Sensor name - MPU9250 IMU
Communication protocol - I2C
Configuration MPU9250 gyroscope to ±1000 dps, accelerometer to ±2g.

Arduino C++ code reads data from an IMU sensor (gyroscope + accelerometer) over I2C, calculates pitch and roll angles using a Kalman filter, and prints smoothed data (angles, acceleration) to the serial console. It also adaptively blends gyroscope integration and accelerometer angles to produce stable orientation estimates.

How we normalized data:

Sensor	Raw range	Sensitivity	Formula	Units
Accelerometer	[-32768, 32767]	16384 LSB/g	raw × (9.81 / 16384)	m/s²
Gyroscope	[-32768, 32767]	32.8 LSB/(°/s)	raw / 32.8	°/s

How we make data smoothed:
KalmanFilter2D - Filters pitch/roll separately for smoother angle estimation.
Low pass filter for acceleration:

$$filteredAccel = \alpha \cdot newAccel + (1-\alpha) \cdot previousFilteredAccel \quad \boldsymbol{\alpha = 0.2}$$

Data flow diagram: