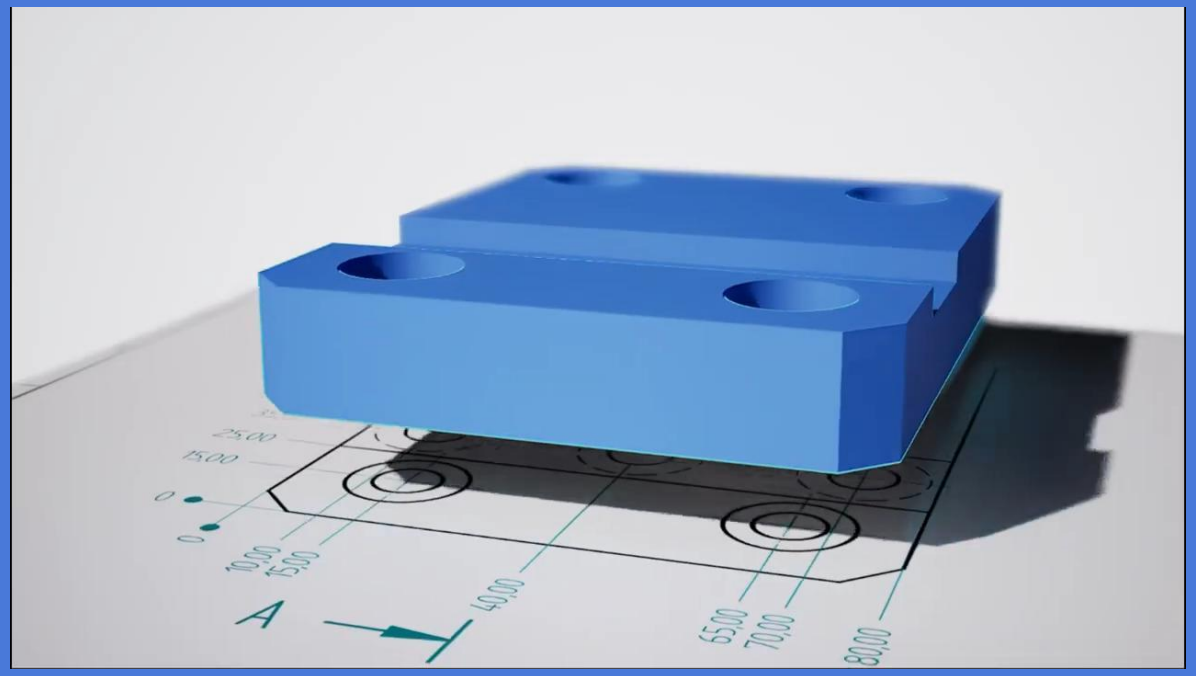
SP3D

INSTITUTE DATAIA
Data Science, Intelligence & Society

AI for mechanincal engineering Seminar

June 2025



From 2D drawing to 3D model using IA

TWO SOLUTIONS TO SIMPLIFY DIGITIZATION

Industry digitalization made simple

DIGITAL INVENTORY

Machine-learning based software and service that provide parts identification and digital inventory creation for 3D printing

DigiPART

AUTOMATED 3D RECONSTRUCTION

AI based software to automatically reconstruct 3D model based on 2D technical drawings

