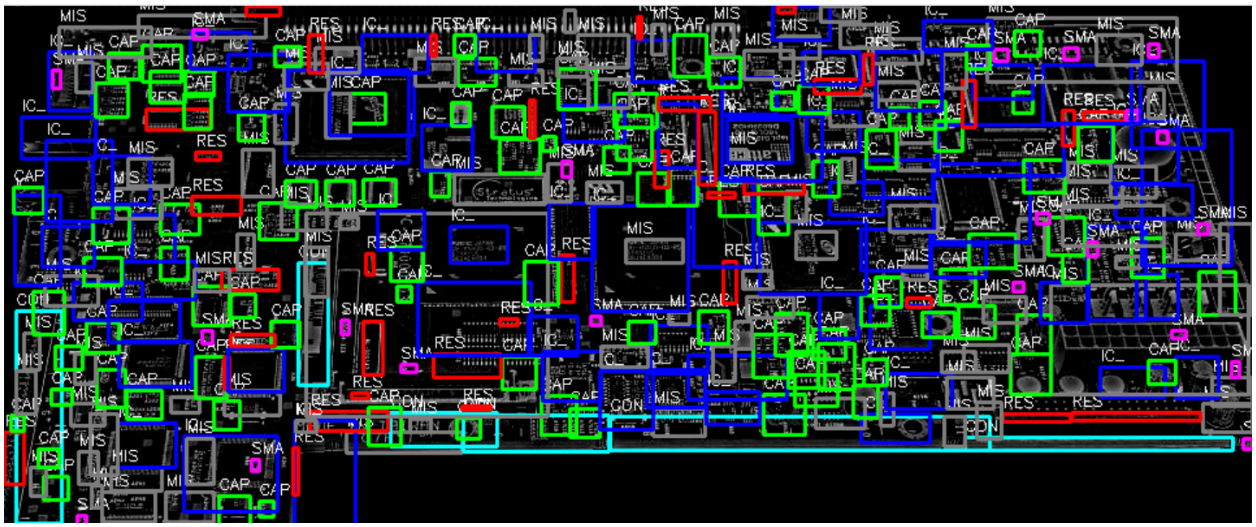
Input Image:

Detected Components(output of component_detector.py):



Terminal Output of component_detector.py:

```
HP@DESKTOP-LNORTVI MINGW64 ~/project_python/BOMCalculation/version1 (main)
$ python component_detector.py
Detecting main object...
Object: PCB
Saved detection_results.json

HP@DESKTOP-LNORTVI MINGW64 ~/project_python/BOMCalculation/version1 (main)
$
```

Detection_results.json:

version1 > {} detection_results.json > ...


```json
{
  "object_type": "PCB",
  "total_components": 317,
  "component_counts": {
    "CAPACITOR": 95,
    "SMALL_COMPONENT": 21,
    "MISC": 91,
    "CONNECTOR": 6,
    "IC_CHIP": 68,
    "RESISTOR": 36
  },
  "components": [
    {
      "id": 0,
      "category": "CAPACITOR",
      "bbox": {
        "x": 165,
        "y": 376,
        "w": 24,
        "h": 24
      },
      "area": 576,
      "norm_area": 0.0015,
      "aspect_ratio": 1.0,
      "centroid": {
        "x": 0.184375,
        "y": 0.97
      },
      "mean_intensity": 20.817708333333332,
```


Output of llm_analyzer.py:

```
HP@DESKTOP-LNORTVI MINGW64 ~/project_python/BOMCalculation/version1 (main)
$ python llm_analyzer.py
Object type: PCB
Total components: 317
Component counts:
CAPACITOR : 95
SMALL_COMPONENT : 21
MISC : 91
CONNECTOR : 6
IC_CHIP : 68
RESISTOR : 36

Raw LLM output:

```json
{
  "pcb_type": "Mixed Signal PCB",
  "complexity": "Medium",
  "confidence": 0.8,
  "bom_estimate": {
    "component_costs": {
      "CAPACITOR": 1500,
      "SMALL_COMPONENT": 420,
      "MISC": 1370,
      "CONNECTOR": 360,
      "IC_CHIP": 5280,
      "RESISTOR": 1080
    },
    "assembly_cost": 1500,
    "total_cost_inr": 10610,
    "cost_range_inr": "10000 - 11000"
  },
  "reasoning": "The PCB contains a mix of components including capacitors, resistors, IC chips, and connectors, indicating a mixed signal design. The presence of IC chips s
uggests a moderate level of complexity. The total number of components (317) and the variety of types also support a medium complexity level. The cost estimate is based on
average Indian market prices for these components and assembly services.",
  "market_reference": "Data from Indian electronics component suppliers and assembly service providers."
}
```

Saved bom_analysis.json

PCB type: Mixed Signal PCB
Complexity: Medium
Confidence: 0.8

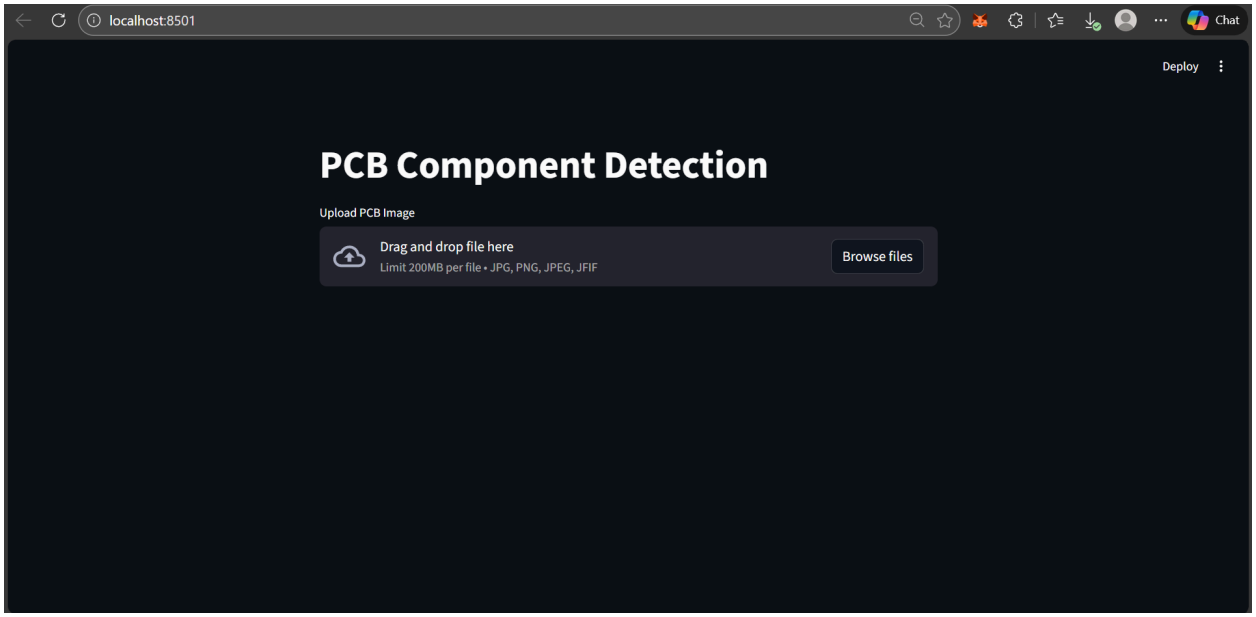
HP@DESKTOP-LNORTVI MINGW64 ~/project_python/BOMCalculation/version1 (main)
$
```

