HEALTH GUARDIAN

MILLIMETER WAVE RADAR

www.iflabel.com

DALIAN IFLABEL TECHOLOGY CO., LTD.

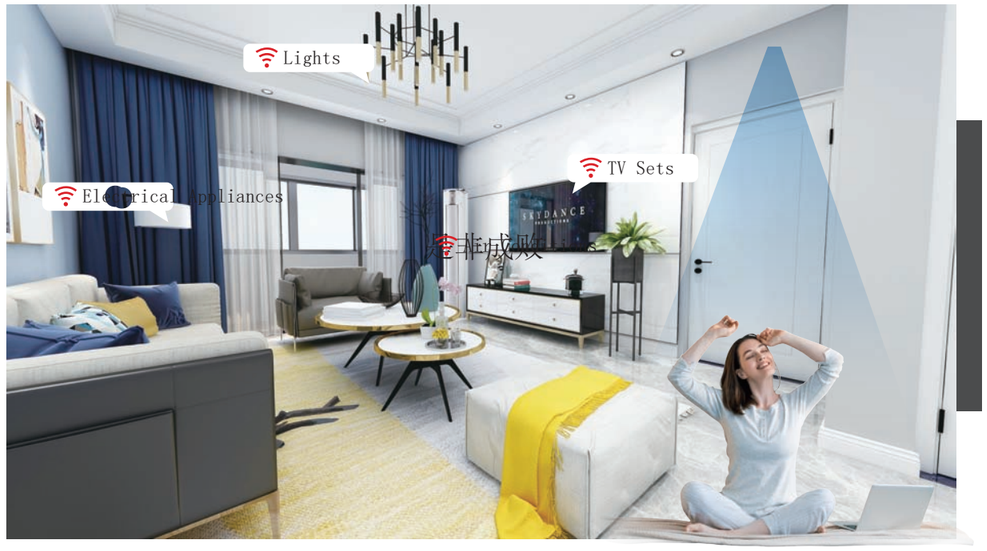
ifLabel is a millimeter wave radar sensor solution provider. Our vision is making life easier by creating seamless interaction between people and things.

Semiconductors enable have become an indispensable part of everyday life. We play a key role in shaping a better future - with micoelectronics that link the real and the digital world.

What our products can do?
Human presence, Human body fall detection, Breathing and heartbeat monitoring, Tracking and identifying people, People counting, Human posture capturing

WORKING PRINCIPLE

Working frequency band:30-300GHz (Wavelegth of 1 to 10mm)
Currently used frequency band: 24GHz, 60GHz, 77GHz



Radar offers a host of advantages over passive infrared (PIR) technology in motion detection applications. These include greater accuracy and more precise measurement of detected objects, paving the way for new capabilities in speed detection and motion sensing. These advanced capabilities enable many consumer goods such as robots, smart home devices, and even lights to "see" their surroundings and respond dynamically.

Designed to support a wide range of industrial, consumer and automotive applications, Iflabel's millimeter wave (mmWave) radar portfolio offers both FMCW as well as Doppler radar sensors supporting 24GHz, 60GHz, 77GHz.

PRODUCT APPLICATION

01
HUMAN PRESENCE DETECTION

In working, the sensor first emits FMCW and CW radio waves to the sensing area. Next, the radio waves, reflected by all targets which are in moving, micro-moving, or extremely weak moving state in the area, are converted into electrical signals by the millimeter-wave MMIC circuit in the sensor system. After that, these signals will be sent to the processor and processed through the related signal and data algorithms. Then, the target information can be solved out

