DEVELOPMENT OF A 3D ACCELEROMETER TO PREDICT DAIRY GOAT BEHAVIOUR

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This study focuses on the application of new technologies in the livestock sector, particularly those aiming at improving individual animal management through data collection and analysis of animal behavior. The goal is to use this data as livestock health and well-being indicators. The study incorporates a commercial triaxial accelerometer called Digitanimal® into goat farms to provide information about individual animal behavior. The study was conducted at an experimental farm for small ruminants, using a herd of 14 Murciano-Granadina goats in a non-productive state. The accelerometers were integrated into collars worn by the goats, recording position values of the X, Y, and Z axes at a frequency of 10 Hz. Behaviors such as lying down, standing, rumination, fighting, movement, and inactivity were observed and recorded during 4 hours per day, always in the morning. Behaviours were recorded through an app provided by Digitanimal®, specially designed for the validation of the devices. The collected data were synchronized with the recorded behaviors, and the predictive capacity of the accelerometer was evaluated using the Random Forest machine learning algorithm. The results showed that the Random Forest algorithm had a moderate to high prediction capability for behaviors such as inactive and lying down, with 46% and 100% accuracy, respectively. The algorithm also performed well in identifying movement behavior, with an accuracy of 82%. However, rumination and fighting behaviors could not be evaluated due to the limited amount of data collected.

The study demonstrates that this sensor could predict behaviors such as active, inactive, movement, and lying down in goats. However, more data and observation hours are needed to improve the accuracy of predicting rumination and fighting behaviors. The accuracy of human observers in labeling behaviors is also an important factor that influences data synchronization, training, and validation. In conclusion, this study highlights the potential of using these specific accelerometers and machine learning algorithms to monitor and assess livestock behavior, providing valuable and promising insights into animal health and well-being.