

PROBLEM IN FOOD INDUSRTY AND HOW WE CAN HELP THROUGH AI.

DATE : 20 MARCH 2020



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Presentation Title : "PROBLEM IN FOOD INDUSTRY AND HOW WE CAN HELP THROUGH AI"

Research Focus : Optimized supply chain management

Research For : COGNITIVEWORKSAI LLC

Presentation Type : PDF Presentation



ABSTRACT

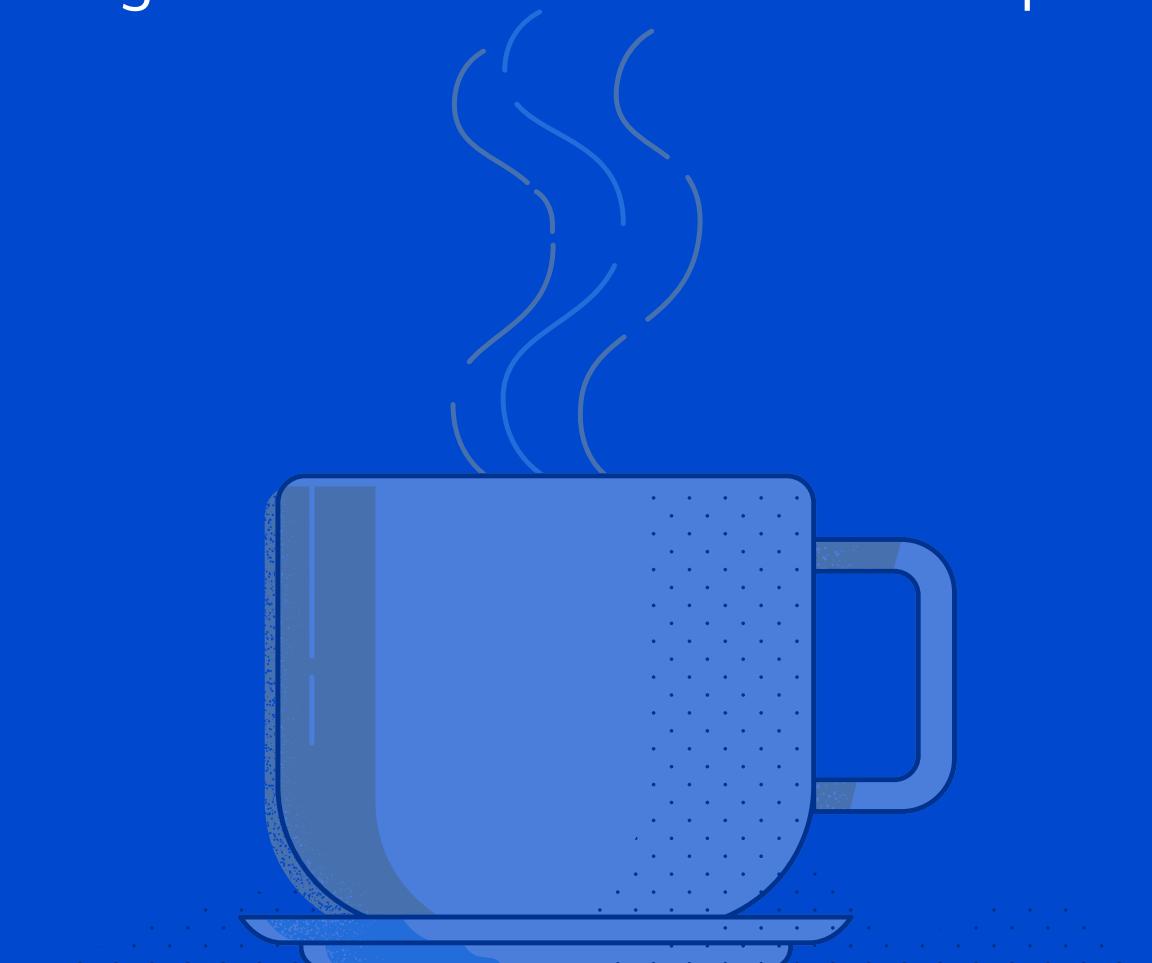
The purpose of an abstract is to highlight the most important information in a research study that others can use to get a clear understanding of what the study was about.

AI is transforming several sectors, including government, medicine, advert, and finance, to name a few have adopted this technology. By learning the intricacies involved with big data analytics and AI, the food and beverage industry has begun utilizing the numerous predictive analysis applications offered by this technology.

An interesting fact we discovered is that the global AI market in food and beverage companies is estimated to grow annually at a compound growth rate of 42% before 2021. This has become evident by the increasing amount of food companies that are using Artificial Intelligence to generate more revenue and improve their productivity.