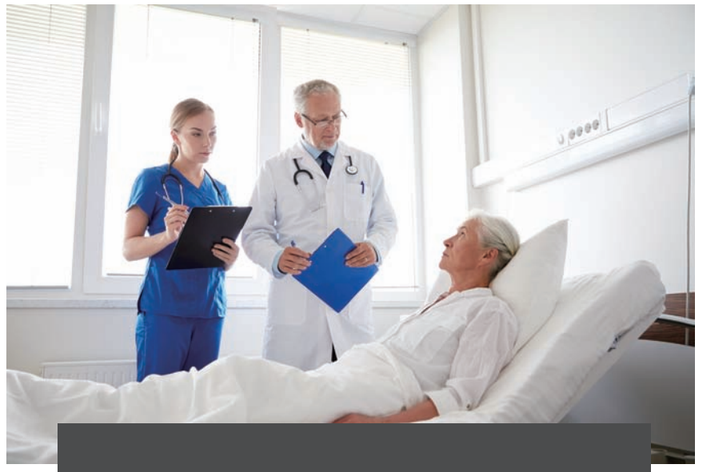
02
SLEEP MONITORING

Continuous monitoring of human's breathing and heart rates is useful in maintaining better health and early detection of many health issues. Designing a technique that can enable contactless and ubiquitous vital sign monitoring is a challenging research problem. We show that the mmWave signals can be directed to human's body and the Received Signal Strength (RSS) of the reflections can be analyzed for accurate estimation of breathing and heart rates. We show how the directional beams of mmWave can be used to monitor multiple humans in an indoor space concurrently. We also provides sleep monitoring with sleeping posture identification and detection of central apnea and hypopnea events. It relies on a novel human finding procedure where a human can be located within a room by reflection loss-based object/human classification.

03

FALL DETECTION

The mmWave Fall Detection Radar Sensor Module is a self-contained near distance sensor(NDS) based on Iflabel mmWave FMCW industrial radar. The unit is built with the enhanced Doppler radar signal processing mechanism and standard algorithm which enables distinguishing between the occupied and unoccupied conditions and identifying human activities in a self-adaption environment, especially human falling.
It is an ideal solution for high-accurate, self-regulation, privacy-protected, secure biotic radar systems in individual applications, such as elderly health care, smart home, human behave detecting, danger alarm.



04

VITAL SIGNS MONITORING

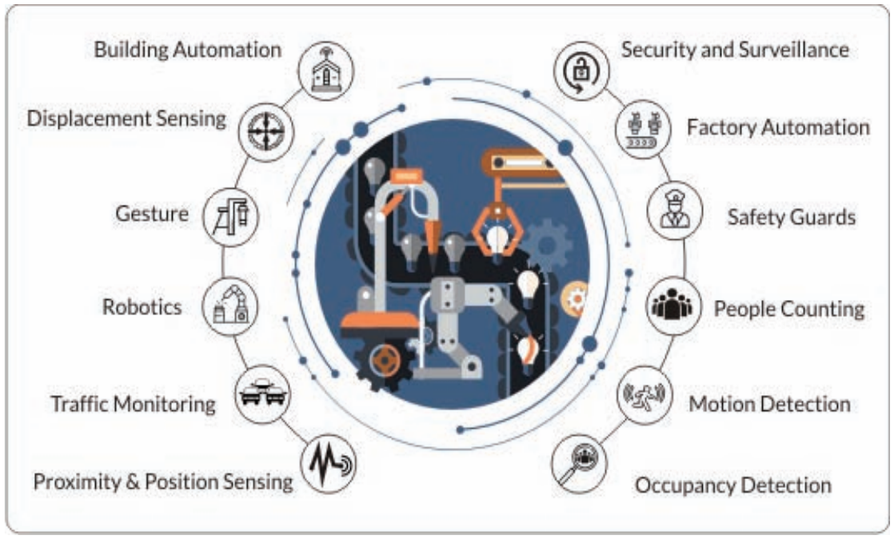
Millimeter wave (mmWave) radars transmit electromagnetic waves and any objects in the path reflect the signals back. By capturing and processing the reflected signals, a radar system can determine the range, velocity and angle of the objects. The potential of mmWave radar to provide millimeter level precision in object range detection makes it an ideal technology for sensing human bio-signals. In addition, mmWave technology brings in an advantage of contactless, continuous surveillance of a patient, making it more convenient for the person and the user.

05

PEOPLE COUNTING

The use of people counting systems outside of retail has seen an acceleration as an increasing range of businesses in sectors as diverse as transport, banking and financial, hospitality, healthcare and sports and entertainment strive to increase efficiencies through the use of data.

