

ABSTRACT

The difficulty in locating loose pets is often a challenge for their owners. To answer this problem, an IoT-based tracking system was developed that is designed in the form of a special vest to keep the animal comfortable. The system consists of lightweight hardware that does not interfere with animal activities and an application that displays the position of the animal in real-time through a digital map connected directly to the user's cell phone. Test results show that cats take about four days to adapt to the vest. In testing the ability of indoor access when the network is inside, the average throughput reaches 545,917 kbps this figure causes the quality of data transmission to decrease, Meanwhile, when the device is outdoors but the network remains indoors, the throughput actually experiences a significant increase with an average of 728,237 kbps. This is due to the open space outdoors which allows the signal to spread more freely without much obstruction, so that data transmission becomes smoother and more stable, while in the test when the device and network are both outdoors, the average throughput is recorded at 649.891 kbps. Although the value remained high, there was a slight decrease when compared to the previous condition. This is likely due to open environment factors such as more variable distance between devices, signal interference that impacts packet loss and delay values. In the indoor test, the RSSI value showed 0 at a distance of 20 meters due to physical obstacles such as walls, while in the outdoor test, the signal quality improved. Testing the geofencing-based notification feature showed that the system started sending notifications consistently at distances above 10 meters with a 100% success rate. The system response was recorded to always be under 5 seconds, making the system responsive and in line with IoT performance standards. For the accuracy aspect, the tracking results show an average value of 0.86 meters, so this system is declared accurate because it has gone through direct testing. Battery life can last for 8 hours and 59 minutes on a single charge.

Keywords: *Pet tracking, IoT, geofencing, throughput, delay, RSSI, location accuracy, real-time system.*