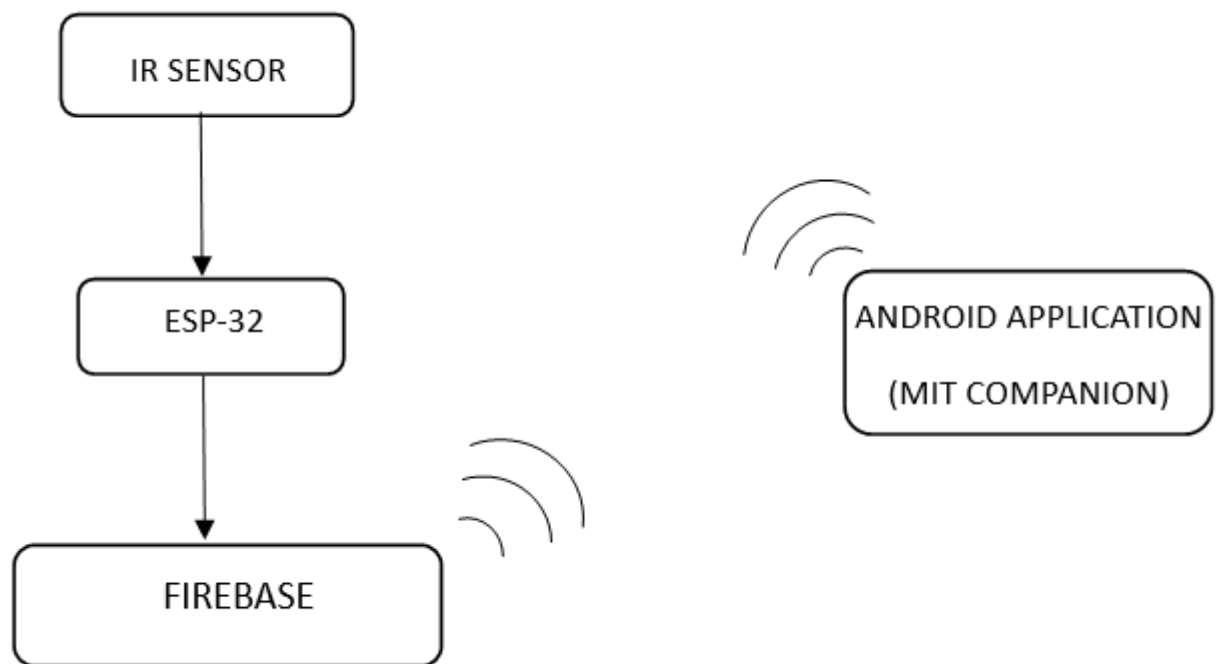


OVERALL ARCHITECTURE



Overall architecture

IR SENSOR : In motion detection systems, IR sensors, particularly passive infrared (PIR) sensors, are commonly used due to their effectiveness in detecting changes in infrared radiation emitted by objects within their field of view.

