AI BASED TOOL TO ASSIST VEHICLES IN DETECTING OBJECTS TO AVOID ACCIDENTS.

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Guide :

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PROBLEM STATEMENT

ON A SURVEY ABOUT TWO WHEELER ROAD ACCIDENTS , WE CAME TO KNOW THAT UPTO 60% OF ACCIDENTS HAPPEN AT NIGHT TIME.

- MOST OF THESE ACCIDENTS WERE LEAD BY PITS ,SAND, ROCKS AND OTHER OBSTACLES ON THE ROAD.
- DUE TO LOW VISIBILITY AT NIGHT TIME THESE OBSTACLES CAN'T BE SPOTTED BY THE RIDER.
- THERE IS NO EXISTING TECHNOLOGY FOR ALERTING THE RIDER IN ABOVE SCENARIOS .
- SO WE WANTED TO EXPLORE THIS PROBLEM THROUGH OBJECT DETECTION.

ABSTRACT :

THE MAIN PURPOSE OF THIS PROJECT IS TO BUILD A OBJECT DETECTOR IN VEHICLES TO DETECT THE OBSTACLES(SUCH AS SAND PILES ,PITS AND ROCKS)

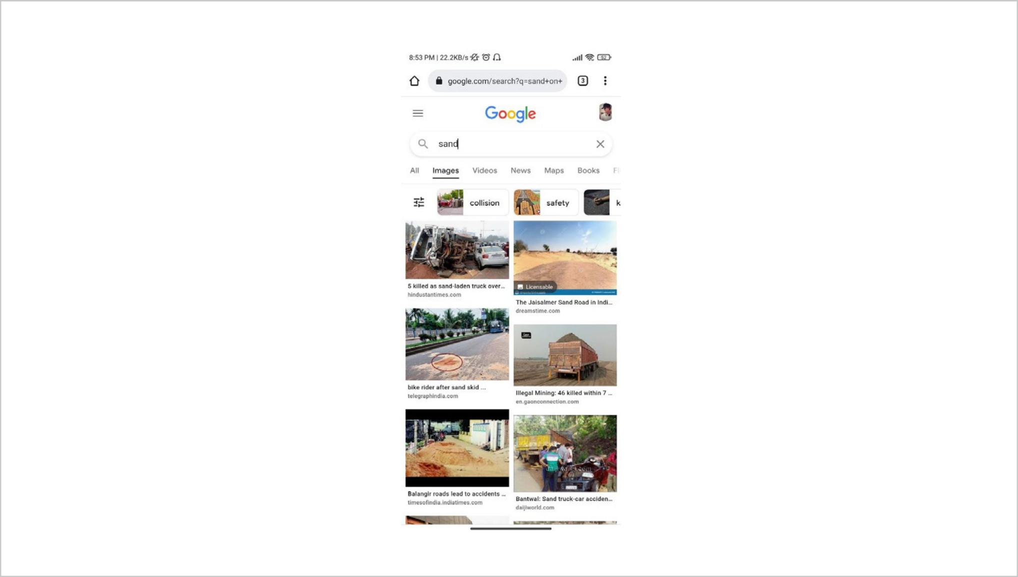
- WE WANT TO INDICATE THE OBSTACLES BY DISPLAYING OBSTACLES ON SPEED DISPLAY METER
- TO CONVEY THE DETAILS OF DETECTED OBJECT IN FORM OF TEXT MESSAGE ALONG WITH A VOICE COMMAND.

