Inspection Systems and Automation
MAE-Industry Connect 2024

भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Sensor fusion and Customization

Vibration and Acoustic Transducers

Advanced Sound Level Meter

HMS IV(Digital Head Measurement System

Bearing Test Setup

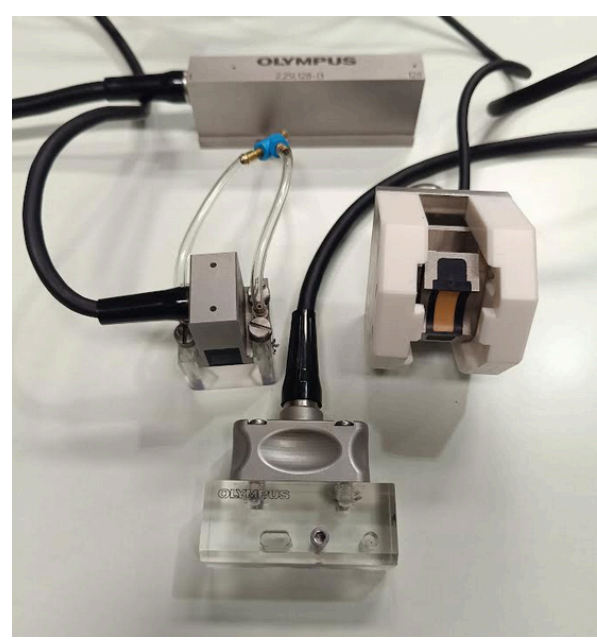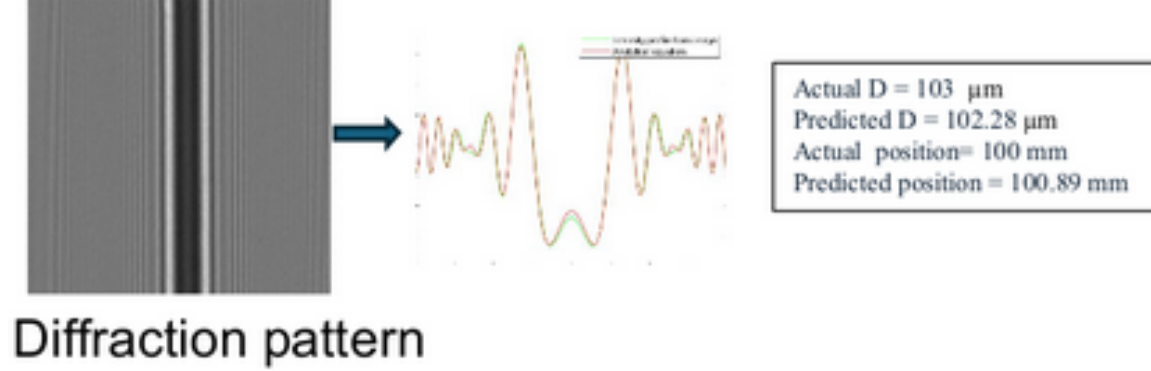| Sr no.	Nomenclature
10	NI DAQ
11	Thermocouples
12	Accelerometers
13	S - Shaped load cell
14	Microphone

Acoustic Emission

Water immersion Probe

Array of Transducer

A device for measuring diameter of thin micro fibre

Diffraction pattern

Actual D = 103 µm
Predicted D = 102.28 µm
Actual position= 100 mm
Predicted position = 100.89 mm

Actuation
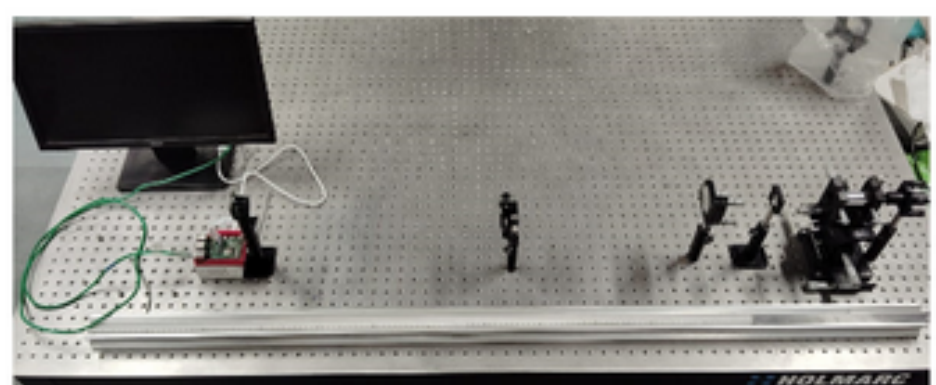
Phased Array Equipment-Signal Acquisition

Data acquisition unit
Probe
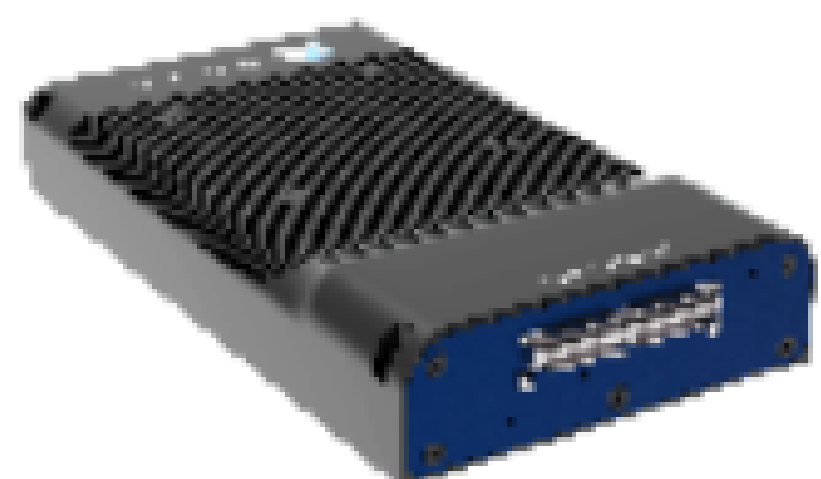Specimen
Versa mouse
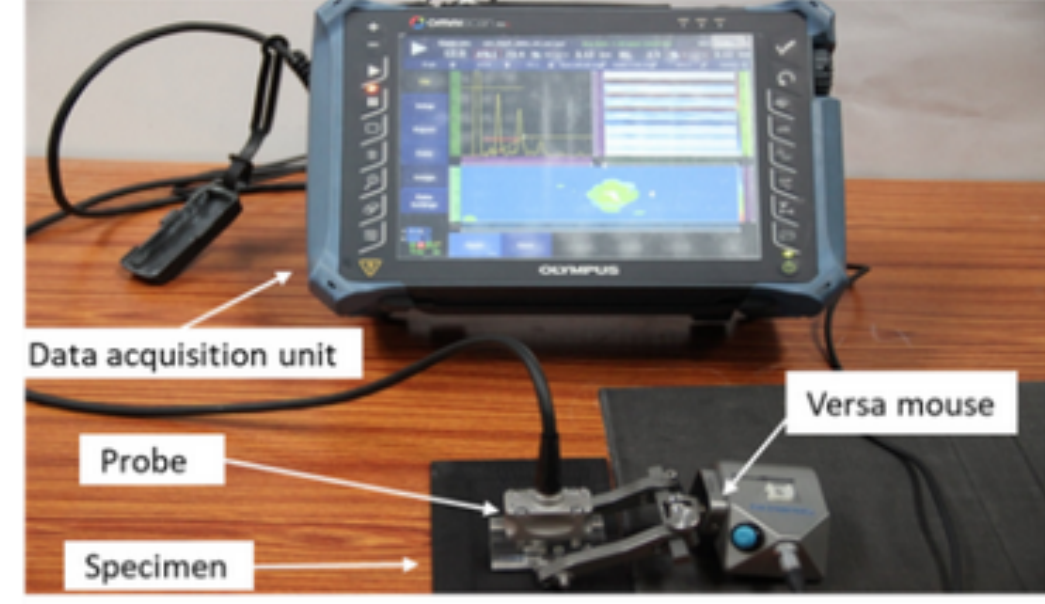
National Instruments(NI) Portable DAQ System

