

ADD INNOVATIONS

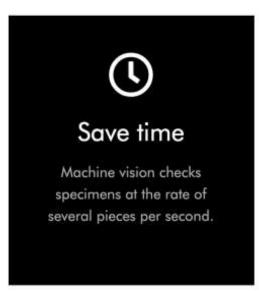
Machine Vision Systems

Firm profile and catalogue



Add Innovations Pvt. Ltd.

Machine vision is the right choice for your manufacturing business





Save money

Machine vision typically pays for itself in the first year. From that point, it's all savings.



Automate

Inspections, quality checks, audit logs, and training are all automated with vision systems.



Improve quality

Machine vision can find errors and blemishes that cannot be detected by the naked eye.



Machine vision systems can automate your quality and inspections – saving man hours, reducing human errors, and improving quality, regardless of specimen



Computer vision can control power robots to perform a host of industrial functions



Machine vision can measure in the range of microns, finding applications in experimental mechanics and testing.

60+ Custom Solutions for our

clients: India's top brands























From Noida to Chennai, and
Gujarat to Nagpur, Add
Innovations Machine Vision
Systems are saving time, reducing
error and improving quality at
production lines across India.

Click here for interactive map of Add Innovations' machine vision system installations







Innovations has been applying machine vision to solve real world problems.

Since 2015, Add

Krishan Kumai CTO

Aman Jangra

Anjali Panakkat, Ph.D. Adviser

ADD INNOVATIONS was founded by electronics engineers Krishan Kumar and Aman Jangra. They are advised by Anjali Panakkat, a serial entrepreneur and leading voice in Indian pharma and biotech sectors. Our team of engineers, coders, and machine builders have worked on marquee projects across India, helping our clients realize cost savings and superior product quality. Large or small, stand-alone of brownfield integration, we bring innovation and obsessive customer service to each project.

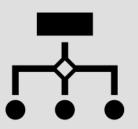
Add Innovations Portfolio Highlights

*Click on the title to find out more about individual systems

STAND ALONE SYSTEMS
3-D Surface Inspection System
<u>Video Extensometer</u>
High Speed Small Specimen Inspection System
2-D Sheet/Plate Template Measurement System
Print Content and Quality Inspection System
2-Wheeler Clutch Plate Inspection System
Bulb Cap inspection system
Robot Guidance System in HVAC Manufacturing
Fabric Inspection System
Automotive Brake Assembly Inspection System
Spring Measurement and Sorting System
<u>Car Stereo Inspection System</u>

CUSTOM DEPLOYMENTS Vehicle Glass Haze Inspection System Washing Machine Top & Side Panel Inspection System Sandpaper Roll (Web) Inspection System Cylinder Tare Weight Inspection System Robot Guidance System at Tractor Assembly Line Parting Line Detection System for Molded Parts Sticker and Graphics Inspection System **U-Bend Inspection System at Auto Brazing Station Projection System for Golf Simulator** Washing Machine Pulsator Inspection System **Bubble Detection System for Porosity Tests Auto Lock Lever Inspection System**

Add Innovations



Vision System Products

Following pages cover stand-alone systems that are ready-to-be deployed anywhere in India at short notice.

Fabric Roll Inspection System

Type

High speed inspection system for surface defects

Summary

Add Innovations' computer vision system is used for fast, efficient and error free inspection of fabric. It detects even the minutest defects like missing threads, blemishes, torn fabric, presence of foreign particles etc. leading to human error-free quality checks and superior products.

System Specifications

Hardware:

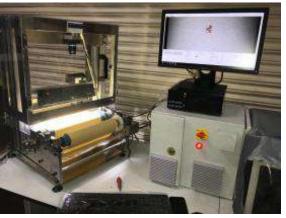
Line scan cameras integrated with industrial vision lenses. Rollers, conveyors, servo motors and associated controls. Windows PC and touchscreen Human Machine Interface (HMI).