DATA PRE-PROCESSING
Feature Engineering

- DATASET COLLECTION
- DATASET CLEANING
- DATASET FORMATTING

DATA SET COLLECTION

- We have used open source resources like google and Kaggle to gather required datasets for our project.
- In our project dataset required is in format of Images.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5 killed as sand-laden truck over...
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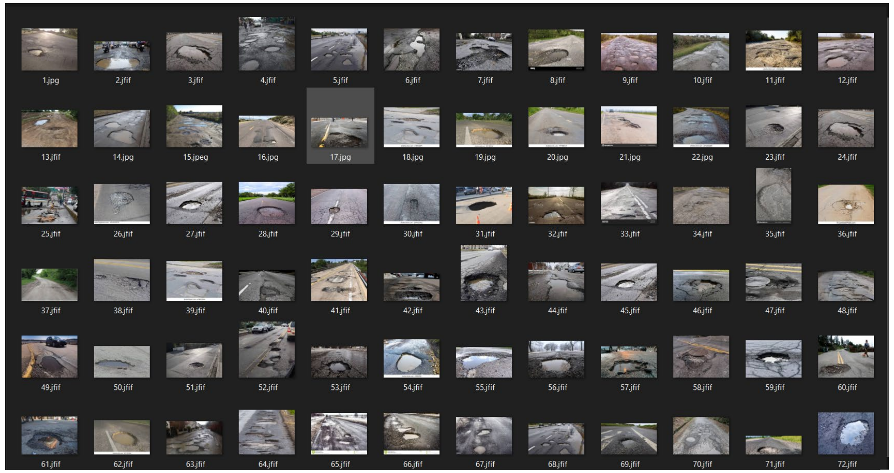
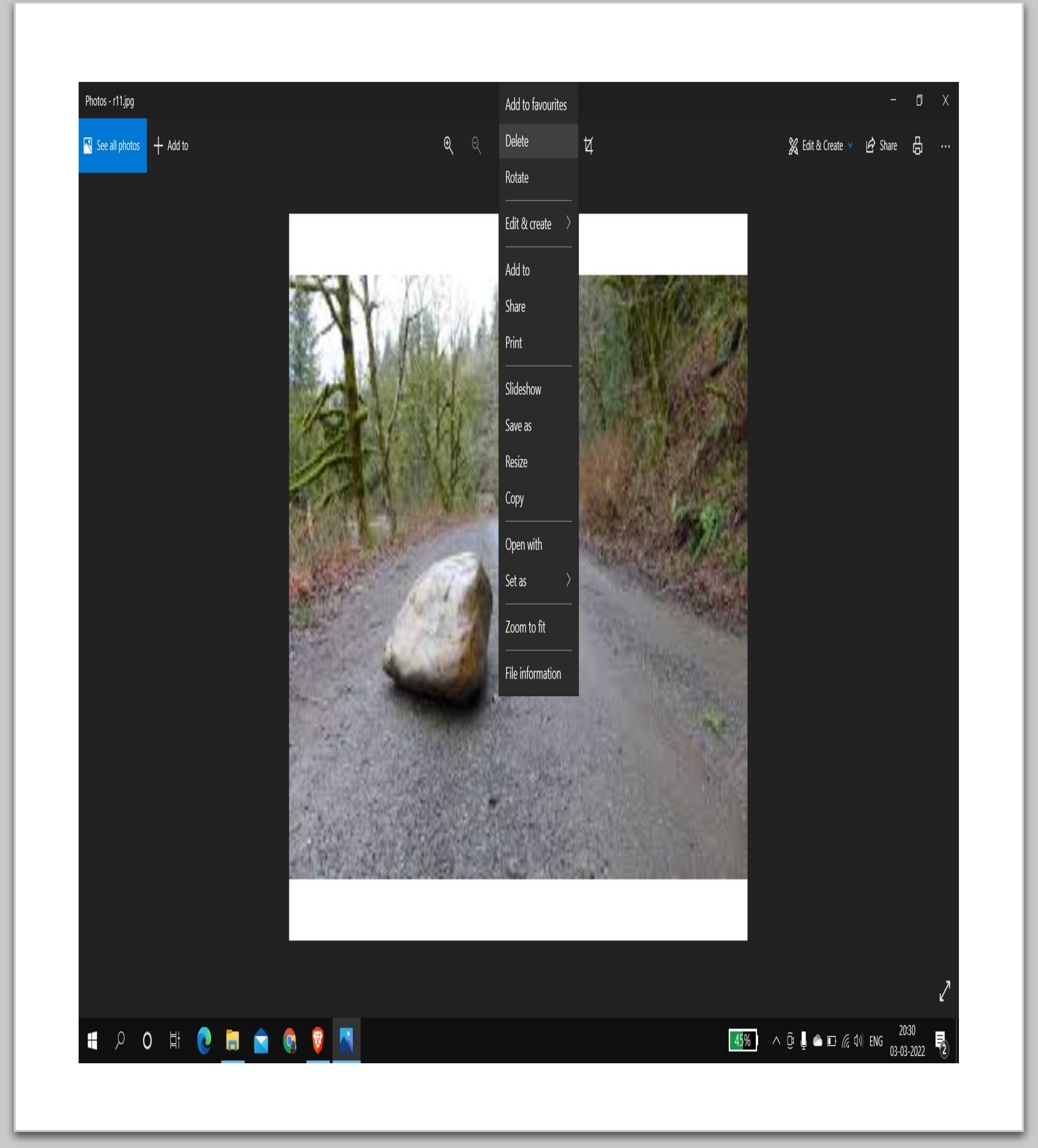


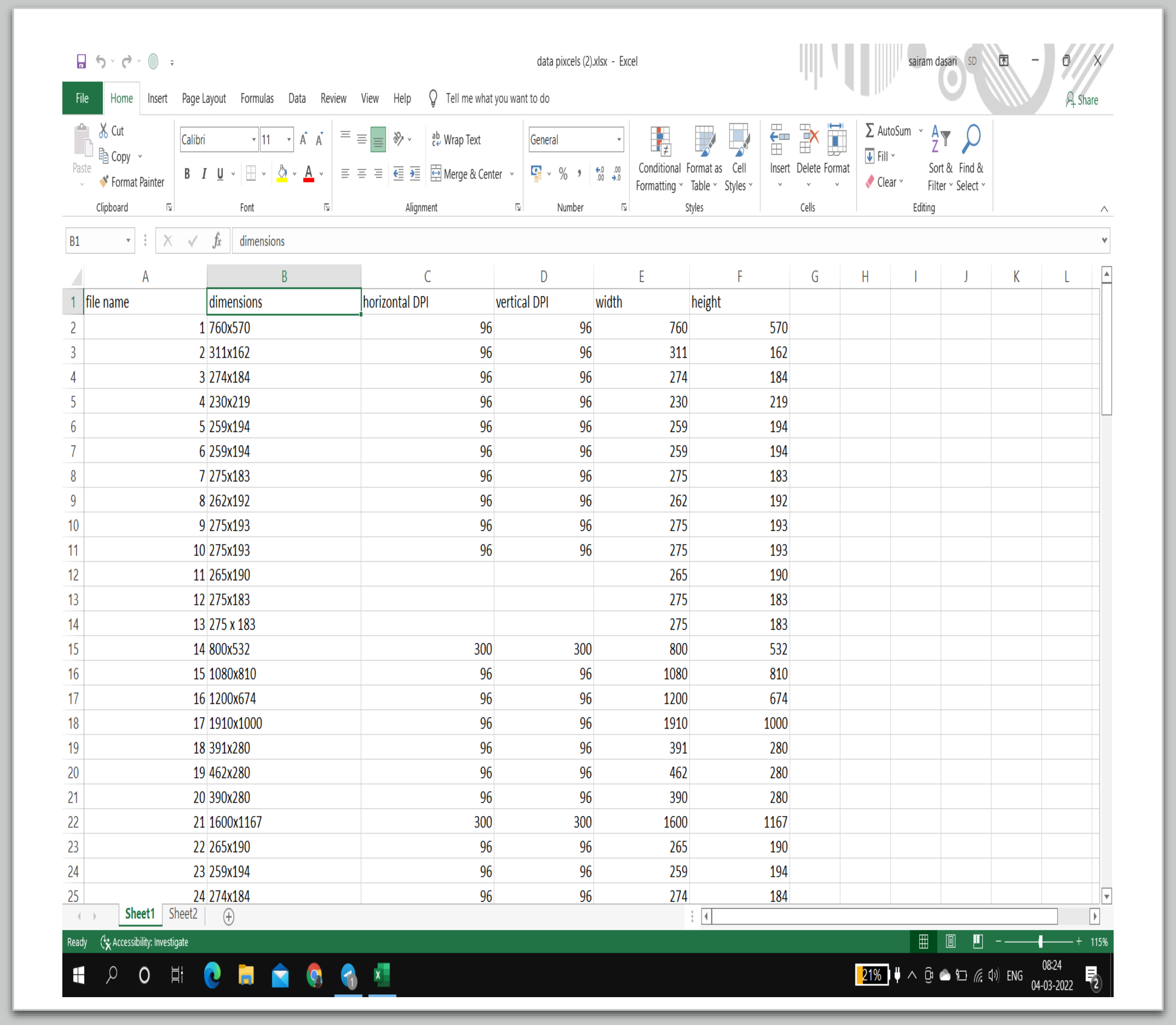
Data cleaning

- We have removed unwanted and noisy data .
- In our case noisy data refers to blur images , duplicate images etc..



Dataset Formatting

- We have rearranged the parameters for dataset into an excel sheet .
- The parameters for our dataset are width ,height,dpi(dots per inch).
- We have changed the parameters of images into equal dimensions.
- In this case we used MODE method for calculating the most repeated parameters.
- We have also handled the missing values.



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sairam dasari
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Share
Paste Cut Copy Format Painter Clipboard
Calibri 11 Font
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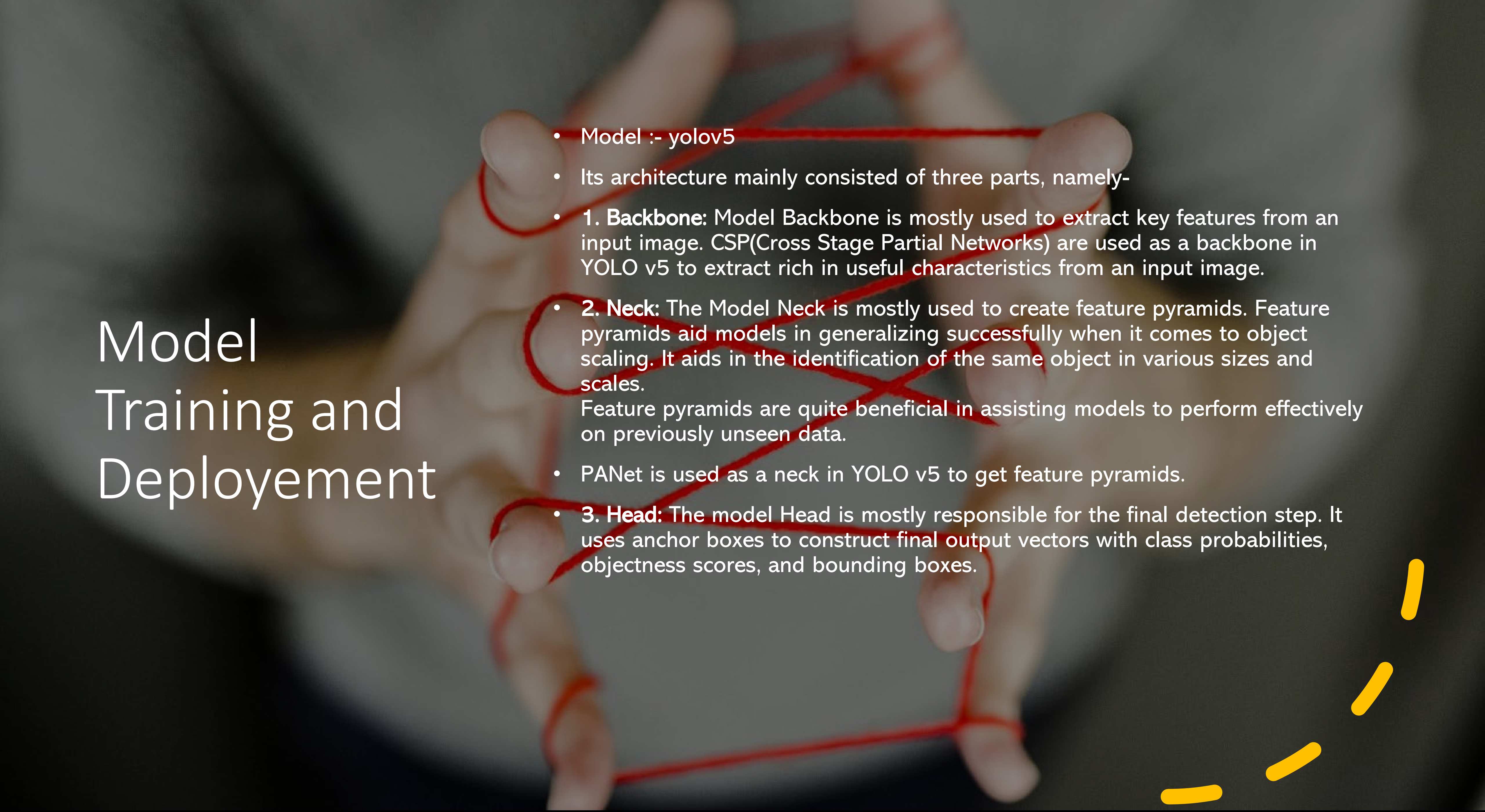
	A	B	C	D	E	F
1	file name	dimensions	horizontal DPI	vertical DPI	width	height
2	1	760x570	96	96	760	570
3	2	311x162	96	96	311	162
4	3	274x184	96	96	274	184
5	4	230x219	96	96	230	219
6	5	259x194	96	96	259	194
7	6	259x194	96	96	259	194
8	7	275x183	96	96	275	183
9	8	262x192	96	96	262	192
10	9	275x193	96	96	275	193
11	10	275x193	96	96	275	193
12	11	265x190			265	190
13	12	275x183			275	183
14	13	275 x 183			275	183
15	14	800x532	300	300	800	532
16	15	1080x810	96	96	1080	810
17	16	1200x674	96	96	1200	674
18	17	1910x1000	96	96	1910	1000
19	18	391x280	96	96	391	280
20	19	462x280	96	96	462	280
21	20	390x280	96	96	390	280
22	21	1600x1167	300	300	1600	1167
23	22	265x190	96	96	265	190
24	23	259x194	96	96	259	194
25	24	274x184	96	96	274	184

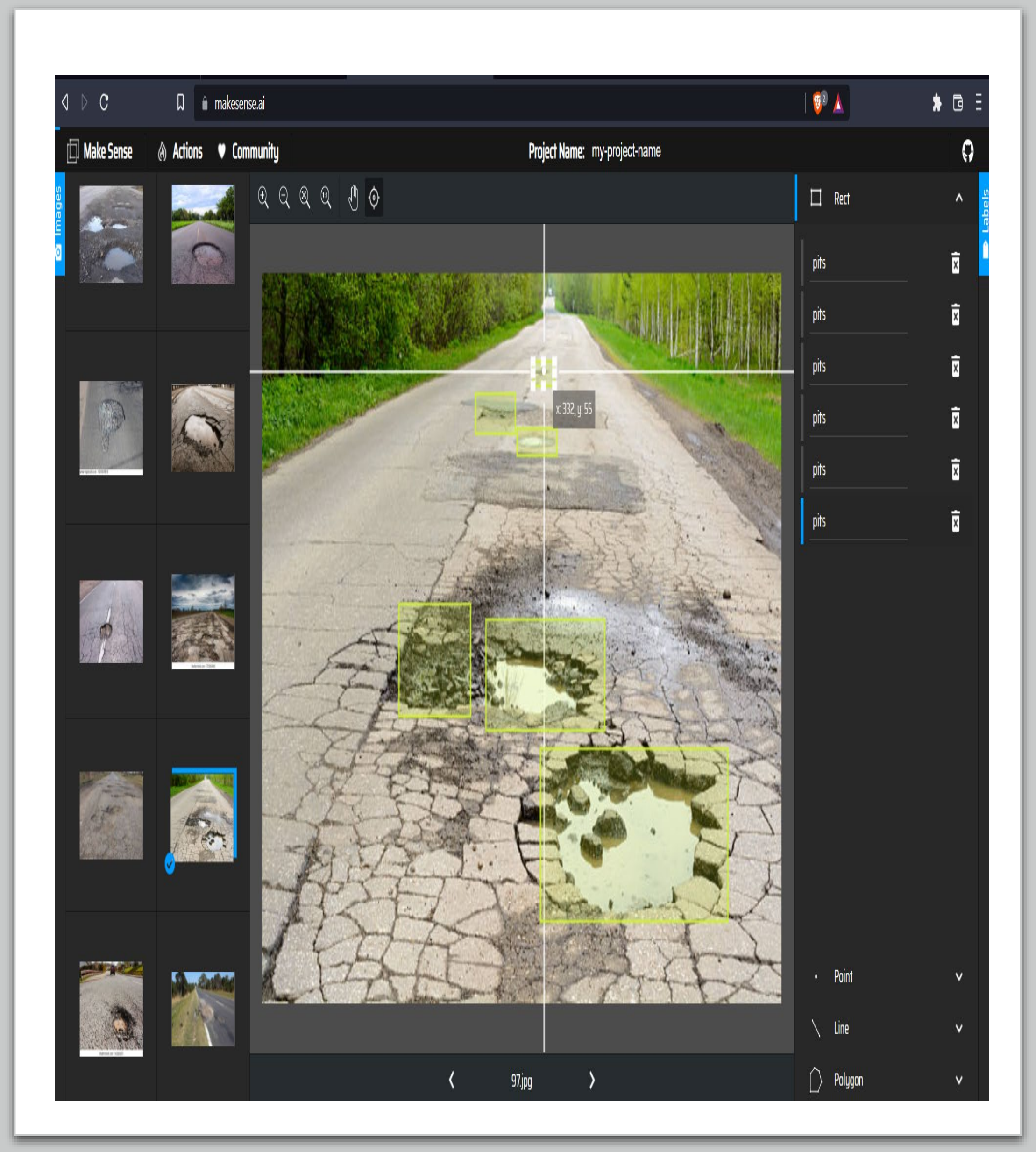


Model Training and Deployement

- Model :- yolov5
- Its architecture mainly consisted of three parts, namely-
- **1. Backbone:** Model Backbone is mostly used to extract key features from an input image. CSP(Cross Stage Partial Networks) are used as a backbone in YOLO v5 to extract rich in useful characteristics from an input image.
- **2. Neck:** The Model Neck is mostly used to create feature pyramids. Feature pyramids aid models in generalizing successfully when it comes to object scaling. It aids in the identification of the same object in various sizes and scales.
  Feature pyramids are quite beneficial in assisting models to perform effectively on previously unseen data.
- PANet is used as a neck in YOLO v5 to get feature pyramids.
- **3. Head:** The model Head is mostly responsible for the final detection step. It uses anchor boxes to construct final output vectors with class probabilities, objectness scores, and bounding boxes.