There are several factor effecting the food industry like :

- Implementation of personal hygiene habits by employees,
- Reducing equipment repair and maintenance costs,
- Predictive maintenance, remote monitoring, and condition monitoring
- Optimized supply chain management,
- Food fraud,
- Food waste,
- Sorting,

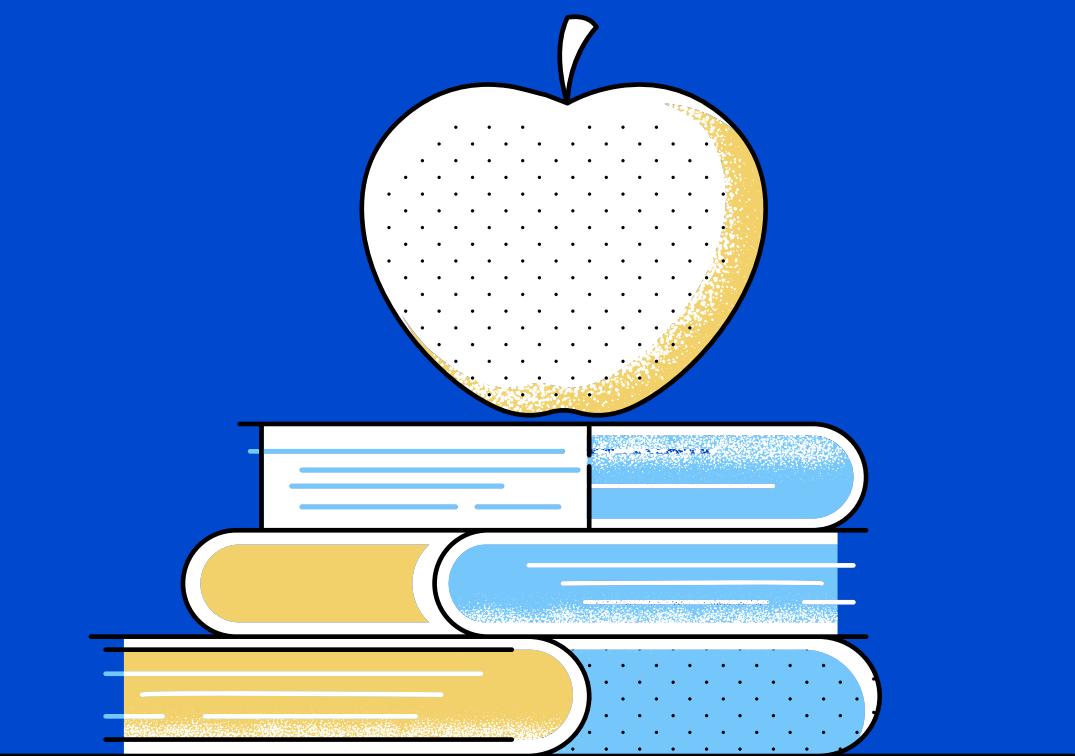


This factors which in turn increasing there production cost and effecting there customer satisfaction. most of the effecting factor are inter-dependent on one another, resolve in one alpha factor could resolve the complete hierarchy of problem

My research findings indicates that optimized supply chain management is the alpha factor which might help to reduce the processing cost of production, increase customer satisfaction and avoid wastage.



INTRODUCTION



What is Artificial Intelligence?

Machines have far superior computational abilities than humans. They can sort through enormous amounts of data and use it to make better decisions. So the general idea behind AI is to have machines do the heavy thinking for us.

AI can:

- Find patterns, trends, and associations
- Discover inefficiencies
- Learn and become better
- Execute plans
- Predict future outcomes based on historical trends
- Inform fact-based decisions

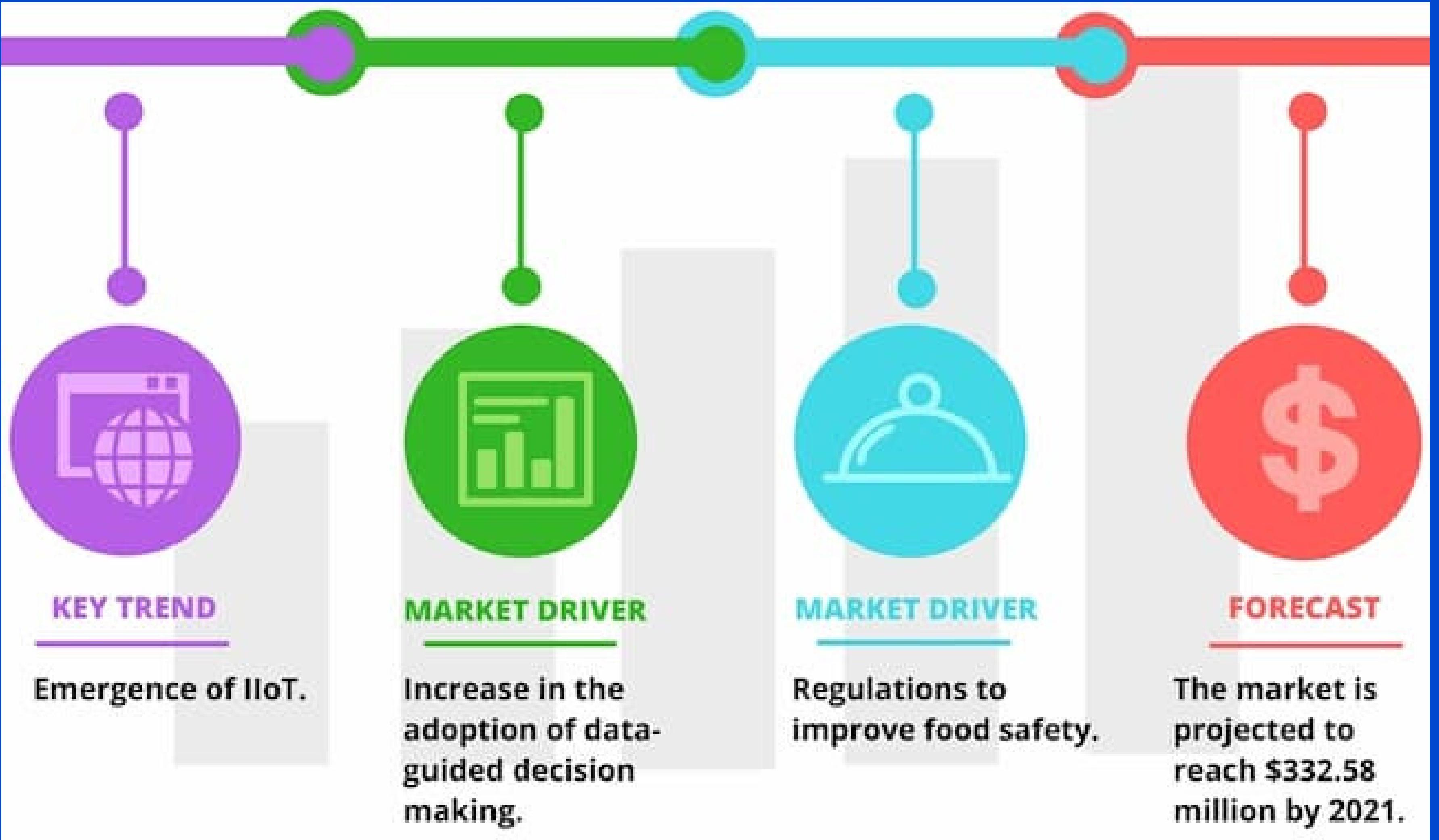
How Can Artificial Intelligence and Machine Learning Help You?