Software:

Add Innovations proprietary Windows based image processing software.







Add Innovations Vision system for Fabric Inspection in installed at IIT, Delhi. See system in action here (YouTube)

Performance

Specimen: Fabric rolls up to 2m width

Defect size: up to 0.5 mm

Inspection speed: 45 meters per minute



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3-D Surface Inspection System

Type

High speed inspection system for surface defects

Summary

Add Innovations' machine vision system checks for defects, blemishes, cracks, and foreign particles on 3-D objects such as faucet parts (pictured). Revolving camera set-up checks all corners of specimen and works with the high-speed image processing algorithm to identify defective specimens.

System Specifications

Hardware:

2 Industrial Cameras, lenses, sensors, conveyor, PLC, servo based rotator, Industrial PC, powder coated metal housing, and touchscreen Interactive UI and defect marker.

Software:

Add Innovations proprietary Windows based image processing software.









 $\textit{Add Innovations Vision system for surface defect inspection at \textit{Jaquar plant, Haryana}. \textbf{See system in action} \underline{\textbf{here}} \textbf{ (YouTube)}$

Performance

Specimen: Objects up to 4"x4"x4"

Defect size: up to 0.1 mm (100 microns)

Inspection speed: 8 pieces per minute



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2-D Template Measurement System

Type

High accuracy measurement system.

Summary

Add Innovations' Computer vision based system to measure plan dimensions of 2-D specimens (like punched/ laser cut sheet metal samples). This highly accurate system checks for dimensional accuracy of 2-D specimens by comparing it with DXF files of specific templates and is capable of detecting and measuring openings of any shape, and custom cuts along the interior or edges of the specimen.

System Specifications

Hardware:

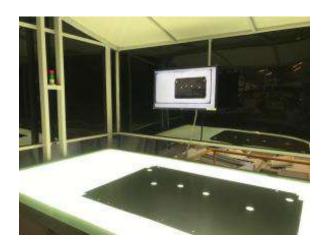
Industrial Cameras, lenses, Industrial PC, sensors, tower light, powder coated metal housing, and backlit table with toughened glass top.

Software:

Add Innovations proprietary Windows based image processing software.









Add Innovations Vision system for 2 D specimen measurement at BlueStar factory, Wapi

Performance

Specimen: Templates up to 2.5m x 1.25 m

Accuracy: 0.5 mm

Inspection speed: user-dependent



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High Speed Small Specimen Inspection System

Type

Surface defect, size and child part inspection system/high speed sorting system

Summary

Add Innovations' machine vision system uses deep learning-based architecture to inspect the quality of small parts like connectors, molded plastic parts, washers etc. for surface defects, chips, short molding, missing child parts, shape difference, and discoloration. It counts the specimens and sorts them into "OK" and "No-Good" bins. The deep learning-based algorithm can be trained for different specimens, and used in a wide range of products irrespective of material

System Specifications

Hardware:

Industrial Cameras, lenses, sensors, conveyor, encoder, PLC, feeder, Industrial PC, powder coated metal housing, and interactive user interface with user configurable inspection tools.

Software:

Add Innovations proprietary Windows based deep learning software.







Add Innovations Vision system for high speed connector inspection at Wago factory, Noida. See system in action here (YouTube)

Performance

Specimen: Connectors, washers, fasteners, molded plastic parts etc.

Accuracy: up to 0.1 mm

Inspection speed: 180 parts / minute



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Video Extensometer

Type

Experimental Mechanics and Measurement

Summary

The VX1 is a high precision video extensometer that uses a non-contacting optical measurement based on a digital camera and real time image processing to measure the longitudinal and transversal strain during tensile tests. The VX1 video extensometer saves video of the entire tensile test and can be used until sample break. It has a large application area and -unlike traditional extensometers – can test a wide range of materials including metals, rigid plastics, composites, ceramics, thick films etc.

