

INDUSTRY 4.0 e-NEWSLETTER

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CONTENT

	Page No
Foreword by Ms. Anna Roy, Adviser, NITI Aayog	3
Message by Mr. Bhaskar Mandal, Chairman, FICCI Industry 4.0 Committee and Executive Vice President & Head, Digital Industries India, Siemens India Ltd.	4
Message by Mr. Rajeev Singh, Co-chairman, FICCI Industry 4.0 Committee & Partner Management Consulting, Deloitte Touche Tohmatsu India LLP	6
Articles on Industry 4.0	
1. Industry 4.0 – An overview of an Automobile Sector by Mr. V. Sridhar, Senior Director-Purchase, Honda Motorcycle & Scooter India Pvt. Ltd.	7
2. Industry 4.0 Post COVID Scenario-Manufacturing by Mr. Satendra Singh, Head of Strategy and Business development, Nokia India Pvt. Ltd. and Mr. Ramkrishna Patra, Head-Manufacturing Solutions, Nokia Chennai Factory	11
3. Case Study on Industrie 4.0 Implementation on a PSF Line by Ashutosh Chincholikar, CEO & Managing Director, Smart Controls India Ltd.	13
Standard Operating Procedure (SOP) for Resuming Operations Post-Lockdown by PL Muthusekhar, Managing Director, Nord Drivesystems.	16
Industry 4.0 – India News	22
Industry 4.0 – Global News	24



NITI Aayog
(National Institution for Transforming India)

Foreword



Ms. Anna Roy
Adviser
NITI Aayog

IR4.0 revolution in its wake has ushered in the potential for massive creative disruptions by Robotics, Artificial Intelligence, IoT, and Cloud Computing affecting every sector – manufacturing, health care, agriculture, transportation, waste management and governance. While we were still grappling with ways to reap the benefits of these advanced technologies, the COVID pandemic have descended upon us bringing in its wake disruptions of global proportions. The crisis impacts the unorganized businesses to MSMEs and MNCs in different ways by disrupting global supply chains, labour challenges, demand shifts, for some even posing an existential threat.

The new normal has changed the entire narrative of Industry 4.0, at least for the immediate future. Use of UAVs and Robotics have been manifested in many forms in the management of the lockdown. On the other hand, manufacturing sector which until recently was engaged in impact of IR 4.0 on productivity, future of work and skilling related issued is now grappling with whole new issues governing the business decisions post lockdown. Government has adopted a graded approach allowing various economic activities based on risk perception.

IR4.0 needs a paradigm change with the conventional drivers of business-like cost reduction, competitive advantage, productivity, sustainability and innovation being reprioritized. How to help companies survive and return to normal operations with minimum turn-around time and ultimately, create more resilient business models in medium-long term would be of concern.

Many of the IR 4.0 technologies would now become a necessity and are expected to be adopted with a far more vigour and form fundamental part of the businesses. A post-covid world, will not be business-as-usual, it could work as a catalyst for a much wider adoption of Industry 4.0 provided we all come together to understand the challenges and take necessary steps to seize the opportunities.



Mr. Bhaskar Mandal

Chairman, FICCI Industry 4.0 Committee and Executive Vice President & Head, Digital Industries India, Siemens India Ltd.

As the global COVID-19 public health emergency continues to spread, creating challenges for families and businesses worldwide, this is a difficult time for all of us. I do hope and pray that you and your loved ones are safe.

These uncertain times are also a test of our resilience: of our mindset, our processes and our people.

While we had VUCA creep up in almost all technology conversations, I'm not sure how many of us really anticipated the COVID-19 pandemic and had systems designed to overcome the challenges that we are enduring each day. Without doubt, I would rate the most important skill that we need during these times as agility. That too not just about a mindset, but agility that is aided by technology.

Even a month back, the business drivers of Industry 4.0 were focused on productivity, cost reduction, faster time to market, competitive advantage, sustainability and innovation. The goal was to make businesses function better and efficiently. However, when I look at the road ahead for Industry 4.0, there will be a few more parameters that we will have to think through. The current crises, if not for anything will only hasten our journey towards Industry 4.0. There are some noticeable trends that will determine this:

Collaboration & computing will be re-engineered: Our ability to break through silos and cross virtual borders has passed the litmus test during this pandemic. Collaboration and virtual planning tools will be embraced even more in the future and compatibility across these platforms would be crucial. Demand for high-speed, secured WANs capable of handling high volume and velocity of data will also go up to support engineering value chains, graphics data to support design, simulation and validation. Remote High-Performance Computing (HPC) would also see investments to support engineering simulation. Engineering data management and project management will need to be digitalized and integrated with business systems like ERP and CRM. This will be valid not just for the large manufacturers but now extremely critical also for Indian SMEs if you view both Engineering Collaboration and Supply Chain collectively.

Remote monitoring of manufacturing operations: Remote monitoring of operations aided by IIOT will be implemented on priority on the shop floor. With this, incorporation of digital twins and remote support from OEM's would improve availability of assets. Adoption of SaaS and Data analytics leveraging cloud would be the new normal with the need for real-time visibility into the availability of raw materials, finished goods, WIP, people and assets. Automation and robotics would also become key to maintain production with skeletal staff. Manufacturers will also warm up to the idea of Robotic Process Automation (RPA) to support non-value added labour-intensive activities. AI and Block-chain technologies will lead to

faster decision-making, better accountability & quality and traceability in manufacturing operations. AGVs would support material handling and line fulfilment – and will also help to reduce the reliance on people and to further assist social distancing. Predictive maintenance supported by data analytics, spares management, asset monitoring and Performance Based Logistics (PBL) would be the new norm.

