Car Damage Parts Detection

Function : #Enhancing Quality Control | **Industry :** #Automotive

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Goal

- To identify and classify damages such as scratches, dents or cracks in vehicles.
- To allow early identification of damages and timely maintenance interventions.
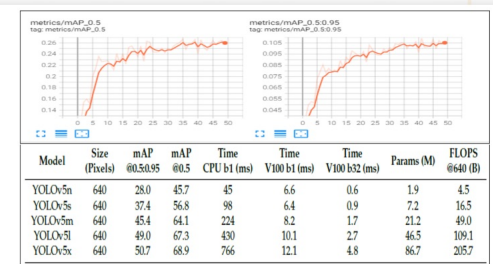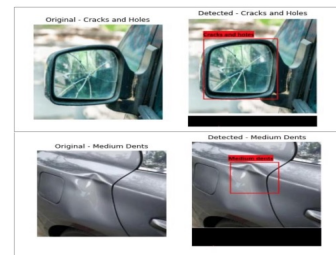- To enable automated and accurate inspections for insurance claims.

Technique

- Image augmentation
- Image capture
- Image processing
- Image classification
- Object detection
- Computer vision

Impact

- Accelerated claims processing, reducing delays and administrative burden.
- Reduced post-purchase repair costs, to enhance ownership experience.
- Enhanced brand image, to attract and retain customers.
- Boosted customer satisfaction and loyalty.

Result

Model	Size (Pixels)	mAP @0.5:0.95	mAP @0.5	Time CPU b1 (ms)	Time V100 b1 (ms)	Time V100 b32 (ms)	Params (M)	FLOPS @640 (B)
YOLOv5n	640	28.0	45.7	45	6.6	0.6	1.9	4.5
YOLOv5s	640	37.4	56.8	98	6.4	0.9	7.2	16.5
YOLOv5m	640	45.4	64.1	224	8.2	1.7	21.2	49.0
YOLOv5l	640	49.0	67.3	430	10.1	2.7	46.5	109.1
YOLOv5x	640	50.7	68.9	766	12.1	4.8	86.7	205.7

Value Points

Understand the **what, why, when, where** & **how**

Data Preprocessing

Image augmentation and enhancement techniques to mitigate the risk of overfitting in the model.
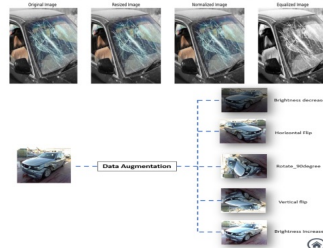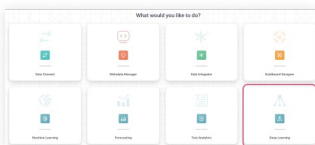

Image preprocessing using augmentation techniques and labelling

Image augmentation generates additional data for model to learn. Image labelling is preprocessing step for model building.

Comparative Analysis

Model	Size (Pixels)	mAP @0.5:0.95	mAP @0.5	Time CPU b1 (ms)	Time V100 b1 (ms)	Time V100 b32 (ms)	Params (M)	FLOPS @640 (B)
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Comparative Study using deep learning architecture.

Conducting a comparative analysis of different YOLOv5 deep learning architectures to discern the intricacies of each model in the context of detecting car damage parts.