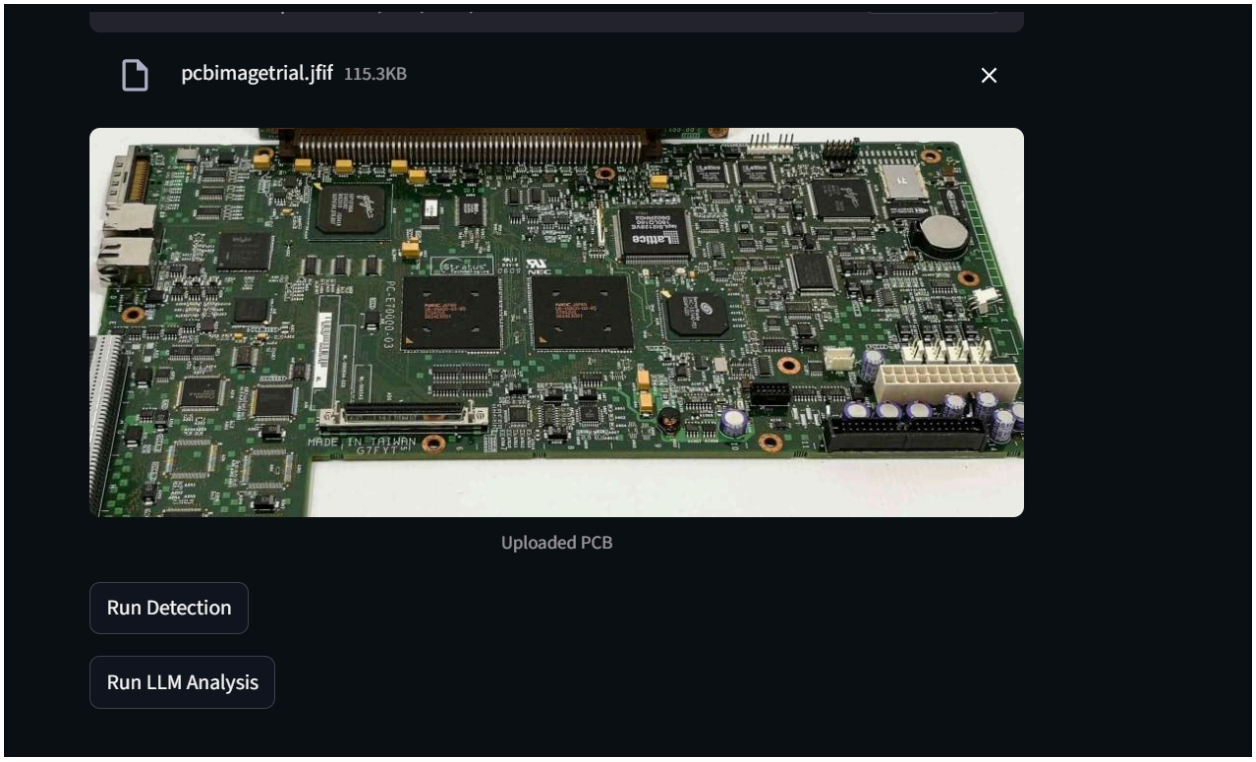
bom_analysis.json:

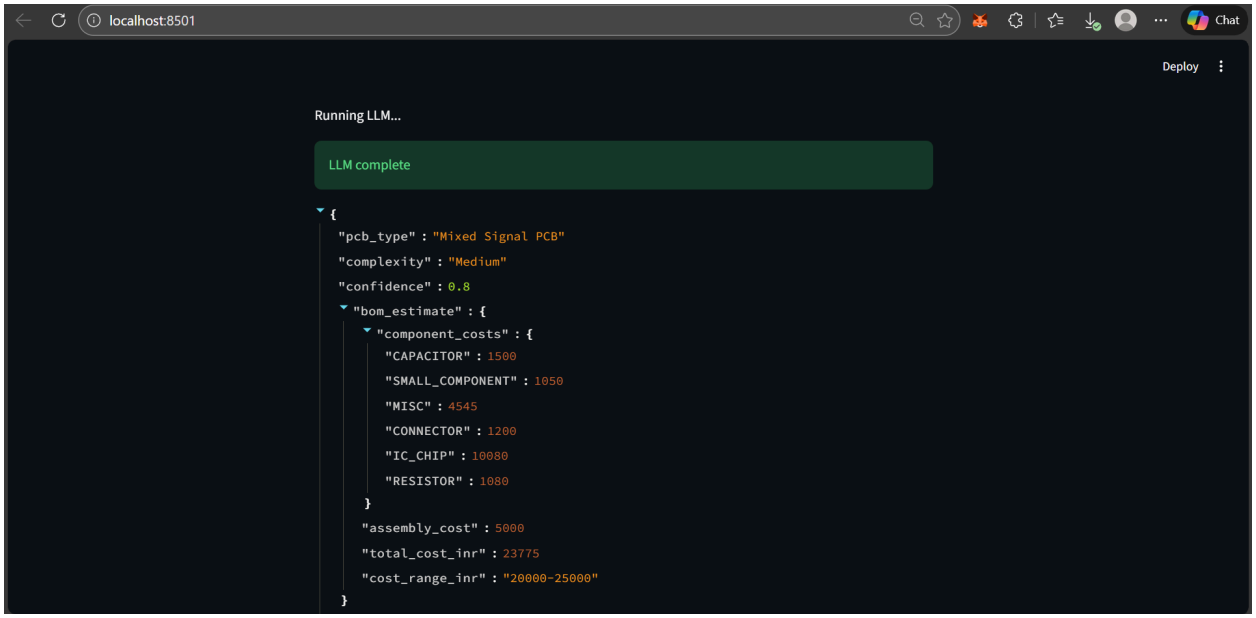
version1 > {} bom_analysis.json > ...