In every industry, there are a myriad of interconnecting inputs and variables. Analyzing this complex data to derive meaningful value is often overwhelming, inhibiting our ability to find adequate solutions in a timely manner. Unlocking these complex scenarios such as how humans are likely to behave and interact can create opportunities.

A lot of the major tech companies are already developing artificial intelligence solutions. This allows these companies to:

- Automate and improve complex analytical tasks
- Look at data in real-time
- Adjusting its behavior with minimal need for supervision
- Increase efficiency and accuracy

Various Applications Of AI In The Food Industry



- **Sorting**

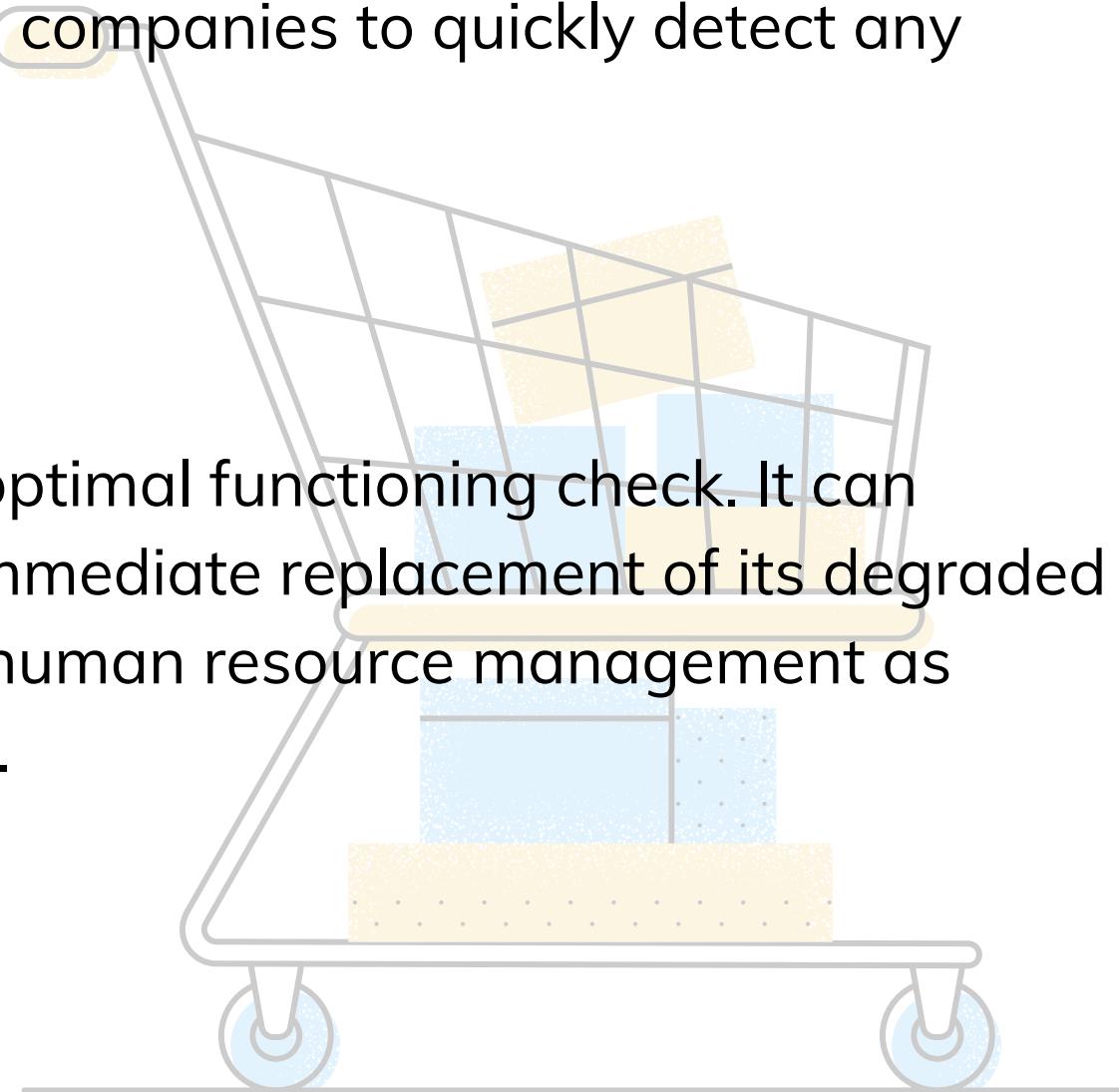
Sorting food requires that extra attention is paid to the specific details of the product, for example, size or color. These factors help food companies to make well-guided decisions on the processing of various foods that will ultimately increase the purchase rate of consumers.

