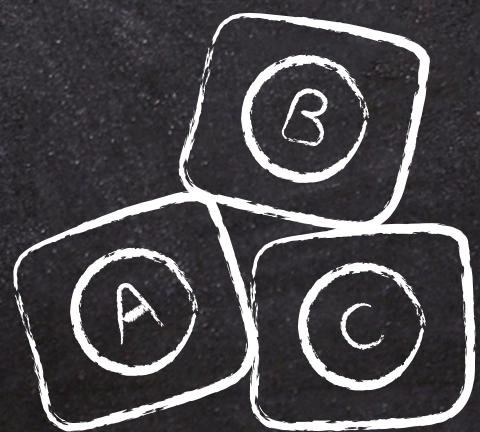


# Industry-Ready Smart Multimeter Using Microcontroller Systems



# Problem & Motivation

01

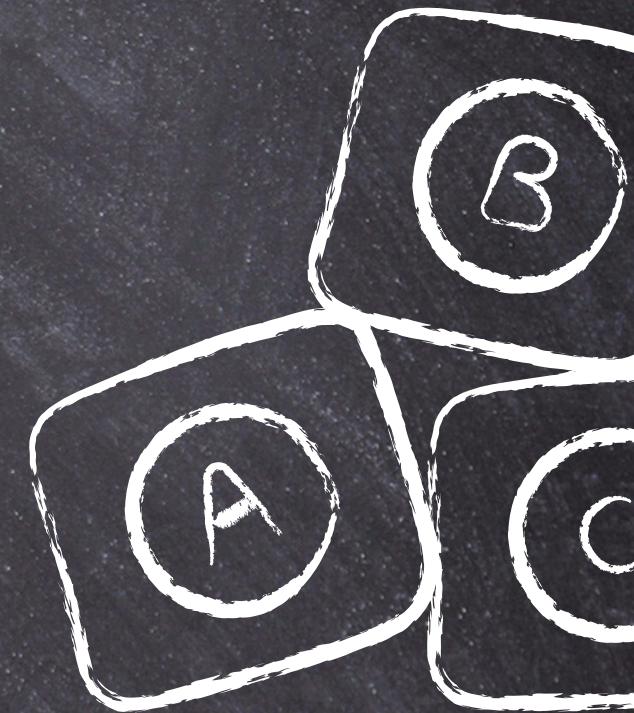
## The Issue with Current Lab Multimeters

- Limited or slow auto-ranging
- No mobile connectivity for logging or analysis
- Cannot visualize readings or store measurement history
- Accuracy varies across ranges; lacks smart calibration
- Not optimized for modern industry-level precision

02

## Why Our Project Matters

- Labs need a fast, accurate, and smart measurement tool
- Demand for devices that can analyze data, not just display numbers
- A modern multimeter should be connected, precise, and intelligent



