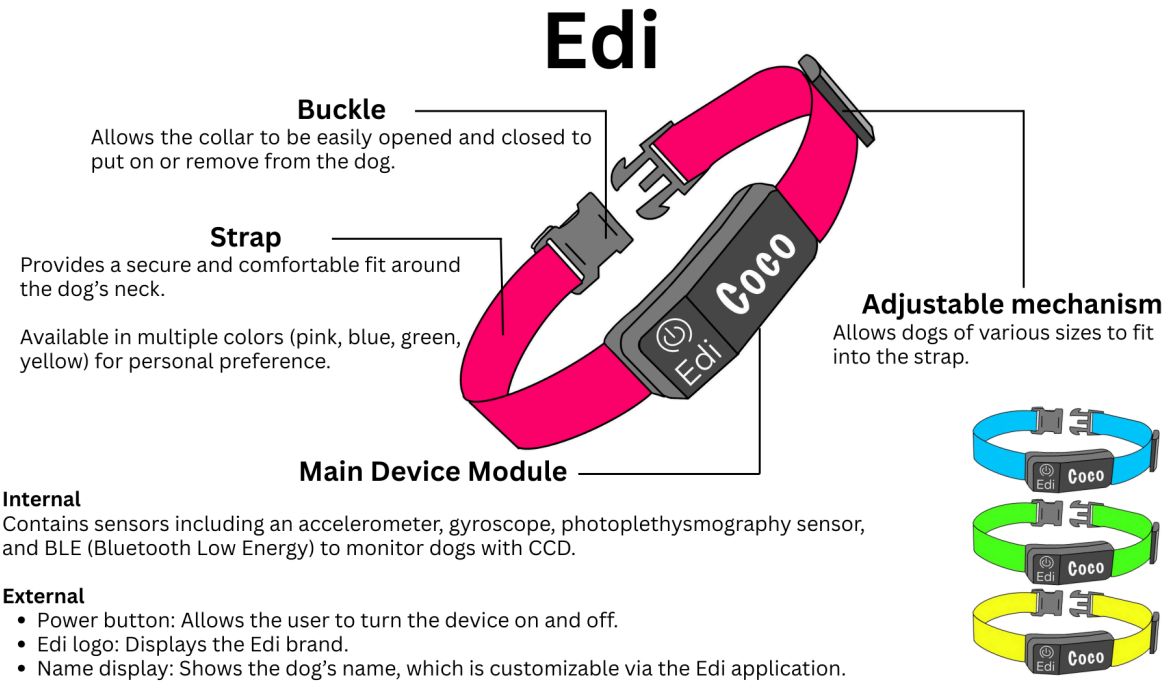
The number of pet owners is increasing globally. In the U.S. specifically, 66% of households own pets, a 10% increase since 1988. Along with this trend, the number of households with senior pets has also risen, from 41.6% in 2012 to 52.4% in 2022, as pets' life expectancy has nearly doubled. As a result, Canine Cognitive Dysfunction (CCD), commonly known as dog dementia, has become more prevalent as one of the key issues associated with aging. Pets are part of our families. Just as humans with dementia require extra care, pets with CCD need special support. However, there are currently no solutions for dogs with CCD. To address this growing problem, Edi was developed, a smart wearable device for dogs that detects unusual behavior and sends alerts to owners concerned about their dogs.

The purpose of Edi is to support dogs suffering from CCD. Its target users are pet owners who need to monitor the health and behavior of dogs with CCD. Between 14% and 35% of the global dog population experiences CCD. The signs of CCD include disorientation, confusion, changes in behavior, anxiety, restlessness, impaired memory, and disruptions in sleep cycles. Edi helps build better lives for both dog owners and their dogs by providing real-time notifications about their dogs' behaviors and health.



Notes

- There will be multiple sizes to accommodate dogs of different sizes—small, medium, and large.
- The strap will be luminous colors (pink, blue, green, and yellow) that glow in the dark, helping owners easily spot their dogs.

Edi is a versatile smart wearable that offers various functions to support dog owners. The first function of Edi is to monitor the behavior of dogs. Dogs with CCD often show unusual behaviors, including repetitive movements, changes in activity levels, disorientation or confusion, and wandering. Edi detects these unusual behaviors using accelerometers and gyroscopes. Accelerometers measure linear acceleration across multiple axes and detect changes in speed and direction, which helps to identify behaviors such as walking, pacing, or freezing. Gyroscopes measure angular velocity and detect head tilts,

shakes, and other rotational movements. For example, accelerometers and gyroscopes can recognize when a dog gets stuck between furniture by detecting repeated movement in the same location without any change in position. Of course, Edi might have utilized cameras and an AI model; however, this requires significant power, making the accelerometer and gyroscope superior due to their efficient power consumption. Not only that, but accelerometers and gyroscopes also have the advantage of not requiring direct skin contact and of enabling real-time detection of unusual behaviors. After Edi detects a dog's unusual behavior, Edi sends notifications to the owner's mobile device. The notifications for the dog will be sent via BLE (Bluetooth Low Energy), which transfers small amounts of data between nearby devices. Unlike standard Bluetooth, BLE is designed for low power consumption. This makes it suitable for fitness devices like Edi, which have small batteries and require energy-efficient communication. The notifications that indicate unusual behavior in the dog reduce the owner's burden, as they don't have to constantly supervise their dog.

The second function of Edi is to monitor the health condition of dogs. Dogs with CCD not only show unusual behaviors but also suffer from health issues such as disrupted sleep patterns. Edi detects changes in the sleep cycle by using the accelerometers. For example, dogs with CCD often wake up in the middle of the night, and accelerometers can measure increased movement and restlessness during these periods. In addition to the sleep patterns, Edi will detect stress levels by measuring the dogs' heart rate. One of the symptoms of CCD includes high anxiety, which can lead to altered activity levels and decreased appetite. Photoplethysmography (PPG) sensors measure heart rate and heart rate variability, which are important for assessing stress levels. PPG will detect changes in heart rate by using light to measure blood flow through the skin. Of course, Edi can incorporate an electrocardiogram (ECG) sensor instead of a PPG sensor, as an ECG can measure heart rate more accurately. Admittedly, using an ECG sensor instead of a PPG sensor is possible, as an ECG can measure heart rate more accurately. However, PPG sensors are less invasive and more comfortable for continuous monitoring than ECG, as ECG sensors require adhesive electrodes (sticky pads). Edi stores data about the dog’s daily sleep patterns and stress levels and sends the data to owners using BLE. The sleep data helps owners respond accordingly and adjust their care routines to better support their dogs. The dogs’ stress levels and sleep patterns will also be displayed using visual representations to present the data effectively. The AI system will analyze the dog’s overall health for the week and provide summary comments, helping owners better understand and manage their dog’s condition effectively.

The third function of Edi is to send daily routines to support memory improvement in dogs. Dogs with CCD experience disruptions in the areas responsible for learning and memory (the cerebral cortex) and coordination (the cerebellum). To manage memory loss, dogs need to follow regular routines such as feeding, walking, and bedtime. Dog owners will enter information about their dogs' routines, including specific times, tasks, and locations. Edi will send notifications each day at the set times to help owners ensure their dogs follow these routines.

Edi allows owners to monitor unusual behaviors and health conditions and sends notifications that help them follow routines designed to support memory enhancement. Edi is a practical and affordable solution for dogs with CCD. Let Edi be their voice when they can’t speak for themselves. Support your furry family member with Edi!