

# Bootcamp Journey: Robotics with ESP32 and Arduino Nano

Embark on an intensive 7-day journey into the world of robotics, mastering the fundamentals with the powerful **ESP32** and **Arduino Nano microcontroller**.

# Day 1: Introduction & Basics

1

## Robotics Fundamentals

Understood the core concepts of **robotics**, including types of robots and their applications.

2

## Electronics Primer

Reviewed essential electronic components like **resistors**, **capacitors**, and **breadboards**, and basic circuit building.

3

## Arduino IDE Setup

Set up and familiarized with the **Arduino IDE**, the primary development environment for our projects.



# Day 2: IR Sensors & Calibration



## Understanding IR Sensors

Explored how **Infrared (IR) sensors** work for obstacle detection and line following.



## Calibration Techniques

Learned to calibrate **IR sensors** using the **Serial Monitor** for accurate readings.



## Data Visualization

Visualized sensor data to understand noise and signal patterns for robust robot behavior.

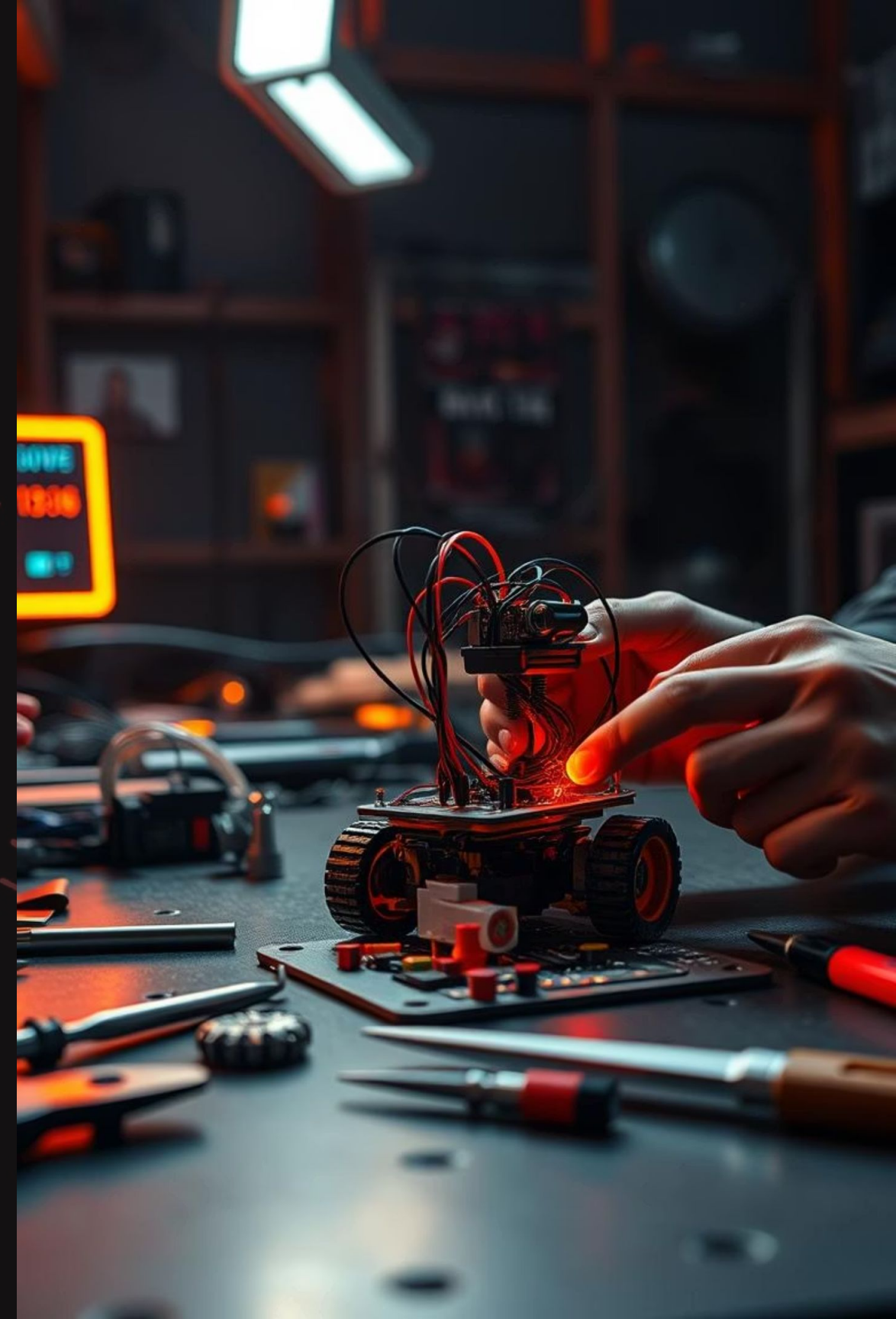


# Day 3: Building the Bot

Assembled the physical chassis of our **line-following robot**.

Mounted **DC motors** and wheels, ensuring proper alignment for smooth movement.

Integrated the **IR sensors** onto the bot's base, positioning them for optimal line detection.