Sound Intensity Measurement-Grid Based
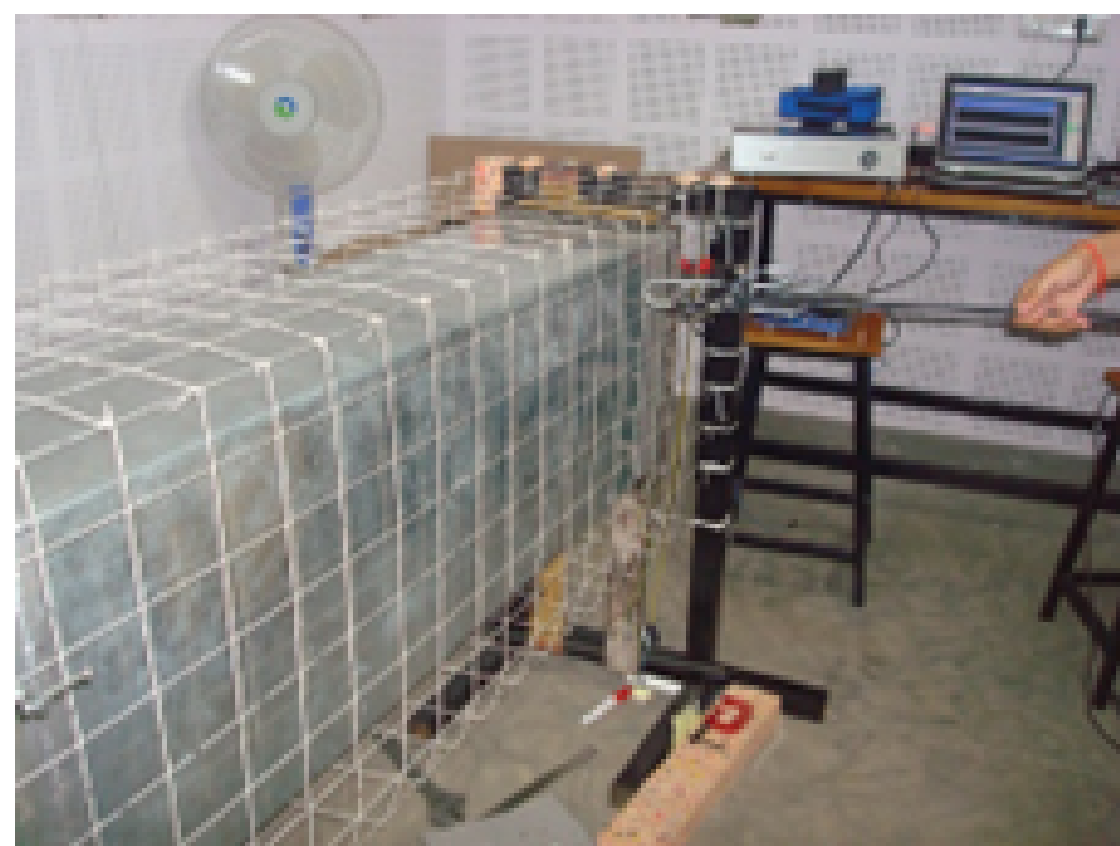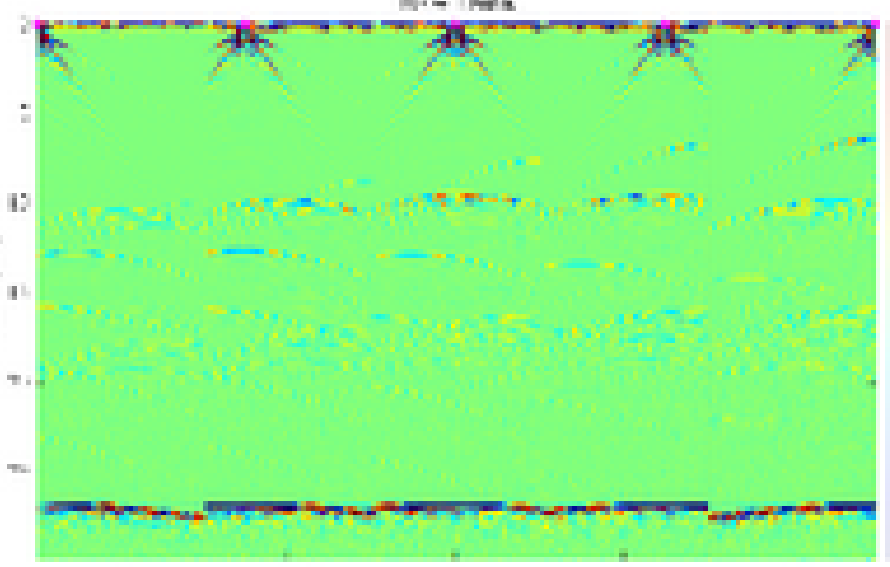

