Web-based animal behavior study service for researchers based on the smartphone inertial central

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Abstract

Smartphones, particularly Iphones, are equipped with high performance inertial units and absolute positioning systems that are traditionally used to measure user behavior. They are also very relevant instruments for researchers in animal behavior. In this work, a lambda cloud architecture and web services are developed to archive and process high-frequency data from the inertial center of an Iphone 4S using behavioral classification algorithms. In addition, a web interface for encoding behavior observed on videos allows to synchronize the observations with the measurements.

Introduction

The Internet of the things offers tremendous opportunities in the fields of smart breeding by making it possible to know at any moment the state of health of the animals and to detect the problems rather before they become worse.
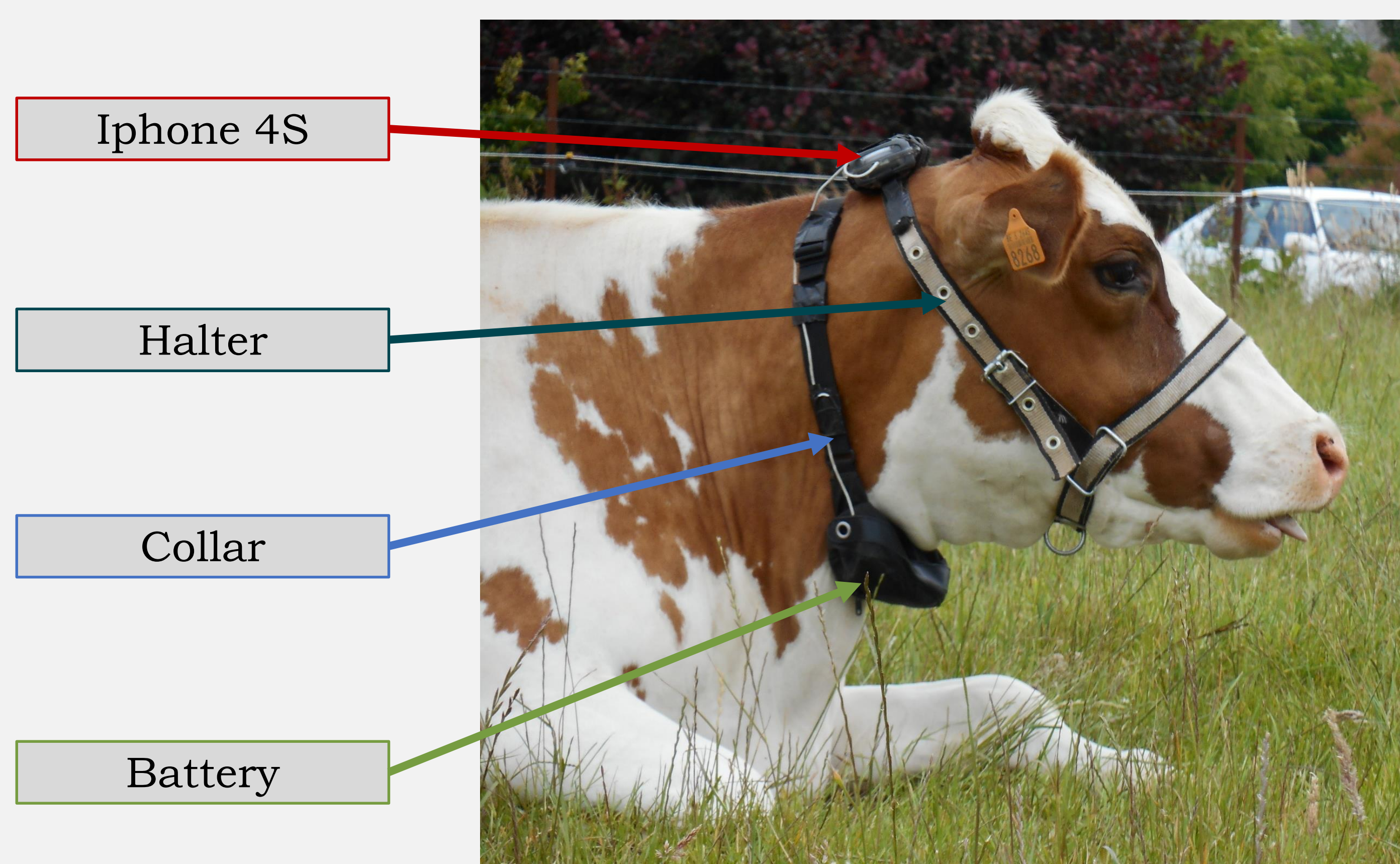
The crossing of data from these new sensors allows to develop new models offering new research opportunities in animal behavior, health and indirect measurement of the state of their environment.

However, technological challenges in smart agriculture are still numerous: protection of production data, collection and processing of high frequency data (up to 100 Hz), storage and processing of large amount of data (several tera up to several peta bytes).