APPLICATION



Automotive ADAS

Healthcare

Machine Vision

Security and Surveillance

Building Automation

Smart City Applications

01

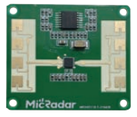
24GHZ RADAR SENSOR MODULES

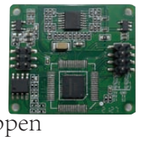
1.1 IR24VDA Human Presence Detection Radar

Description	The Human Presence Radar Sensor is a self-contained, privacy-protectively, safety mmWave module operating at 24GHz. With the enhanced Doppler radar and the standard algorithm, the module is an ideal solution for individual applications like smart home, smart hotel and danger alarm.
Feature	Enabled theory: Apply Doppler radar technology with Near Distance Sensor(NDS) operating at 24GHz Standard algorithm: Distinguish occupied/unoccupied conditions and identify human activities in the self-adaption environment Perfect privacy protection: Provide surveillance capabilities without identification Customizable radar: Support secondary development including radar parameter, protocol, antenna, function
Dimension	⩽35mm×30mm×5mm
Operating frequency	24-24.25GHz
Transmit Power	6DBM
Operating voltage	3.3V
Power consumption	5V/93mA
Detection Distance	Horizontal 90° Vertical 60°
Output format	⩽13 m
Installation	Serial/TTL
Detection method	Active/Static , Occupied/Idle, Body perception Top/Sideways/Horizontal Hotel, Office, Home, Prison Doppler, FMCW

1.2 IR24FDA Fall Detection Radar

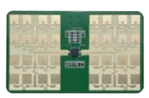
Description	It is an ideal solution for high-accurate, self-regulation, privacy-protected, secure biotic radar systems in individual applications, such as elderly health care, smart home, human behave detecting, danger alarm
Feature	Detect falls in large, indoor environments Utilizes a point cloud vs a person's identifiable features Support secondary development, suitable for a variety of scenarios
Dimension	⩽35mm×30mm×5mm
Operating frequency	24-24.25GHz
Transmit Power	6DBM
Operating voltage	3.3V
Power consumption	5V/93mA
Detection direction	Horizontal 90° Vertical 60°
Detection Distance	⩽13 m
Output format	Serial/TTL
Output	Active/Static , Occupied/Idle, Body perception, Fall alert
Installation	Top/Sideways
Scenarios	Nursing house, Apartment, Home, Where fall-down to happen
Detection method	Doppler, FMCW





1.3 IR24BDA Sleep Breathing Monitoring Radar

Description	This radar module applies Doppler radar detection technology to implement human sleep quality monitoring, detecting body moving and stationary along with human breathing rate, providing a fully private and secure environment, independently from other noisy influences.
Feature	Health-friendly working status: Output power as low as harmless to human body High stability: Independ from temperature, humidity, noise, airflow, dust, light and other environmental influences High flexibility radar: Support secondary development and adapt to various scenarios
Dimension	⩽46mm×27.5mm×5mm
Operating frequency	24-24.25GHz
Transmit Power	6DBM
Operating voltage	3.3V
Power consumption	5V/93mA
Detection direction	Horizontal 40° Vertical 40°
Detection Distance	⩽2.75 m
Output format	Serial/TTL
Output	Active/Static , Occupied/Idle, Breathing rate, Awake/Deep & light sleep
Installation	Horizontal(not suitable for breathing & sleep detection)/Top/Sideways
Scenarios	Nursing house, Apartment, Home, Where sleep quality is concerned
Detection method	Doppler, FMCW



02 60GHZ RADAR SENSOR MODULES

2.1 IR60FD1A Fall Detection & Posture Recognition Radar

Description	The fall detection & posture recognition Radar Sensor is a ideal for fall detection applications since it is able to detect falls in large, indoor environments, can distinguish between a person sitting and falling, and utilizes a point cloud vs a person's identifiable features, which allows the sensor to be used in areas where privacy is vital such as bathrooms and bedrooms
Feature	Detect falls in large, indoor environments Can distinguish between a person sitting and falling Utilizes a point cloud vs a person's identifiable features which allows the sensor to be used in areas where privacy is vital. Support secondary development, suitable for a variety of scenarios
Dimension	⩽35mm×30mm×5mm
Operating frequency	58-63.5GHz
Transmit Power	6DBM
Operating voltage	3.3V
Power consumption	5V/93mA
Detection direction	Horizontal 100° Vertical 100°
Detection Distance	⩽4 m
Output format	Serial/TTL
Output	Active/Static , Occupied/Idle, Body perception, Fall alert
Installation	Top/Sidewaysl
Scenarios	Nursing house, Apartment, Home, Where fall-down to happen
Detection method	FMCW