System Specifications

Hardware:

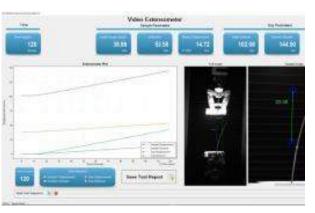
Industrial Cameras, lens, bar light ,polarizers, and Laptop/Desktop PC.

Software:

Add Innovations proprietary Windows based application software with PDF report generation and test re-simulation features.







Add Innovations Video Extensometer (user interface screengrabs)

Performance

Specimen: Metals, plastics, composites,

ceramics etc.

Accuracy: up to 0.025 mm (25 microns)

Inspection speed: User dependent



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Bulb Cap Inspection system

Type

High speed inspection system for surface defects

Summary

This high-speed inspection system is a robust way to check for shell cracks, missing terminals, and hole close on aluminium and steel caps of bulbs.

Feeder and conveyor orients specimens and runs them at high speed along the camera line of sight. Images captured by camera are processed in real time (within micro-seconds), and samples sorted into "OK" and "No-Good" bins using a pneumatic set-up.

System Specifications

Hardware:

Industrial Cameras, lenses, sensors, conveyor, feeder, PC, powder coated metal housing, and touch-screen human-machine interface (HMI)

Software:

Add Innovations proprietary Windows based image processing software.







Add Innovations Halogen bulb inspection system at Autonix plant in Haryana

Performance

Specimen: Halogen bulb capsules

Accuracy: 0.2 mm

Inspection speed: 120 specimen per minute



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Vision Guided Robotics in HVAC Manufacturing

Type

Robot integration and Vision Guidance.

Summary

Add Innovations vision system is controlling a UR10 collaborative robot to complete expansion and sealing operations on heat exchangers (chiller tubes) at <u>Bluestar</u>. The system completes detection of tubes and positioning of robot with accuracy of 0.5mm. Our algorithms can guide robots by manufacturers like KUKA, UR, FANUC, YASKAWA, DELTA, YAMAHA and ABB.

System Specifications

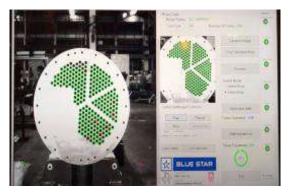
Hardware:

Industrial Cameras, lenses, sensors, and Industrial PC, included robot.

Software:

Add Innovations proprietary Windows based image processing and control software.







Add Innovations Robot Guidance System at BlueStar plant in Maharashtra. See system in action here (YouTube)

Performance

Specimen: Chiller Tube

Accuracy: 0.5 mm

Inspection speed: User dependent



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2-Wheeler Clutch Plate Inspection System

Type

High speed inspection system for surface defects

Summary

Add Innovations' high-speed inspection system checks for the presence, position, and size of friction segments, as well as overall shape and size of clutch plate. It identifies mixing of plates and sorts based on user-defined properties.

Twin camera set up checks both sides of plate with an accuracy of 0.5mm

System Specifications

Hardware:

Industrial Cameras, lenses, sensors, conveyor, PC, Panel, Camera enclosure.

Software:

Add Innovations proprietary Windows based image processing software.







Add Innovations clutch plate inspection system at Makino plant in Haryana

Performance

Specimen: 2-wheeler clutch plate

Accuracy: 0.5 mm

Inspection speed: 120 specimen per minute



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Automotive Brake Assembly Inspection System

Type

High speed inspection system for surface defects

Summary

This twin system set-up checks automobile hydraulic brake assemblies.

System 1(Piston Inspection): Surface inspection for dents and scratches, shape, size, and presence of knurling operation on part.

System 2(Housing Inspection): Presence of inner threads, position of holes, inspection of burrs in through holes, with an accuracy of 0.2 mm

System Specifications

Hardware:

Industrial Cameras, lenses, sensors, conveyor, PC, powder coated metal enclosure, twin inspection stations.

Software:

Add Innovations proprietary Windows based image processing software.







