PetPal

Problem Definition

The uncontrolled presence of stray cats and dogs in public areas, and the fact that many are unvaccinated, raises health and safety concerns due to possible diseases that may result from bites or scratches. Hygiene is also at risk in places such as our own campus as they frequently wander around classrooms, cafeterias, and even dining areas. The absence of a monitoring system makes it difficult to locate animals and provide appropriate vaccination, increasing the risk of transmission of possible diseases. In addition, since their whereabouts cannot be tracked, it is not always possible to provide proper feeding and water to all of them. Therefore, addressing this issue has been identified as a priority to ensure public safety and promote responsible animal care.

Background Information

The presence of unvaccinated stray cats and dogs in public spaces poses health and safety risks, including potential diseases from animal bites or scratches. Their presence poses hygiene concerns, as they may carry parasites, diseases, and disrupt dining areas. This has led to divided opinions, with some advocating to leave them be due to affection, while others believe it exacerbates the problem. To solve this problem, this proposal presents a multifaceted system incorporating an app for highlighting areas with high animal activity, also offering a feature for the adoption of these animals, trackers and RFID emitters placed on collars to monitor animal movement, QR codes on animal collars for instant vaccination status checks, and smart food & water bowls located outside the campus, to encourage animals to spend more time outside the campus, which send alerts through the app when they need refilling. This proposal intends to couple this feature with spoilage monitoring sensors in food bowls, which send notifications to volunteers if any food is in danger of spoiling, allowing the food to be replaced before it spoils. In addition to QR codes, this proposal plans to use RFID detectors hidden in places people frequent to keep track of animal locations, also coupling this with a panic button style “I’ve been bitten!” button within the app, which reveals a list of all animals detected by the nearest RFID sensor to the user upon press. Additionally, users will be able to report if an animal is sick or injured by finding the profile of the animal by scanning the QR code on the collar, and submitting a report. Reports will be sent to a team of administrators, who will decide if the report is valid or not, and if the report is deemed to be valid a veterinarian will be alerted. In addition to these aforementioned features, this proposal suggests allowing food related businesses such as restaurants and cafes to donate unused meat that would otherwise be thrown out to the animals. Businesses will be given the choice of either having a volunteer come and collect the meat, or submitting it to a smart food bowl themselves.

This proposal plans to start in a small area, such as the university campus, using it as a test area for a period of time. Once tests have been completed and any unforeseen issues have been resolved, the plan is to implement the project in more areas such as parks and recreational areas within crowded cities.

Objectives

• Ensuring that food & water dispensers remain filled for at least 90% of the time by continuously monitoring fill levels and triggering refill notifications when needed. The system will track and analyze the ratio of empty vs. full dispenser time to assess performance and optimize refilling schedules.

• Creating smart food bowls designed for stray animals that are equipped with a system to keep the food fresh. This system should monitor the spoilage time of the food in the bowl.

• Giving administrators the ability to create profiles for street animals with their name, photos, and health status with vaccination details. Users will be able to write comments in these profiles, look for vaccination status in case of an incident, and submit adoption requests.

• Using AI and machine learning algorithms, the system will process data from GPS trackers and sensors to predict animal behavior, track high-activity areas, and generate heatmaps for effective intervention.

• Developing a mobile application that accurately updates animal locations on an interactive map with a refresh rate of at least once every 10 seconds.

• Giving users the ability to submit an injury or sickness report on an animal profile to let administrators know if an animal is in need of help, administrators will then validate the report and call a vet if necessary.

• Implementing RFID detectors, similar to alarm systems in shops, hidden in various places that people frequent, such as parks or dining areas, coupled with RFID emitters on collars and having a panic button style “I’ve been bitten!” button in the app, which when pressed lists every animal detected by the closest RFID detector to the user at the given time, allowing the user to choose the animal they’ve been attacked by based on photos, and check the vaccination status of the animal.

• Using an RFID system to detect when an animal is near a revolving door on campus, and altering the speed of the door accordingly, or stopping the door if needed.

• Allowing businesses to donate meat that would otherwise be thrown out via the app, and giving them the choice of either submitting the meat to a smart bowl themselves, or having a volunteer collect it.

Approval Signatures and GitHub Accounts

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