



# Smart Inventory Tracking with Barcode Scanning

**6th May, 2025**



Timmerman Industries

# **RESEARCH PROPOSAL PRESENTATION**

**PRODUCT RESEARCH PROPOSAL FOR INGOUDE COMPANY**

02 May, 2024

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# Introduction



## Business Type:

- Small Electronics Warehouse



## Warehouse Size:

- 10 unique products (SKUs)



## Current Challenges:

- Manual inventory tracking is slow, error-prone, and inefficient



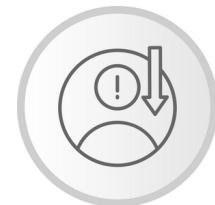
## Solution Direction:

- Implement barcode-based inventory tracking to improve accuracy and efficiency

# Problem Statement



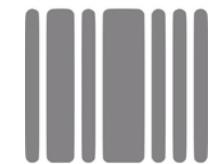
Manual inventory systems often cause errors and inefficiencies.



Human mistakes lead to inaccurate stock levels and lost sales.



Smart inventory technologies are too costly for small and medium warehouses.



A low-cost software solution is needed to automate inventory updates using barcode recognition.

# Project Objectives



Generate barcodes using Python program



Develop a Python system to scan barcodes from moving products in the video streams



Simulate a lightweight inventory database using Excel



Automatically track and update item quantities



Visualize and export inventory data



Keeping it fully software-based

# Process Flow



Product Tagging

Item Movement on Conveyor Simulation

Barcodes Detection

Inventory Update

Live Monitoring Display

Report Generation & Export



# Data Collection

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Generate Barcodes using python-barcode library



Assign Unique SKUs



Duplicate for Multiple Units



Save as PNG Images



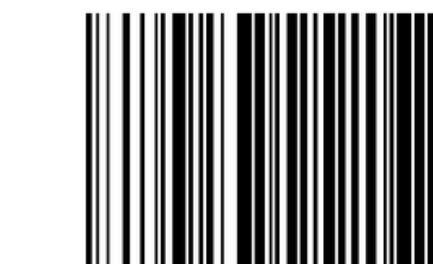
Organize and Zip Files



Upload to System for Scanning



Item001



Item002



# Methodology: System Workflow



- » Upload barcode images (.png) in ZIP format



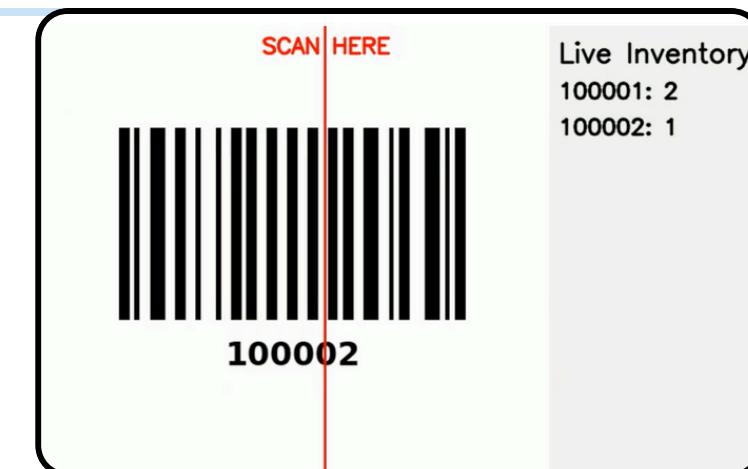
- » Decode barcodes from images using pyzbar
- » Generate scrolling video with scanline overlay
- » Read both static images and video frame



- » Increase item quantity when a new barcode is scanned
- » Store item counts dynamically in memory



- » Display live inventory on video panel
- » Export scanning simulation as .mp4
- » Export Excel (.xlsx) inventory report

