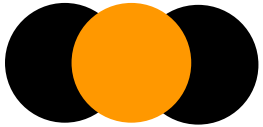
Custom OCR using YOLOv3 & Tesseract



Project Overview

01 Combines YOLOv3 and Tesseract OCR

02 Detects and extracts structured text from lab reports

03 Generates downloadable CSV and Excel outputs

04 Streamlit-based user interface

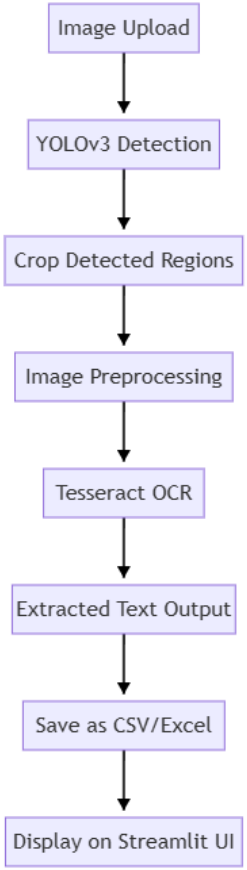
05 Cloud deployment with AWS & Google Colab

- **YOLOv3**: Detects structured fields in lab reports
- **Tesseract OCR**: Extracts readable text from detected regions
- **OpenCV**: Helps with image preprocessing
- **Streamlit**: Offers a user-friendly web interface
- **Pandas & ExcelWriter**: Format and export clean data

Tech Stack & Dependencies

Core Tools Used

Workflow Architecture



- Convert image to grayscale for contrast
- Apply Gaussian blur and thresholding
- Use bitwise inversion to standardize text
- Clean input regions before Tesseract OCR
- Improves clarity and output structure

OCR & Image Preprocessing

Enhancing Recognition Accuracy

- Upload lab report images via browser
- Real-time preview of detection output
- View extracted text and patient data
- Download structured data as CSV or Excel
- Accessible on desktop or mobile

Streamlit App Interface

User-Friendly Experience

Lab Report Upload Interface

Streamlit UI Upload

Users can upload lab report images directly through the Streamlit interface. The system supports JPG, JPEG, and PNG formats.

Live Preview

The uploaded image is previewed on the screen before processing begins. This helps ensure the correct file is selected.

File Management

Streamlit handles file input cleanly and gives the user clear visual feedback for the file upload and status.

OCR Output Table

Structured Data

After processing, extracted lab data is displayed in a structured table showing test names, values, units, and reference ranges.

Patient Information

Patient name is extracted separately and highlighted above the results for clarity.

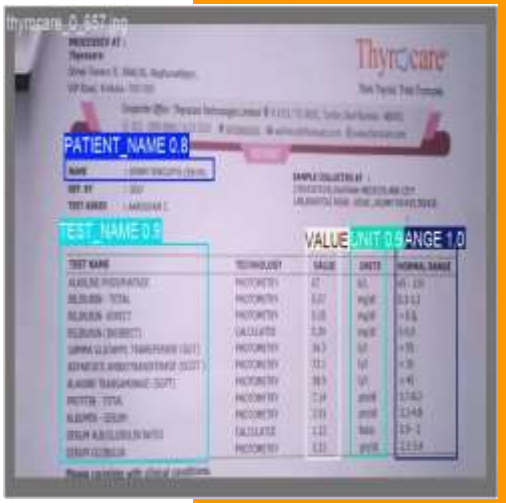
Export Options

Users can download the OCR results as CSV or Excel with a single click, making data portable and editable.

YOLOv3 Detection Results

Labeled Predictions

YOLOv3 identifies and labels key fields in the report such as patient name, test name, values, and units with bounding boxes.



Class Confidence

Each label is accompanied by a confidence score to evaluate detection accuracy.

Pre-OCR Visualization

These regions are then cropped and passed to Tesseract for final text recognition.

- □ Colab for development & GPU-based training
- □ Streamlit Cloud for hosting the UI
- □ Results downloadable in real-time
- 🎁 Future: Dockerize and deploy on AWS EC2 or GCP VM
- 🔐 Can be scaled to private/secure environments

Cloud Deployment Options

Bringing It to Production

Future Work & Expansion

Opportunities for Enhancement

- 📄 Support for multi-page PDF parsing
- ✍️ Handwritten text recognition using deep learning models
- 🌐 Deploy as REST API for broader integration
- 📈 Compare accuracy with AWS Textract and Google Vision
- 🌍 Add multilingual OCR support for global use cases

Custom OCR Demo

Thank You!

Any Questions?

Thank you for your time and attention. I'm happy to walk you through the demo, code, or discuss future improvements.