Business operations would need restructuring: Businesses will have to de-risk against unstable supplies or dependencies on centralized manufacturing. There could be a trend towards onshoring versus the trend of offshoring in the past with a preference for local procurement. Readiness of local suppliers will be a crucial determinant here and I see a lot opportunity for Indian OEM's and suppliers. Warehousing strategies also will have to be re-examined and JIT inventory will be debated with respect to the prospect of a disrupted supply chain. De-centralized warehouses might need to be created to achieve buffers as a mitigation against disrupted supply chain. Digitalization of Logistics and Automated Warehousing Solutions will be a big opportunity.

Additive manufacturing will get a boost: During the COVID situation, we are seeing the need for parts that must be produced on demand because many of these parts are just missing by the original manufacturers. In industrial production, the prospect of additive techniques has been discussed since the 1990s. What is completely new is that we are starting to break away from single pieces and prototypes and moving from the tech center into serial production. Digital software tools have made this development possible. Rapid prototyping, hyper-customization and ability to manufacture small batches of product have all emerged as realities today with industrial customers' need for additively made parts. The industrial world is only beginning to understand the value of additive manufacturing, and there is no doubt that new applications will continue to be discovered as the technology advances.

Cyber preparedness will have to be a way of life at Industry: A microbe in the real world has brought the world to its knees. Now imagine what havoc a synthesized microbe can cause if pushed into our industrial networks? In a connected world this has the potential to cause a chain reaction of devastation. Some might argue that seclusion and isolation is the only solution. However, the irony is that when you look at the current crises, a lot of industries, wish, that they were connected and could communicate remotely with their machines and teams. Hence, information and network security will become important evermore with the tech world moving to a newfound wave of convergence: Software is converging with Automation, Information Tech is meeting Operational Tech and Enterprise level is trying to become seamless with the manufacturing field. We will have to adopt technology; we will need to be connected and we will also need to be secure against the latest threats.

Learning and skill-building for the new normal: Needless to say, to support the above listed abilities, online and digital content would be needed for reskilling at all levels. A mindset and culture of continuous learning will have to be adopted across the hierarchy in all enterprises. The new normal is that this is not even a choice.

The need of the hour therefore is to relook at our business models and ensure a sustainable one. It needs to be looked at holistically right from design to production to services. In doing so, all available technologies especially Industry 4.0 must be evaluated to maximize the traditional KPIs as well as the emerging ones listed above. Only with this outlook, can our industries in India emerge stronger in the coming times.



Mr. Rajeev Singh

*Co-chairman, FICCI Industry 4.0 Committee & Partner
Management Consulting, Deloitte Touche Tohmatsu India LLP*

As India and the rest of the world battle the complexity created by the COVID-19 pandemic, we now see the beginning of a sluggish recovery in some sectors. The recovery phase will necessitate unprecedented levels of coordination across the Industry spectrum and the actions that an organization takes during this period, will set the foundation for sustained growth and performance over long term. Digitalization will play a very critical role in this recovery process and FICCI Industry 4.0 committee is committed to support the business community by being a catalyst in addressing some of these challenges faced in the post pandemic era.

The pandemic has elevated the demand, supply & workforce complexities to a much greater extent and in many ways has forced everyone to realize that this is the “the new normal”. With swinging customer sentiments, comes volatility in demand and it’s necessary for organizations to start focusing on a well-connected, transparent & agile supply chain network that is highly responsive to these changing needs. To achieve this level of flexibility manufacturing organization will have to rapidly embrace the various Industry 4.0 concepts around Smart factories & Digital supply chain in a much aggressive manner. On the supply side, the need for a connected network between the organization’s & the supplier’s manufacturing units will be felt more significantly than the pre-COVID times.

Manufacturing organizations would also have to start exploring solutions for supplanting tasks which had to be executed in-person, such as process parameter monitoring, quality inspection & controls, asset health monitoring among others. To ensure a safe & controlled workspace, solutions around virtual connectivity & monitoring would have to be explored in the shortest time possible due to the essential social distancing prerequisites created by the outbreak of COVID-19. In this process organizations will essentially do away with excessive dependency on people for routine processes, which will also result in improving accuracy of data across the value chain.

We envisage that organizations will accelerate technology adoption & swiftly move away from the entire mechanism of human enabled data gathering, tracking and post facto analysis to predictive modeling, based on real-time information generated from the connected ecosystem. This will enable them to foresee potential failures of a manufacturing asset or an anticipated fluctuation in consumer demand or a supply security issue in advance and hence be better prepared to address the uncertainties induced in the current business environment due to this pandemic. Overall, access to reliable, real time data will be a strategic resource across multiple facets of business & society. Hence a “virtual shift” is on the cards, which will accelerate Digital adoption & Transform the ways in which the organizations of the future will operate.

Through this Quarterly newsletter on Industry 4.0, our endeavor is to share knowledge, ideas and trends that are changing the Industrial landscape in the country and beyond. I am sure we all will come out stronger than ever from these challenging times.

Industry 4.0 – An Overview of Post COVID Scenario in Automobile Sector



Mr. V. Sridhar

*Senior Director-Purchase,
Honda Motorcycle & Scooter India Pvt. Ltd.*

In April 2020, Automobile industry was embracing itself for one of the major transitions in India. An upgrade to strictest emission norms, from BS IV to BS VI to reduce air pollution & provide clean & healthy environment to its citizen. But if last year was not already challenging enough for automobile industry due to preparations underwent in getting ready to new emission norms & slump in demand for various reasons, it ended on posing an altogether new threat to the world. The rise of a new Pandemic: Covid-19, that has brought entire world & global economy to a standstill.

