2025

OBSERVERSHIP REPORT

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CynLr Laboratories

EPIP Zone, Whitefield, Bengaluru, KA

CyRo

ABOUT THE COMPANY:

Cybernertics Laboratory is a robotics and vision intelligence company specialising in adaptive, articulated robotic arms that replicate human-like visual perception.

Vision: **Complete autonomous** factories where a cluster of CyRo's can work in unison to assemble different parts, in limitless combinations.

Univeral replacement for **costly custom** articulated arms that only work for specific parts, and are not adaptable.

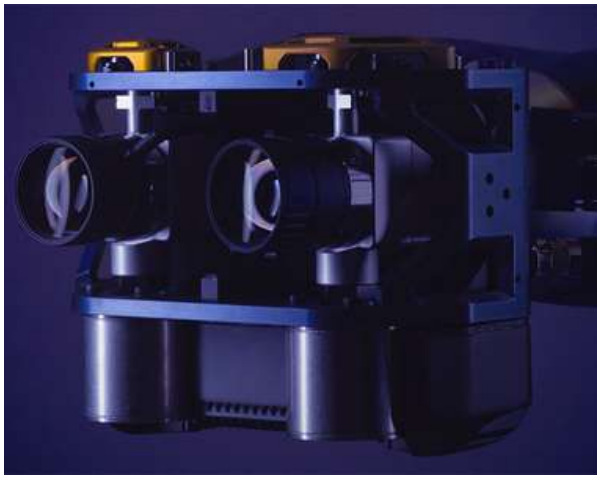
PRODUCT LIST

- CLX-01 Vision Hardware Platform
- CyRo - Dual Arm Robotic System

CEO:
Mr. Nikhil Ramaswamy

What sets them apart?

Pick, orient, and manipulate previously non-automatable **objects** in unstructured settings **with minimal training** or mechanical re-alignment.


CLX-01

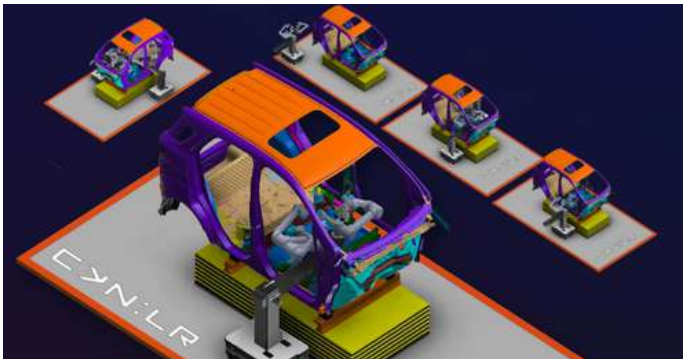
CLX-01 - Replicates Human Eye's Intelligence

Optical Convergence – Converge & diverge to adapt to objects at different distances and acquire high-fidelity, high-speed depth information

Auto Focus (Liquid Lens Optics): **Reduced Dependace on Colour Analysis Depth Mapping** of Key Contours that is calibration free and even works for reflective, transparent or randomly lit & environments.

CyRo -

- A 6-DOF articulated manipulator powered by the CLX-01 stack for training-free grasping and real-time object tracking.
- Adaptive Grasping replacable 2/3/5 finger grasping that can handle variety of objects varying in size, shape and texture
- Closed-loop adaptive control, where visual perception continuously refines motion execution for sub-millimetre precision.



INDUSTRIAL APPLICATIONS

Converts conventional assembly lines into modular micro-factories, reducing deployment time from 12 months to < 4 weeks.

1. General assembly automation (automotive / electronics)
2. Warehouse piece-picking and kitting
3. Optical inspection and high-precision part handling

Thrithi Robotics

24th Main Rd, Bengaluru, KA

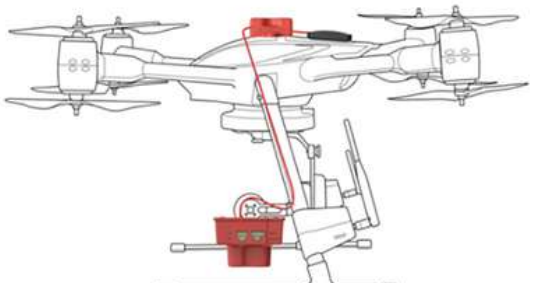
ABOUT THE COMPANY:

Thrithi Robotics is a Bengaluru-based agritech company developing autonomous aerial systems for precision farming. Their drones integrate multispectral imaging, thermal sensing, and automated spraying technologies to improve agricultural efficiency and sustainability.