- **Implementation of personal hygiene habits by employees**

We know that the importance of ensuring that employees in food and beverage companies take necessary personal hygiene precautionary measures cannot be overstated. AI enables companies to quickly detect any inefficiencies in this aspect and eliminate them for improved food safety.

- **Reducing equipment repair and maintenance costs**

Companies can also utilize AI in the aspect of machine repair and periodic optimal functioning check. It can quickly detect any piece of equipment that's faulty and separate them for immediate replacement of its degraded components. This will ultimately lead to improved employee efficiency and human resource management as there's a much better system in place to provide early detection of any fault.



- Optimized supply chain management

The food industry can use Artificial Intelligence to minimize delays and maximize profit margins by providing close monitoring of every supply chain operation. This also helps companies to forecast for better management of pricing and stock products accurately.

With growing concerns about transparency, Artificial Intelligence has also been utilized to track products from the farm to consumers to ensure transparency. You can be sure that the flow of products will be cost-effective and streamlined in the best way possible with the adoption of this technique into food production and distribution.

- Predictive maintenance, remote monitoring, and condition monitoring

It is obvious that manufacturing a lot of goods demands big, complicated and intricately constructed mechanisms. The maintenance of such machines can be rather costly without predictive maintenance — figuring out the time-to-repair and cost-to-repair indicators through categorizing issues and making predictive alerts.

Timely repairs can save up to 50% maintenance time and reduce the costs needed for it to almost 10%. To perform remote monitoring on complicated mechanisms you can make a Digital Twin of a machine that will show you the performance data on parameters and manufacturing processes and boost the throughput. Machine learning also allows to identify factors affecting the quality and causing flows in the manufacturing process with Root Cause Analysis (eliminating the problem in its very source). With condition monitoring, you are able to monitor the equipment health in real-time to reach high overall equipment effectiveness (OEE).

There are also lots of other issue faced by food industry which can be resolved by AI such as. But this issue can be considered as secondary problem which rises from the primary problems.

- Food fraud - a global issue on a global scale
- Lack of traceability
- Affordability
- Deciding What New Products to Make
- Food Waste

Problem Identification



Before describing the identification of problem let us know what is hierarchy?

