Intelligent Process Automation:The Next Generation Operating Model

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Abstract*:FourthIndustrialRevolution ,thegenerator of the smart factoriesis the current trend for automation and data exchange in technologieswhichincludeIoT, cyber physicalsystems, cloudcomputing and cognitive computing.This paperfocuses on the cognitive processingof differentindustrialprocesses.Over the whichrequiredhuman supervision and manual assistance whichthengraduallyupdated to RPA thatisRoboticProcess automationwithlesshuman assistance and lowcomplexity.Now the industry has been developedwith the Intelligence Process Automation(Artificial Intelligence)beingbetterthan the RDARobotic Desktop Automation and RPA sinceit has large learningdata sets and whichsimulates the humanwork force withautomated robotsyears automationindustry have developed in the market.Startingfrom the RDA, whichismonitoredthrough consoles.*

Keywords *–cognitive, Industry 4.0, IPA, RDA, RPA.*

I. INTRODUCTION

Automation in field of robotics is the current trend. The robotics industry have gone through various phase .industrial automation 4.0 is based on cyber and physical system[1]. These system is made up of smart machines, storage systems and production facilities capable of exchanging information, triggering actions and controlling each other independently and efficiently.This brings improvements to the industrial processes involved in manufacturing,material usage and supply chain..The Internet of Things is what enables objects and machines such as mobile phones and sensors to "communicate" with each other as well as human beings to work out solutions[2].
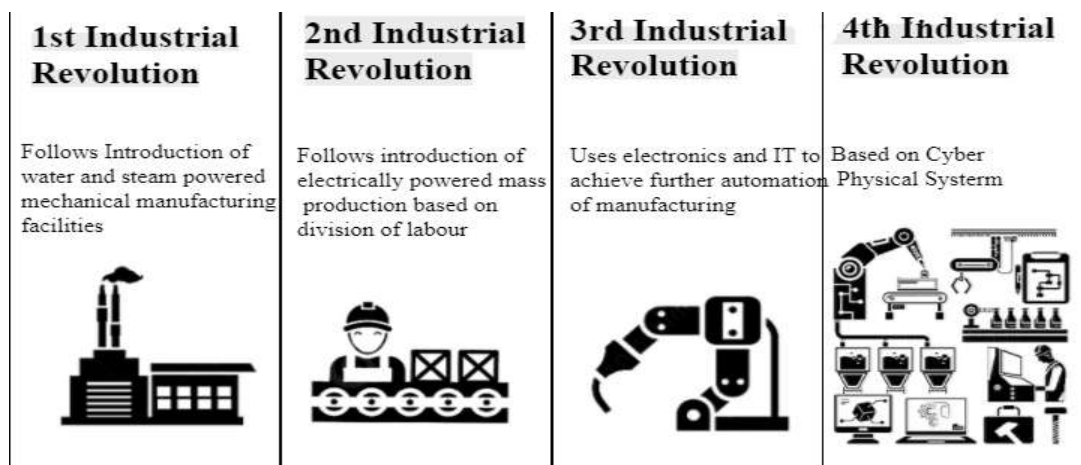

Fig .1 Industrial Automation

1.1 RDA(Robotic Desktop Application)

Revolution from RDA to RPA and RPA to IPA. The current automated robots are used for application specific purpose but in IPA an attempt in which a robot can be used in various application based on The environment.Remote Desktop Automation is a form of RPA software deployed locally on user machine whereby the software is initiated on demand to carry out an automated action[3].The software executes tasks by emulating the human user.Task operators can manage a significantly increased workload. Desktop Automation is simple to implement at relatively low cost, and can be a very simple way to deliver efficiency improvements where human workers can call automated routines on demand. In RDA a continuous human monitoring is required. RDA is not highly accurate system as the feedback type to change the process is of human type which is not a accurate type. hence there was a need to introduce RPA system[4].
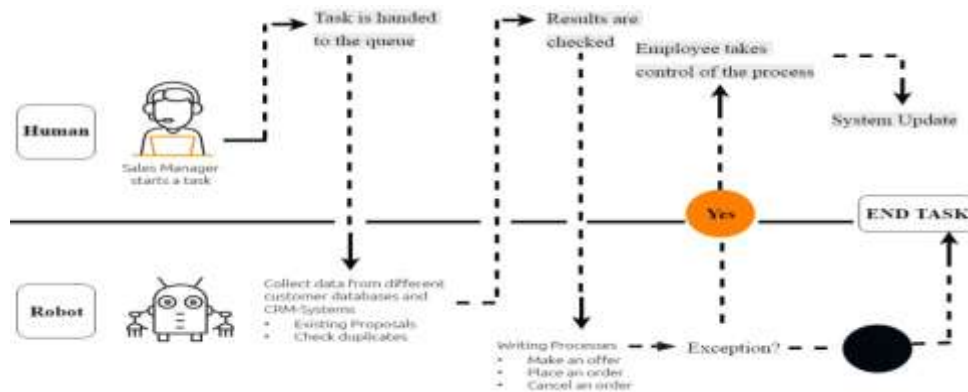
Fig. 2: Robotic Desktop Application