Acquisition of Raw Data

Data Acquisition System

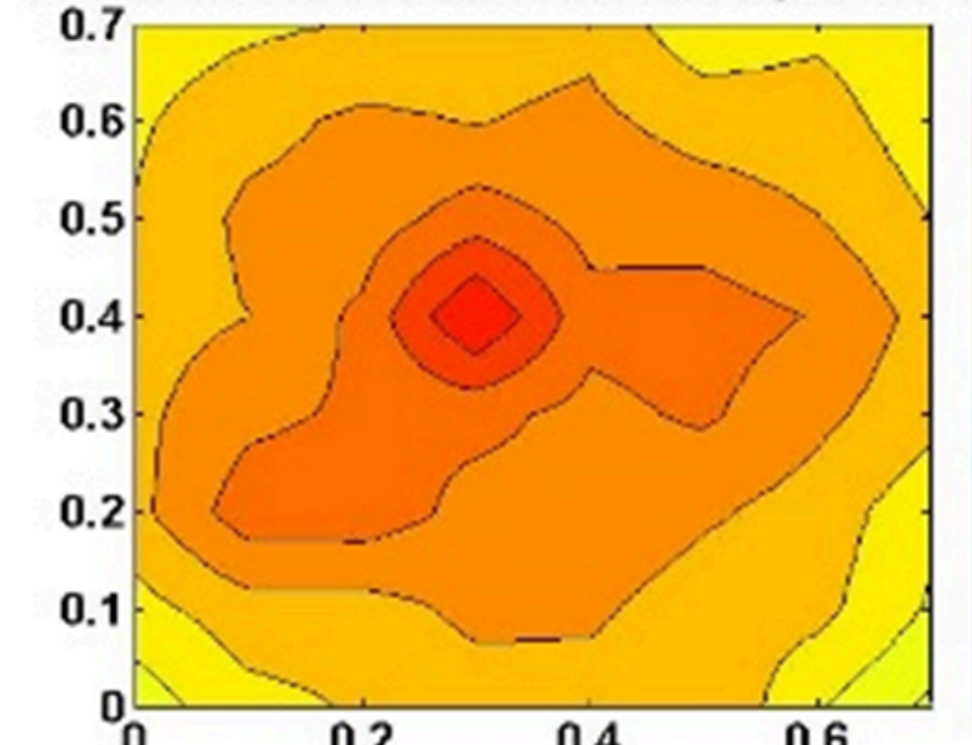

Signal Processing

Evaluating Sound Quality
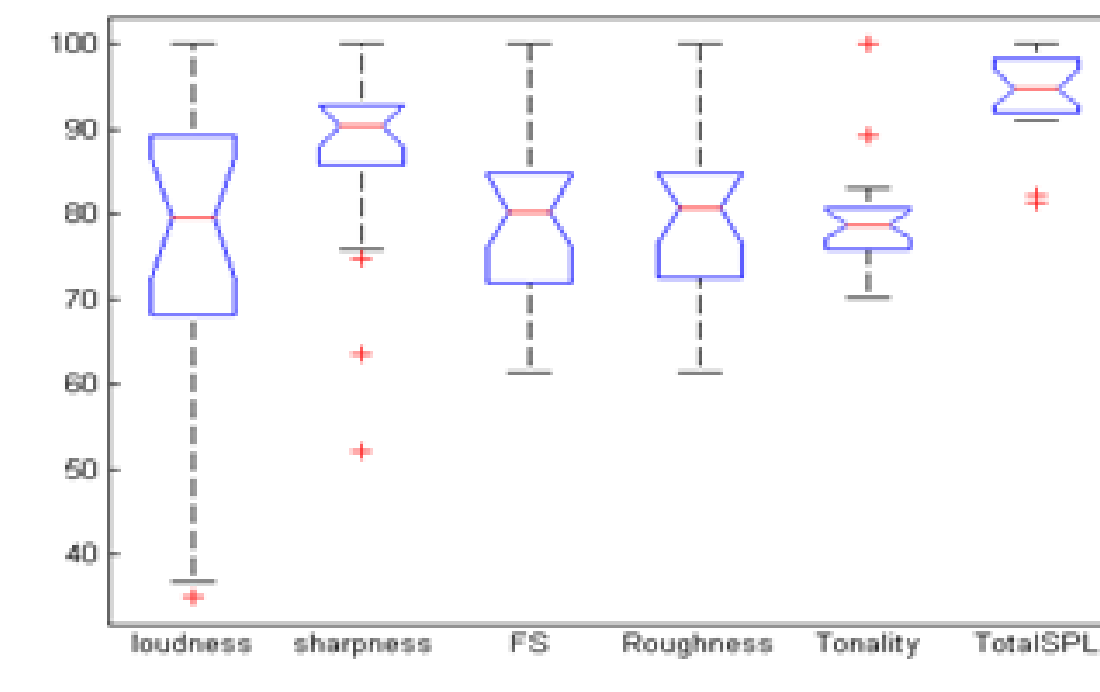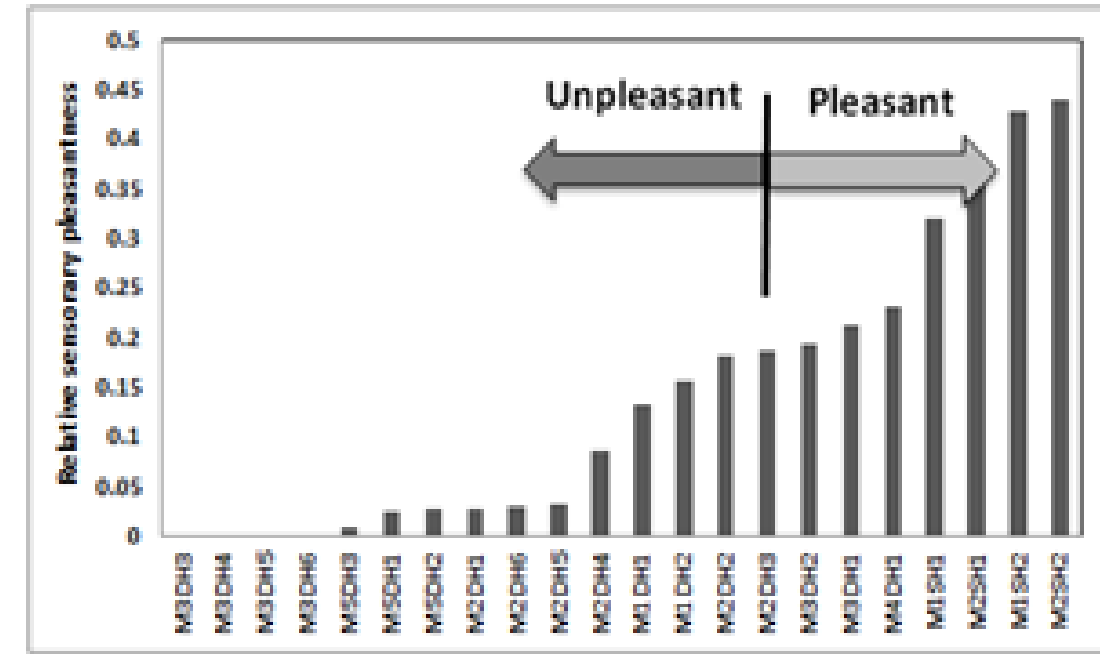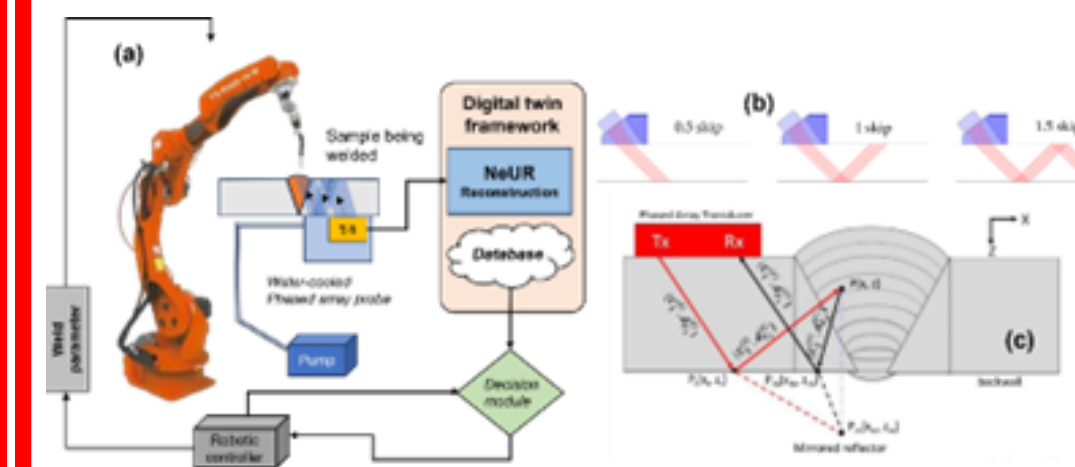