The current crisis is completely different which no one anticipated. As the infection continues to spread, governments, healthcare authorities, and business leaders are focused on preserving lives and containing the pandemic. Nation wise lockdown was declared in India by our Honorable PM from 24th March 2020 onwards, a proactive step considered impossible by many and hailed all over the world to save lives of 130 billion people.

Covid 19 pandemic has affected all the sectors with Aerospace, Oil & Gas & Automobile industry among the top 5 worst hit sectors. It is the first instance in peacetime that we've observed a simultaneous disruption in the supply chain and the demand chain globally. Manufacturing companies will have to deal with global supply chain disruption as well as volatile demand in the near future in addition to many 'new normal' scenarios.

Before this crisis, Industry 4.0 was seen as the next big thing. It was considered by many as the future of manufacturing. The business drivers of Industry 4.0 pre-Covid crisis were focussed on Productivity excellence, Asset optimisation, cost reduction, sustainability and innovation.

The focus for many manufacturers now is survival first and then beyond that, damage mitigation. The immediate financial impact on manufacturers has already caused a huge cut in non-essential spending and investments.

So, the big question is- Is Industry 4.0 relevant in today's scenario or is it a thing of the past?

Industry 4.0 is not only as relevant as it was before, it is far more relevant for moving forward.

Manufactures will have to find ways to stay in the business, return to normalcy with new normal and then build on their businesses for future requirements.

The first step is Business continuity by ensuring Health & safety of employees & preventing Covid 19 infection into/from factories during Start-up of operations post lockdown.

Health & Safety of associates has always been top priority for us. But this highly contagious pandemic has further added new dimensions to it. To prevent the entry of infection into company premises, Artificial intelligence & Data Analytics can be combined to track & distinguish associates living in hotspots zones from those in safe zones on real time basis as zones keep on changing based on the spread of covid-19. Associates residential location can be further mapped & grouped based on the radial distance from the factory. This will help prepare inventory of workforce & prioritize who can be called on to join company depending upon the volatile market demand & Social distancing norms that has put a restriction on the number of workforces that can join.

People coming to factories also need to be assessed for their wellbeing before entering the premises. AI enabled video feeds analyzers can be combined with infrared imaging to detect fever. Together, these tools can assist with the identification of infected employees, monitor physical distancing, and ensure that sick employees do not enter premises & can be sent back home.

The current pandemic will see redesigned work environment at shop floor with lesser work force due to physical-distancing requirements. What will be the most effective workplace design? Data analytics can be used to design existing process in various shops like Engine Assembly, Weld Shop, Machining line etc., thereby detecting waste activities, optimizing OEE & effective Line balancing as per 'new Normal' scenarios, thus ensuring Health & safety of workforce and at the same time optimize production efficiency.

To enforce essential social-distancing measures, workforce-tracking can help further. Employees can wear positioning devices for tracking purposes. Their movement gets fed into intelligent algorithms that help managers optimize workflows and minimize employee contact at shift changeovers and other critical points.

If employees test positive for the coronavirus, companies could use positioning data from their wearable devices to notify colleagues with whom they have been in close proximity for contact tracing & send them for self - quarantine. The government recently launched the Aarogya Setu mobile app to help people identify the risk of contracting the novel coronavirus by using smartphone's Bluetooth, location services & Artificial Intelligence which works on similar lines as Industry 4.0 principle.

In the long run, Advanced Manufacturing Robots can be used to work alongside humans, thus compensating for the cycle time losses due to physical distance norms. They are of size of humans & are a reality now. They can be programmed to perform Complex & non repetitive tasks.

The Second step is to stabilise again the manufacturing operations, bringing cost competitiveness & improve production efficiency.

As pandemic condition improves in near future, it's important for businesses to recover as fast as possible & come to normalcy.

Social distancing norms may stay for longer time than expected. It means a job that required a certain number of employees at shop floor will be carried out by fewer people only. Each person's

job has increased. So, workforce skill needs to be improved for other operations & technologies, that he was not knowing earlier. With use of Virtual Reality, work force can be trained quickly for carrying out new tasks. More focus is required on upskilling of technical people who are good at trouble shooting. New Business model would be continuous skilling & reskilling of people as the workforce pool may keep changing based on existing pandemic.

For cost competitiveness, it's important to bring Real-time visibility into the availability of raw materials, finished goods, WIP, people and assets

Digital Manufacturing addresses the complete Ecosystem by combining advanced connectivity, Cloud computing, Sensors, 3D printing, intelligent algorithms & Internet of Things with Horizontal & vertical supply chains. The whole Ecosystem is Customer oriented. With Advance Data Collection and analytics, Fast Information can be gathered regarding Customer's requirement as to "What to Produce" and "When to Produce". Procurement can be optimized by using real-time information on inventory levels and production capacity to determine what quantities must be ordered. Simultaneously, Delivery schedules can be shared with suppliers & production line. It will also communicate to HR regarding the skill set & requirement for the above jobs.

IIoT will also help in asset optimization. Machines fitted with smart sensors will determine its preventive maintenance needs & anticipate the trouble in advance. Real time monitoring will help fixing M/c's just before breaking down, thus maximizing asset utilization and Zero Unplanned Breakdown.

Finally Develop new & more resilient business for Sustainable growth.

Automobile industry environment is becoming very competitive. Manufacturers will like to introduce new products. However, lead time of the product from concept stage to mass production stage takes between 18 - 30 months. With advancement in digitisation & 3D printing, product development lead time can be reduced significantly.

These innovative technologies will enable "First time Right designs" & zero-defect manufacturing.