U-Net (Attention) Analysis
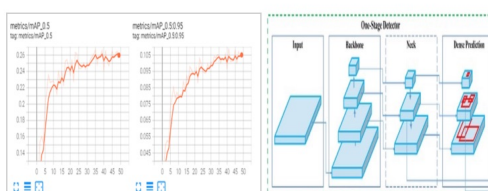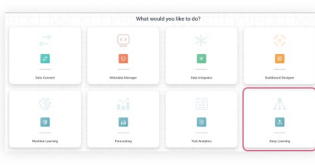
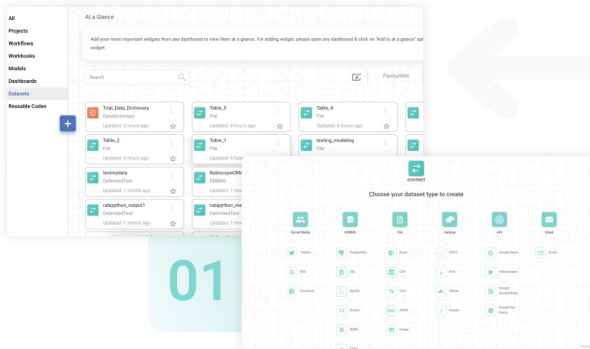**Object detection using Yolov5 algorithm**

Object detection helps in locating instances of objects in images or videos.

Multi Persona DSML Platform

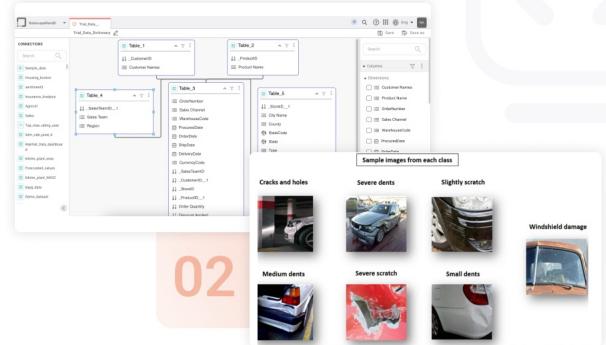For all your data needs- Data Engineering, Data Science, Data Visualisation, IoT

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Data Connect

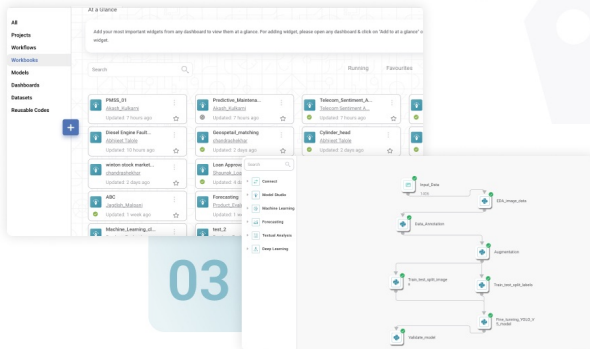
01

Damaged Car Part Data

Metadata Manger

02

Comprehensive Data Operations, encompassing Metadata Management

Model Studio

03

Modelling, encompassing the selection and configuration of models
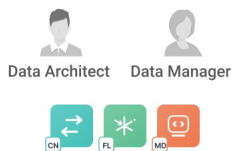
Visualisation

04

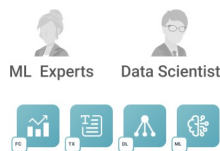Viz Ops, Illustrating The Core Trends And Graphical Representations

Agile Data Science

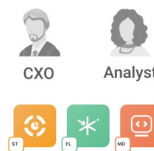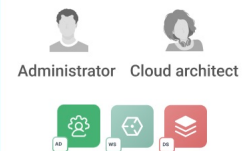Encapsulating **best practices**, tools and **methods**

Data Ops

Data Architect   Data Manager

ML Ops

ML Experts   Data Scientist

Viz Ops

CXO   Analyst

Tech Ops

Administrator   Cloud architect

Ideate
- What is the **goal**?
- How can you leverage the **data**?
- What do you want to **predict**?

Acquire
- How is data **sampled**?
- Which data is **relevant**?
- Any data **privacy** issue?

Explore
- Plot the **data**
- Are there **anomalies**?
- Are there **patterns**?

Model
- **Build** a model
- **Fit** the model
- **Validate** the model

Present
- What did we **learn**?
- Do the results make **sense**?
- Can we tell a **story**?

Deploy
- Where to **Deploy**?
- What is the **Structure** of Pipeline?
- How to **Optimise** and **Scale**?