Noise Source Identifcation
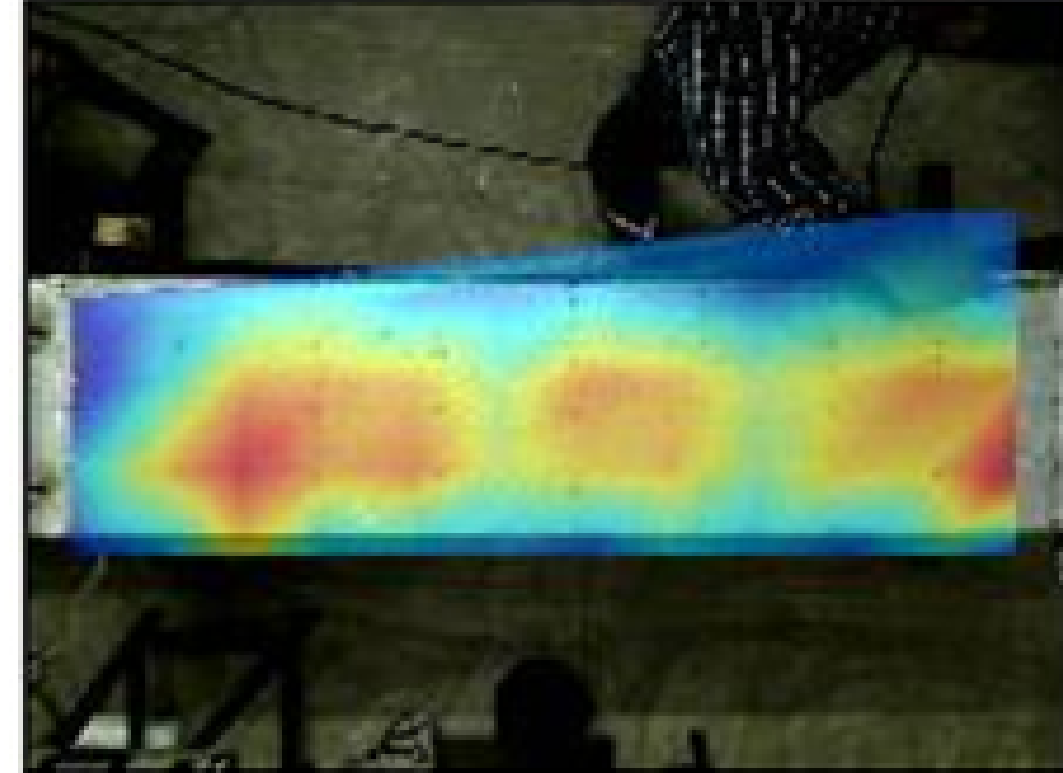
Raw Data

Pressure on Reconstructed Plane

Wind Tunnel Facility
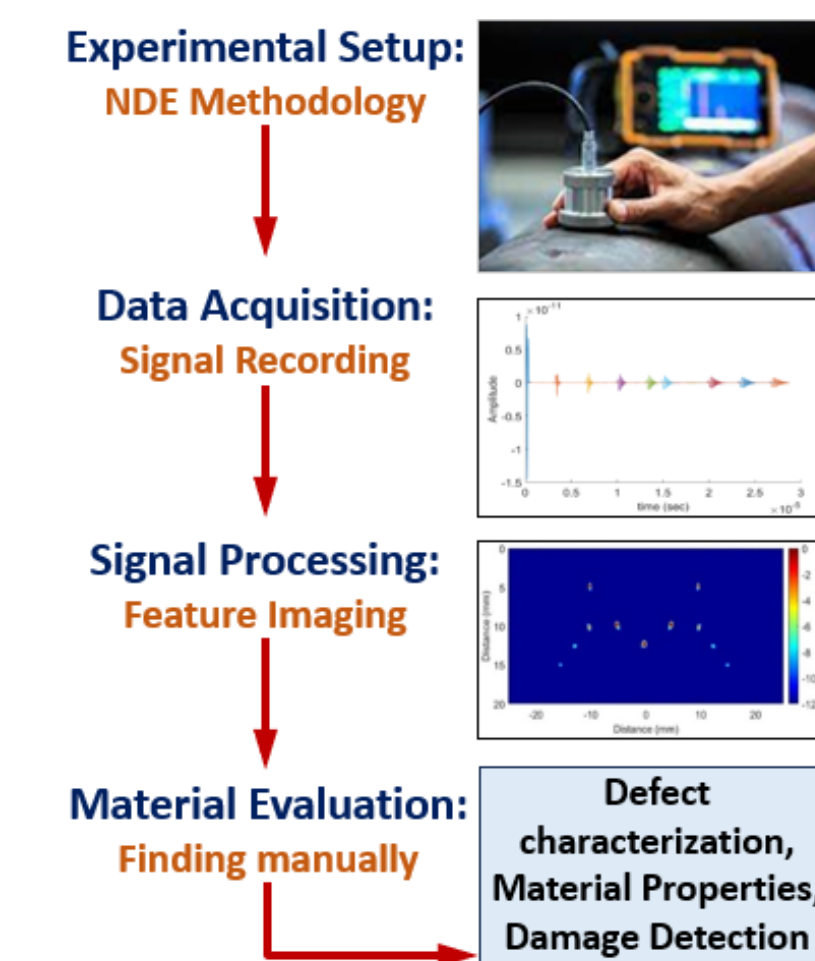

Control and Automation

Target Tracking
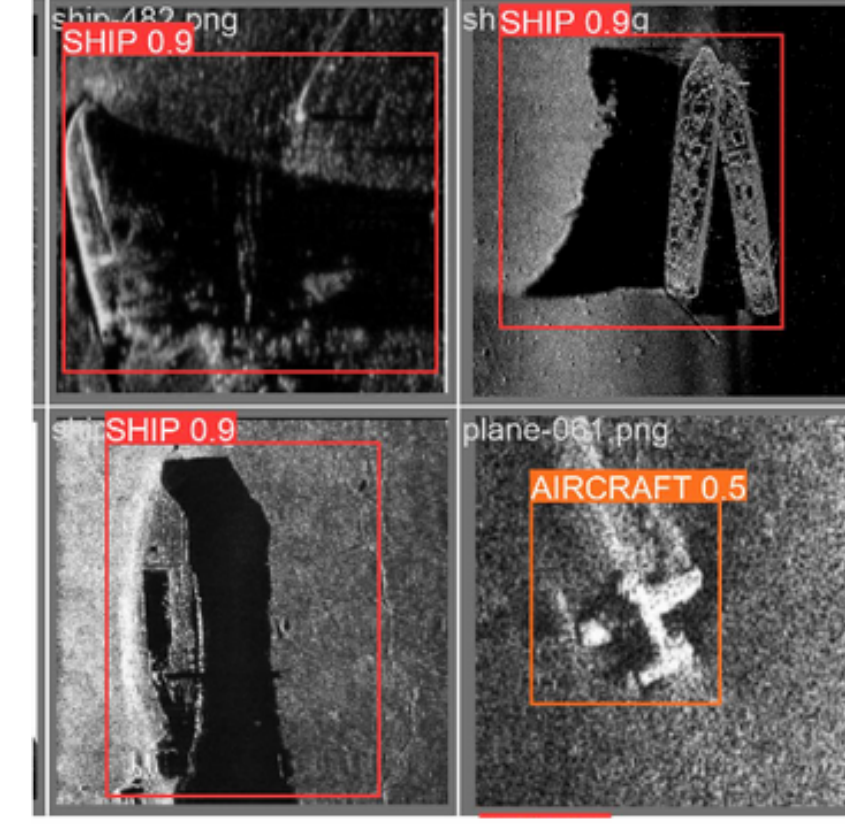
Automated Robot Weld Inspection