There will be increased adoption of new Technologies like COBOTS, Digital Twins & Augmented Reality. It will help workers to work faster and improve Quality. Situations of Market recalls due to failure to detect defect in a product can be avoided as inline quality checks will become more common where employees are notified of errors and can correct them or can be corrected automatically.

By combining digital twins of a product and production line, new production processes can be virtually tested and optimised before any physical work has been started.

Every challenge brings new opportunity with it. Industry 4.0 can help industries come out of this difficult phase because of the many capabilities that it offers. At the same time, it must be said that one solution does not fit all. So, industries & businesses have to self-assess and analyse the situation to take the best approach that suits them the best.

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Industry 4.0 Post COVID Scenario

Manufacturing



Mr. Satendra Singh

*Head of Strategy and Business development
India Nokia solutions and network Pvt. Ltd.*



Mr. Ramkrishna Patra

*Head-Manufacturing Solutions
India Nokia Chennai Factory*

COVID has brought about one of the most disruptive changes that any business has experienced in the recent times. When the world evolved through 3 major industrial revolutions, the progress in engineering and technology played a significant role in the evolutionary process. Industry 4.0 with cyber physical integration capability has the potential to change landscape of manufacturing operations.

Until now, Industry 4.0 has been perceived as a "good to have" with substantial potential to transform industrial operations and create a positive impact on supply chain management and efficiency improvements in manufacturing. However, what will be its relevance during and post COVID? Can it bring manufacturers back to the game faster and smarter? Can this be leveraged to tackle some of the serious threats posed by COVID to human safety?

Thinking about it, we realise that the COVID paradigm has completely re-written the INDUSTRY 4.0 story. Today, manufacturers have to cut back on their productive head count by almost 50% due to meet the social distancing requirements, increase safety precautions to a new level with closer monitoring and immediate response to health crisis situations. The availability of resources has become the point of uncertainty at all functional levels.

The complexity doesn't end here. The demand visibility is ambivalent, with fluctuating demands across sectors, supply chain has become more critical than ever before due to impending material and resource movement challenges across the globe. There is also an implicit financial impact, where the companies have to make more vigilant decisions on investments.

The New Normal

One thing that we have realised through this pandemic is that this is not something that is going to go away like a war, calamity or political crisis. This is going to be the new normal. Manufacturers have to start becoming agile like never before and leverage every possible solution available to ensure business continuity and ensure faster response and ramp-up times towards every crisis that will arise.

Industry 4.0 will not only be able to do this but will be the perfect vehicle for companies to get back into the game faster and smarter. Industry 4.0 relies on 4 major pillars - Seamless Connectivity, Digitalisation that

creates transparency in operations, Artificial Intelligence (AI) and Automation (aided by hardware and software Robotics), Industrial IoT.

While getting back to business continuity, companies have to start asking themselves a few questions:

- Do we have complete visibility of our operations (physical and digital) to support collaboration of onsite and offsite support?
- Do we have the ability to automate processes that can make the workplace safer without compromising productivity?
- Do we have the infrastructural capability to make our lines flexible and adaptive to change?
- Will we be able to use technology to bring resources up to speed and reduce time to market to match growing customer requirements?

Solving the Puzzle

Most of the questions boil down to one thing - real time Visibility. Be it operations, inventory or performance, real time visibility will be the most critical asset towards making sensible business decisions. And Industry 4.0 will exactly offer that. Imagine a situation where, during manufacturing, we have complete visibility of the operations through a Digital Twin interface that enables every stakeholder to view the progress real time, retrieve data and make instant decisions to improve the process, coupled with the state-of-the-art machines like SMT or Robots are accessed remotely by engineers from their homes to execute complex programming and inspections. This will positively impact the overall productivity and allow larger workforce to operate remotely. A combination of IoT, Digital Twin and seamless connectivity can achieve this capability.

So far, Digital Twin and IoT combination has been used extensively for monitoring. However, this is the time to take the leap because we have the capability to enable digital control of essential equipment, facilitate remote operations. The availability of mobile applications and cloud-based services will further increase the transparency of operations and increase support capability.

Wireless connectivity specifically plays an important role in making the shop floor flexible, cutting down the lead time to make modifications or building a line as high as 80%. Leveraging IoT can help in real time tracking and smart management of these resources with maximum efficiency.

Telepresence robotics is not a new concept, but it becomes more and more relevant today with increasing requirements for monitoring, guidance at critical stages and even interaction with the team to facilitate collaboration. At the time when key resources are unable to support onsite, physical presence can be replaced effectively by telepresence. Telepresence effectively facilitates unmanned surveillance of a facility and enables instant real time visibility to operations.

Industrial IoT will not only double up to provide industrial operational monitoring of key equipment, but it will also be used extensively to ensure health and safety applications. High Accuracy Indoor positioning can be effectively utilised for social distance monitoring inside the workplace and to generate alerts during conditions of breach.

Post COVID-19, Industry 4.0 will become the necessary investment that can put the companies back in the game, faster, smarter and safer. Industry 4.0 will turn silo-based operations to a collaborative and agile one. This is the need of the hour, especially with the new normal, that demands physical separation, but continuous cooperation.

Industrie 4.0 Implementation on a PSF Line

Case Study



Mr. Ashutosh Chincholikar
CEO, Smart Controls India Ltd.

Objective:

A leading manufacturer of Polyester Staple Fiber (PSF) from South East Asia approached us with a requirement to predict the quality of PSF “online” while it is being produced. Main reason of this requirement was that quality tests of the produced PSF takes about 48 hours while the PSF is required to be dispatched to the customer within 12 hours of production. Online predictions could help them take decisions while the batch is running instead of waiting till the end of batch resulting in scrap reduction.

