AI-ICAI Technical Specification

Intelligent Circuit Assistant | Hajoon Park | Chosun University

NVIDIA Jetson Orin Nano 'AI-ICAI' . , , VLM .

1. (Motivation)

1.1

. AI 90% .

1.2 ' (Dead Stock)'

, .

1.3

(Burn-out) . .

1.4

VLM( ) "4 "

1.5

'Typical Application' .

1.6

(Invoice) OCR DB .

2. (AI Pipeline)

Step 1. YOLOv11

➔

Step 2. OpenCV
/

➔

Step 3. EasyOCR

➔

Step 4. VLM/DB

1: YOLOv11-Nano ( ) DIP, SMD, TO-92 0.01 Bounding Box .

2: OpenCV Structural Analyzer ( ) Canny Edge Contour **(Pin)** **(Pitch)** .
.

3: EasyOCR & Fuzzy Matching ( ) GPU . CLAHE , Levenshtein Distance DB .

4: Layout-Aware OCR ( ) (Table) . SQL DB .

5: Intelligent Application Scout ( ) PDFPlumber 'Typical Application' , .

6: Moondream2 VLM ( ) . " " " " .

3.

Model_ID	(PK)	AI OCR NE555P
Package_Spec		DIP-8 (2.54mm)

Inventory_Log	OCR / Log	2026-01-12 In: 50
App_Circuit		/assets/ne555.png
Market_Price	BeautifulSoup	480 (Devicemart)
Design_Spec	PDF OCR	$$f = \frac{1.44}{(R_1 + 2R_2)C}$$

4.

, / .

inventory_analytics.py Python / SQLite3

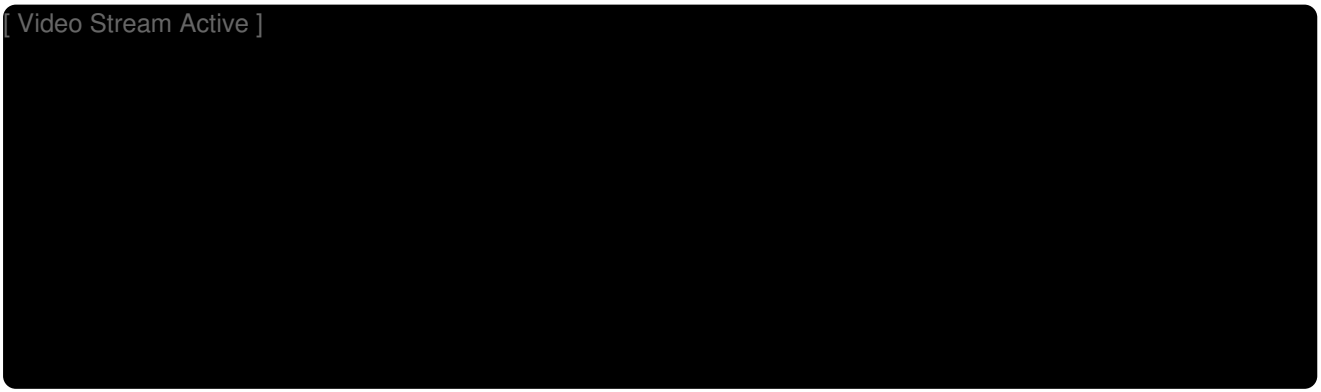
```
# Weekly Usage Trend Analysis & Alert Logic
usage_data = db.query("SELECT qty_out FROM inventory_logs WHERE date > current_week")
trend_slope = calculate_usage_slope(usage_data)

if current_stock < (trend_slope * lead_time):
    trigger_restock_alert(model_id, lowest_market_price)
```

AI-ICAI Pro Dashboard v1.2

System Online | Jetson Orin Nano

Live Scanner Feed



Inventory Analytics

Monthly Consumption Trend

Identified: NE555P Precision Timer

42 pcs

Stock Status

A-3-04

Storage Drawer

₩480

Market Lowest

Typical Application

[Typical Operating Circuit Diagram]

Extracted: Astable Multivibrator Mode

AI Mentor (VLM)

AI Mentor: NE555 4 (Reset) ' ' . VCC .

Ask AI about circuit design...