TMS TECHNOV M SYSTEMS (P) LIMITED
ENGINEERS & CONSULTANTS
"CONVERTING THOUGHTS INTO FEASIBLE SOLUTIONS"

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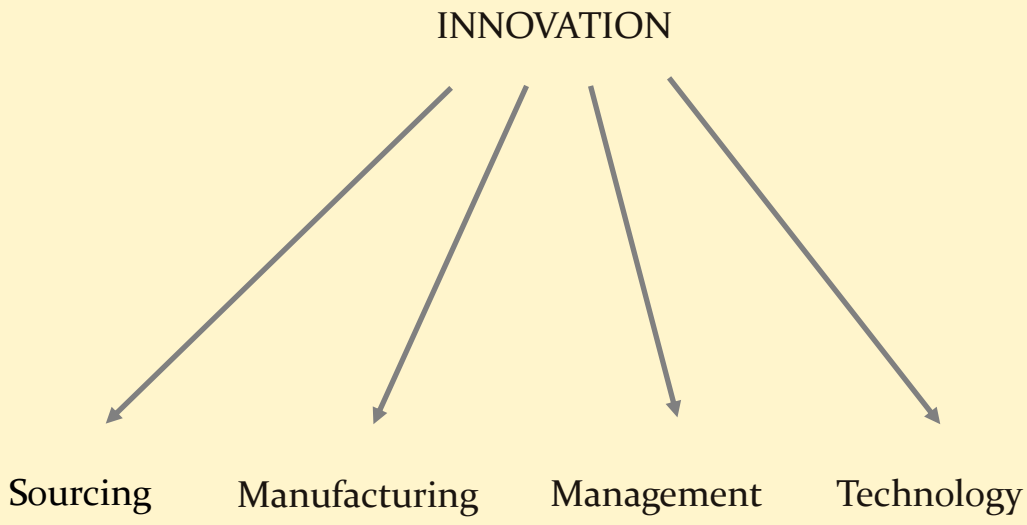
ResonanZ

A Feature Study

INNOVATION

Innovation in manufacturing covers wide areas like introduction of new processes/practices, new technology/equipment, new materials, etc. The approach to innovation could be either proactive or reactive. In addition to productivity and quality gains, innovation also results in improved responsiveness to customer demands, lower turnaround times, reduced waste levels and downtime, higher product quality, better designed products, capacity for a wider product range, streamlined relationships with suppliers and customers.



INNOVATION IN SOURCING

New components, new suppliers or an improved deal with the existing suppliers could improve products and profits significantly. A number of companies have integrated the suppliers into the manufacturing processes to ensure online visibility on inventory at various stages and quality control.

MANAGEMENT INNOVATION

Management innovation refers to innovation in management principles and processes that will eventually change the practice of what managers do, and how they do it. Typically, such innovations have long lasting impact on the organization. Innovation in Business model falls under this category.

INNOVATION IN MANUFACTURING PROCESSES

Companies can innovate in the way products are developed or manufactured either within the firm or across the supply chain. Such innovations are termed as 'Process Innovation'. It is typically aimed at garnering competitive advantage through improved quality, reduced costs or reduced time-to-market.

INNOVATION THROUGH TECHNOLOGY

Many breakthrough concepts and development in businesses have been primarily driven by the development of new generation technology.

There has been a growing concern globally about the fast depletion of global resources and the need to conserve them for the future. Another key concern is the need to control pollution and to safeguard the environment.

INCORPORATION OF ARTIFICIAL INTELLIGENCE AND DIGITAL MANUFACTURING INTO EXISTING MANUFACTURING SECTOR

Abstract:

Automatic sorting system will be of great importance in segregating metal and nonmetallic wastes as it would reduce the time from many hours to few minutes as compared to manual sorting system. For this we use a tactile sensor. Tactile sensors segregate wastes based on the surface texture. Here, automated sorting machine is able to separate wastes flexibly and at the same time move objects automatically to the basket as defined by PLC with a tactile sensor to detect the surface texture.