Add Innovations hydraulic brake inspection system at Tasa Automotive plant in Haryana

Performance

Specimen: Hydraulic brake assembly

Accuracy: 0.2 mm

Inspection speed: User dependent



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Spring Measurement and Sorting System

Type

High Precision Measurement System

Summary

Add Innovations' vision system measures the height, and diameter of suspension springs used in rail bogies with accuracy of 0.5mm. Custom software to measure dimensions of spring placed in the lighted enclosure, and categorizes springs based on bogie model, spring type (Outer, Inner, Snubber) and color codes based on free height. The system is capable of measuring and sorting over 90 variants of springs used by Indian Railways.

System Specifications

Hardware:

1 Industrial Camera, custom fabricated backlight, lenses, sensors, powder coated metal enclosure.

Software:

Add Innovations proprietary Windows based image processing software.







Add Innovations spring measurement and sorting system at Paragon Instrumentation, Pune

Performance

Specimen: Springs/Suspensions

Accuracy: 0.5 mm

Inspection speed: User dependent



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Car Stereo Inspection System

Type

High Precision Measurement System

Summary

Add Innovations' stand-alone machine vision system checks dimension accuracy of overall housing, and punched openings in car stereo metal housing. It also checks for presence of thread at fastener locations with an overall accuracy of 0.2mm. The built-in rotary stage allows 360-degree image capture and customized image processing and control software sorts OK and NG specimen in real time..

System Specifications

Hardware:

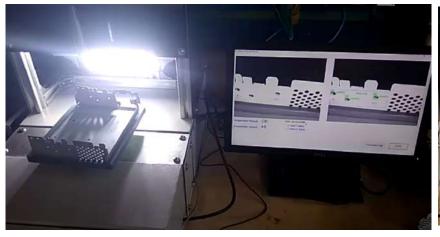
1 Industrial Camera, complete custom fabricated system with rotary stage and marking mechanism for NG parts, panel, sensors, powder coated metal enclosure.

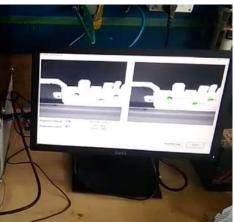
Software:

Add Innovations proprietary Windows based image processing and control software.









Add Innovations Car Stereo inspection system at Minda Group plant in Haryana

Performance

Specimen: Car Stereo Housing

Accuracy: 0.2 mm

Inspection speed: User dependent



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Print Content and Quality Inspection System

Type

High speed inspection system for surface and printing defects

Summary

Computer vision-based system to check printed content, OCR, print quality, missing characters, print position, color variations. System also prints out desired results for OK specimens including unique identifiers like QR codes.

System checks for printed content using a proof copy. It checks for print quality using pre-defined, user-set parameters.

System Specifications

Hardware:

Industrial Cameras, lenses, sensors, PC, powder coated metal housing. Optional thermal printer for additional outputs for good specimen such as QR codes.

Software:

Add Innovations proprietary Windows based image processing and control software.





Add Innovations Print Content and Quality Inspection System being used on Maruti Suzuki Vehicle Identification Plates

Performance

Specimen: Printed material on any substance.

Inspection speed: User dependent



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Add Innovations



Custom deployments

Following pages cover ADD Innovations custom vision system deployments across India (Brownfield Projects)

Vision Guided Robotics in Tractor Assembly line

Type

Robot integration and deep learning.

Client

Mahindra Tractors – Nagpur, Maharashtra

Summary

Add Innovations' deep learning algorithm is communicating with a robot which captures images along a Mahindra tractor assembly line. The system analyses the images captured from different angles for a 78-point quality check of bolts and other child parts.

System Specifications

Hardware:

Industrial Cameras, lenses, sensors, and PC.

Software:

Add Innovations proprietary Windows based deep learning software.









