Report | DLCV PROJECT | Phase -2

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Introduction:

A preliminary report is shared in Phase 1. In this, Final-phase report, the main focus is on the Approach (towards non-labeled data - which is 46 % of total data), approach towards model training, Justification for considering the approach, Quantitative results, and observation.

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(1) Approach

1.1 Approach towards "not labeled" data

Making heuristic that ALL data that are not labeled as 0-label

1.1.1 Justification for using the above approach

- Considering the above heuristic gives the binary classification f1 score of 0.96. So we can't say heuristic is false, and I am considering it for this project.

1.2 Approach toward training model

- I am making two models – one for binary classification (using f1-score) and one for waste localization tasks (using IoU). I am using Keras API models for the task.
- In pre-processing, in addition to what was mentioned in the Phase-I report, I did file-type generalization to ".jpg". The different file types there in the dataset were {'.jpg': 833, '.jpeg': 5, '.JPG': 42, '.gif': 9, '.png': 16, '.JPEG': 1, '.php': 1}.
- I used roboflow.com to make a file format "createml" to load localization data
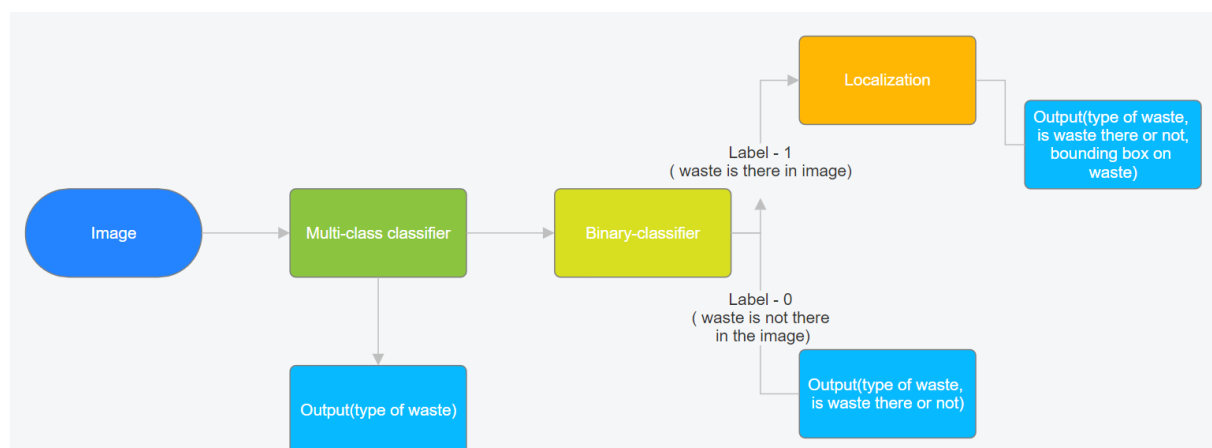- The overall architecture of pipeline :

Figure 1 Pipeline architecture

(2) Binary classification task

2.1 Baseline model for binary classification task

- BASELINE MODEL & Score: I am using 'efficientnetv2_b0' pre-trained on the imagenet dataset, and while testing that pre-trained model on our waste binary classification task it gives an average f1-score of 0.5055.

2.2 training model for binary classification task

- Model using to fine-tune: 'efficientnetv2_b0' pre-trained on imagenet data
- **Metric** : F1_score
- **Loss** : categorical_crossentropy
- Training for 5 epochs

2.3 Quantitative result

- After training,
- **F1_score**: 0.96
- **Crossentropy_loss**:

(3) Localization task

Reference: https://lukewood.xyz/blog/marine-animal-detection

3.1 Baseline model

- I used YOLODetector pretrained on imagenet dataset.
- **Baseline CIoU score** : 2.60

3.2 training model for localization task

- **Model used to fine-tune**: YOLODetecor pre-trained on imagenet dataset
- **Metric**: CIoU (It's similar to IoU, but instead of just taking the intersection to union ratio, CIoU calculates the distance between the center of box localization between the true box and the predicted box)
- Trained for 5 epochs.

3.3 Quantitative result

- After training **for JUST 5 epochs**,
- **CIoU**: 2.48

(4) Compiled result

Task on hand	Evaluation metric	Baseline score	Score after training
Binary classification	f1-score	0.505	0.96
Localization	CIoU	2.60	2.16

References:

Binary classification notebook : https://colab.research.google.com/drive/1ZGDeWcHudqYhJayo7DBI1J-jdVx5kOOQ?usp=sharing

Localization notebook :

https://colab.research.google.com/drive/1SzmJemTMxb68p7NZLhpngEeFTwG01a9a?usp=sharing

Luke Wood's blog on localization: https://lukewood.xyz/blog/marine-animal-detection

Roboflow to convert data in *createml* format: https://app.roboflow.com