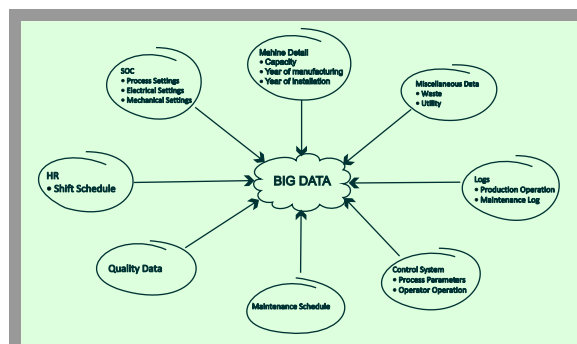
Solution Proposed:

Smart Controls proposed an Industrie 4.0 based solution approach to the client that involves identifying, acquiring and passing of all possible data from the production line to a Data Analytics engine that can analyse the data, learn from it and then predict the quality of PSF being produced

Challenges: Biggest challenge was to firstly identify all the data from the production line that can affect the quality of the product and then to acquire this data to form the so-called Big Data.

Solution Details:

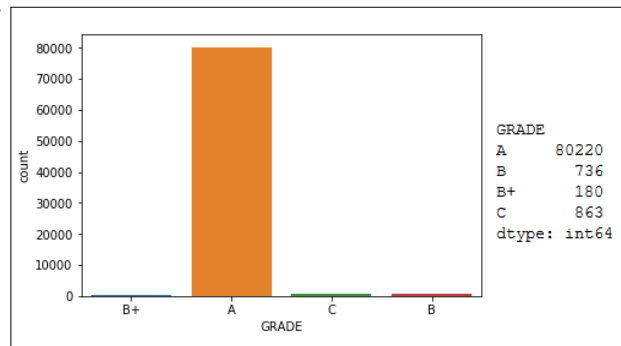
Team of experts started working to identify the big data in the production line. Initially it was thought that most of the data would be available with the PLC based Automation system that controls the production line. But as the study proceeded, it was observed that there is a big chunk of data that is not available in the PLC system. This data was mainly the raw material data, maintenance data like machine maintenance schedule etc, some mechanical settings of the machine, data from the quality lab, operator shift schedule, Recipe Data etc. However, the real time data for the production line like temperatures, speed, current etc was available in the PLC. Some data like Recipe data and Quality lab data was available in Excel files that was brought to the Big Data database. The data that was manually maintained like Machine cleaning, Machine manual settings etc was also Digitised to be made available in the Big Data database.



Once the Big Data was constructed and stored in the central server, the activity of creating the Online prediction models started which involved different steps like Data Fetching, Data Pre-processing, Data Analysis, selecting the right machine learning algorithms.

Primary task was to balance the data as the data which the AI model received was highly imbalanced.

Maximum observations were of 'A' GRADE quality. This happened because maximum times actual production in the plant was of grade 'A'. As per above screenshot, out of 81999 observations 80200 were of 'A' grade and remaining observations are distributed amongst B, B+ and C. With this data system was not to be predict lower grades with accuracy.

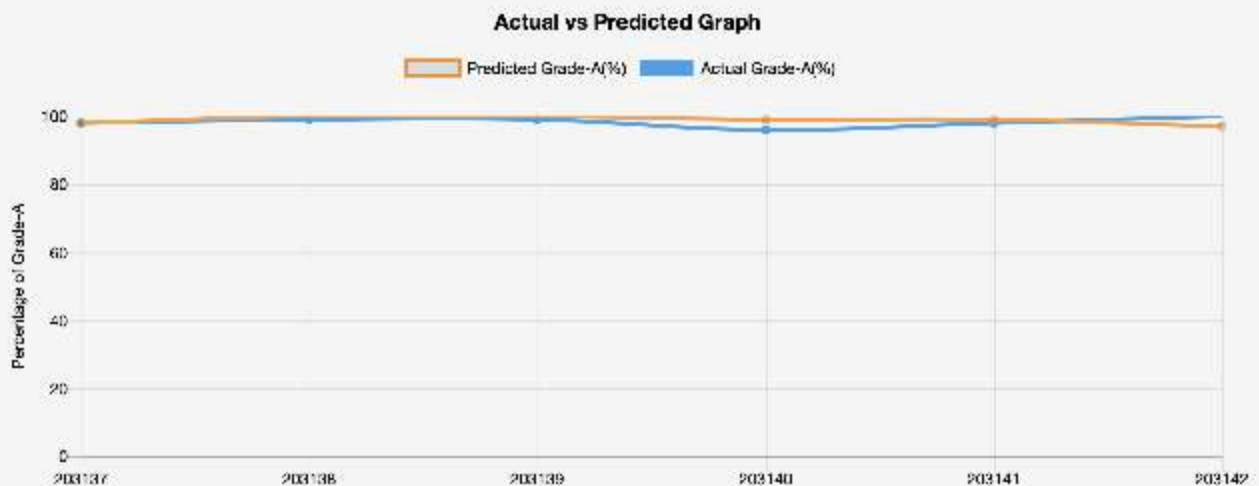


Appropriate data balancing techniques were used, and this data was fed to the model. Model started predicting with 90% accuracy and as the data grew data size grew, the accuracy of prediction started to come close to 95-98%.

This online prediction model could also provide insights into the parameters which contributed to the quality of the product. It could also provide appropriate reasons when the AI engine predicted lower grades for the products.