Video Link

https://youtu.be/SZqh9-OaiMg

Cycle time: 90 seconds for 78 point inspection



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Vehicle Glass Haze Detection System

Type

Inline Inspection and sorting system

Client

AIS (Asahi) Glass India

Summary

The camera-based inspection system measures haze/cloud condition in laminated glass sandwich panels. Installed and integrated with central PLC system of production line, it detects incomplete de-airing between the glass panels leading to a foggy appearance saving hundreds of man hours at <u>AIS</u>. The system is integrated with production line SCADA to log critical parameters.

System Specifications

Hardware:

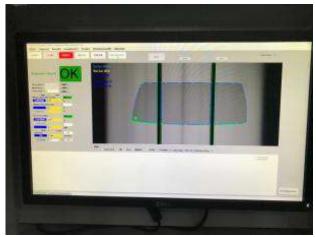
Industrial Line scan camera, line light, lenses, sensors, panel, and IPC.

Software:

Add Innovations proprietary Windows based image processing and control software.







Video Link

https://youtu.be/mQxTEEbwQko



Add Innovations Pvt. Ltd.

Parting Line Detection System for Moulded Parts

Type

Surface defect inspection system/high speed sorting system

Client

Luxor International Pvt Ltd (Luxor Pens)

Summary

Add Innovations Machine Vision System is checking for dimensions and presence of parting line on top surface before screen printing step to ensure proper printing of molded pens at Luxor International Pvt Ltd (Luxor Pens) — one of India's premier pen brands. if line is present, the part is rotated so that printing is performed on flat surface without parting line

System Specifications

Hardware:

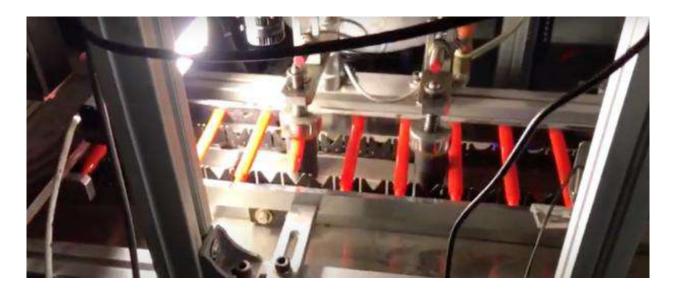
Industrial Cameras, lenses, sensors, and PC.

Software:

Add Innovations proprietary Windows based image processing software.







Video Link

https://youtu.be/TkU28NZzDw8



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Cylinder Tare Weight Inspection System

Type

Deep learning based inspection systems

Client

Bharat Petroleum (BPCL), Indian Oil Corporation (IOCL)

Summary

This system by Add Innovations is used to read the weight and date codes printed on top of LPG cylinders while also checking the presence of safety caps and reading the 5 year test due date. Installed along the filling station, this system uses a deep learning-based OCR algorithm for reading the weight and date codes. Machine vision camera is used for capturing the images at very high speed and system is capable of inspecting more than 4200 cylinders in an hour with an accuracy or 98% minimum.

System Specifications

Hardware:

Industrial Camera, lens, sensors, and PC.

Software:

Add Innovations proprietary Windows based deep learning software.







Video Link

https://youtu.be/-M624bbAbgg



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Washing Machine Top & Side Panel Inspection System

Type

Inspection System/Sorting system

Client

Voltas Home Appliances, Dixon Technologies

Summary

Camera based inspection system for washing machine top cover and side panel assembly verifies the presence of all the child parts, capacity print as per the model of machine and several other features. It is installed on the production line before the packing station, Capabilities of the system: 1. OCR for Capacity Reading and barcode reading 2. Child Part Presence Detection on top cover 3. Color Matching 4. Side panel graphics reading 5. Data Logging with Images (According to serial number) 6. Alert on defect detection and automatic removal of NG specimen.

System Specifications Hardware:

Industrial Cameras, lenses, sensors, custom deigned dome lighting and PC.

Software:

Add Innovations proprietary Windows based image processing and deep learning software.