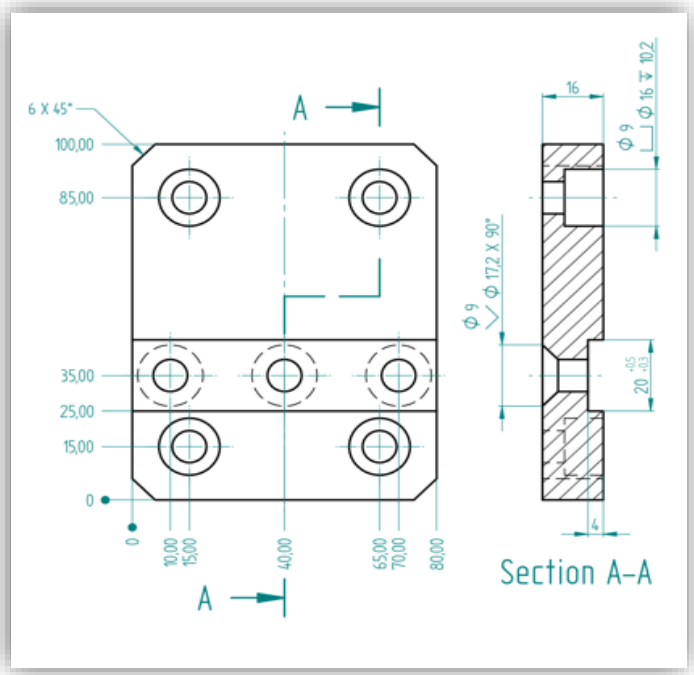
NEW

theia

2D to 3D Reconstruction

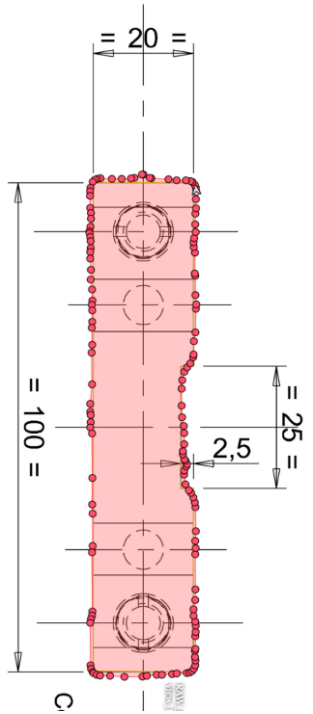
3D RECONSTRUCTION

CONVERT 2D DRAWING INTO 3D MODEL

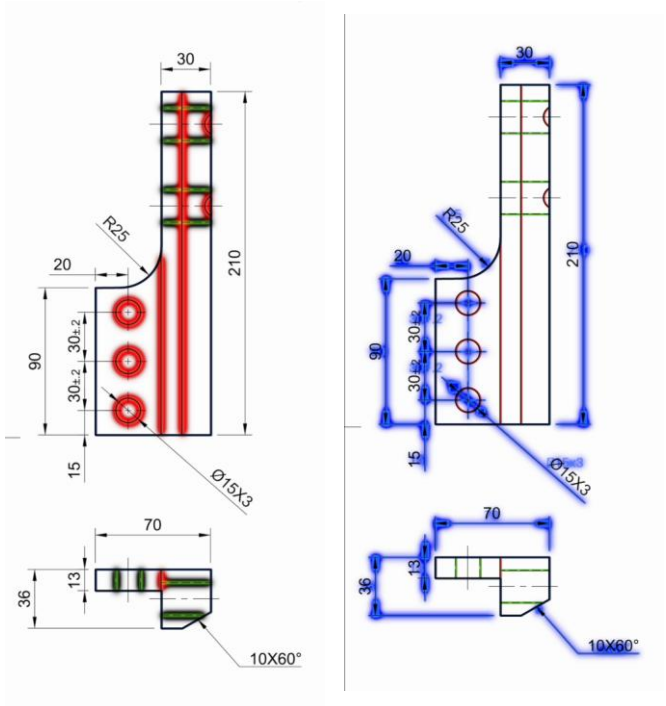


THEIA IS AN ENGINEERING APPLICATION WITH A COMPLEX PIPELINE POWERED BY SMALL SPECIALISED IA MODELS

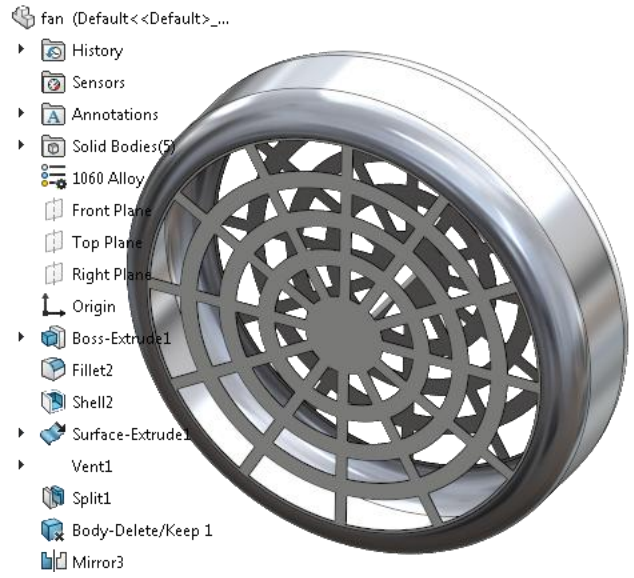
1 Image reading & vectorization



2 Classification

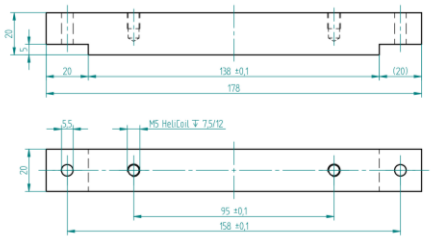