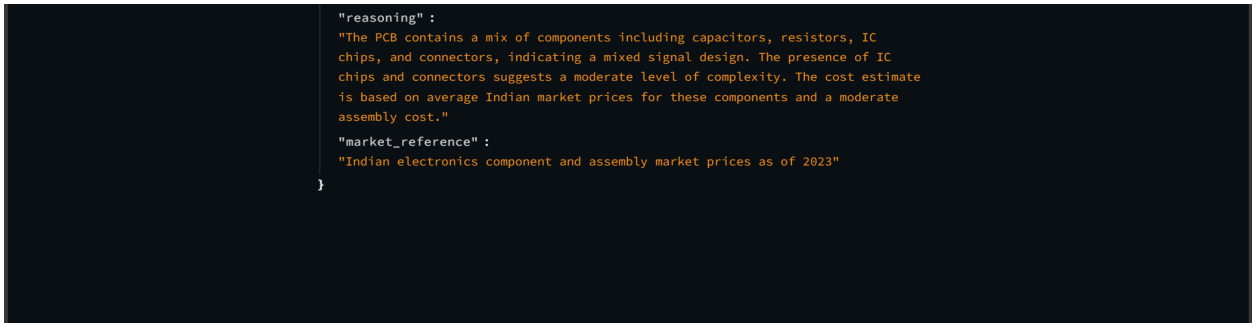

```json
{
  "pcb_type": "Mixed Signal PCB",
  "complexity": "Medium",
  "confidence": 0.8,
  "bom_estimate": {
    "component_costs": {
      "CAPACITOR": 1500,
      "SMALL_COMPONENT": 420,
      "MISC": 1370,
      "CONNECTOR": 360,
      "IC_CHIP": 5280,
      "RESISTOR": 1080
    },
    "assembly_cost": 1500,
    "total_cost_inr": 10610,
    "cost_range_inr": "10000 - 11000"
  },
  "reasoning": "The PCB contains a mix of components including capacitors, resistors, IC chips, and
  "market_reference": "Data from Indian electronics component suppliers and assembly service provide
}
```

Streamlit GUI:






localhost:8501
Chat
Deploy
Running LLM...
LLM complete
{
"pcb_type" : "Mixed Signal PCB"
"complexity" : "Medium"
"confidence" : 0.8
"bom_estimate" : {
"component_costs" : {
"CAPACITOR" : 1500
"SMALL_COMPONENT" : 1050
"MISC" : 4545
"CONNECTOR" : 1200
"IC_CHIP" : 10080
"RESISTOR" : 1080
}
"assembly_cost" : 5000
"total_cost_inr" : 23775
"cost_range_inr" : "20000-25000"
}


"reasoning" :
"The PCB contains a mix of components including capacitors, resistors, IC chips, and connectors, indicating a mixed signal design. The presence of IC chips and connectors suggests a moderate level of complexity. The cost estimate is based on average Indian market prices for these components and a moderate assembly cost."
"market_reference" :
"Indian electronics component and assembly market prices as of 2023"
}