1. Introduction:

The aim of this research therefore is to design a model and simulate the functionalities of an automatic sorting machine using a tactile sensor. In order to achieve these developed automatic sorting methods, the images of the objects (i.e. plastics, wood and steel) were captured with the X-ray and the conveyer belt transports the material from one point to another.

The conveyor belt could be automated by allowing the objects to move to the detection position through dynamics of the running motors using the sensor signal to control the Programmable Logic Controller PLC for processing.

2. Theory and principles:

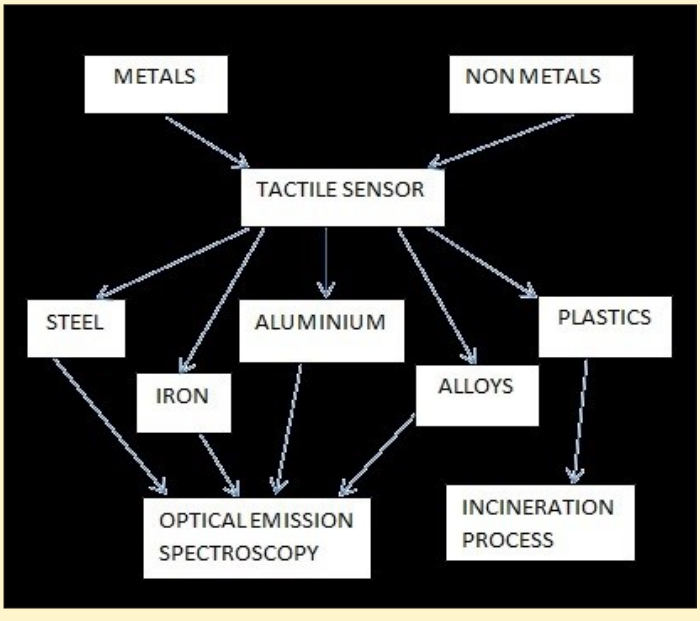
2.1. Sorting machine belt assembly and movement

The wedge belt is made of the synthetic ring encased in rubber that gave the core the desired strength.

The DC motor and gear reduction system reduce the speed and increase the torque of the motor.

2.2. Characteristics of the systems sensor to detect objects

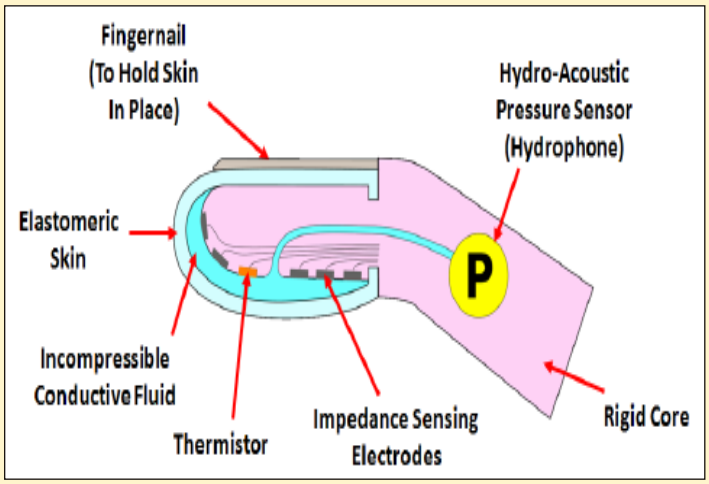
The detection section of the automatic sorting machine has a detection device, which is made of the tactile sensor. Surface Textures of metal and nonmetallic wastes can be distinguished by the presence of different frequencies in the signal. The data from the sensor is pre-processed and Fourier coefficients of the sensor outputs are used to learn a tactile sensor for different textures.



Force/Torque sensor

(for tactile sensing):

Force/ torque sensors are used in combination with a tactile array to give the information for force control.



