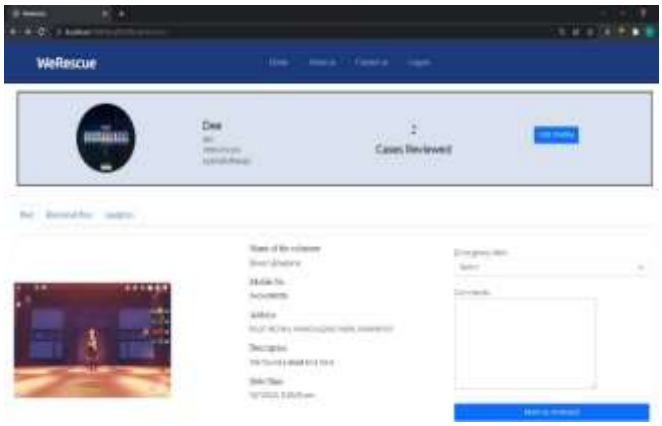

Fig-10: Review the received posts and create an alert

This screen is for health officials to review the volunteer posts that have been submitted. He or she will be able to take the required actions after analyzing the posts. It has features that allow it to generate an alert based on the severity of the incidents that are occurring.

Fig-11: Chat option for communication

In addition, health officers and volunteers will be able to communicate with one another regarding recent cases. Essentially, it would provide a convenient and efficient means of staying updated about suspected outbreaks.

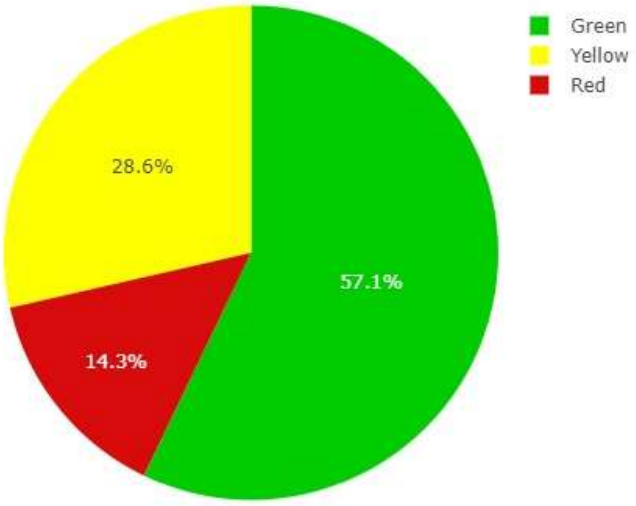

Fig-12: Pie Chart - The severity of alerts showing in three colors red, green, and yellow

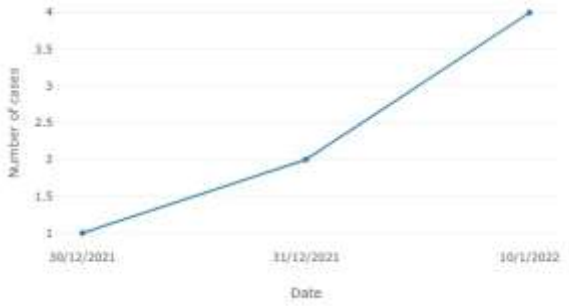

Fig-13: Line Graph - Illustrates the total number of cases in a city by date

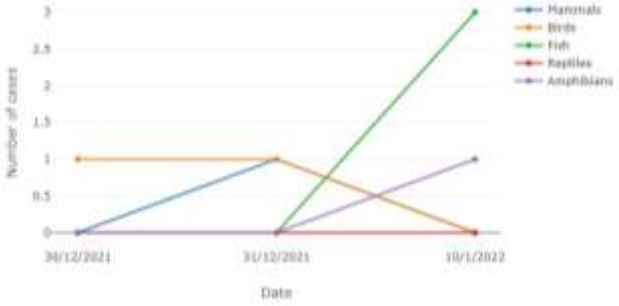

Fig-14: Multiple Line Graph-Number of cases by animal kingdom by date

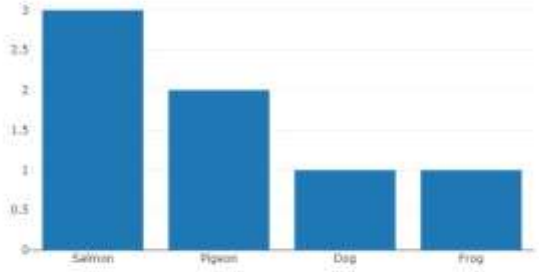

Fig-15: Bar chart - Distribution of cases for different animals and birds

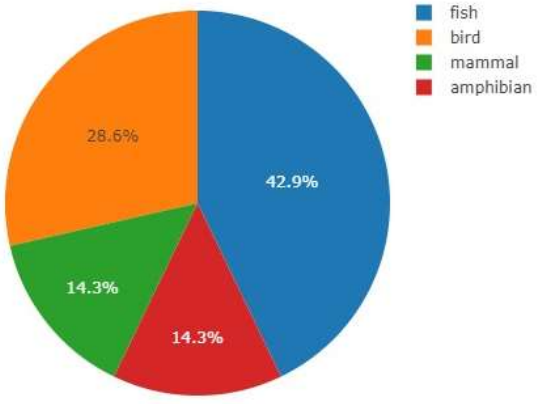

Fig-16: Pie Chart - Distribution of cases for a different kingdom

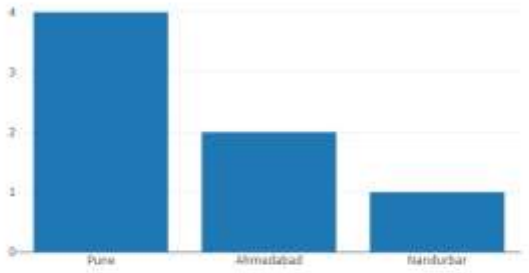

Fig-17: Bar chart - City wise case distribution

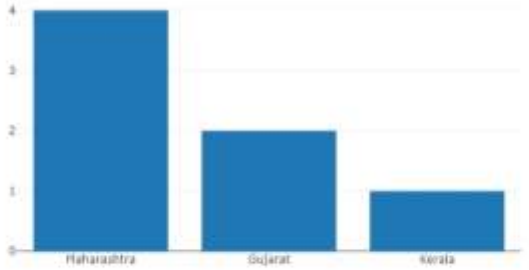

Fig-18: Bar chart - City wise case distribution

These images depict the graphs/charts that show the distribution of cases depending on various parameters. Health officials would be able to see these charts and graphs in order to suspect future epidemics.

4. CONCLUSION

The WeRescue is developed to bridge the gap between people and health officials in order to help and treat animals and birds in the area. It is believed that when WeRescue: An Initiative to Prevent Another Epidemic is put into practice, communication between people and volunteers will be simple and efficient. As compared to the traditional method of doing everything manually, reporting and reviewing the cases that occur would only take seconds. Both volunteers' and health officials' workloads would be automated and lightened.

5. REFERENCES

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