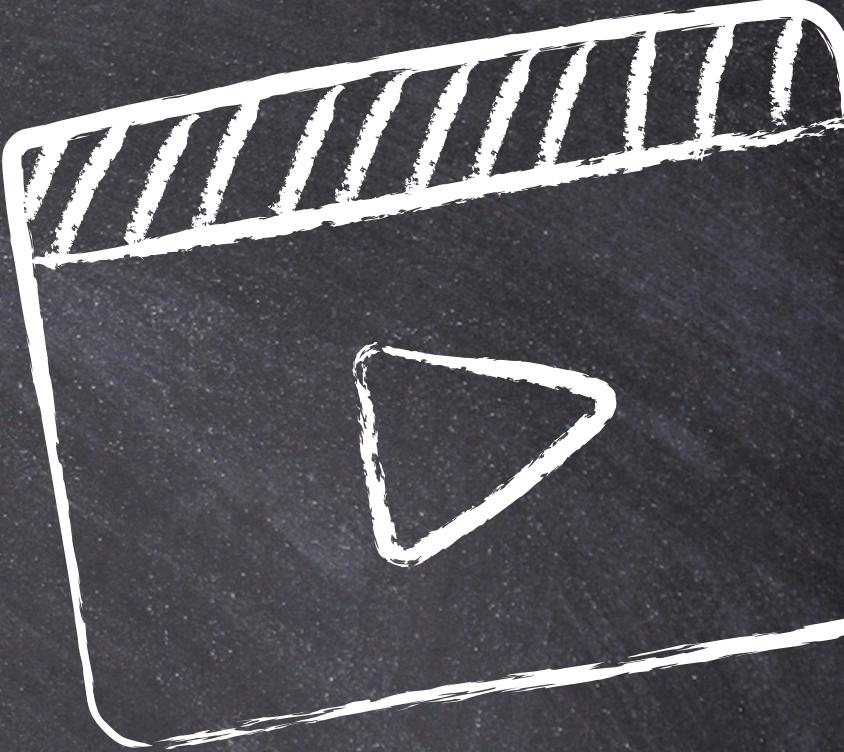
# Project Objective

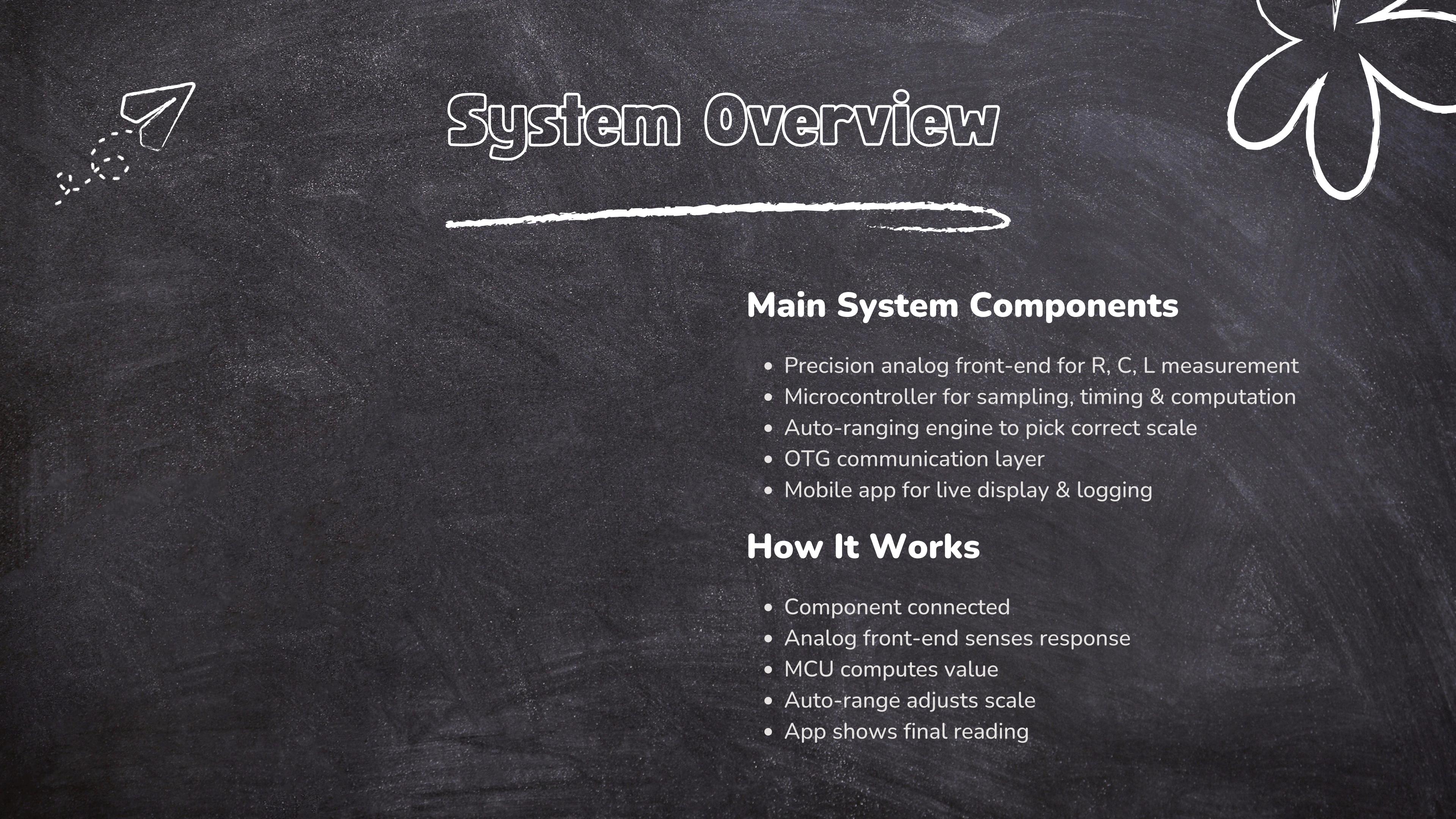
## **Core Goal**

To develop an industry-grade smart multimeter capable of high-accuracy R, C, and L measurement using a microcontroller-based system.

## **Key Objectives**

- Measure Resistance, Capacitance, and Inductance across a  $10^5$  range
- Achieve approximately 98% measurement accuracy
- Implement a hybrid auto-ranging algorithm for fast and reliable scaling
- Build a compact, robust hardware system around a microcontroller
- Enable real-time data transmission to a mobile application via OTG
- Provide live visualization, logging, and analysis through the app





# System Overview

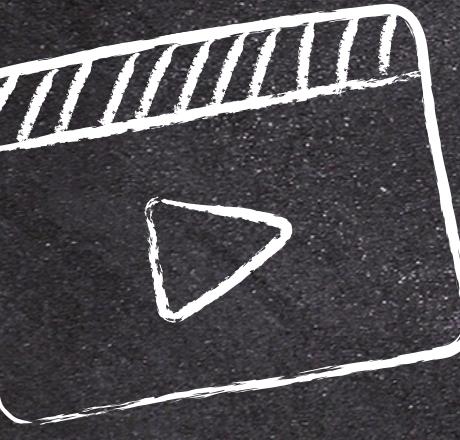
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## Main System Components

