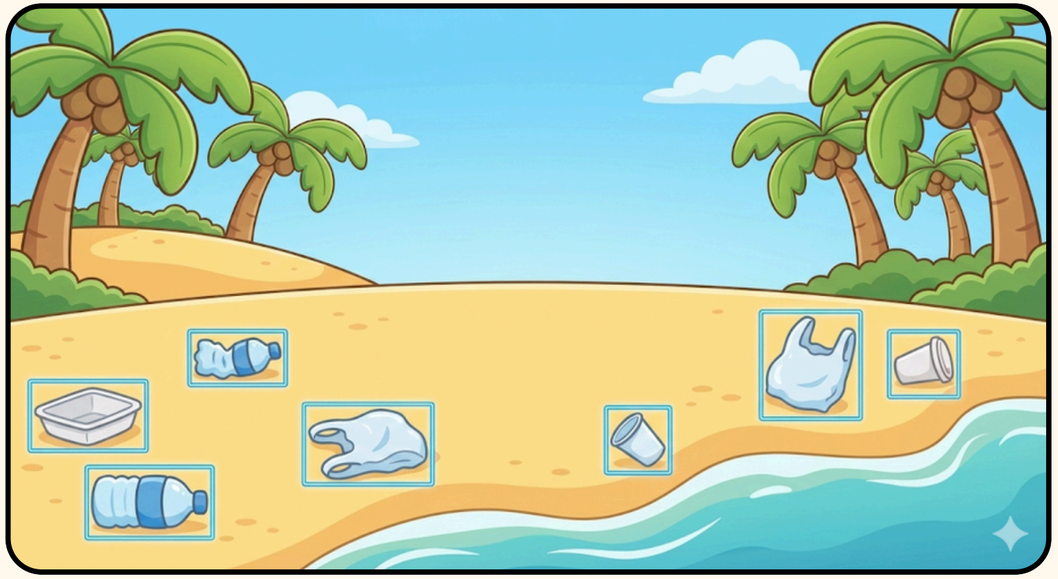
DETECTION OF PLASTIC LITTER ON BEACHES



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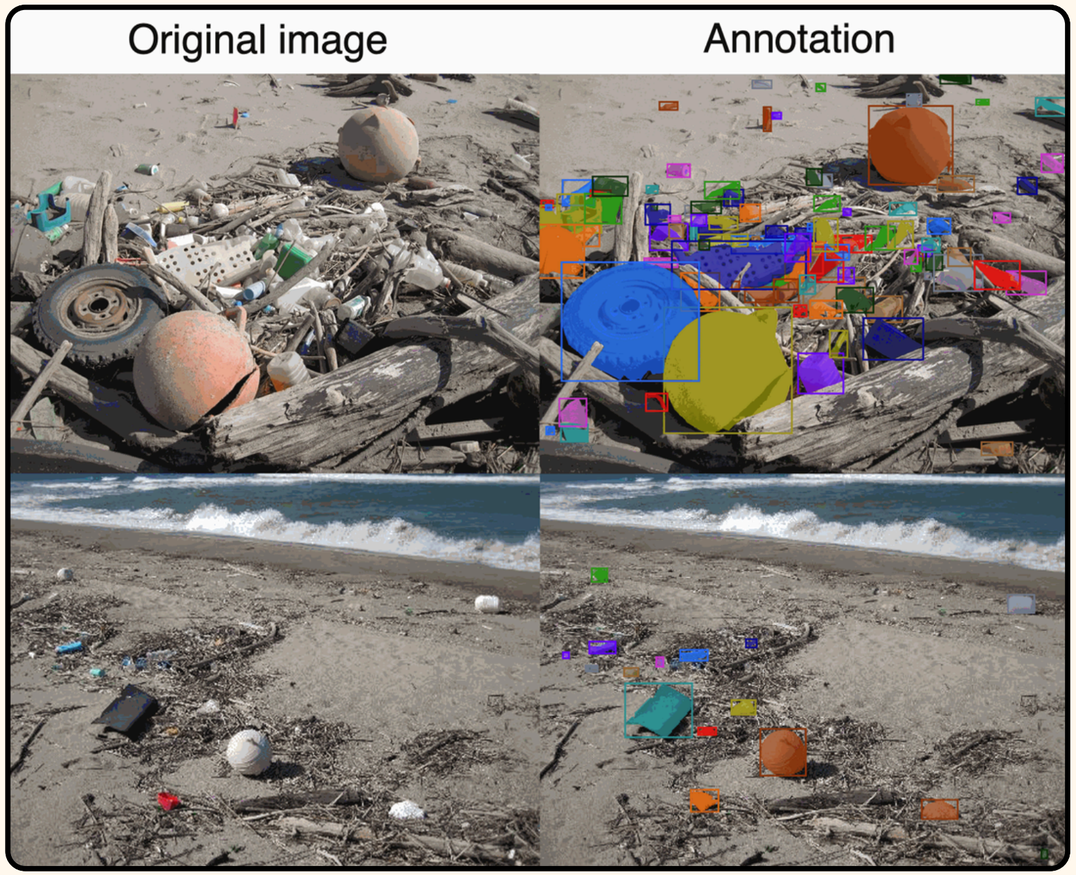
PROBLEM BACKGROUND