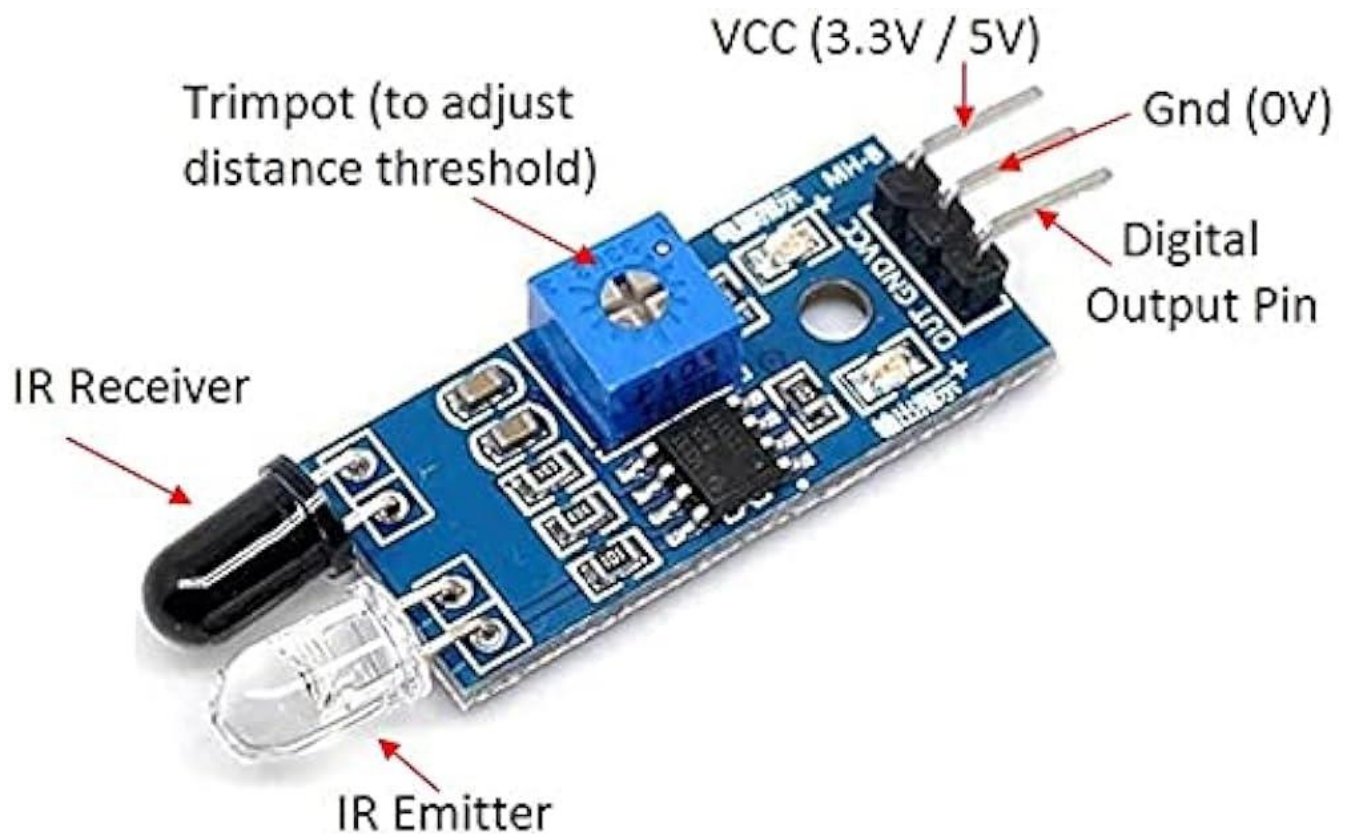
1. **Detection Principle:** IR sensors detect changes in infrared radiation levels in their surroundings. They consist of pyroelectric sensors that generate an electric charge when exposed to infrared radiation.
2. **Field of View:** IR sensors have a specific field of view (FOV) within which they can detect motion. When an object moves within this FOV, it causes a change in the infrared radiation patterns detected by the sensor.

3. Signal Processing: The output from the pyroelectric sensor is processed by electronic circuitry to amplify and analyze the signal. When motion is detected, the sensor triggers an output signal, indicating the presence of motion.

4. Threshold Setting: Motion detection sensitivity can be adjusted by setting a threshold level for the detected changes in infrared radiation. This helps in minimizing false alarms caused by environmental factors like temperature changes or small animals.

5. Application: In motion detection systems, PIR sensors are often used in conjunction with other components such as microcontrollers, relays, or alarms. When motion is detected, these systems can activate lighting, trigger alarms, or initiate other actions based on programmed instructions.