2.2 IR60TR1A Multiple Object Tracking Radar

Description	Precise localization and tracking of moving objects is of great interest for a variety of emerging applications including IoT. The localization and tracking tasks are challenging in harsh wireless environments
Feature	Motion object detection, micro-motion object detection, people counting Built-in program algorithm Support secondary development, suitable for a variety of scenarios
Dimension	⩽35mm×30mm×5mm
Operating frequency	58-63.5GHz
Transmit Power	6DBM
Operating voltage	3.3V
Power consumption	5V/93mA
Detection direction	Horizontal 100° Vertical 100°
Detection Distance	⩽8 m (Static, Radial)
Max. count number	10
Max. tracking number	3
Output format	Serial/TTL
Output	Active/Static , Occupied/Idle, Body perception, Fall alert
Installation	Horizeontal
Detection method	FMCW

2.3 IR60BH1A Breathing & Heartbeat Monitoring Radar

Description	IR60BH1A 60GHz radar module applies FMCW to detect personal breathing rate and heart rate in high accuracy, leaving the people a real private and secure environment.
Feature	Motion object detection, micro-motion object detection, people counting Built-in program algorithm Support secondary development, suitable for a variety of scenarios
Dimension	⩽35mm×30mm×5mm
Operating frequency	58-63.5GHz
Transmit Power	6DBM
Operating voltage	3.3V
Power consumption	5V/93mA
Detection direction	Horizontal 80° Vertical 80°
Detection Distance	⩽2 m
Output format	Serial/TTL
Installation	Top/Sida-way/Horizeontal
Detection method	FMCW

2.2 IR60PC1A People Counting Radar

Description	Precise localization and tracking of moving objects is of great interest for a variety of emerging applications including IoT. The localization and tracking tasks are challenging in harsh wireless environments
Feature	Detecting the position and number of people moving around freely within a constrained area. Support secondary development, suitable for a variety of scenarios
Dimension	⩽35mm×30mm×5mm
Operating frequency	58-63.5GHz
Transmit Power	6DBM
Operating voltage	3.3V
Power consumption	5V/93mA
Detection direction	Horizontal 80° Vertical 80°
Detection Distance	⩽15 m (Moving, Adult) / ⩽8 m (Static, Radial)
Max. counting num	10
Max. tracking num	3
Output format	Serial/TTL
Installation	Top/Sideway/Horizeontal
Detection method	FMCW

03 77GHZ RADAR SENSOR MODULES

3.1 IR77BHM1 Breathing & Heartbeat Monitoring Radar

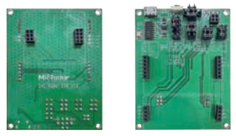
Description	IR77BHM1 77GHz radar module applies FMCW to detect personal breathing rate and heart rate in high accuracy, leaving the people a real private and secure environment.
Feature	The distance from the body to the radar can be measured, Real-time detection of respiratory rate and heart rate, Built-in program algorithm Support secondary development, suitable for a variety of scenarios
Dimension	⩽60mm×45mm×5mm
Operating frequency	77-78GHz
Transmit Power	10DBM
Power consumption	5.0V/250mA
Detection Distance	0.1-2 m
Output format	Serial/TTL
Installation	It is recommended to be fixed horizontally on the wall or placed on the table with the radar wave facing the body and the center of the wave facing the chest
Detection method	FMCW