Signal Processing in NDE

Experimental Setup: NDE Methodology
Data Acquisition: Signal Recording
Signal Processing: Feature Imaging
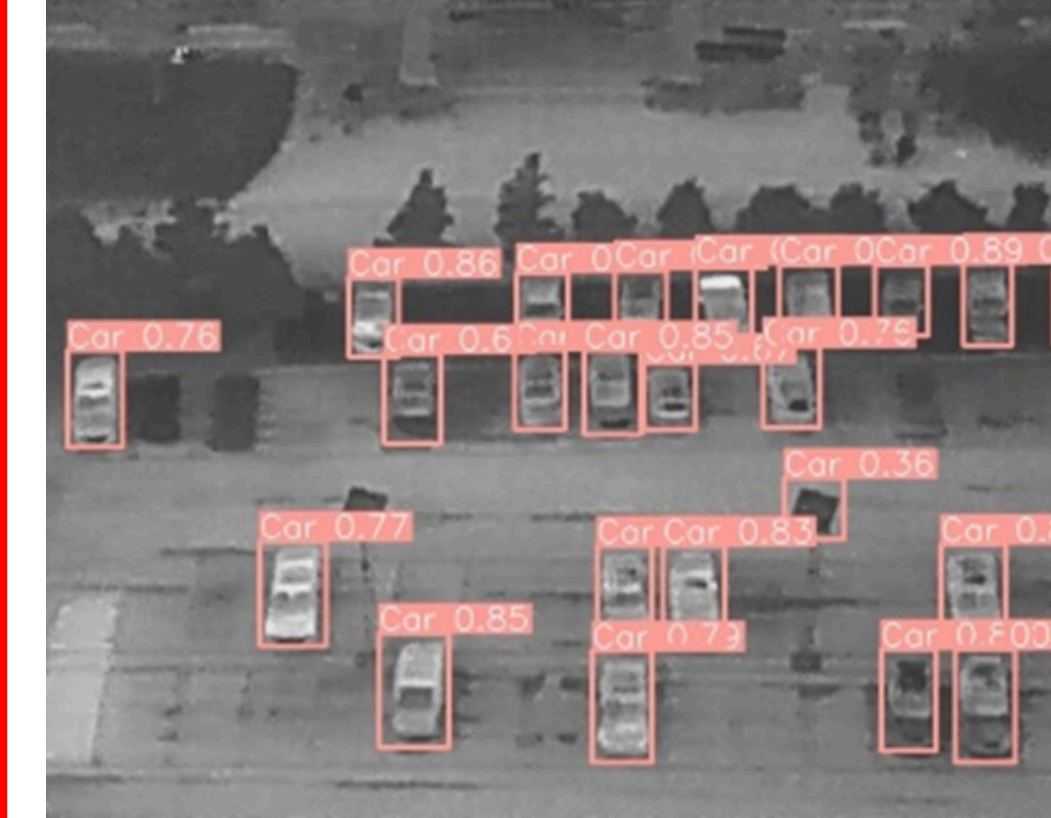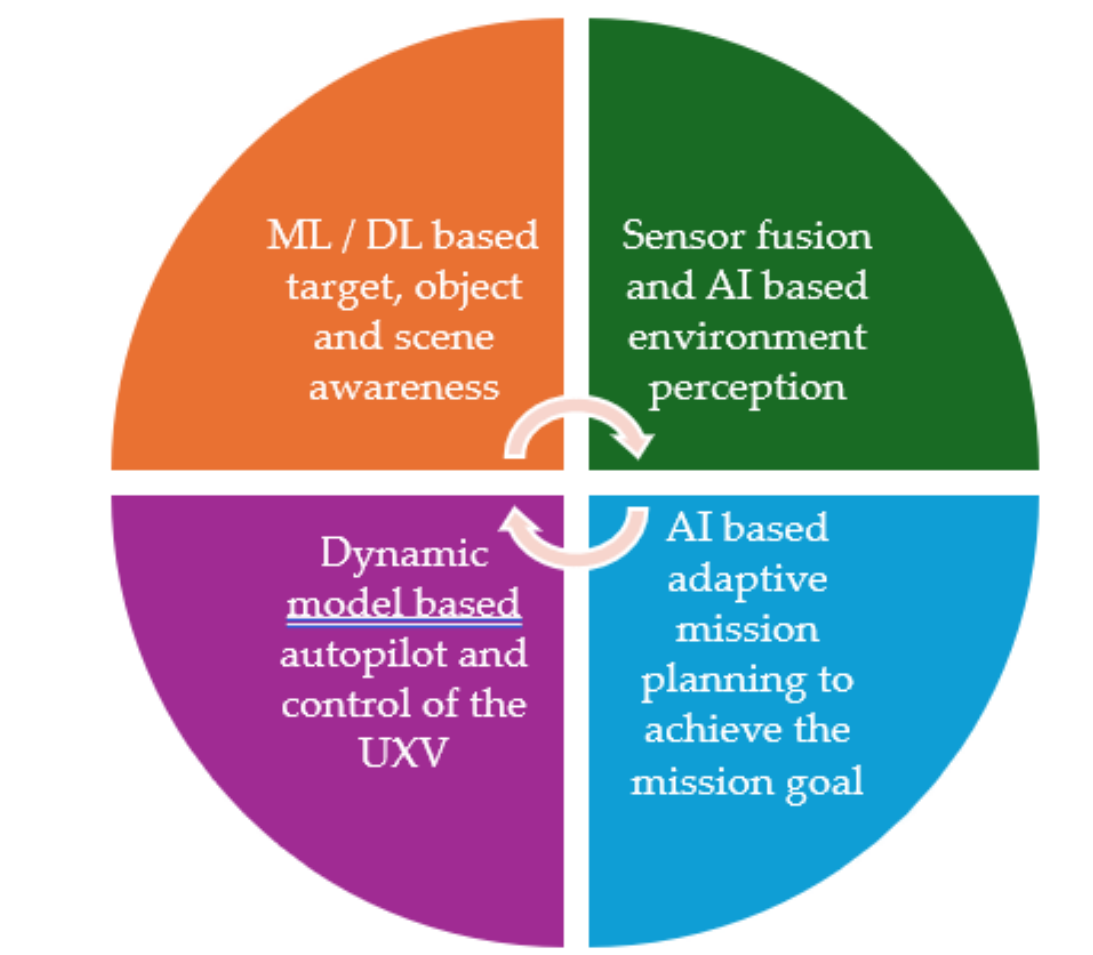Material Evaluation: Finding manually → Defect characterization, Material Properties, Damage Detection

Reconstruction Algorithms using GPU
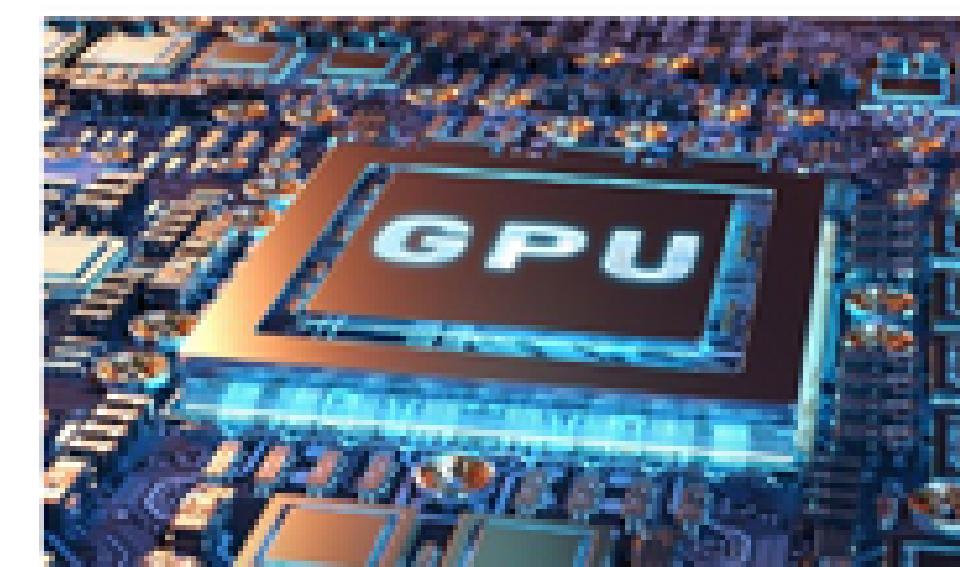
Adaptive Autonomy on every UXV platform

Data Driven Methods and Identification

ML / DL based target, object and scene awareness | Sensor fusion and AI based environment perception
Dynamic model based autopilot and control of the UXV | AI based adaptive mission planning to achieve the mission goal