Dataset labelling

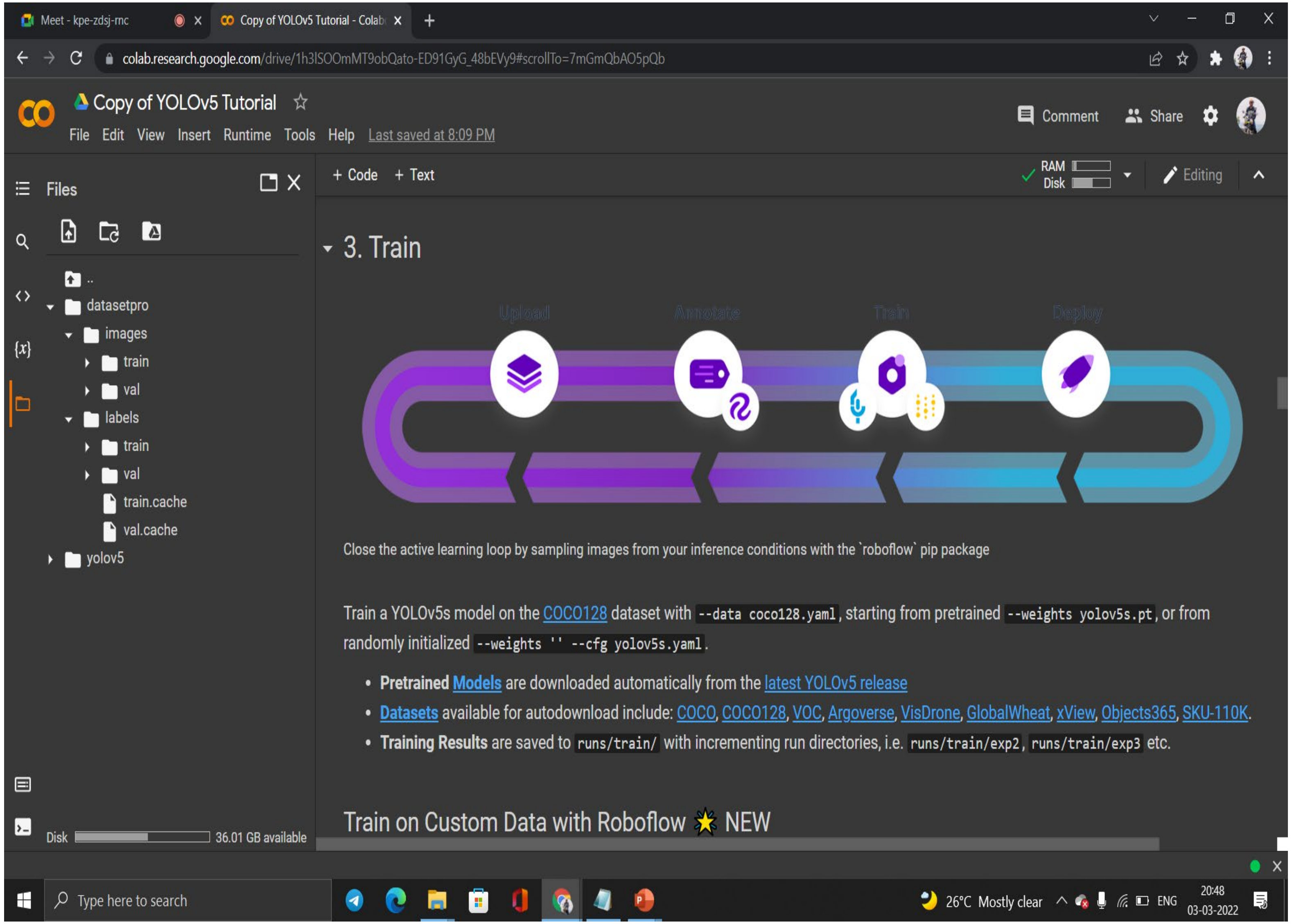
- We have used an Application called MAKESENSE.AI .
- This application is used for labelling the images in our dataset.
- This labelling is helpful in training the model .



Project Name: my-project-name

Training and validation

- We have used google colab for training the yolov5 algorithm using the labelled images.
- We have also validate these images in the same source.
- https://colab.research.google.com/drive/1h3lSOOmMT9obQato-ED91GyG_48bEVy9#scrollTo=7mGmQbAO5pQb