PRODUCT LIST

- Spray Drons: One5, Three5
- Crop Sensors and Thermal Monitoring Drones

CEO:
Mr. Vasant Bhat



Spray Drones:

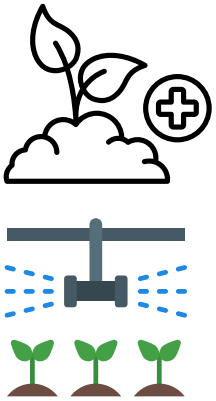
- **RTK-enabled flight controller enables centimeter-level accuracy for autonomous spraying routes.**
- **Variable nozzle system adjusts droplet size and flow rate according to crop type and canopy density.**
- **LiDAR sensors maintain altitude uniformity across uneven terrain.**
- **Autonomous route optimization reduces chemical use and minimizes overlap.**
- **Payload: 10–15 L spray capacity with 20–25 min endurance per charge cycle.**

Thermal Drones:

- **Equipped with MicaSense Altum-PT for synchronized multispectral, panchromatic, and thermal imaging.**
- **Captures six spectral bands (Red, Green, Blue, NIR, Red Edge, Thermal IR) for assessing vegetation health and stress.**
- **Integrated DLS 2 sunlight sensor and radiometric calibration panel ensure accurate reflectance data under changing light.**
- **Pan-sharpening algorithm combines high-res panchromatic data with multispectral output for clearer NDVI maps.**
- **Thermal imaging using FLIR Boson module detects crop temperature variations for irrigation and pest diagnostics.**

Applications

- Precision Crop Health Mapping: Real-time NDVI and thermal data detect water stress, pest damage, and nutrient deficiency.
- Targeted Pesticide & Fertilizer Spraying: Variable-rate control ensures even distribution, saving up to 30% chemical usage.
- Irrigation Planning: Thermal imagery identifies water-deficient zones for efficient drip-line placement.



PPAP Automotive Ltd.

Plot. 206A, Sector-81, Noida, UP

ABOUT THE COMPANY:

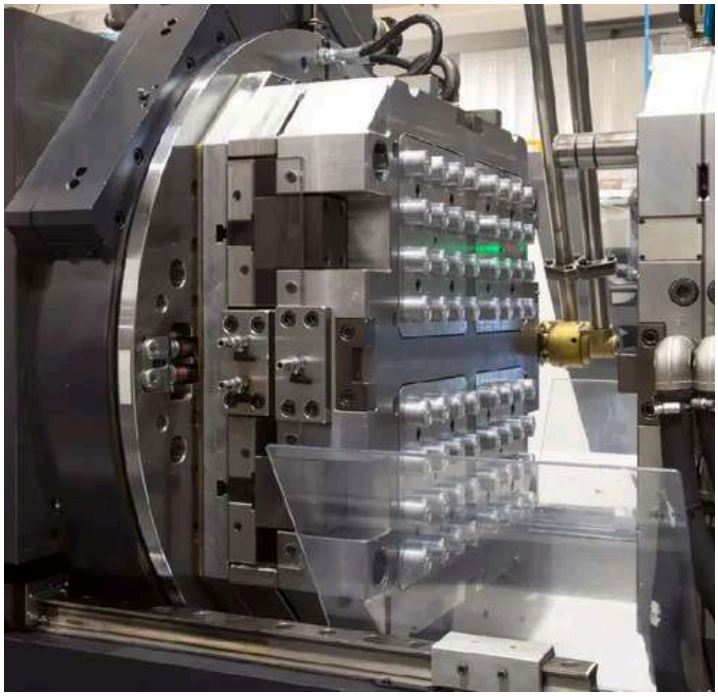
Leading manufacturer of plastic and rubber-based automotive components. The company specializes in high-precision plastic injection moulding systems, custom-engineering sealing systems.

A Tier-1 supplier to major OEMS such as Honda, Toyota, Nissan, and others, and developing dies or moulds as part of their injection toolkits.

PRODUCT LIST

- **Plastic Injection Moulded Components:** instrument clusters, EV charger boxes, front grills and body panels
- **Rubber Extrusion Systems:** inner and outer weatherstrips, slide rails, window seals, and others.

CEO:
Mr. Ajay Jain



Plastic Injection Moulding Process Flow

Material Preparation: PVC, ABS, and thermoplastic granules are pre-heated to eliminate moisture before feeding.