WHAT PROBLEM ARE WE SOLVING

- Plastic pollution threatens marine ecosystems
- Beach plastic is easily ingested by wildlife
- Manual beach surveys are slow and error-prone
- Automated visual detection is needed

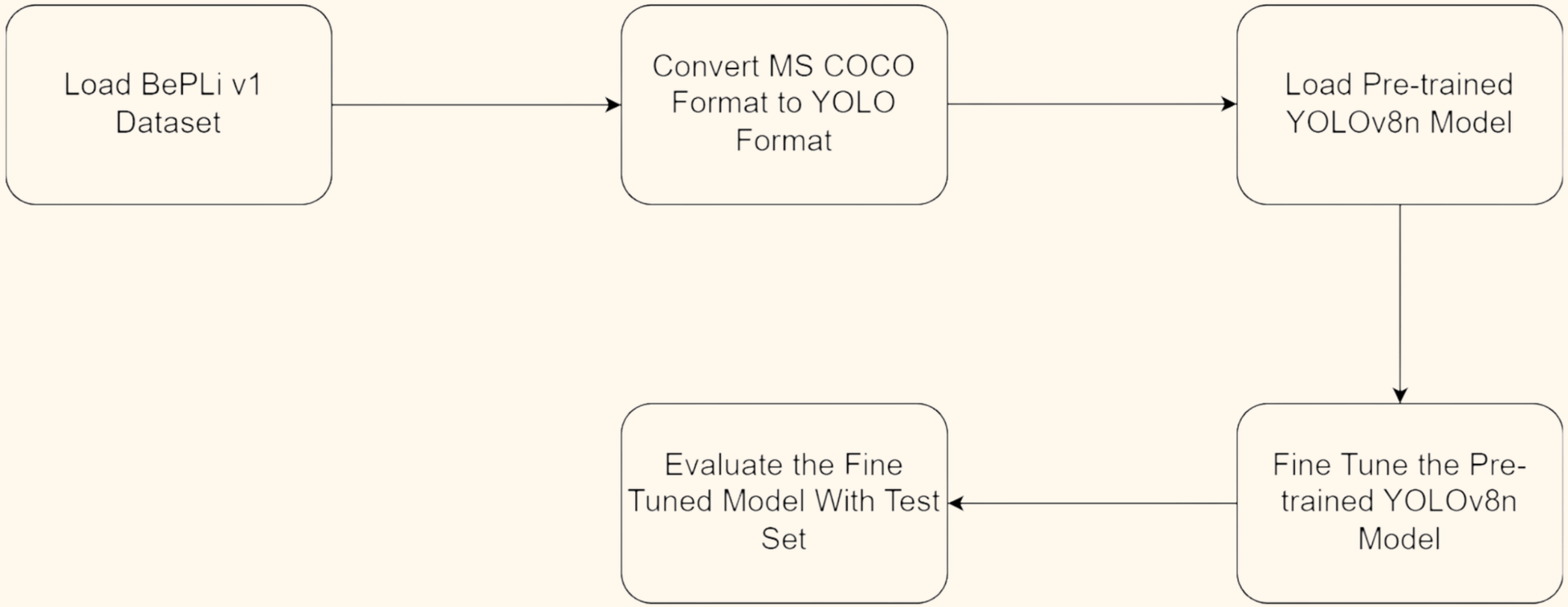
DATASET

Dataset: BePLi v1



- 3,709 real-world beach images (Japan)
- Single class: plastic litter
- Bounding box annotations
- Train / Validation / Test split

