

TagCly - predictive pet health management system using smart collar

K. Mirojan¹, S. Tharshan¹, S. Krishan¹, D. M. D. Dissanayaka², N. T. Weerawarna¹

¹*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

²*DMS Electronics (Pvt) Ltd, Sri Lanka*

The increasing presence of pets has created a need for proactive animal health management. Existing care practices are reactive, and, in many cases, making the treatment of health problems more expensive and a burden to the owner. Wearable pet technology aims at basic tracking and lacks abilities for forecasting. The proposed “TagCly” research is an Internet of Things (IoT) system that incorporates Machine Learning (ML) to ensure the health condition prediction of pets and alert the owner. “TagCly” has a microcontroller onboard with sensors for tracking temperature, movement, and a gyroscope module with location data tracking and heart rate with vocalization. Sensor data is sent via MQTT over Wi-Fi, with local buffering for disconnections; future upgrades include BLE and cellular for extended connectivity. This data is sent in real-time to the backend to be analysed and have an ML inference. Health analytics use Python-based ML models: Random Forests, regression, clustering, and anomaly detection. The anomaly detection performed with MERN-stack interface (MongoDB, Express.js, React.js, Node.js) provides an intuitive view, real-time analytics, and predictive warnings to dog owners. Testing was conducted using a synthetic dataset of over 8,000 samples, generated to simulate sensor readings and engineered features. TagCly achieved 89% accuracy in predicting behaviors and anomalies, and 92% accuracy in action reporting such as step-counting. Implementing predictive wearables for pets is an optimal practice for the preventive care of pets. The future research opportunities span from experimenting with the smart collar with different types of pets, ergonomics of wearable and improving the pet tracking area. “TagCly” will make pet care proactive, assist in promptly intervening with pets, reduce the expense of veterinary care, and empower pet owners with timely and action-based pet health initiatives.

Keywords: *Smart pet collar, IoT, Machine learning, Predictive health*