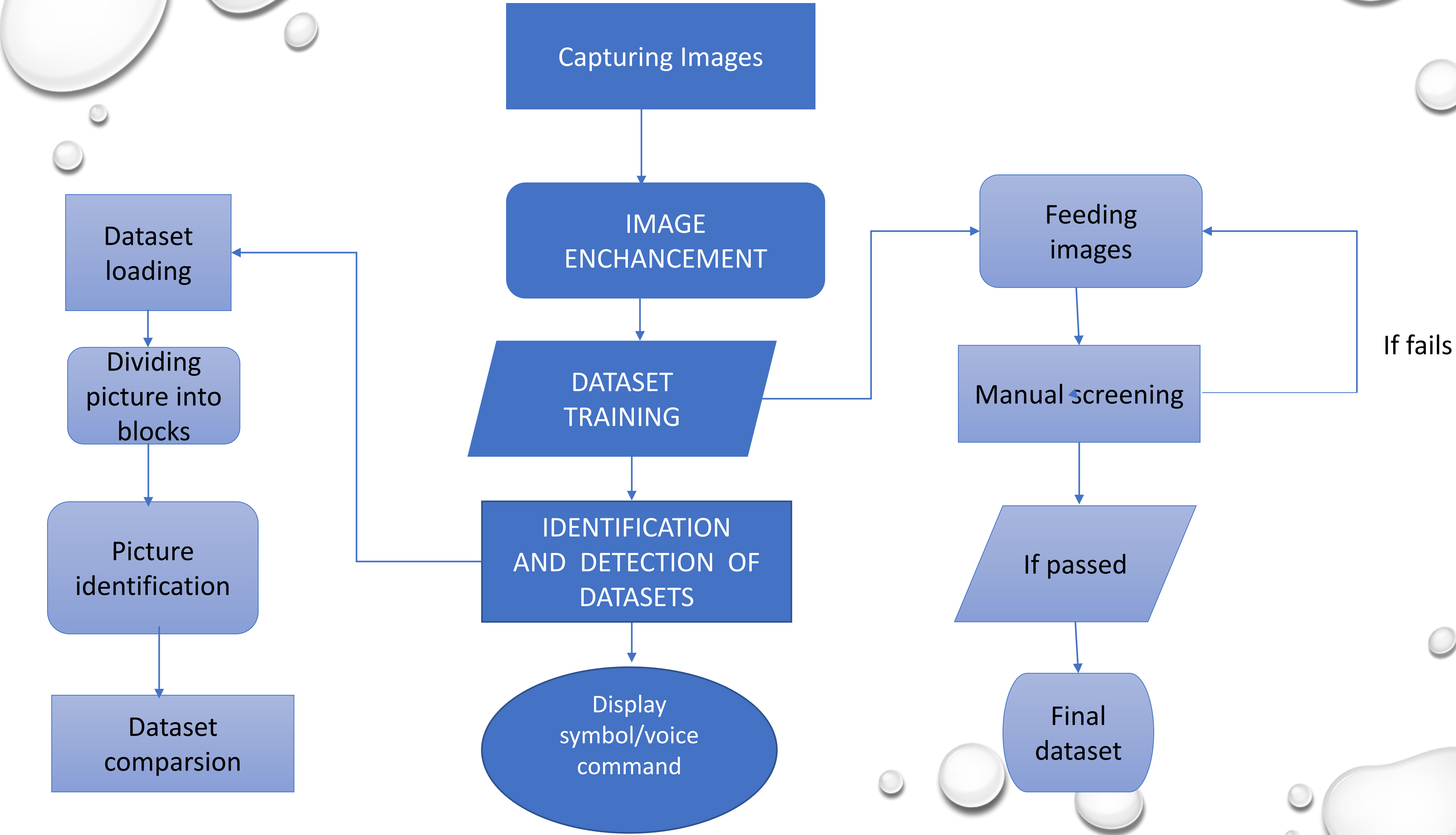
3. Train

Close the active learning loop by sampling images from your inference conditions with the `roboflow` pip package

Train a YOLOv5s model on the COCO128 dataset with `--data coco128.yaml`, starting from pretrained `--weights yolov5s.pt`, or from randomly initialized `--weights '' --cfg yolov5s.yaml`.

- **Pretrained Models** are downloaded automatically from the latest YOLOv5 release
- **Datasets** available for autodownload include: COCO, COCO128, VOC, Argoverse, VisDrone, GlobalWheat, xView, Objects365, SKU-110K.
- **Training Results** are saved to `runs/train/` with incrementing run directories, i.e. `runs/train/exp2`, `runs/train/exp3` etc.

Train on Custom Data with Roboflow 🌟 NEW



Capturing Images

IMAGE ENCHANCEMENT

DATASET TRAINING

IDENTIFICATION AND DETECTION OF DATASETS

Display symbol/voice command

Dataset loading

Dividing picture into blocks

Picture identification

Dataset comparsion

Feeding images

Manual screening

If fails

If passed

Final dataset

Tools and packages

Tools

- Py-charm
- Nvidia cuda
- Visual studio build tools

Packages

- Open-cv
- Py-torch
- Pandas
- NumPy
- Pycoco
- Torch ,torch vision ,torch audio
- Threadpoolctl
- Scipy
- Pillow