1.2 RPA (Robotic Process Automation)

RPA that is Robotic Process automation with less human assistance and low complexity. in Robotic Process Automation (RPA) there is an approach to remove human activity whereby automation software carries out tasks and activities in other applications and systems by interacting with them in the same way as a human –Typically this involves theuse of closed loop feedback system in which the feedback is the software type and no human intervention is required hence the changes done for required output for a process are highly accurate Hence RPA are more reliable than the RDA[5] . the cons of the RPA system is that that it can be used for only one type of application. To overcome thisIPA was introduced. In intelligent process automation the feedback is provided by the machine itself to get the desired output. This type of system is highly accurate and there is no need of human .this type of system include artificial intelligence

Machine learning, virtual workforce .hence this academic research will help us to design intelligent robotic

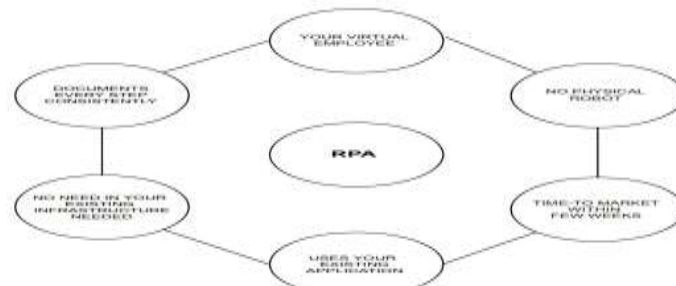systems and discusses the proposed criteria required toachieve an intelligent robotic system[6].

Fig.3: Robotic Process Automation

1.3 Intelligent Process Automation

IPA is an emerging set of new technologies that combines robotic process automation and machine learning. It is a business-process improvement and next-generation tools that assists the knowledge worker by removing repetitive, replicable, and routine tasks. And it can radically improve customer journeys by simplifying interactions and speeding up processes[7].IPA replicates the activity carried out by humans learns by itself to do them even better. AI and RPA should not be regarded as two separate technologies since both can be used in combination. When AI is incorporated into RPA it is referred to as cognitive robotics, which enables the robot to identify patterns, process natural language and learn. With IPA, robots can replace manual clicks (RPA), interpret text-heavy communications (NLG), make rule-based decisions that don't have to be preprogrammed (machine learning), offer customers suggestions (cognitive agents), and provide real-time tracking of handoffs between systems and people (smart workflows)[8].

IPA offers three types of automation:[9]
- "Systems That Do" for automation that replicate human actions to process information
- "Systems That Think" for process that apply judgment while doing work
- "Systems That Learn" for process that recognize patterns and apply logic to execute tasks

1.3.1 Following are different benefits of IPA:

- **Customer Satisfaction -** Services provided by the product can be relished by the customer.
- **Cost Reduction**   - Since the automation is the next gen, it reduces the cost in the market.
- **24 x 7 x 365**   - Would be in working condition all the time.
- **Flexibility**   - Can be adapted or implemented as per user requirement.
- **Time to Market**   - Early access to the market.
- **Talent Management**   - Workload can be segregated efficiently.
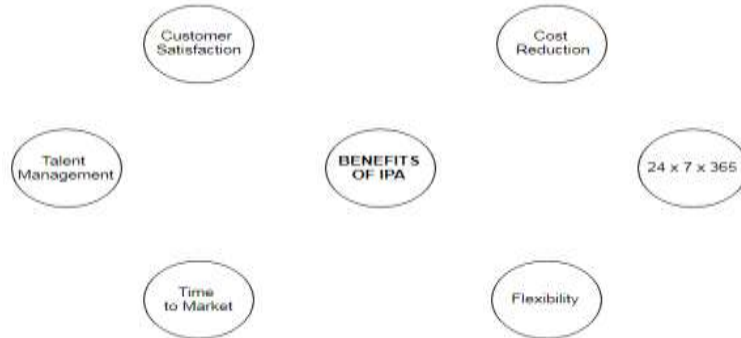