Video Link

https://youtu.be/r-UDE-1alYo



Add Innovations Pvt. Itd.

Washing Machine Pulsator Inspection System

Type

Inspection System/Sorting system

Client

DLJM, Noida, UP

Summary

This machine vision system is Installed on the washing machine pulsatory assembly line. It reads model identification text on the pulsator and inspects for the presence of child parts corresponding to the model on top and bottom surface of pulsator. The robust image processing software can analyze pieces coming on the conveyor in completely random order and correctly identifying the specific model. The built-in rejection mechanism pushes off specimen with missing child parts off the conveyor.

System Specifications

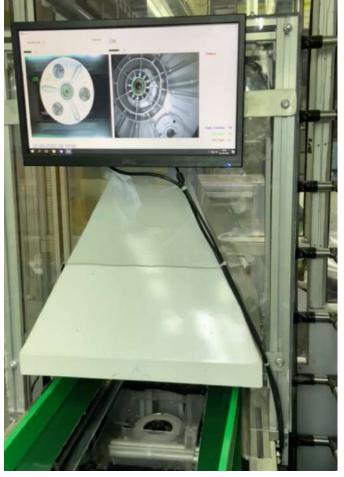
Hardware:

2 Industrial Cameras, lenses, sensors, custom deigned camera and light mount and PC.

Software:

Add Innovations proprietary Windows based image processing software.





Video Link

https://youtu.be/1wjldchf3ZY



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Sandpaper Roll (Web) Inspection System

Type

Surface defect inspection system/high speed sorting system

Client

Carborundum Universal Limited (CUMI), part of Murugappa Group

Summary

Web Inspection System developed by Add Innovations for India's largest abrasives manufacturer. Integrated with the cutting and slicing machine, it uses 6 line scan cameras. System inspects grain side for oil patches, cut marks, scratches, air folds. It also inspects reverse side for missing print, oil patches, and print quality.

System Specifications

Hardware:

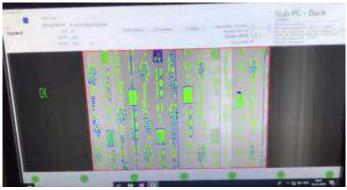
Industrial (line scan) Cameras, lenses, line lights, sensors, and PC.

Software:

Add Innovations proprietary Windows based image processing software.







Video Link

https://youtu.be/yTbGUO9HFhM



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U-Bend Inspection System at Auto Brazing Station

Type

Surface defect inspection system/high speed sorting system

Client

BlueStar Air Conditioners

Summary

Integrated with auto brazing line – Add Innovations' machine vision system inspects the presence and position of U bends as per standard template set by user. Robust user-trainable software also checks correctness of coil circuits before brazing (beyond which changes are not possible). The system covers over 80 variants running on auto brazing line.

System Specifications

Hardware:

2 industrial cameras, fabricated light mounts, panel, camera mount, sensors, and PC.

Software:

Add Innovations proprietary Windows based image processing software.







Video Link

https://youtu.be/f0izNwWKZyQ



Add Innovations Pvt. Ltd.

Auto Lock Lever Inspection System

Type

Surface defect inspection system/high speed sorting system

Client

Shivani Locks for Maruti Suzuki

Summary

Add Innovations Machine Vision System is integrated and installed directly on the lock lever riveting machine at Shivani Locks — a leading supplier to India's largest auto OEM. This versatile system checks for multiple parameters including correct print on the lever, and presence of child parts, before final riveting. Defective pieces are flagged and preventing from riveting.

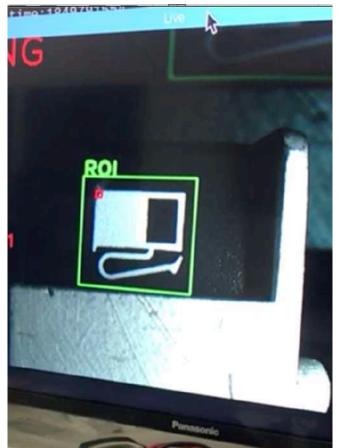
System Specifications

Hardware:

1 smart camera, fabricated mounts, panel,, and PC.