This type of sensor can sense load anywhere and in constrains as a skin sensor. The skin sensor generally provides more accurate force measurement at higher bandwidths. If the manipulator link is defined generally, and the signal point contact is assumed, then the force/ torque sensor can give the information about the contact location of force and moments it is called as an intrinsic tactile sensing.

3. Experiments

3.1. Experimental procedures

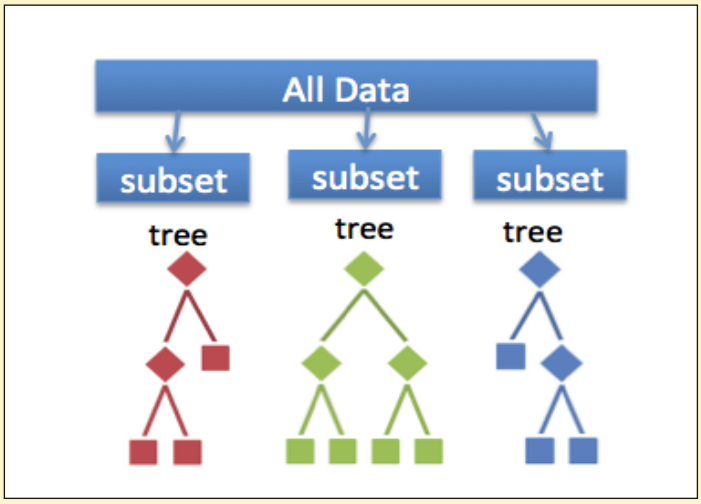
The conveyor belt receives the signal from the force/torque sensor in order to actuate and process the program logic and at the same time to run the conveyor to work as intended.

The conveyor belt actuates as soon as an object is placed on it. The object is then transported to the area of the detecting sensor activated by the PLC. It then sends a signal to the double acting cylinder to push the object into the appropriate compartment for storage.

Choosing a model

The ***Random Forest model*** works by taking the training set and performing random sampling to create subsets of data or random "*trees*". After many trees have been created, it creates a random "*forest*". The benefit of having many trees is to get a more accurate prediction of classification for the data.

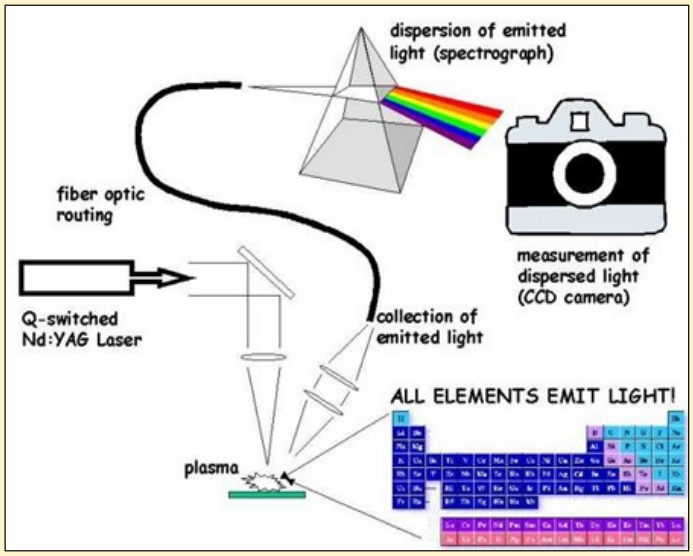
The Random Forest model is efficient on larger data sets, and can handle thousands of input variables.



Re-engineering (Market dynamics)

Nondestructive testing

Laser-induced breakdown spectrometer (LIBS) is a form of Atomic Emission Spectrometry but it uses a highly energetic laser pulse to excite the sample. This technique is also considered non-destructive to samples and is popular in scrap metal analysis. This method is also time saving.



This laser causing a high temperature plasma on the surface of the sample and the light generated indicates composition of the sample. This is a point-and-shoot process that provides fast and accurate results.