Fig 4. Benefits of IPA

II.   Architecture

An IPA is a system proposed in which the modeling is based on defining and evaluating the intelligent system. For designing high end robotics system modular robotics system are used .the design proposed here is based on facts that Transforming processes to increase agility and deliver great customer experiences. With intelligent automation, businesses operate faster, scale more efficiently and compete more effectively in the digital economy. There are three process types that are excellent candidates for IPA implementation: Data-entry procedures in workflow processes: such as entering data from claims documents into a claims management system, and invoice-processing functions[10].Data extraction from standard databases: for example, extracting customer information to file tax claims, and data migration activities from one system to another Routine .Decision-making processes: such as processing insurance claims, and banking transactions. Within the first three industrial revolutions, humans have created mechanical, electrical and information technology, which were aimed at improving productivity of industrial processes. The first industrial revolution improved efficiency through the use of hydropower, increased use of steam power and development of machine tools; the second industrial revolution brought electricity and mass production ; the third industrial revolution further accelerated automation using electronics and information technology, and now the fourth industrial revolution is emerging which is led by CPS technology to integrate the real world with the information age for future industrial development. Figure 1 displays the four stages of the industrial revolution.

Intelligent Process Automation offers two phases
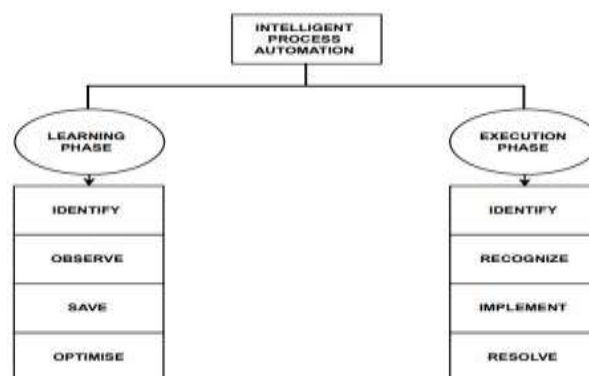- Learning phase
- Execution phase

Fig.5: Phases of IPA

III. Proposed Framework

The below figure show the proposed framework and research in the field of IPA system. IPA is composed of much small subdivisions. It has its helping hands such as robotics automation,cloud computing, data analysis, machine learning and artificial intelligence. These all types of services are a helping hand to the IPA.In the IPA field, developer first design a system which can solve a particular problem in case of RPA or a intelligent system which performs multiple task and solves many issue at a time or one by one.

The process defined by human operators goes through 3 phases
- Intelligent level
- Control and sensing level
- Execution level

3.1 Intelligent level

This level consist of plan and learn i.e. when a problem is defined the system or the human operator must plan how to solve the defined problem . The system must learn about the problem statement in the operation given and produce a well defined solution to it . The system must also design a feedback path for zero error system this is how an IPA must work. This level has two principles control and sensing ,and the execution level

3.2 Control and sensing level

The control and sensing part ,sense the input provided by the sensors at different level .The input provided by the user may be inaccurate hence , IPA control loop are used to avoid human errors .The IPA control loop not only corrects the output by feedback loop but also changes the input accordingly for errorless system.Thus the control loop and sensor are used as interference between human and system.

3.3 Execution level

This level defines the difference between the RPA and IPA. Here the actual automation is used .The robot or the system defines a set of instruction which run the process . It has two main components robot modeling and robot hardware. The modeling part enable to perform multitask operation and environment friendly nature of the robot. A hardwarecompatible with the designed software is the prime requirement. VariousSoC(system on chip) can be use as a hardware part like the microcontroller and microprocessor.
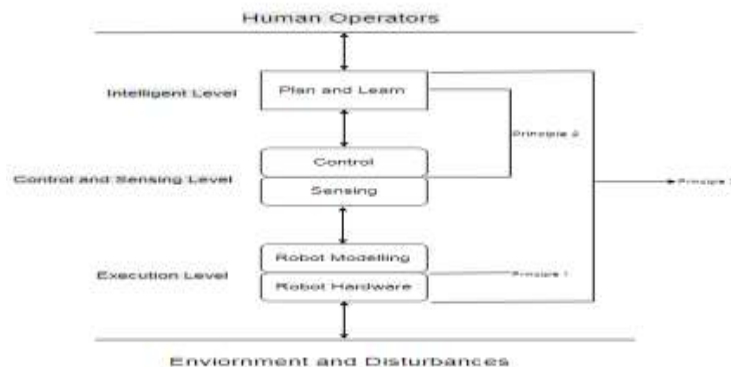

Fig.6 Pictorial Proposed Framework

IV. Conclusion

This paper provides major insights into the deployment of Intelligent Process Automation in the industrial sector. The deeper you imbed IPA, the more touch points it can add value to. This fundamentally is the reason for thinking of and treating IPA as a platform rather than a tool, and as a programme rather than a one-off limited intelligent application that gives a quick, but limited win on its business case. A tool, at the end of the day, is in the hands of an individual and as assisted (or attended) automation can give you some small gain, whereas an IPA platform represents an Enterprise capability, which, properly founded, the IT function supports, is comfortable with, and even leverages for its own purposes.

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