AI Prediction for Weld Defects
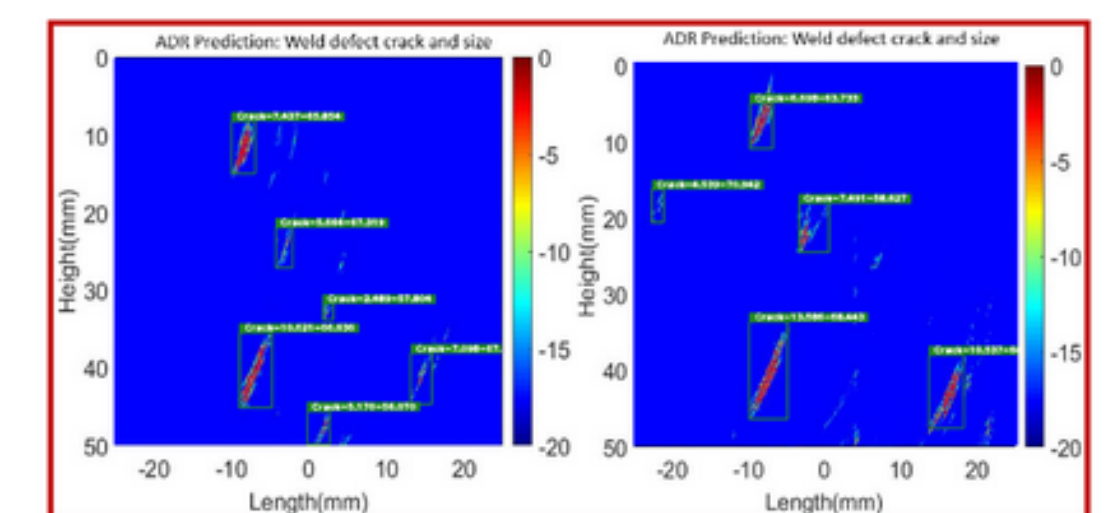
AI Prediction for Casting Defects