Injection: Heated plastic fed into 3-plate mould (core and cavity). Left and right parts moulded simultaneously.

- ***Multi-Material Moulding:*** 2K Injection Moulding machine alternates hard and soft plastics.

Component Joining:
Ultrasonic Welding and Handheld Vibration Welding used to fuse metal sub-assemblies through high-frequency vibrations.

Fixing and Adhesive Application: Piston-based Glue

Rubber Extrusion Process Flow

Uncoiling and Spot welding of rubber rolls.

- **Looping machine:** Feed buffer for continuous extrusion.

Heated Extrusion Line: bfor desired rubber shape/bend

Edge breaking, Roll forming, Folding machines – ensures flexibility for imbedded metal.

Oven sequence (Pre-shock, UHF, HAV)- curing; plasma coating-improves surface finish.

Buffing, laser marking, and electrostatic flocking ensure uniform polishes.

CTS cutting system ensures dimensional precision

TVS Motors

Haritha, Hosur, Bengaluru, KA

ABOUT THE COMPANY:

TVS Motor Company is one of India's largest two- and three-wheeler manufacturers and the second-largest two-wheeler exporter, operating in over 60 countries.

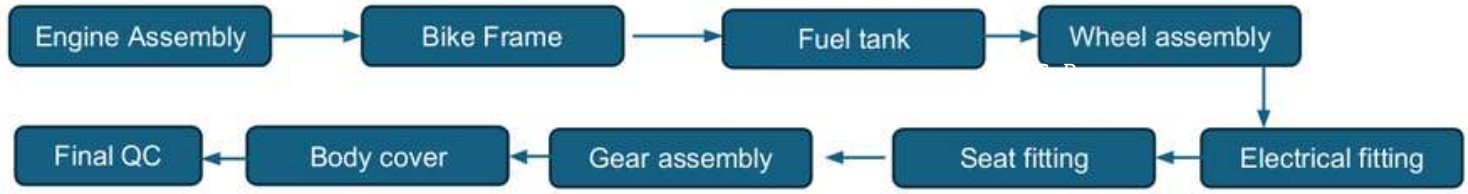
Its Hosur plant is highly automated, producing one motorcycle every 3.5 seconds through advanced assembly and testing systems.

PRODUCT LIST

- Motorcycles, Scooters, Mopeds
- Electric two-wheelers and battery modules
- Engine assemblies and sub-components

CEO:
Mr. K.N. Radhakrishnan

PROCESS FLOW FOR TWO WHEELERS:



PROCESS FLOW FOR BATTERY ASSEMBLY:

1. **Battery Cell Installation** & orientation using precision jigs
2. **Module Assembly**
   Cells grouped for desired voltage/capacity; busbars fixed (spot welding).
3. **Aluminum Casing & Sealing**
4. **Electrical Testing & Balancing**
   Voltage stability, leakage of current, and capacitive balance.
5. **Quality Testing**
   Battery Management System (BMS) integrated for charge control, temperature monitoring, & safety-cutoffs.

PROCESS FLOW FOR ENGINE ASSEMBLY:

1. **Crankshaft assembly** & and aligningi left and right crankshaft
2. **Cylinder and Piston Assembly**
   Block mounting and aligniment of torque
3. **Clutch and Transmission assembly**
4. **Cylinder head assembly**
   Camshaft , rocker arm and head gasgate assembly
5. **Lubrication, wirirng and Testing**
   Installing sensors and wires
   Compression, oil, noise and vibration testing

JayCo. Chemicals

W.E. Highway, Kashimira, Mira Road, MH

ABOUT THE COMPANY:

Jayco Chemical Industries is one of India's fastest-growing manufacturers and exporters of Active Pharmaceutical Ingredients (APIs) and advanced intermediates, specializing in Anti-Asthmatic, Vasodilator, and Analgesic drugs.

