Using a Wearable Device to Estimate Dog Emotions and Generate SNS Sentences from the Dog's Perspective

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Interpreting a dog's emotions via physiological metrics plays a crucial role in deepening humandog connections and promoting animal welfare. This thesis presents a pioneering wearable device that circumvents the usual hindrances of dense fur by measuring heart rate variability (HRV) at the ear, a region typically sparser in fur coverage[1]. The device incorporates photoplethysmograph (PPG) sensors within an earring-style design that optimizes signal fidelity, showcasing an evolution in monitoring techniques adapted to the varied conditions of a dog's anatomy.

Foundational research validates HRV as an effective biomarker for emotional states across species[2, 3, 4, 5, 6]. However, its application in dogs has not been as extensive. This investigation critically explores the association of specific HRV indices, notably SDNN and RMSSD[7, 2], with dog's emotional states, both positive and negative. Utilizing these dedicated HRV metrics, the study offers a comprehensive emotional assessment, contributing a pivotal analysis tool for various behavioral contexts.

A pivotal development of this thesis is the system's capacity to generate social media sentences that reflect these emotions from a dog's perspective, creating a novel form of interaction that deepens the connection between owners and their pets. By translating complex physiological data into relatable and engaging narratives, owners can share their dog's experiences in an innovative way, fostering a social presence that truly captures the canine viewpoint.

The research encapsulates the expansion of non-invasive monitoring tools within the realms of veterinary science and household pet care. It highlights the trajectory of future development in technologies designed to decode and interpret dogs' behaviors and emotions. This progress marks strides toward improved interspecies communication, aiming to elevate the overall quality of life shared by dogs and their human families.

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