- Precision analog front-end for R, C, L measurement
- Microcontroller for sampling, timing & computation
- Auto-ranging engine to pick correct scale
- OTG communication layer
- Mobile app for live display & logging

## How It Works

- Component connected
- Analog front-end senses response
- MCU computes value
- Auto-range adjusts scale
- App shows final reading

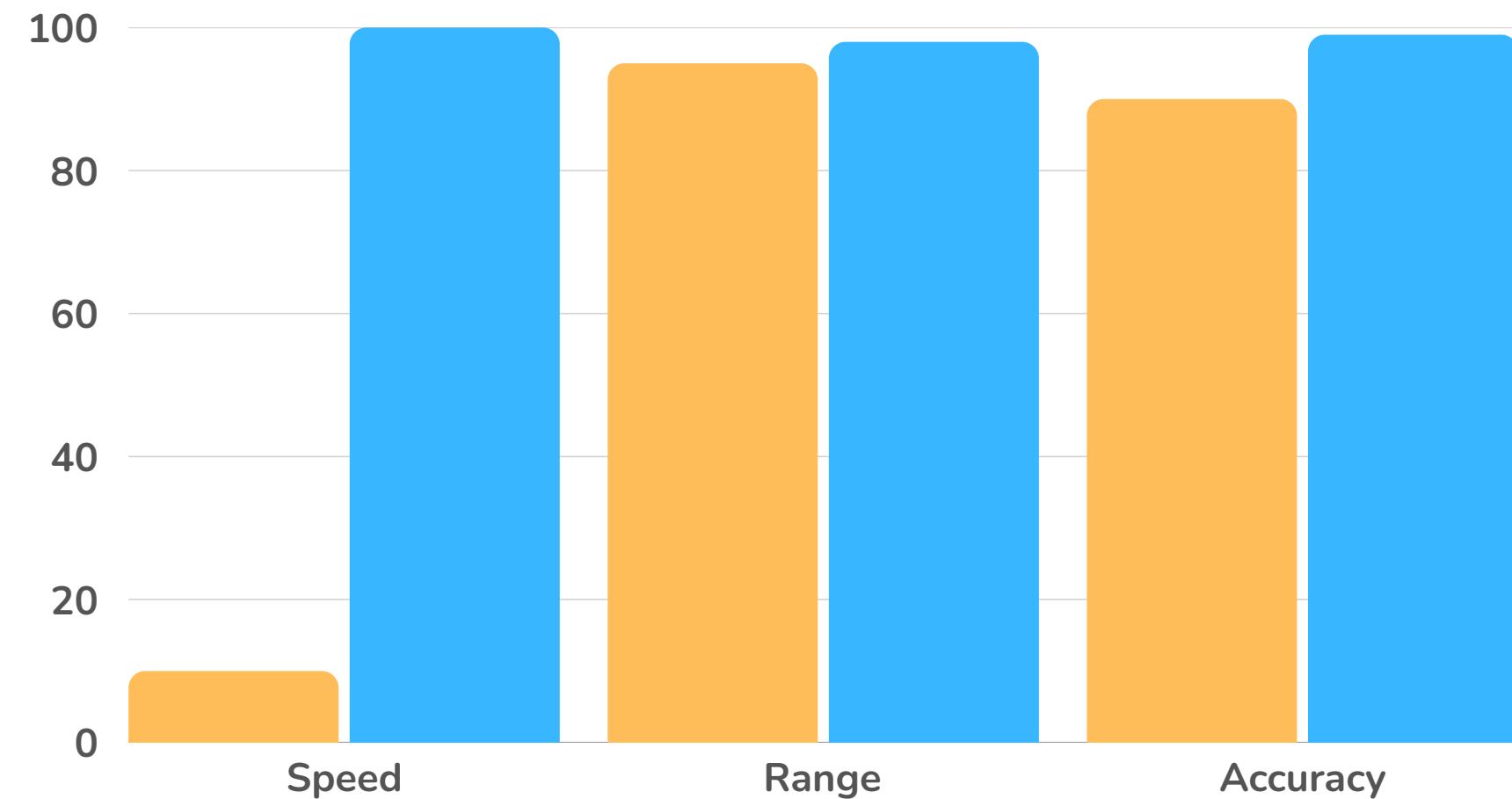


# Result

## The Outcome of Our Project

A DMM that will :

- Seamlessly integrate with the App that will transfer the data using BLE.
- Achieve 1Ghz Frequency
- Get 98% Accuracy



Open To  
Doubts

# Mentors



Akshat Dhote



Adwaaiit Pande



Kaushal Mehra

# Thank You



Presented by EEA