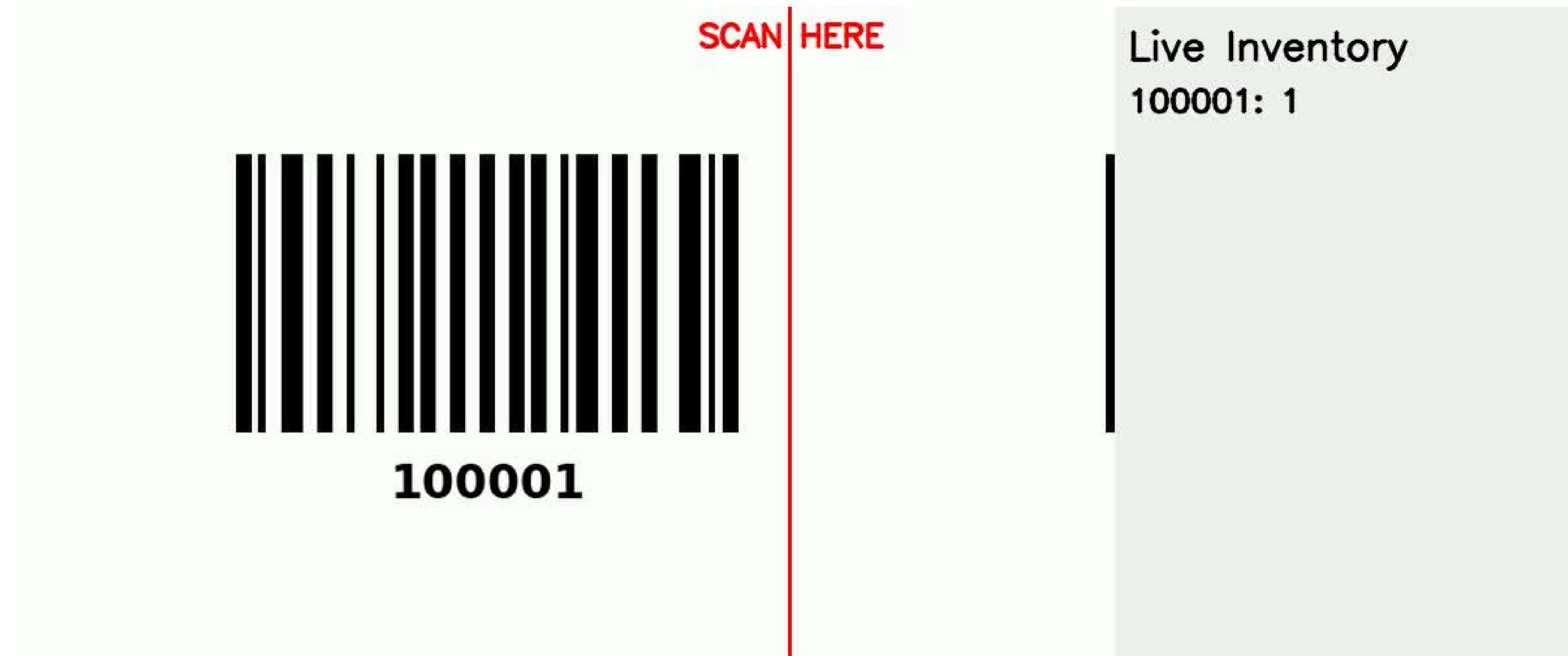


# Methodology: Technologies Used

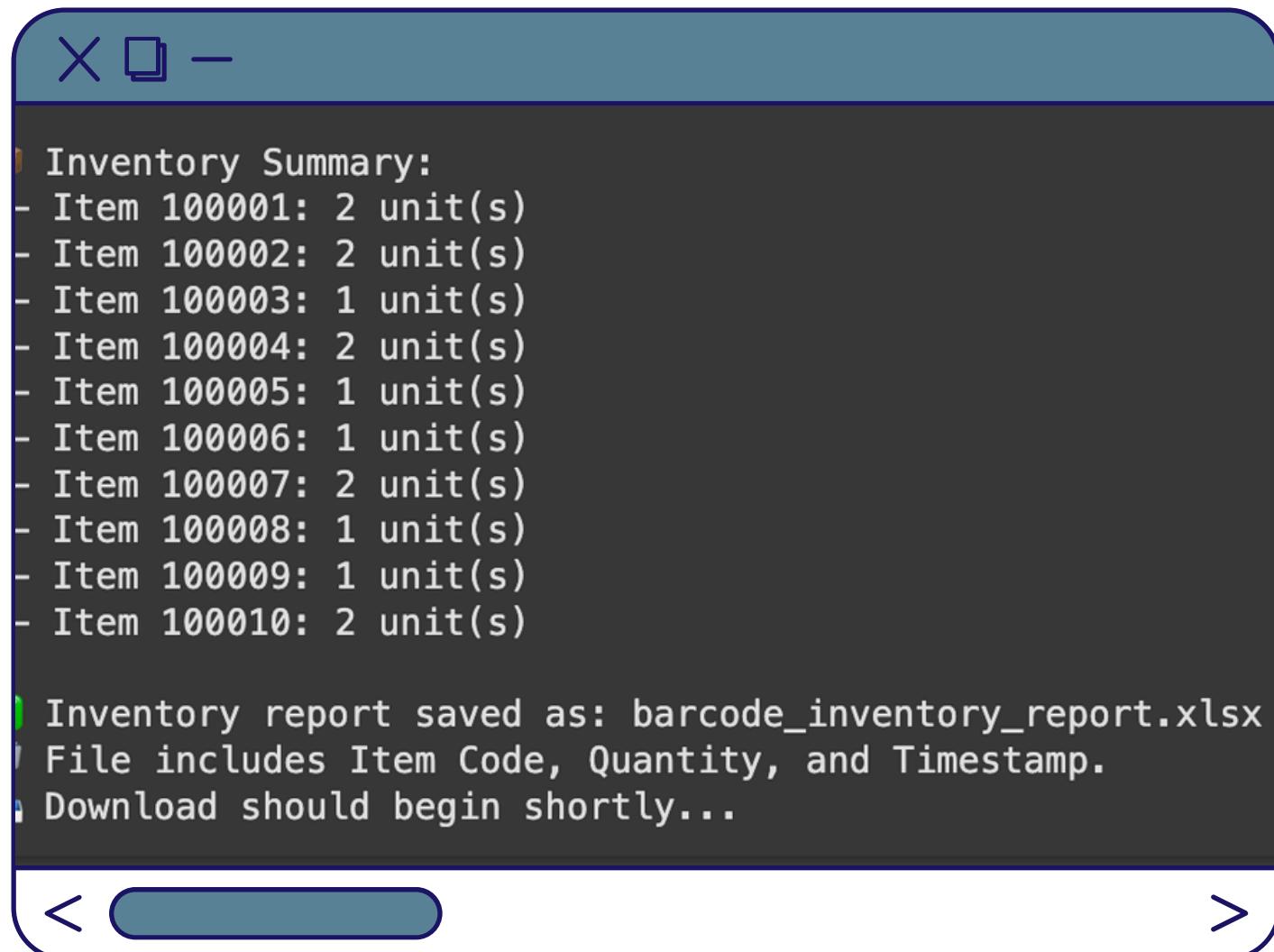
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Library	Function
Python	Core programming language
python-barcode	Generate barcode images
Pillow (PIL)	Handle and resize images
pyzbar	Decode barcodes from images and video
OpenCV (cv2)	Create video and scanline simulation
pandas	Export inventory data to Excel .xlsx
Google Colab	Run system in the cloud

# Result and discussion



## Final Inventory Summary and Exported Excel Report



The Excel spreadsheet has a title bar 'barcode\_inventory\_report'. The ribbon tabs are Home, Insert, Draw, Page Layout, Formulas, Data, Review, View, and Tell me. The formula bar shows 'Calibri (Body) 11'. The table below contains the inventory data:

Item Code	Quantity	Timestamp
100001	2	2025-05-03 19:11:07
100002	2	2025-05-03 19:11:07
100003	1	2025-05-03 19:11:07
100004	2	2025-05-03 19:11:07
100005	1	2025-05-03 19:11:07
100006	1	2025-05-03 19:11:07
100007	2	2025-05-03 19:11:07
100008	1	2025-05-03 19:11:07
100009	1	2025-05-03 19:11:07
100010	2	2025-05-03 19:11:07



## System Functionality

- Simulated barcode movement across scanline
- Detected barcodes from images and video
- Updated inventory in real time

## Inventory Reporting

- A complete inventory record was generated showing
- Item ID, Quantity and Timestamp

## Development Tools and Platform

- Developed using Python, OpenCV, pyzbar, Pandas.
- Deployed on Google Colab

# Conclusion



A fully software-driven smart inventory system designed for cost efficiency



Enables real-time inventory tracking through automation and seamless data updates



Optimized for logistics startups and small-scale retail warehouses



**Thank You**  
for your attention

**6th May, 2025**