PRODUCT LIST

- Isoxsuprine Hydrochloride
- Salbutamol SulphateAPI

CEO:
Mr. Jayantilal Vaishnav

QUALITY CONTROL & ASSURANCE

Comprehensive testing for every batch using:

- HPLC (High-Pressure Liquid Chromatography)
- GC (Gas Chromatography)
- UV and IR Spectroscopy
- TLC (Thin Layer Chromatography)

Ensures product and solvent purity, impurity profiling for ICH global benchmarks

PROCESS FLOW:

1. **Raw Material Handling & Testing**
   - Pass boxes, HEPA filters prevent cross-contamination.
2. **Reaction Stage:**
   - Glass-lined or stainless-steel reactors.
3. **Crystallisation & Drying:**
   - Tray/Centrifugal dryers.
4. **Filtration & Separation**
   - **Nutsche filters/Centrifuges** remove catalysts from mother liquor
5. **Final Processing & Packaging**

SAFETY

- Explosion-proof reactors
- HVAC control, and HEPA filtration.
- Inert gas purging in hydrogenation for safety.

REACTION STAGES

Chlorinination: or bromination reactors with heating, cooling, and aeration systems

Hydrogenation: H_2 gas added with Pd/C catalyst for reduction or functional group modification.

Prime Packaging Ltd.

Gala 1, Bhiwandi, Mumbai, MH

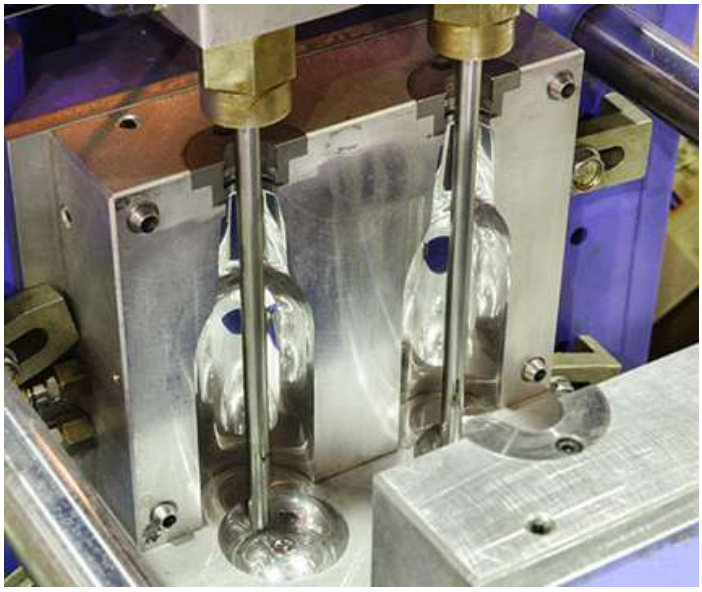
ABOUT THE COMPANY:

Founded in 2000, Prime Packaging specializes in extrusion, blow, and compression moulding processes. The company produces PET, PVC, and PP-based containers, trays, and rigid packaging components for FMCG, cosmetic, and pharmaceutical industries with over 25 years of experience.

PRODUCT LIST

- Transparent boxes: PVC, PET, PP
- Thermoformed trays, injection-moulded containers
- Paper folding boxes, corrugated packaging

CEO:
Mr. Jatin Sanghavi



BLOW MOULDING

- **Parison Extrusion – Heated polymer melt extruded vertically from a parison die head forming a tubular section.**
- **Mould Clamping – Parison captured between two halves of the split mould using a servo-driven clamp system.**
- **Air Blowing – Compressed air (6–8 bar) injected through a blow pin to expand the parison against the mould cavity.**
- **Cooling – Shape retained through water-cooled mould channels until solidified.**
- **De-flashing & Trimming – Excess material (flash) trimmed automatically.**
- **Ejection & Inspection – Part ejected and passed through leak and weight testers before packing.**

Machines Observed:

- 3-station rotary blow moulding machine (multi-cavity).
- Air compressor system with pressure regulator and moisture trap.
- Automatic bottle trimmer and leak tester on output conveyor.

EXTRUSION MOULDING

- **Material Drying** – Polymer granules dehumidified to remove moisture that causes bubble formation.
- **Feeding & Melting** – Dried granules conveyed into a **twin-screw extruder** where rotating screws shear and melt the polymer uniformly.
- **Filtration & Die Entry** – Melt filtered to remove contaminants before entering the **T-die head**.
- **Sheet Formation** – Molten polymer extruded through the **flat die**, forming a continuous sheet.
- **Calendering & Cooling** – Sheet passes between **chill rolls** for thickness calibration and surface gloss.
- **Trimming & Winding** – Edges trimmed and wound on **automatic winders** for storage or further forming.

- **Machines Observed:**
- Twin-screw extruder line (for PET).
- Inline slitting and rewinding units.
- Scrap edge trimmers and automatic scrap re-feed units (regrind loop).