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Box Inside/Outside Detection Radar AI Model

Overview

The Box Inside/Outside Detection App is a cutting-edge Edge AI application designed to detect whether a person is located within or outside a predefined 60 cm x 60 cm area using radar sensor data. Leveraging advanced neural network technology, this application provides accurate and real-time inference for contactless monitoring. With configurable area settings, it offers flexibility to adapt to various use cases, making it an ideal solution for consumer electronics manufacturers aiming to integrate intelligent, future-proof functionalities into their products.

Key Features

- **Radar-Based Detection:** Utilizes Infineon's XENSIV™ 60GHz radar sensor for high-precision detection to accurately determine whether a person is inside or outside a defined area.
- **Configurable Area:** Default detection area of 60 cm x 60 cm, with customizable dimensions to suit specific application needs.
- **Low Resource Usage:** Optimized for low memory footprint and fast inference time, ideal for resource-constrained embedded systems such as PSoC™ 6, PSoC™ Edge microcontrollers.
- **Privacy-Focused:** Processes all data locally on the edge device, ensuring no personal data is sent to the cloud.
- **Easy Integration:** Seamlessly integrates with Infineon's ModusToolbox™ software and supported hardware kits.
- **Neural Network Inference:** Employs a robust neural network model for precise and reliable detection in real-time.
- **Edge AI Integration:** Fully optimized for edge devices, ensuring low latency and efficient performance.
- **Contactless Operation:** Enables seamless, non-intrusive monitoring for enhanced user experience.

Key Benefits

- **Simplified Development:** Pre-trained and tested Edge AI model reduces development time, allowing manufacturers to focus on product innovation.

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- **High Accuracy:** Reliable detection across various environmental conditions and user scenarios.
- **Flexible Integration:** Configurable area settings enable easy adaptation to diverse applications and device requirements.
- **Future-Proof Design:** Machine learning-based approach ensures scalability and adaptability in competitive consumer markets.
- **Efficient Performance:** Optimized for low resource consumption, making it suitable for resource-constrained edge devices.

Key Use Cases

- **Smart Home Devices:** Enhances home automation systems by detecting presence in specific zones for automated lighting, security, or appliance control.
- **Retail Analytics:** Monitors customer presence in designated areas for foot traffic analysis or personalized marketing.
- **Healthcare Monitoring:** Enables contactless patient monitoring in confined spaces, such as hospital beds or recovery areas.
- **Industrial Safety:** Detects personnel in restricted or hazardous zones to ensure compliance with safety protocols.
- **Gaming and Interactive Systems:** Provides intuitive, contactless control for immersive user experiences in gaming or interactive displays.

Sensor settings – radar

- Sample rate: 2000000
- Features: Doppler, Azimuth

Supported Devices

- Infineon PSoC™ 6
- Infineon XENSIV™ BGT60TR13C