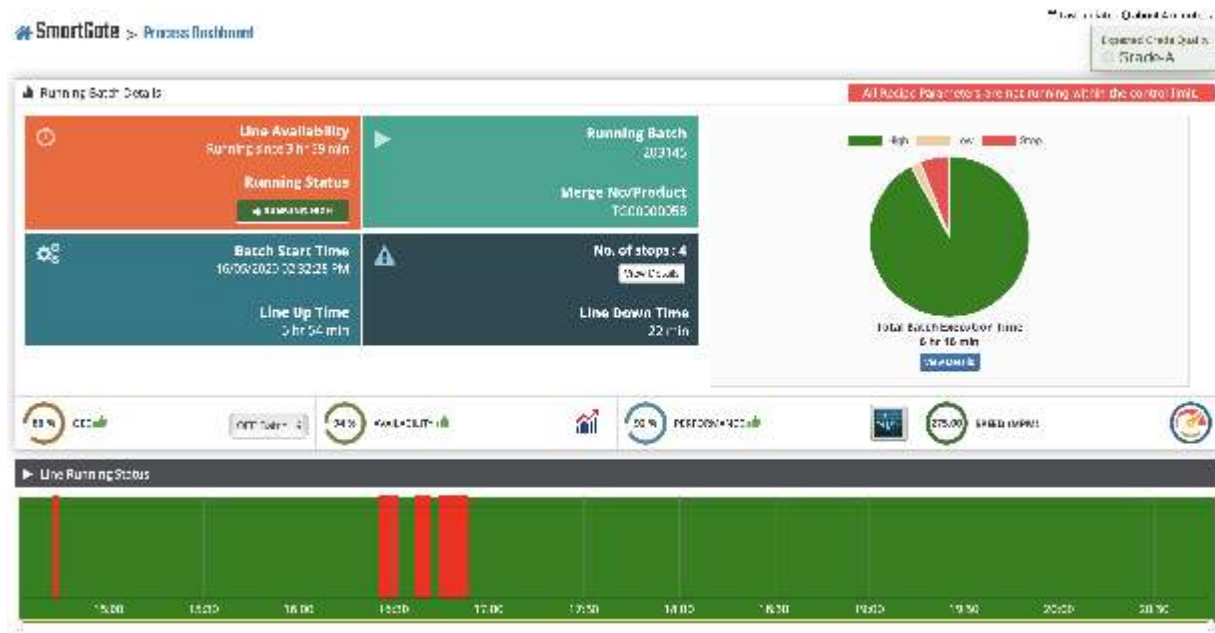
Metrics	
Overall accuracy	0.986702
Average accuracy	0.993351
Micro-averaged precision	0.986702
Macro-averaged precision	0.986149
Micro-averaged recall	0.986702
Macro-averaged recall	0.98729

Week Summary



Benefits:

Customer was able to know the quality of product while it was being produced enabling him to control the quality and thus increase the OEE of the production line. This ensured that lower grade product did not reach the customers.



Conclusion:

Typical Industrie 4.0 solution not just involves getting the data from the PLC and other controllers, it involves a huge engineering effort to construct the big data which is truly all possible data related to the production line and not just the real time process data gathered by the PLC. Once the big data is constructed on a cloud server, the data can be analysed and represented on Digital devices and further analysed with help of special AI algorithms to derive meaningful conclusions from the production process so as to improve the quality of product and in turn increase the OEE of the production line.

Standard Operating Procedure (SOP) for Resuming Operations Post-Lockdown



Mr. P.L. Muthusekhar

Managing Director, Nord Drivesystems

Positivity is more Contagious than COVID, we at Nord communicate a lot through short videos, voice messages, mails, social media and through various forms of Communications to our entire Team, customers, supply chain and channel partners.

Basic idea behind this communication is spread the positivity and bring in the changes what required. Adaptation is the key to today's situation as it is going to stay for a longer period, Best is to prepare and unitedly fight against Corona but with social distancing and following the hygiene practices. Above all, to bring in the change is the key. These messages talk about precautions, following Standard operating procedure (SOP) and repeated communication to ensure everyone follows with greater intensity. As our company produces geared motors and gear boxes required for pharma, food and beverage, Pump industry for Sanitizers etc. which forms the part of essential support services, with due permissions we were operating even during lockdown period with limited resources, so these communications become mandatory considering the short time available.

In our opinion the life now and after COVID has and will change, behaviour and hygiene practices, way of socializing, big road shows, Exhibition, conference etc. will see a new form in its entirety. We would like to share our Standard Operating Procedure norms that we at Nord are following during this lockdown in order to keep our human resource safe.

STANDARD OPERATING PROCEDURE

1. Thermal screening & hand sanitization is mandatory for all Employees/Visitors/Guests while entering NORD premises at the main entrance gate irrespective of cadre & status.
2. Compulsory wearing of face masks by all employees as well as visitors. Option to replace it will be provided by the company depending on it's usage.
3. Due care should be taken to dispose off used face mask at separately designated dustbins provided at different locations with top closure covers. Example for Admin building & Sales office it has being provided at the car parking level floor staircase entry corner while for plant it has being provided at the vehicle exit rolling shutter. Admin will ensure for separate disposal of COVID-19 consumables waste as per guidelines laid down by Govt.
- .4 Hand sanitizers will be kept at strategic locations like all building points, shop floor PC centers, Offices etc for employee usage as & when they are using common utilities like common PC keyboards, coffee machines etc.
5. We expect strict adherence for frequent hand washing as may be necessary. Would be great to do it once every two hour preferably using liquid soap or alcohol-based sanitizers as may be available.
- .6 As per guidelines from Indian govt., Arogya Setu App to be downloaded and used for self-health declaration during entering company premises post lockdown.
- .7 Temporarily we have suspended use of Biometric scanners. Attendance Register will be maintain and kept in convenient place. Use your own ball pen for attendance signature.
8. During work hours, it is expected for employees to work from their own seat and avoid moving around as far as possible. We suggest avoiding usage of anyone else's chair, nor share food or snacks; sanitize your laptops, mobiles and desks from time to time.