Method to find hazardous wastes:

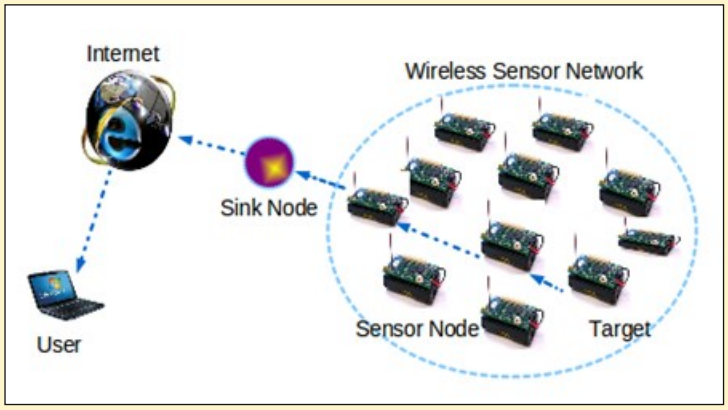
It is based on fast Random Forest statistical algorithm of machine learning for reliable and automated segmentation of typical steel microstructures.

The accurate microstructure pattern recognition/segmentation technique in combination with other suitable mathematical methods of image processing using a GPU interface and gives the specified range of frequency bandwidth.

This Analysis can help to handle the large volumes of image data in a short time.

Industrial IOT (Digital manufacturing)

Surface texture data are fed through the ***Wireless Sensor Network (WSN)*** of tactile sensors to computing systems that displays range of texture values.



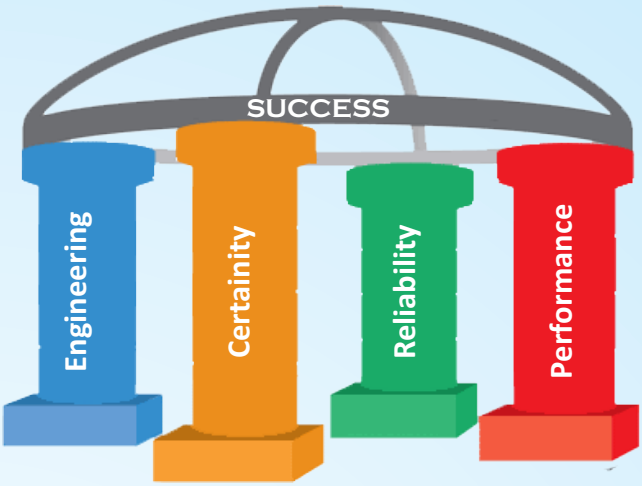
To remotely control a device over the Internet, or take the device's sensor data and store it on a remote server, the ***Internet Protocol (IP)*** must be involved.

Infrastructure-as-a-Service (IaaS) IoT/ Clouds: These services provide the means for accessing sensors and actuator in the cloud. The associated business model involves the IoT/Cloud provide to act either as data or sensor provider. Big data and the IoT basically go hand in hand.

OUR MISSION:

- Improving the productivity of our industries by micro improvising the direct input costs
- Improving productivity by saving the non-renewable resources directly
- Converging the essence of sustainability for rapid industrialization of nation through innovation

OUR PATHWAY



Our Journey

Our Achievement:

- Patented technology
- Currently savings 76 Crores value of petroleum/annum
- Contributed to minimized CAD
- Field Research with published articles in world renowned journals

TMS Specifics:

- Dedication
- Collaborative with user
- Innovative team efforts
- Empathy for certainty
- Each implementation evaluated
- Replication for all utilities *enterprise wide*

Our Achievement

Evinced by our recent installations:

Enterprise wide for PSU's such as IOCL, HPCL, IPGCL, NTPC, RWF etc., and private sectors such as L&T, TATA STEEL, NIRMA, HONDA, YAMAHA, HYUNDAI, TVS group etc.,

Our track records with 20 years of service dedicated to nation building implementing 2500 projects including Automobiles, Steel industries, fertilizers, cement , metals etc.,

Our Journey Marches....