AI Data Driven Wave Modelling

Physics aware NN for Modelling Wave Dynamics

$Loss = MSE_{EXP} + MSE_{PDE} + MSE_{IC} + MSE_{BC}$

Ux   Uy

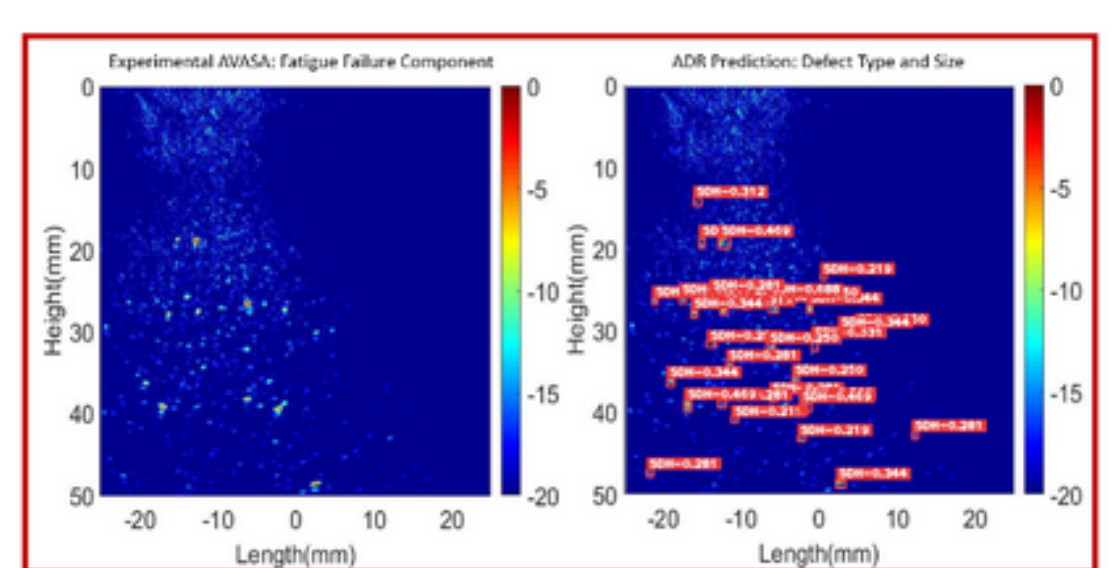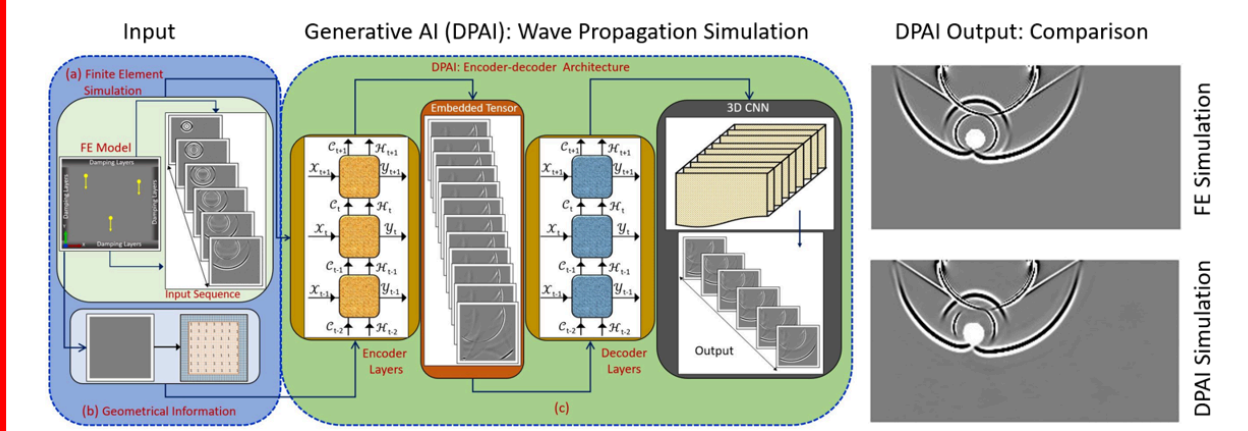