- .9 No Frisking at Entry / Exit Gate will be done by security for some days.
10. Social distancing at least 6 feet to be maintained at every point - Assembly Area, Logistic Area, meeting in conference room, canteen/cafeteria, assembly area, Security Checking point. Please wait till the next person moves.
11. To keep up with strict social distancing use of phone calls, Teams meetings & VC conferencing are highly encouraged. Physical Meetings should be avoided as far as possible & unless necessary.
12. Common stationaries like pen, calculator, stapler and other office consumables should not be shared.
13. Use of hand gloves is mandatory for all shopfloor employees in addition to face mask & protective glasses (assembly).
14. Common utility machines like Forklifts, hand pallets as well as Assembly tool, measuring instruments to be properly sanitized by the employee using it before leaving for the day's work on shift basis.
15. Employees are requested to bring their own tiffin and water bottle from home and will be allowed to consume food at desk along with cafeteria. Use of disposable cup for tea/coffee is compulsory.
16. Management encourages to work with open ventilations (windows & doors). Air Conditioners can be switched on only when highly necessary & ensuring all necessary safety guidelines being followed.
17. Entry for Visitors is strictly restricted. Outsiders may be permitted in very exceptional and urgent situation with after pre- approval from Function Head.
18. Use of locker rooms to be regulated strictly. Considering the size of change room, maximum 05 employee will be allowed to enter at a time with due care on social distancing & with face masks intact. Lockers locations will be rearranged for maintaining safe distancing while usage.

19. Frequent touch points like Stairways, railings, doorknob etc. disinfection to be done regularly every two hour. Personal Protective Equipment (PPE) usage mandatory for cleaning/housekeeping staff. Alcohol-based disinfectant to be used.
20. Shop floor to be sanitized after every shift.
21. Special attention be given to washrooms / toilets by periodic cleaning, swabbing, disinfecting and maintaining dry.
22. Use your own vehicle from Home to office and back. No car-pooling more than two employees with both siting in diagonal arrangement.
23. For business visits travelling by Public transport is strictly prohibited for the time being. For any urgent travel concern person should take approval from their respective HOD. As far as possible use your own vehicle.
24. Self-declaration of travel histories of the employees and their family members is compulsory at the time of resuming duty.
25. As per government guidelines; 50% employees working from home will be encouraged, hence Functional Head can decide on employee's physical presence in office or release him for work from home. Only those whose physical presence is essential, are expected to work from office. Pregnant women, Diabetic, Heart history employees to work from home.
26. Incoming materials especially coming from red zones or import shipments must be fumigated before unloading.
27. All Delivery, Loading and Unloading personnel to be briefed about the COVID-19 awareness.
28. External vehicles entering company premises to be thoroughly sanitized before loading or unloading as applicable. Use of dock levelers is highly encouraged as far as possible to avoid direct vehicle entry into shop floor area.

29. Vehicle drivers or any external person entry on shop floor is strictly prohibited. Drivers should remain in truck cabin during at loading and unloading points. All documents to be handled through rear side security person.
30. Consumption & spitting of Gutka, Tobacco etc, is strictly prohibited in company premises.
31. Any employee not feeling well, or close family member reported with Covid-19 symptoms should immediately report to HR or functional Head. It is highly essential to safeguard other employee's health wellbeing.
32. Company Management reserve the right to modify, revised or take final decision on above instructions at any given point of time or as may be felt necessary.

The SOP revolves around safety for self, safe at home, safe for family, safe in transit, safety of colleagues, safety at workplace and safety for community.



THE BEST RUN 

Innovation at SAP

At SAP, innovation is more than just developing top - notch software - it's creating technologies that open up new possibilities. We provide a working environment that promotes free thinking, bold ideas, and collaboration. Of course, having the resources and expertise of a major global organisation helps too.

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>€3.6
spend on R&D



700
patents granted
and validated



28%
of employees
work in R&D



Industry 4.0 – India News

Airtel Partners with Nokia to Provide Cutting Edge Industry 4.0 Applications for Enterprises

The partnership of Airtel and Nokia will open the vast opportunity of Industry 4.0 revolution with private LTE for all the enterprises in India. Not only this, the merger will deliver an extensive private wireless portfolio which will come with high security, mission-critical reliability and broad coverage to cater the growing demand for a network which will support a high volume of data with low latency range along with the vast array of telecom portfolio of Bharti Airtel.

Source: <https://telecomtalk.info/airtel-partners-nokia-applications-enterprises/248679/>

Industry 4.0: Now manage your machines remotely

JCB India, the leading manufacturer and supplier of heavy construction machines, recently unveiled plans to invest Rs 650 crore in setting up a new plant in Vadodara, Gujarat. This will be aimed at increasing production to supply for global markets, making it a major exporter of heavy earth moving machinery. Along with this, it launched Livelink, a digital offering which will introduce a first of its kind OEM support for JCB's clients in India – a control room that will monitor the health of machines sold with the help of sensors and telemetry, help customers track their machines real time and use geo-fencing to prevent theft and illegal use of the machines

Source: <https://www.financialexpress.com/industry/technology/industry-4-0-now-manage-your-machines-remotely/1838207/>

Industry 4.0: Pune can be epicentre of fourth industrial revolution

Henkel Adhesives Technologies India is running a global pilot at its brand-new adhesive manufacturing facility in Pune – a smart factory – for implementing fourth industrial revolution (Industry 4.0). Bajaj Auto and Bharat Forge are investing heavily in specific areas of Industry 4.0 relevant to their industry. GE manufacturing plant in Chakan has become a model for Industry 4.0.