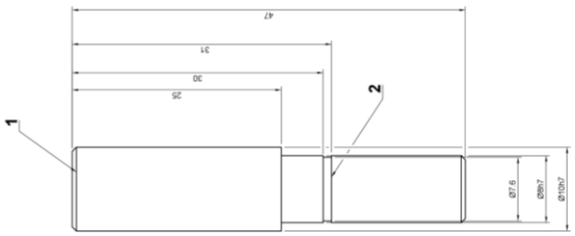
3 3D Reconstruction

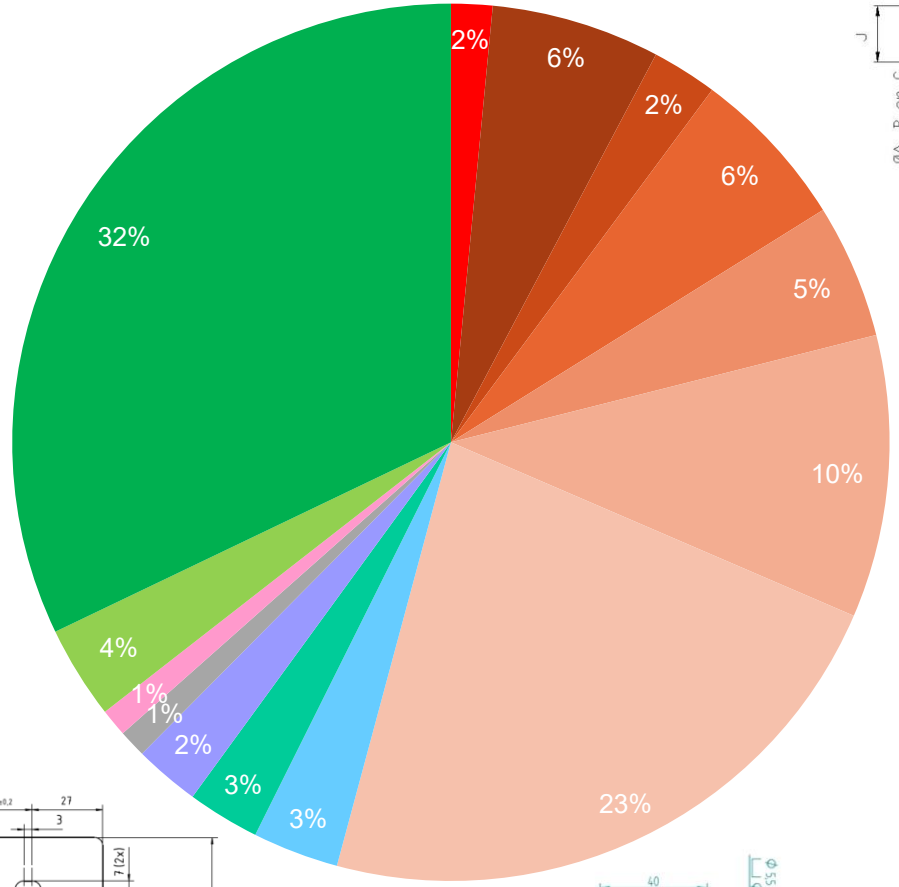


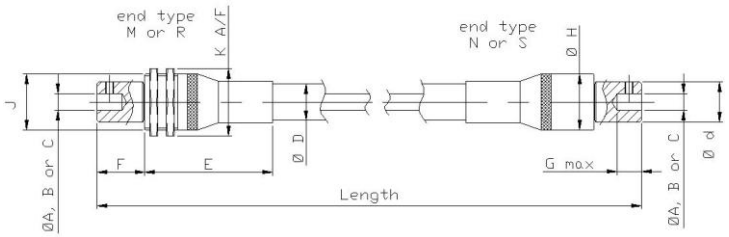
Computer vision **Neural Networks** **Language models**

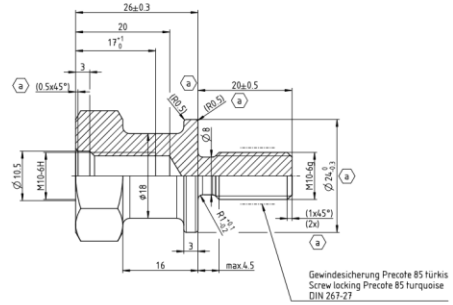
A SCATTERED PROBLEM WITH VERY IMPORTANT VARIETY OF ENGINEERING DRAWINGS

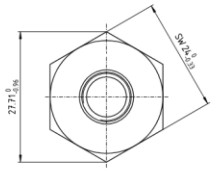


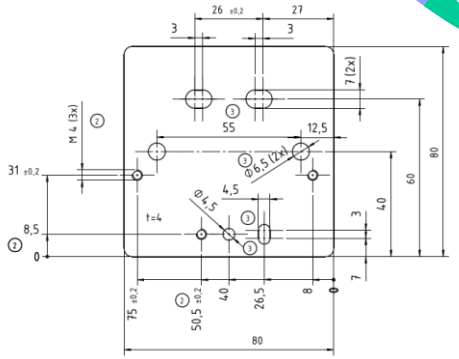


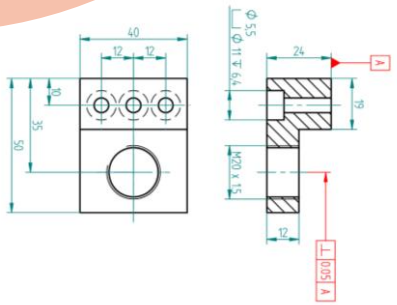












- Not reconstructible
- Truncated view
- Section lvl4
- Section lvl3
- Section lvl2
- Section lvl1
- Section lvl0
- Image quality
- Watermark
- Multiple parts drawing
- Multipage drawing
- Third angle
- Sheetmetal
- No apparent complexity

A MULTI-PRODUCT APPROACH LEVERAGING THE TECHNOLOGY TO ANSWER MARKET NEEDS

2025

Approximation

Theia Sketch

Near accurate 3D model (from drawings)