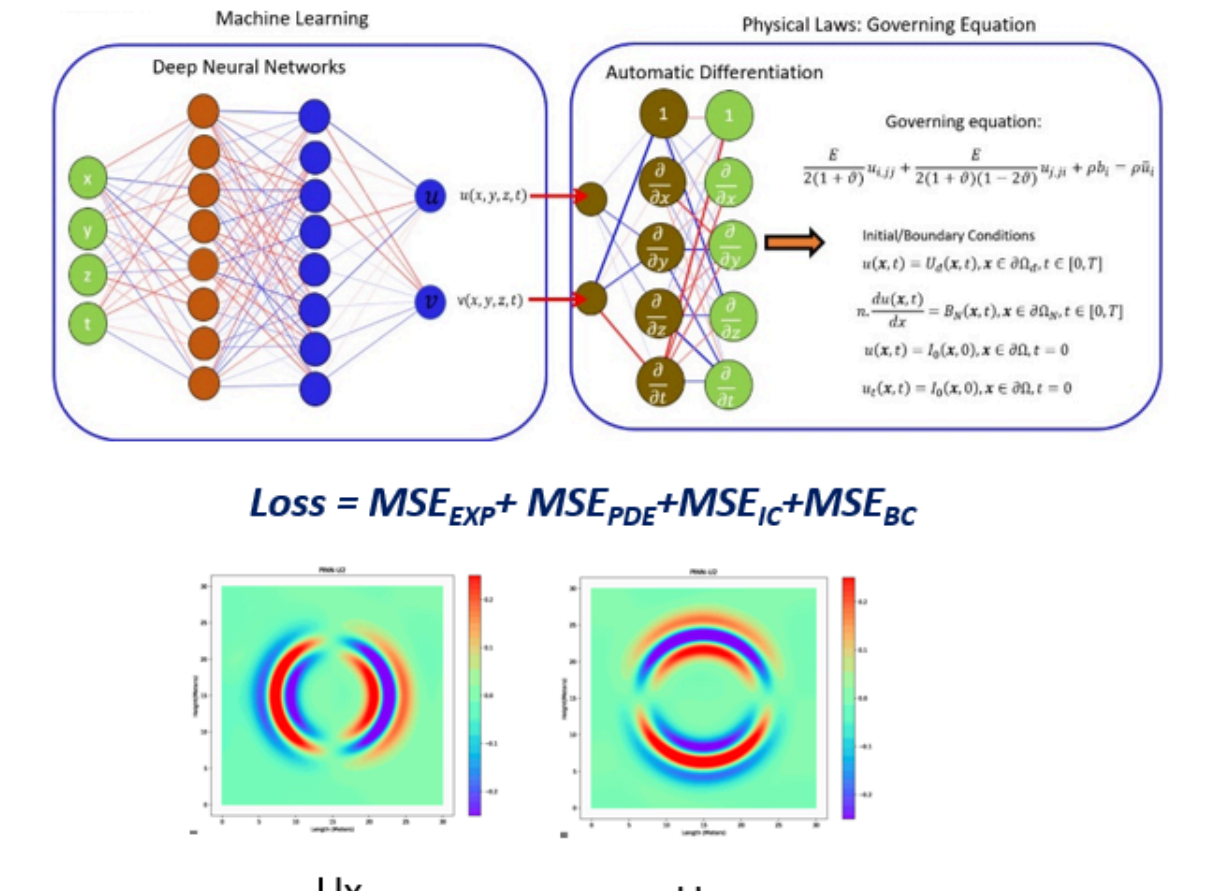**U-net CNN based holography for particle size measurements**
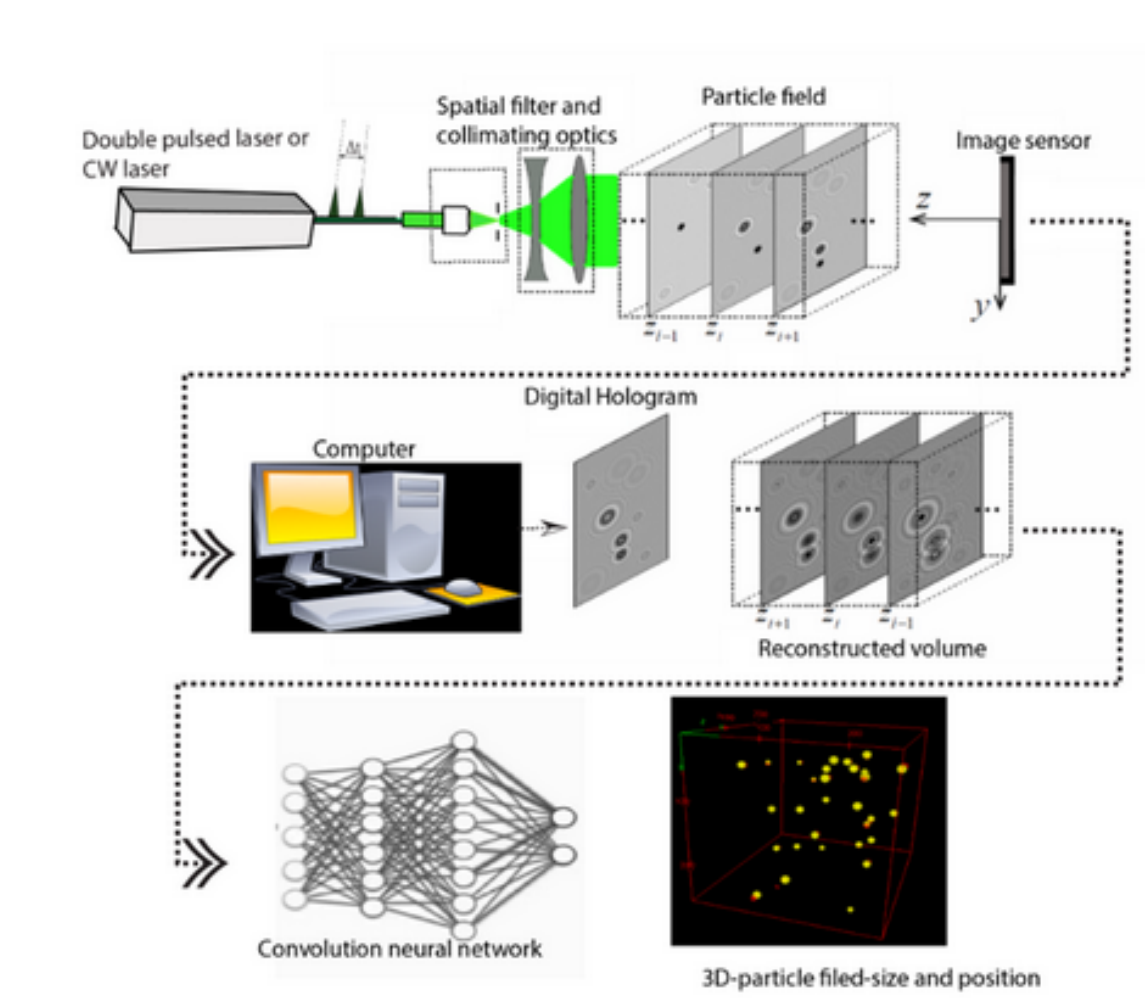
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