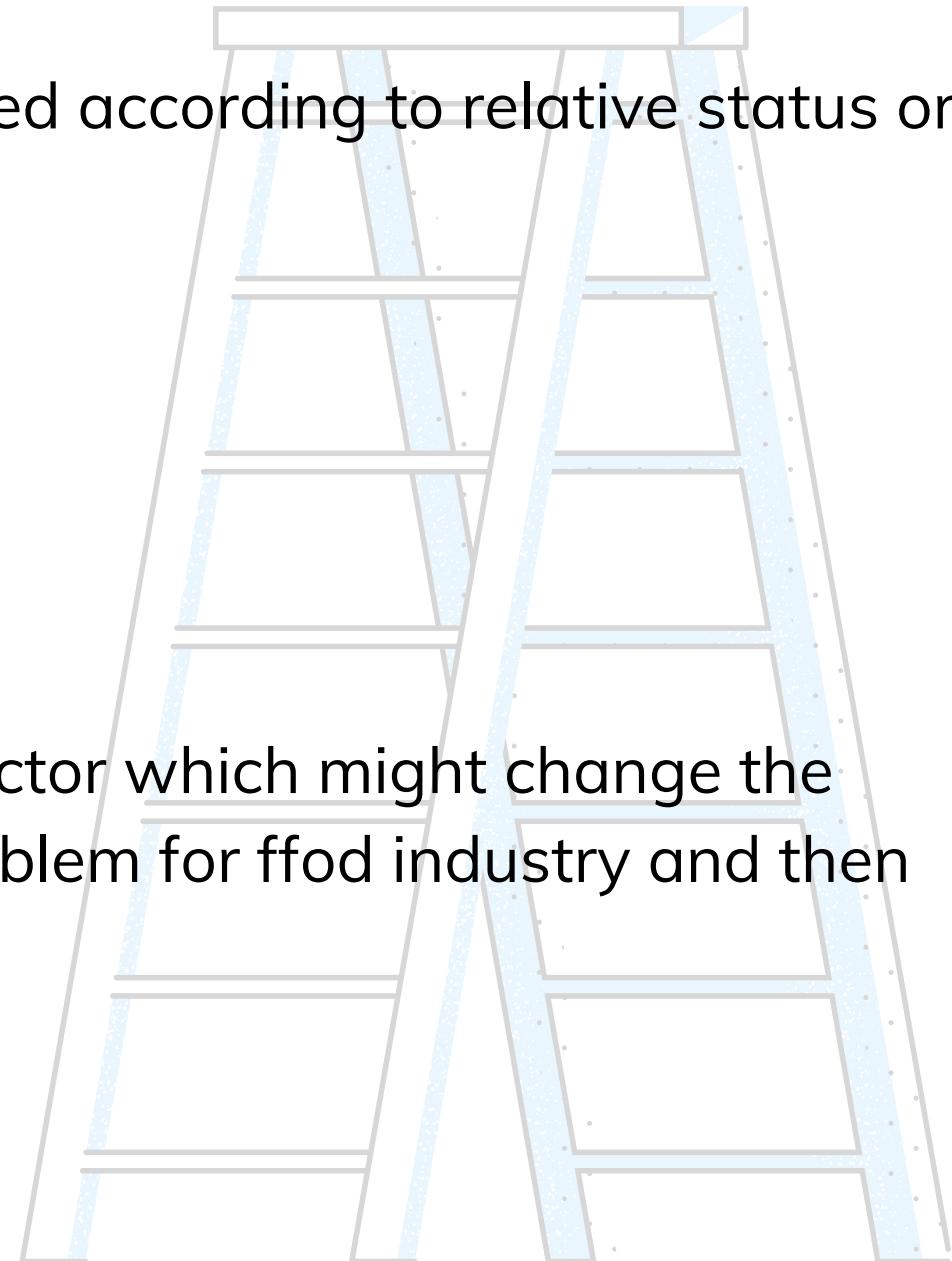
As described by wikipedia:

"A system in which members of an organisation or society are ranked according to relative status or authority."

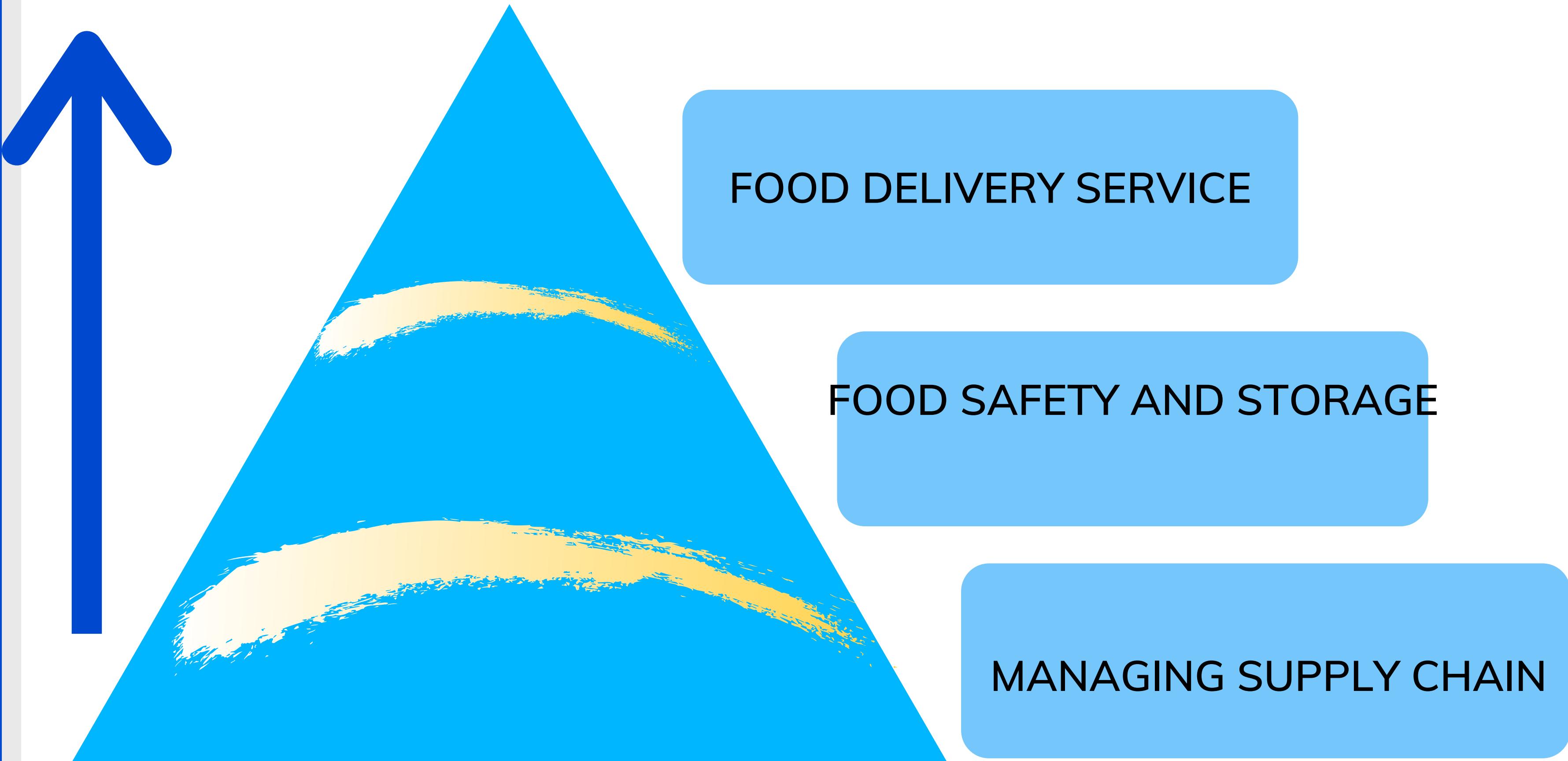
Example:

A designation of police arranged in order of rank.

Let us understand in detail the hierarchy of food industry to analyse the the factor which might change the complete structure and give us optimal solution to the maximum counts of problem for food industry and then study how AI could help us.



FOOD INDUSTRY PROBLEM STRUCTURE



As we know now what is the structure for the problem let us dive deep into each aspects and find out how it me be correlated to each other.

MANAGING SUPPLY CHAIN PROBLEMS:

- integration with macro and micro space planning
- Food safety monitoring and testing product at every step of the supply chain
- Tracking products from farm to consumer to provide transparent
- More accurate forecasting to manage pricing and inventory
- Demand And Supply of product
- Record of batches
- Proper reuse of product by second part.
- Warehouse cost management
- Managing cost on machinery



FOOD SAFETY AND STORAGE

- Sorting food: getting off from unwanted product
- Food Fraud: getting information on value added product on existing product from third party which may lead to change in product standard or even adulteration
- Implementation of personal hygiene habits by employees
- remote monitoring, and condition monitoring

FOOD DELIVERY SERVICE

- Lack of traceability
- product transportation cost
- damaged goods evaluation
- Timely delivery of products



Problem Explanation In Detail

From getting the raw material through sales of product the only thing which can help company to get best insight of

- future sales,
- reduce cost,
- help in risk taking,
- Maintaining supply,
- See working of machine for maintenance,
- Maintaining warehouse logistics,
- see supply and demand and track time.

Is AI Based Supply Chain Management System. There are already enough tech for the other issue which can be upgraded or have working system. Also applying change to any off would result in minimum help to the entire system.

In current scenario small organisation does not have advanced AI setup which might help them to track their product, reduce time and unwanted effort and money for processing and maintenance. it also lead to their product wastage and unsatisfactory customer result as they do not have capability to predict future trends and their demands. This indeed can lead to limit the growth of business

USE CASE

As we can see from our problems identification the most biggest issue faced by each sector can be easily solved by proper management which can be done only by proper supply chain management also it can help in prediction of pattern and understanding market trends for future.

For simple explanation let us assume we are running analysis with our finish AI service that is helping in supply chain management for one of the most booming product of Indian market i.e Aashirvaad Atta.

Let us assume the work flow of company as:

STEP1: Getting raw material [WHEAT]

-> data of wheat quality,quantity,Cost and nutrition value of product gathered

STEP2: Product is sorted and unwanted material is filtered

->There are already enough AI system available in this field to carry out task for product filtering which use AI Product running on ANN's

-> Our system would gather the data in this level which include quantity of material wastage, machine running time, extra added product,Number of labour applied, new cost and so on



STEP3: Product Warehousing

-> data of product transported to particular location, cost for warehousing per batch, time period of product, realising quantity, Supply demand

STEP4: Food Delivery Service

-> data of packaging per quantity, transportation cost, final nutrition value, sales, etc