2027 onwards

2D to 3D

Theia Design

Exact, validated, reconstructed 3D model

Scan to 3D

Theia Scan

3D model from cloudpoints

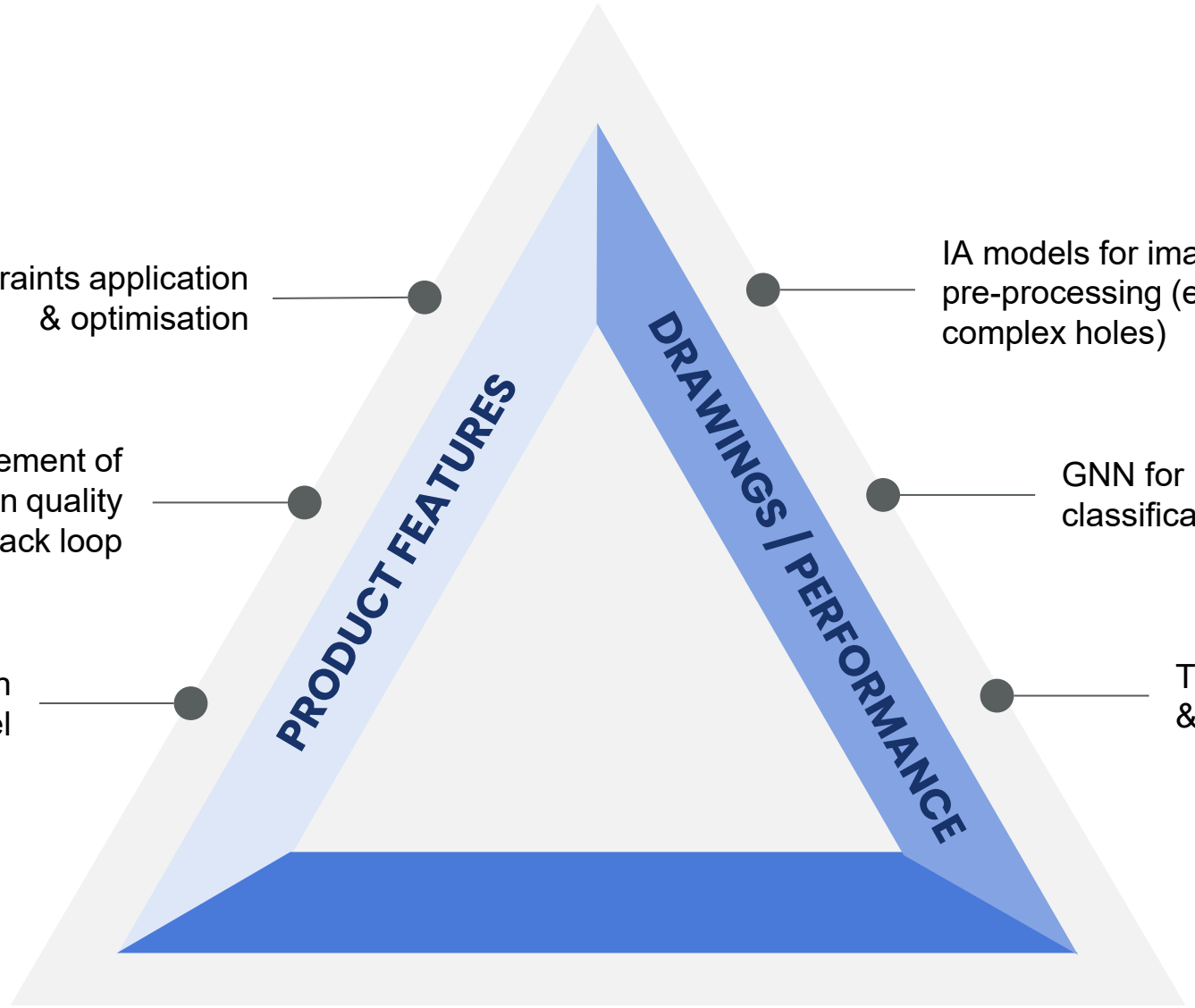
OUR R&D CHALLENGES

A ONE-FIT ALL SOLUTION COVERING A VAST ARRAY OF PROBLEMS

AMBIGUITY, ERRORS AND NON-RESPECT OF STANDARD

3D RECONSTRUCTION USING GEN IA FOR COMPLEX GEOMETRIES WHILE ENSURING RESULT QUALITY

OUR R&D AXIS AND MAJOR THEMES



- Contraints application & optimisation
- Measurement of reconstruction quality / feedback loop
- 3D reconstruction using langage model
- IA models for image pre-processing (e.g., complex holes)
- GNN for classification
- Treatment of sections & complex views