Objectif

The aim of this work is to design an online platform capable of collecting data with high frequency (100 Hz) from the Iphone 4S inertial units placed in the neck of cows in order to realize a behavioral model.
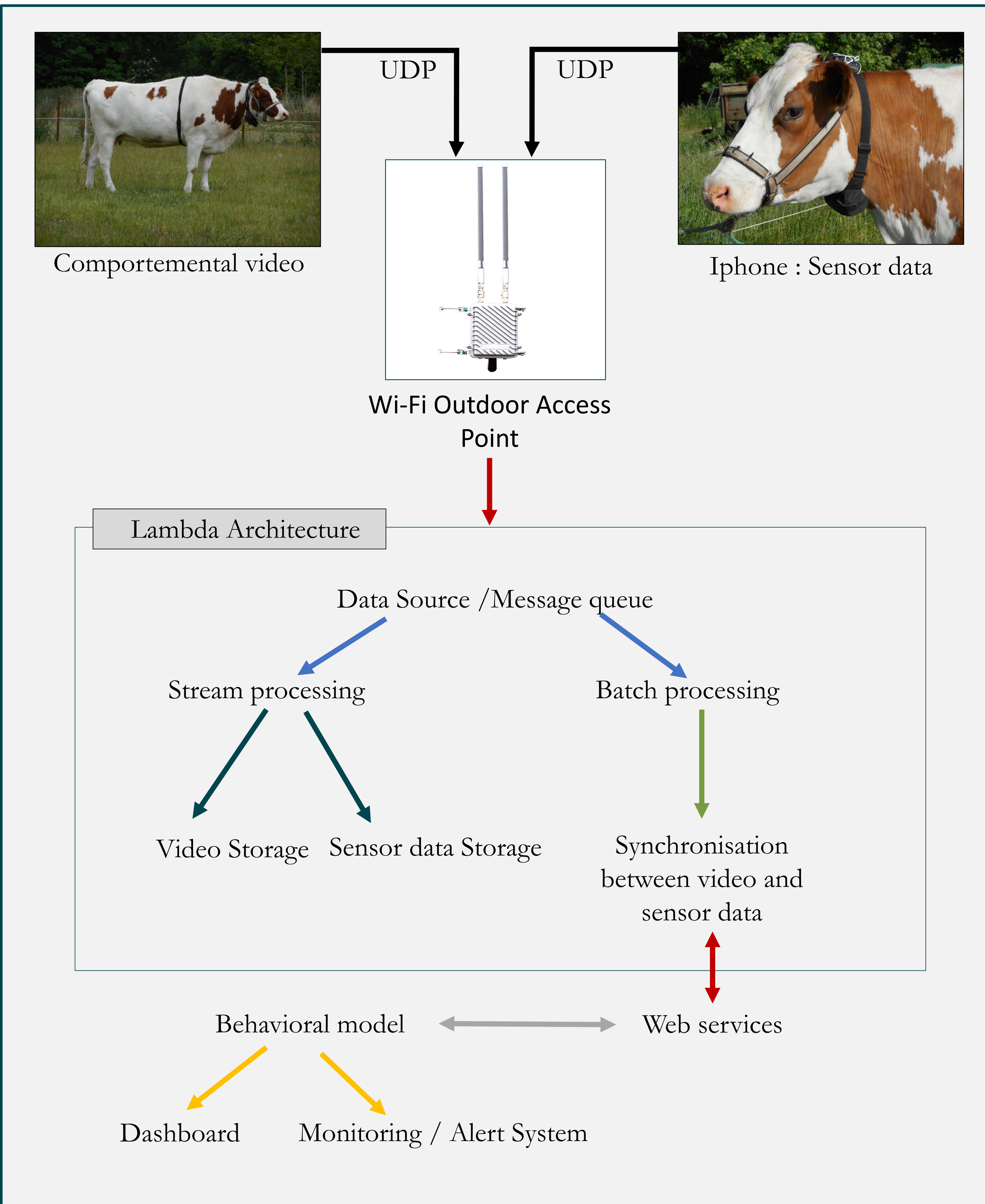
Material

- Iphone 4S
- Halter
- Collar
- Battery

Platform architecture

Comportemental video — UDP — Wi-Fi Outdoor Access Point — UDP — Iphone : Sensor data

Lambda Architecture
Data Source /Message queue
Stream processing — Batch processing
Video Storage — Sensor data Storage — Synchronisation between video and sensor data
Behavioral model ↔ Web services
Dashboard — Monitoring / Alert System
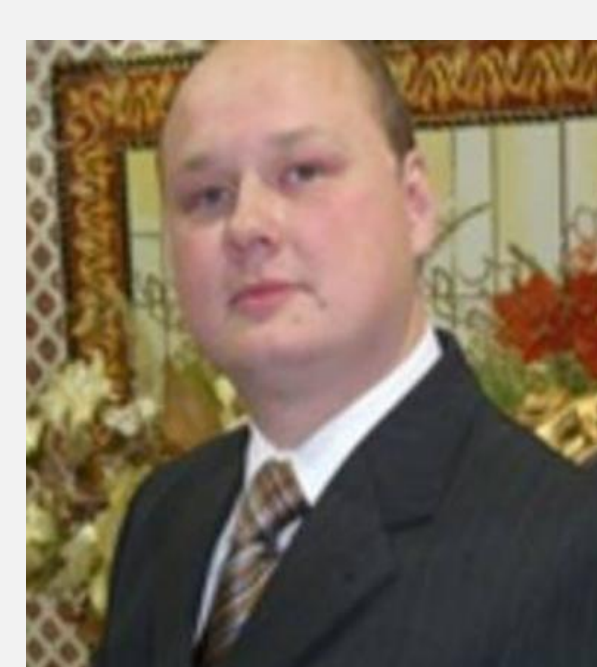
Conclusion

The relationship between the parameters measured by the inertial units of the Iphone and the tagged images endower to know the behaviors, the health status of the animals situated in the prairie and the state of the grazing.

Acknowledgment

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