Source: <https://www.financialexpress.com/industry/industry-4-0-pune-can-be-epicentre-of-fourth-industrial-revolution/1865006/>

EVs, Ind 4.0 will make mechanical engineers hot

Mechanical engineering is often broken down into three subsidiary subjects - manufacturing, design and thermal. An engineer trained in thermal engineering has a good chance to excel in the electric vehicle industry, where the battery management system is extremely critical. Some electric vehicle manufacturers in the country have already started designing the circuit board of the battery, looking into the thermal management - how the heat is spread uniformly over the cells and also focusing on electrical safety.

Source: <https://timesofindia.indiatimes.com/business/india-business/evs-ind-4-0-will-make-mechanical-engineers-hot/articleshow/74685479.cms>



India not behind in Industrial technology, Siemens

India is not behind any other nation when it comes to using industrial and commercial technologies. The multi-year gap between available technology between India and other countries has ended. In an interview with Financial Express Online, Bhaskar Mandal, Head- Digital Industries, Siemens Limited says India, however, needs to bridge the skill gap within and across companies

Source: <https://www.financialexpress.com/industry/technology/india-is-not-behind-any-other-nation-in-terms-of-industrial-technology-says-siemens/1840179/>

Industry 4.0 – Global News

How IoT Could Transform the Business Models Of Essential Services

IoT technology seems to have penetrated every sector and geography imaginable, but there are still places that the hype has not yet reached. In the current climate of uncertainty and risk for vulnerable individuals, IoT technology could drastically improve essential services by offering a completely new way to deliver that service.

Source: <https://www.forbes.com/sites/charlestowersclark/2020/04/26/how-iot-could-transform-the-business-models-of-essential-services/#128c238d1055>

Using the Fourth Industrial Revolution to fight COVID-19 around the world

From artificial intelligence for medical diagnostics to mobile technology for data collection and contact tracing, technologies associated with the Fourth Industrial Revolution offer efficient and effective ways to cope with the speed, scope, and impact of the COVID-19 pandemic. But these technologies are far from evenly distributed around the world, and this leaves lagging countries and their vulnerable populations at a considerable disadvantage in their capacity to decrease the risk and slow the transmission of the disease.

Source: <https://www.brookings.edu/techstream/using-the-fourth-industrial-revolution-to-fight-covid-19-around-the-world/>

How digital infrastructure can help us through the COVID-19 crisis

In recent years, the world has witnessed the rise of SARS, Zika virus, Ebola and now COVID-19. Epidemics are a rising threat.

Cities across the world have made infrastructure innovation a priority to safeguard their physical systems so they can stay robust and antifragile during natural disasters such as earthquakes, tsunami and hurricanes. But pandemics have shown that these methods aren't enough when it comes to ensuring connectivity and accessing our society during biological disasters

Source: <https://www.weforum.org/agenda/2020/04/digital-infrastructure-public-health-crisis-covid-19/>

What can the Digital Transformation and IoT achieve for Agenda 2030?

Digital technologies can drive growth, connect people and help us protect the environment. At the same time, they can lead to market concentration, fuel precarious working conditions and consume vast amounts of energy. The Internet of Things (IoT) is a perfect example of this tension and embodies both the promise and the peril of digitalisation. Its emergence offers unique opportunities to achieve the Sustainable Development Goals (SDGs) and the European Green Deal, but policymakers need to be aware of the need for tailored policies and investments, if they want to maximise the benefits of the IoT revolution while mitigating the risks.

Source: <https://www.ceps.eu/ceps-publications/iot-4-sdgs/>

5G wireless networks leading fourth industrial revolution

Network providers around the globe are launching 5G networks that can connect the handful of available 5G-capable devices. Currently, very few devices are connected to these new networks, allowing providers to tout headline grabbing download speeds of 1 Gbps plus. That is up to ten times faster than the “superfast” broadband services households in the UK enjoy when they are with a major provider, which is around 50 to 100 Mbps to the home, which has to be shared with all the occupants, such as a data-hungry young family or even a group of students.

Source: <https://www.techradar.com/in/news/5g-wireless-networks-leading-fourth-industrial-revolution>

Why coronavirus will accelerate the fourth Industrial Revolution

The pandemic's silver lining is the chance to experiment with technologies and co-operative approaches across borders that could lead to safer, more sustainable and more inclusive global futures.

Source: <https://eiuperspectives.economist.com/financial-services/why-coronavirus-will-accelerate-fourth-industrial-revolution>

The key to manufacturing recovery and Industry 4.0 adoption: The advice of Henry Ford

There is a quote attributed to Henry Ford that I think holds the key to the future success of manufacturing. It may even change our thinking during the current crisis and provide the basis for successful recovery, digital transformation, and the adoption of Industry 4.0. And perhaps it can unlock significant value from an organization's legacy investments

Source: <https://www.thefuturefactory.com/blog/46>

Manufacturing IoT solutions "Meister Series"

The global manufacturing environment is currently entering an era of great innovation, as people are advocating for the concepts of "INDUSTRIE 4.0" and "Industrial Internet." This is a revolution in the manufacturing industry oriented toward the next generation. In addition to achieving higher productivity and quality than ever before by optimizing entire value chains in the manufacturing industry, it will be necessary to provide products and services with better usage value by knowing how individual customers use them. Toshiba offers the manufacturing IoT solutions "Meister Series" as ICT solutions to support this innovation.

Source: <https://www.reuters.com/brandfeatures/road-to-a-new-day/industrial-innovation>