Software:

Add Innovations proprietary Windows based image processing software.







Video Link

https://youtu.be/eDHvxsxUoT4



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Sticker and Graphics Inspection System

Type

Surface defect inspection system/high speed sorting system

Client

Hero Group

Summary

Add Innovations' machine vision system is used to inspect sticker and graphics quality on visors of different models of Hero Motorcycles. This system is integrated on assembly line for online inspection and looks for presence and position of stickers, and damage including, misprints, chips, tears and other blemishes.

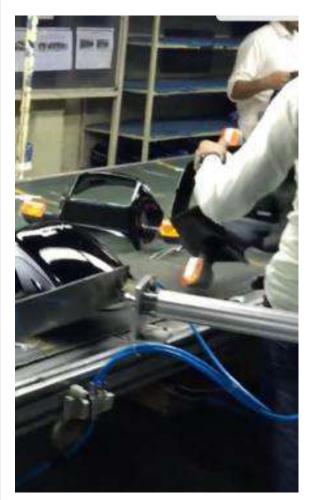
System Specifications

Hardware:

1 Camera, Custom fabricated light diffuser, camera mount and panel, sensors, and PC.

Software:

Add Innovations proprietary Windows based image processing software.







Video Link

https://youtu.be/f0izNwWKZyQ



Add Innovations Pvt. Itd.

Bubble Detection System for Porosity Tests

Type

Surface defect inspection system/high speed sorting system

Client

Profile Engineers, Gurugram

Summary

Add Innovations Machine Vision system is integrated with porosity testing apparatus for automotive filters for detecting and measuring bubble parameters during the test. The system has an accuracy of 1mm and can log input and output pressure, resistance, permeability and pore size.

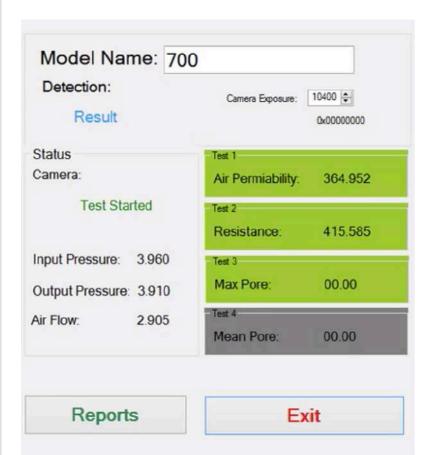
System Specifications

Hardware:

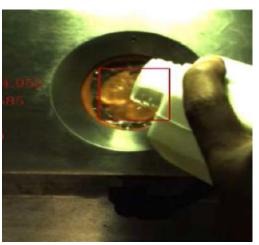
1 Camera, mount and panel, sensors, and PC.

Software:

Add Innovations proprietary Windows based image processing software.







Video Link

https://youtu.be/jm_jbLYG1rE



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Projection System for Golf Simulator

Type

System Integration

Client

AIS (Asahi) Glass India

Summary

Add Innovations' projection system helps you improve your golf game and make putting a science. Integrated with golf simulator table and control hardware, the system projects a virtual path on the simulator table for training by tracking the golf ball, and analyzing its path, angle, and speed. It includes additional gamification including matches, player profiles, and game scenarios.

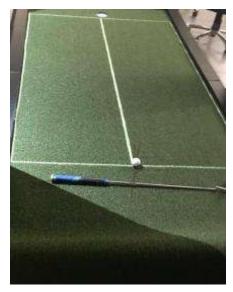
System Specifications

Hardware:

1 Camera, projector, IPC, Raspberry PI

Software:

Add Innovations proprietary Windows based image processing software.







Video Link

https://youtu.be/f0izNwWKZyQ



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Machine Vision Systems

Greater Noida, UP, India