# Day 4: Bot Testing & Refinement

On day 4, we put our newly assembled robots to the test and began refining their performance.

1

## Initial Movement Tests

Conducted basic tests for motor control and directional movement to ensure hardware functionality.

2

## Line Following Algorithm

Implemented a simple **line-following algorithm** based on IR sensor feedback.

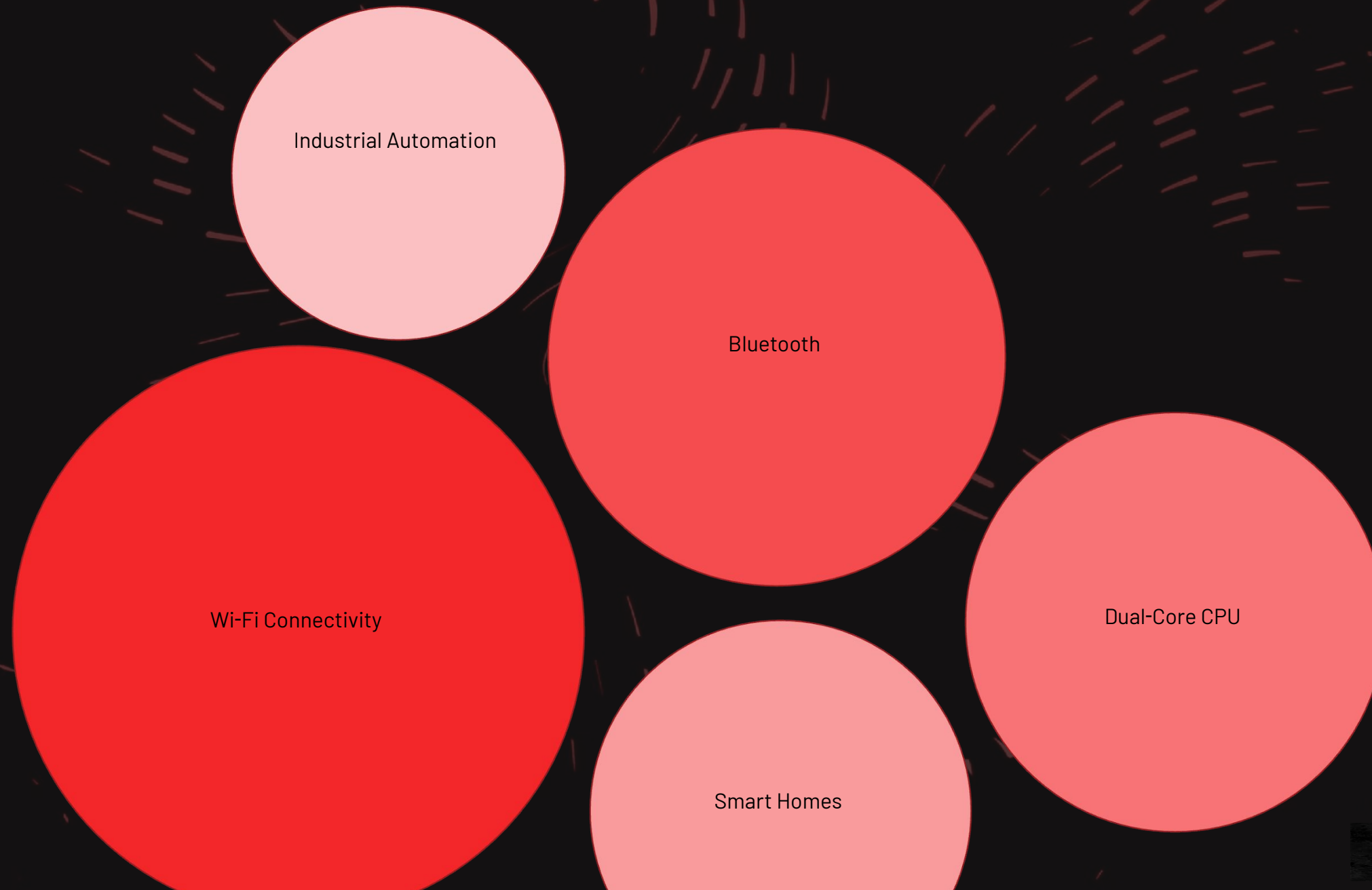
3

## Debugging & Tuning

Identified and debugged issues with sensor readings and motor response, fine-tuning the robot's behavior for better accuracy.

# Day 5: Introduction to ESP32

The **ESP32** is a powerful, low-cost **microcontroller** with integrated Wi-Fi and Bluetooth capabilities, making it ideal for IoT and robotics projects.





# Day 6 & 7: Advanced Integration & Final Testing

## 1 8-Array Sensor Integration

Connected the **8-array IR sensor** to the **ESP32**, leveraging its multiple pins for more precise line detection.

2

**Advanced Control Code**  
Developed more sophisticated control algorithms to handle complex turns and intersections using the **8-array data**.

3

## Final Performance Tests

Conducted comprehensive tests on diverse tracks, evaluating speed, accuracy, and robustness of our **ESP32-powered robot**.

