### **Data Sources**

High-Resolution Inline Images (Image Data)

> PCB Plan (Vector Graphics)

Placement
Tolerances
(Numeric
Data)

# Data Processing Pipelines

Image Preprocessing
(This step cleans and prepares the images for analysis.)

Alignment with PCB
Plan (Aligns the
processed image of the
PCB with the design)

Component Localization
(Identifies the
components in the
image using object
detection techniques)

## ML MODEL

Object Detection
Model (A computer
vision model like
YOLO)

Displacement
Measurement (This
module calculates
the exact position of
each detected
component)

Object Detection
Model (A computer
vision model like
YOLO)

## Backend Services & APIs

Data Storage (Stores the images, analysis results, etc.)

APIs (Provides an interface for communication between the AI system)

#### **User Interface**

Real-time Dashboard
(A graphical interface
that displays the
results of the
analysis)