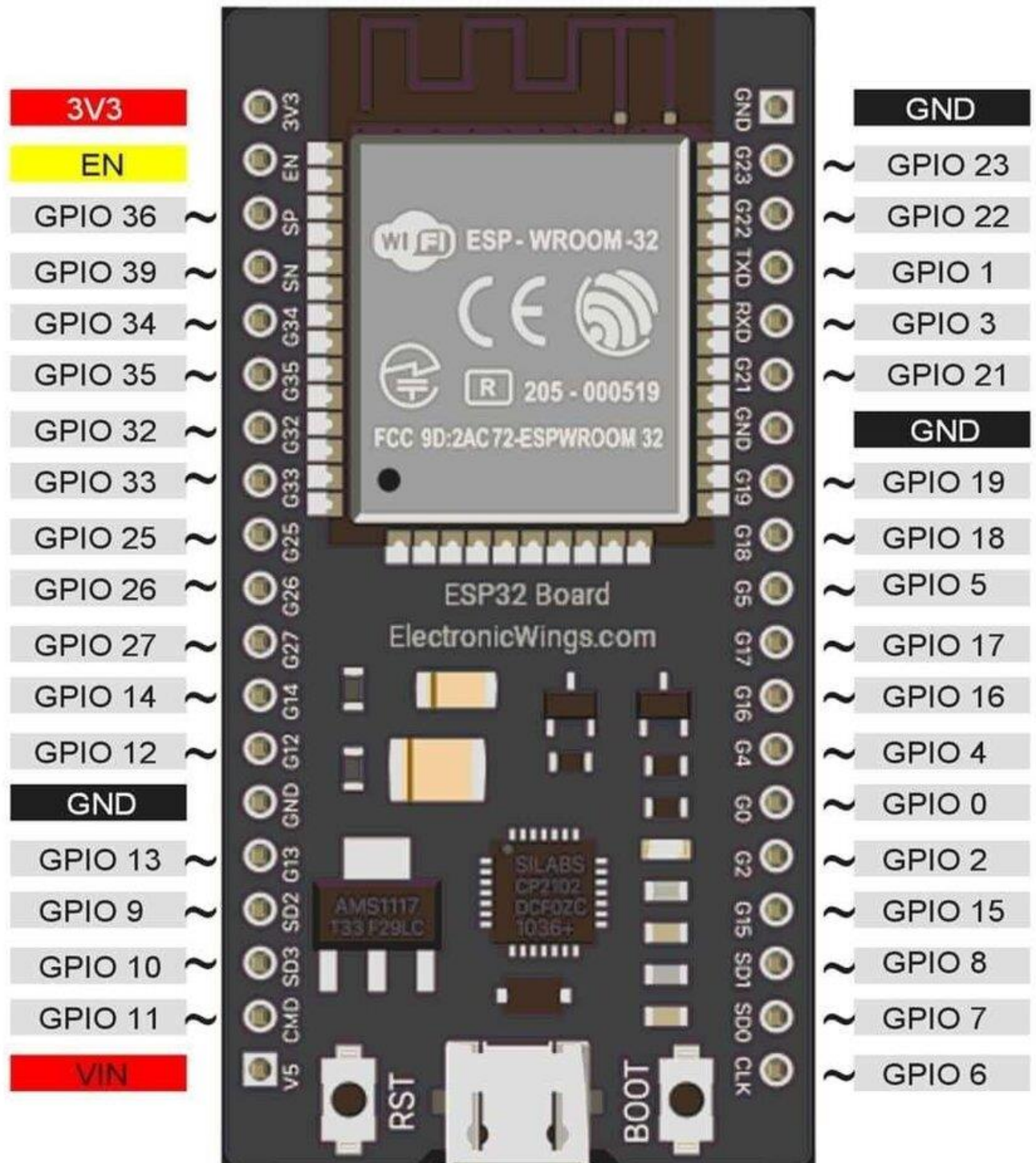
IR sensors are widely used in motion detection applications due to their reliability, low cost, and ease of integration into various systems for security, automation, and energy conservation purposes.



IR SENSOR

ESP-32 : The ESP32 is a versatile microcontroller chip renowned for its integrated Wi-Fi and Bluetooth connectivity, dual-core processor, and low power consumption. With a rich set of peripherals, including GPIO, SPI, I2C, UART, ADC, and DAC, it's ideal for interfacing with various sensors and actuators. Its built-in security features, such as secure boot and cryptographic hardware acceleration, ensure the safety of IoT applications. The ESP32 can be programmed using popular development frameworks like Arduino IDE and ESP-IDF, offering flexibility to developers. Its vibrant ecosystem and extensive documentation support a wide range of IoT projects, from home automation to industrial applications. Overall, the ESP32's combination of features,

performance, and affordability has made it a preferred choice for hobbyists, makers, and professional developers alike.



ESP-32

FIREBASE : Firebase is a versatile platform designed for the development of mobile and web applications. It encompasses a rich array of tools and services aimed at simplifying various aspects of app development and management. At its core, Firebase offers features such as a realtime database, authentication services, and Cloud Firestore, a scalable NoSQL database solution. Developers can leverage Cloud Functions to execute backend code in response to events, while Firebase Hosting ensures fast and secure web hosting for their applications. Firebase Storage facilitates seamless file management, while Analytics provides valuable insights into user behavior and app performance. Remote Config allows for on-the-fly customization without necessitating app updates, and Cloud Messaging enables cross-platform notifications. Additionally, Crashlytics furnishes real-time crash reporting, aiding developers in swiftly identifying and resolving issues to enhance overall app stability and user experience. Together, these components form a robust ecosystem that empowers developers to build, monitor, and optimize their applications effectively.