MODEL APPROACH



EVALUATION

Metric	Value
Precision	0.52
Recall	0.40
F1 Score	0.45
mAP@0.5	0.39
mAP@0.5-0.95	0.17

REFLECTION

Reflection & Limitation

- Model works on real-world beach images
- Struggles with precise localization
- Performance affected by object size and background complexity

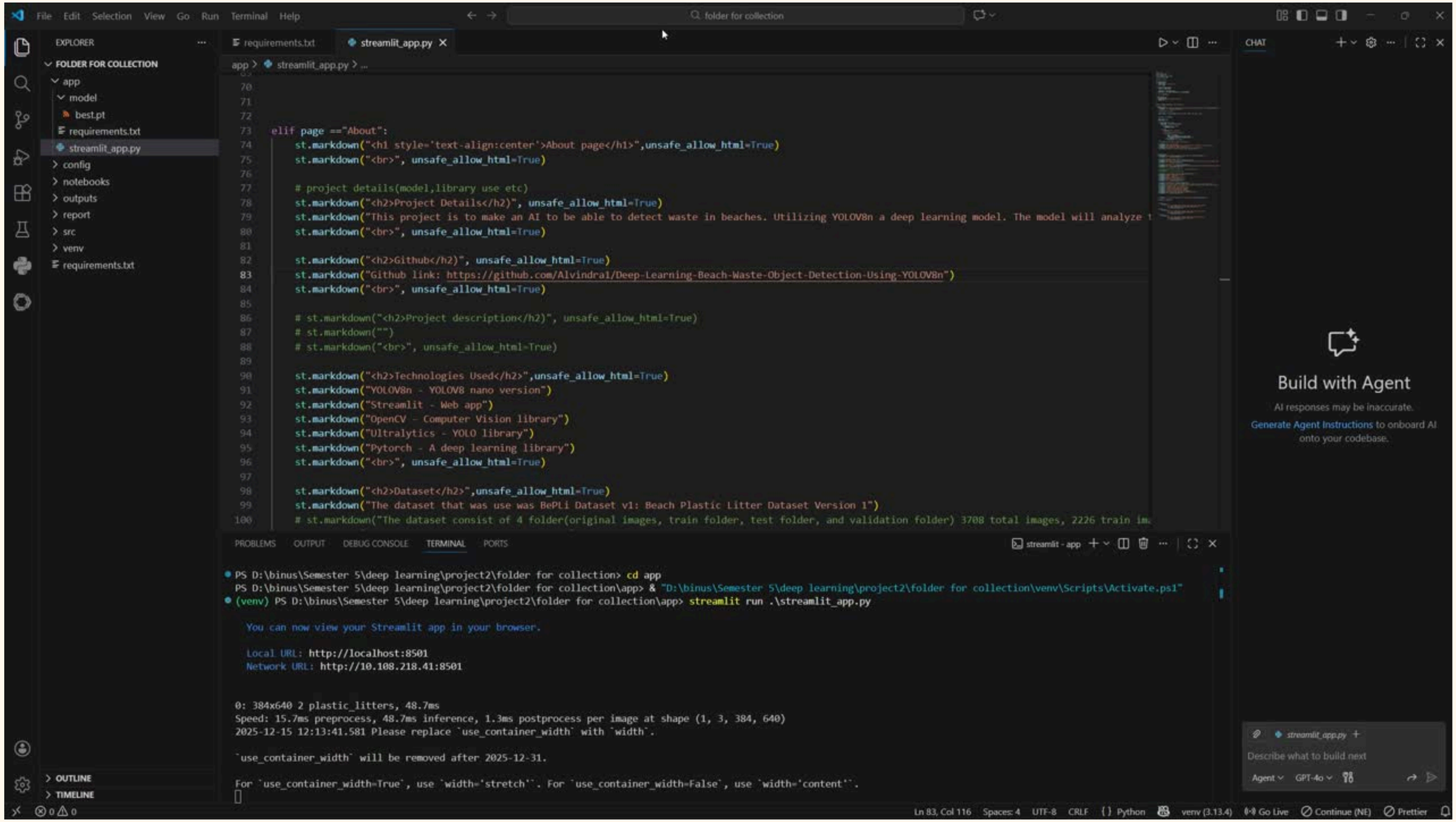
Future Improvement

- More diverse training data
- Larger YOLO variants
- Improved data augmentation

CONCLUSION

1. **Deep learning enables automated beach plastic detection**
2. **YOLOv8n provides a practical balance between speed and accuracy**
3. **Real-world environmental monitoring remains challenging**

DEMO VIDEO


File Edit Selection View Go Run Terminal Help
folder for collection
EXPLORER
FOLDER FOR COLLECTION
app
model
best.pt
requirements.txt
streamlit_app.py
config
notebooks
outputs
report
src
venv
requirements.txt
requirements.txt
streamlit_app.py
app > streamlit_app.py > ...
elif page =="About":
st.markdown("<h1 style='text-align:center'>About page</h1>",unsafe_allow_html=True)
st.markdown("<br>", unsafe_allow_html=True)
# project details(model,library use etc)
st.markdown("<h2>Project Details</h2)", unsafe_allow_html=True)
st.markdown("This project is to make an AI to be able to detect waste in beaches. Utilizing YOLOV8n a deep learning model. The model will analyze t
st.markdown("<br>", unsafe_allow_html=True)
st.markdown("<h2>Github</h2)", unsafe_allow_html=True)
st.markdown("Github link: https://github.com/Alvindra1/Deep-Learning-Beach-Waste-Object-Detection-Using-YOLOV8n")
st.markdown("<br>", unsafe_allow_html=True)
# st.markdown("<h2>Project description</h2)", unsafe_allow_html=True)
# st.markdown("")
# st.markdown("<br>", unsafe_allow_html=True)
st.markdown("<h2>Technologies Used</h2>",unsafe_allow_html=True)