BENEFITS OF AI BASED SUPPLY CHAIN SYSTEM

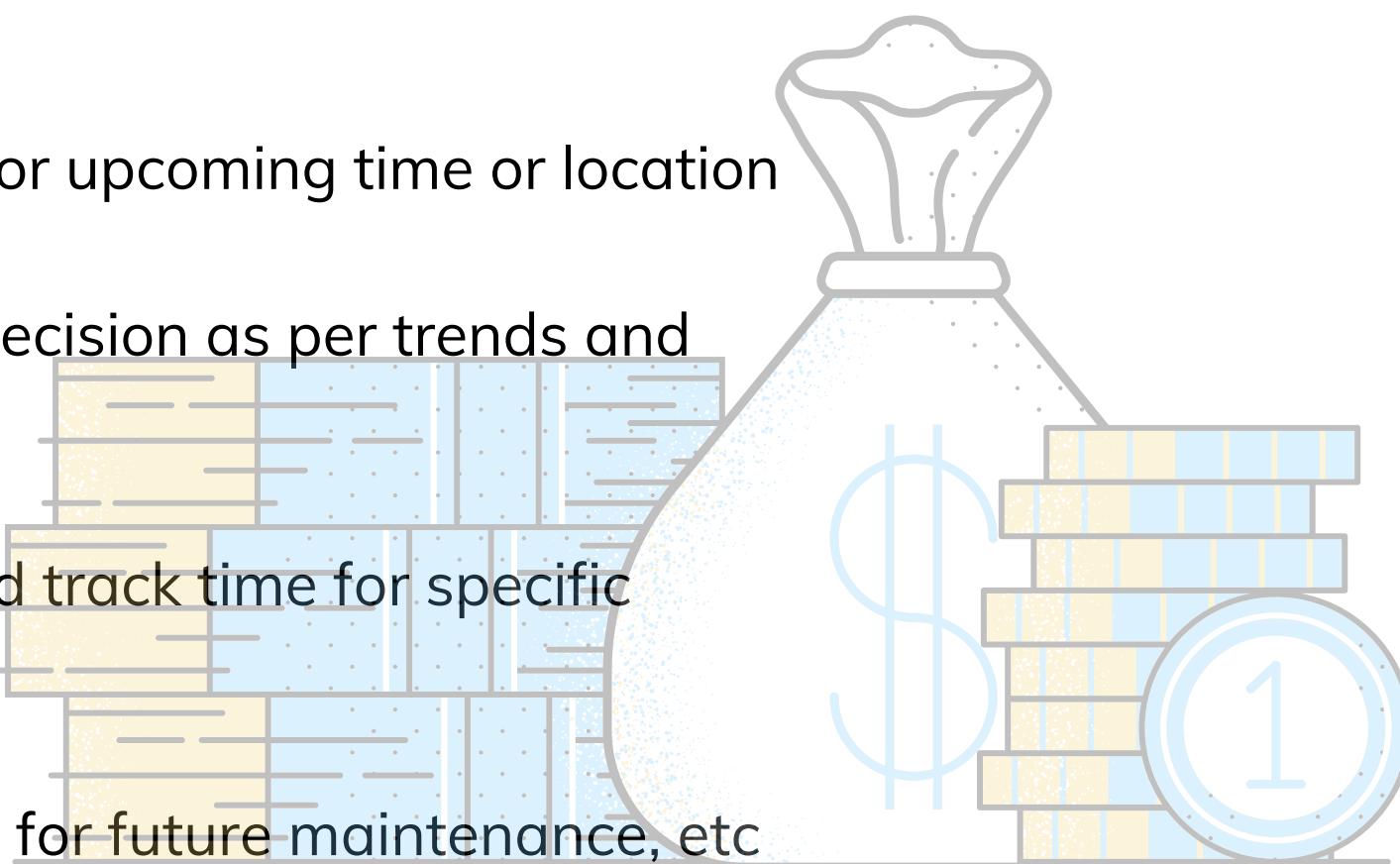
Customer Satisfaction : They will get all the necessary product details which will help company to build confidence among them

Future Prediction : help organisation to analyse product demand for upcoming time or location

Reduce Cost: help organisation to reduce cost by taking proper decision as per trends and reducing wastage

Monitoring and tracking : help organisation to monitor product and track time for specific process

Machinery Maintenance : See the runtime of machine and analyse for future maintenance, etc



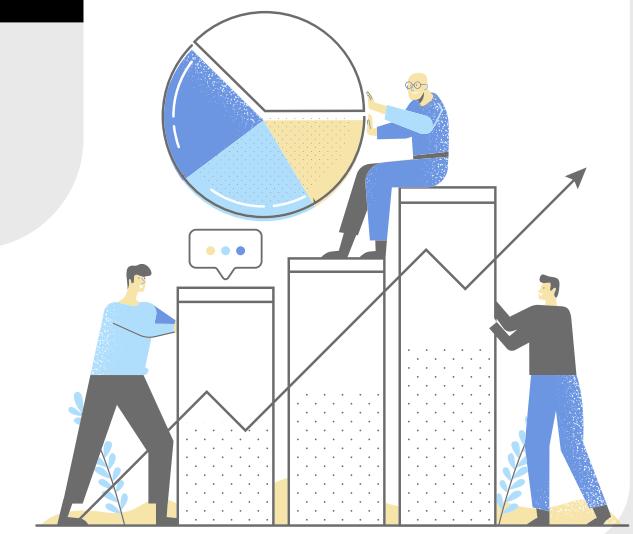
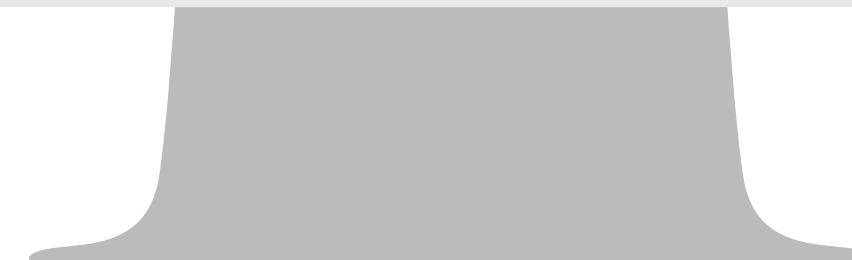


SUGGESTION

The best suggestion for the problem is to create Real Time AI Dashboard which represent data visualisation and provide all the data from each and every chain in real time to interpret and take decision for.