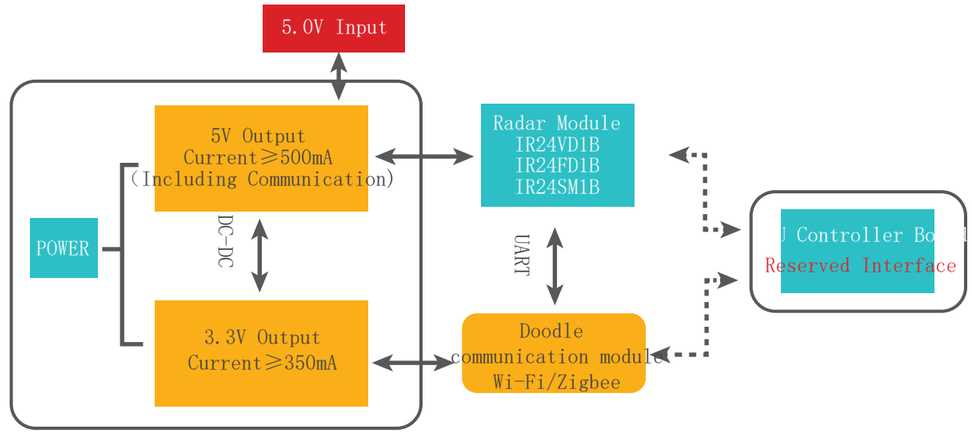
04

DEVELOPMENT KIT

4.1 DERADAR-24G

Description	In order to make it more convenient for users to understand the functions of the radar module and quickly access to the wireless universal module, we designed the development kit to support pluggable mode, and can freely build their own service platform. With MCU board interface, The users can use their MCU to communicate with radar and wireless module respectively.
Feature	Can be used in the 24GHz or 60GHz band module Embedded program development and debugging Finish hard product demo, Implement project development with communication module. Understand the working principle of radar, output parameters and interface protocol
Power supply input	Micro USB - DC 5.0V ⩾500mA
Output voltage	DC 5.0V, 3.3 V
TTL serial port	It can be used as a debugging interface
Function interface	Radar module, communication board, MCU board, optical sensor board
The others	1 button, 4 indicators

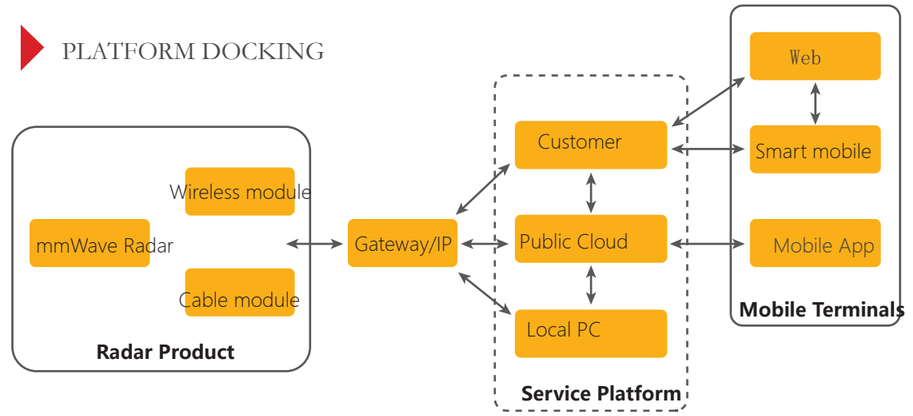




THE ADVANTAGES OF RADAR MODULE

High Precision: Higher measurement accuracy such as speed, distance, angle etc., can measure the motion amplitude of 0.1mm object.
Environmental Adaptability: Not affected by light, temperature, haze and so on
Reliability: FCC and RoHS certified.
Cost Performance: High
Privacy Protection: No characteristic parameter collection, No cameras, No privacy leaks

PLATFORM DOCKING



Third Party Service Platform
Standardization of radar data format protocol and network communication protocol
Transmission, such as HTTP and MQTT

Public Cloud Platform
Graffiti IoT, Ali Life IoT, Hilink.....
Graffiti IoT: OEM can mass-produce complete solution (Wi-Fi, Zigbee, Cat1)
Graffiti IoT: Cloud docking, API call

Customized Products
The customized platform solutions through evaluation

TECHNICAL SUPPORT

Application Manual	Provide module product manual, user manual, typical application module sample trial test
Technical Support	Application engineers provide on-line technical support
Test equipment	Equipped with a series of R & D test equipment, self-developed series of batch production testing production line.
Custom protocol/ Application development	Seek customized agreements according to customers; Support partial application development based on application scenarios