st.markdown("YOLOV8n - YOLOV8 nano version")
st.markdown("Streamlit - Web app")
st.markdown("OpenCV - Computer Vision library")
st.markdown("Ultralytics - YOLO library")
st.markdown("Pytorch - A deep learning library")
st.markdown("<br>", unsafe_allow_html=True)
st.markdown("<h2>Dataset</h2>",unsafe_allow_html=True)
st.markdown("The dataset that was use was BePLi Dataset v1: Beach Plastic Litter Dataset Version 1")
# st.markdown("The dataset consist of 4 folder(original images, train folder, test folder, and validation folder) 3708 total images, 2226 train im
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
streamlit - app
PS D:\binus\Semester 5\deep learning\project2\folder for collection> cd app
PS D:\binus\Semester 5\deep learning\project2\folder for collection\app> & "D:\binus\Semester 5\deep learning\project2\folder for collection\venv\Scripts\Activate.ps1"
(venv) PS D:\binus\Semester 5\deep learning\project2\folder for collection\app> streamlit run .\streamlit_app.py
You can now view your Streamlit app in your browser.
Local URL: http://localhost:8501
Network URL: http://10.108.218.41:8501
0: 384x640 2 plastic_litters, 48.7ms
Speed: 15.7ms preprocess, 48.7ms inference, 1.3ms postprocess per image at shape (1, 3, 384, 640)
2025-12-15 12:13:41.581 Please replace `use_container_width` with `width`.
`use_container_width` will be removed after 2025-12-31.
For `use_container_width=True`, use `width='stretch'`. For `use_container_width=False`, use `width='content'`.
CHAT
Build with Agent
AI responses may be inaccurate.
Generate Agent Instructions to onboard AI onto your codebase.
streamlit_app.py
Describe what to build next
Agent
GPT-4o
OUTLINE
TIMELINE
Ln 83, Col 116
Spaces: 4
UTF-8
CRLF
Python
venv (3.13.4)
Go Live
Continue (NE)
Prettier

THANK YOU!