REASON FOR SELECTING DASHBOARD

- The dashboard could easily connect through various api's and make data available
- One place for all solution
- Easily understanding for non technical person
- Can showcase predicted data
- We can use optimal AI algorithms such as regressions, naive Bayes, K-means for prediction of data and representing it in dashboard as it would use less computation and represent data with satisfactory accuracy and representation



The above dashboard like management system can help management or the owner to have complete insight of organisation, product and even their customer. With the help of this data one can do the following things

- Reduce the cost by avoiding wasting or elements which cause no value to service
- Analyse customer behaviour on their new product
- Maintaining proper supply of product on demanding location and time
- Proper maintenance of machines
- Forecasting sales for next batch
- Ensure quality and third party work
- Keep track on processing time

This will help the organisation to minimise human error, save time and resources and avoid loss in future by taking risk decision.

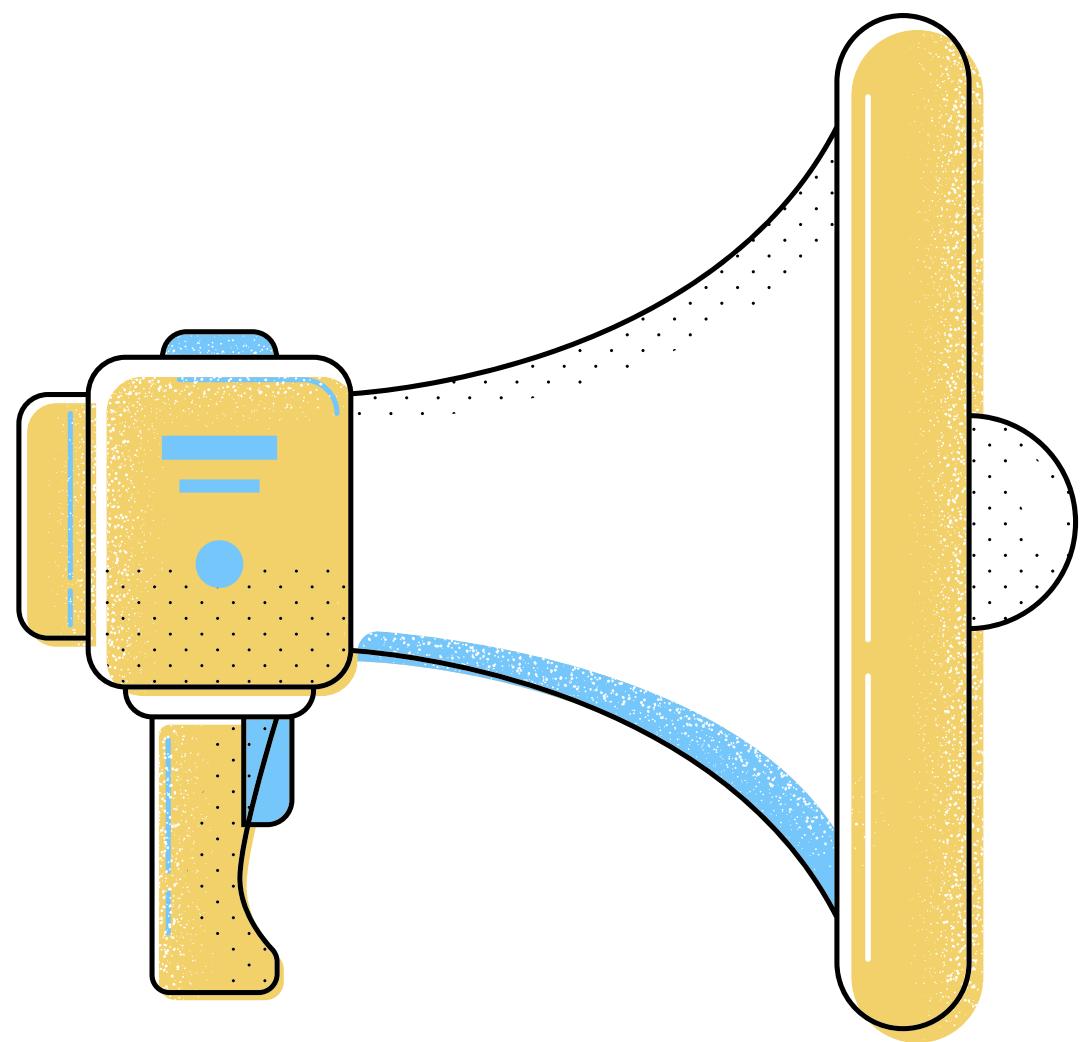
Disadvantage:

But obvious it will not completely help to automate the whole process but it can be low cost game changer for small to large scale organisation as its implementaion would not require high cost performing system or machinery

- Data from every unit should be gathered. If not the system can generate false report
- Proper availability of resources to gather data

REFERENCE

- WIKIPEDIA
- GOOGLE
- Medium.com
- blog.produvia.com
- foodindustryexecutive.com
- canva.com
- www.fao.org
- www.foodradar.com
- www.bloomberg.com



THANK YOU