IV B.Tech.(IT) I Sem
Robotic Process Automation (RPA)

Unit-1 – Introduction to RPA

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Gartner Def of RPA

What is Robotic process automation? (1/2)

- RPA is the technology used for software tools that automate human tasks, which are manual, rule- based, or repetitive
- It is like a bot that performs such tasks at a much higher rate than a human alone
- The word 'Robot' in 'RPA' is not a physical robot but a virtual system that helps in automating the repetitive manual computing or business process tasks

What is Robotic process automation? (2/2)

- These RPA software bots never sleep and make zero mistakes, and can interact with in-house applications, websites, user portals, etc.

- They can log into applications, enter data, open emails and attachments, calculate and complete tasks, and then log out.

RPA

Robotic

An entity which has the capability to mimic human actions.

Process

A sequence of steps that lead to a meaningful activity of task is called a process.

Automation

Tasks that happen automatically (without human interaction)
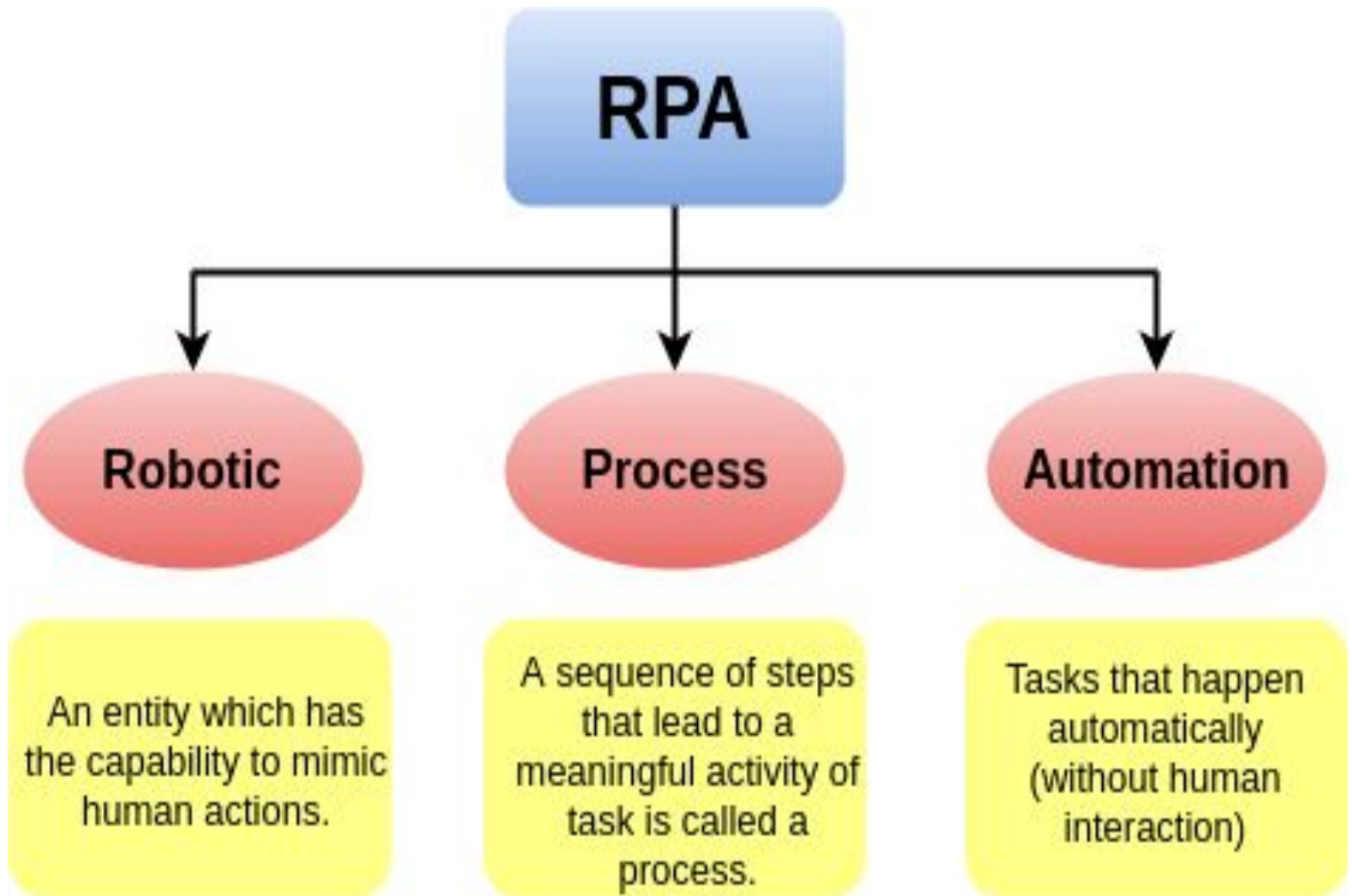
History of Automation (1/3)

- From PC Revolution emerged the key elements for RPA, which came about in the early 2000s.

- A big part of this was screen scraping, which is the automation of moving data among applications, which turned out to provide a nice boost to efficiency and effectiveness.

- But the nascent RPA market got scant attention. It was mostly perceived as low-tech and a commodity.

- Instead, investors and entrepreneurs in Silicon Valley focused their attention on the rapidly growing cloud market that was disrupting traditional IT systems

- Around 2012 or so, the RPA market hit an inflection point.

History of Automation (2/3)

There was a convergence of trends that made RPA inflection happen, such as the following:

- In the aftermath of the financial crisis, companies were looking for ways to lower their costs. Simply put, traditional technologies like ERP were reaching maturation. So companies needed to look for new drivers.

- Companies also realized they had to find ways to not be disrupted from technology companies. RPA was considered an easier and more cost-effective way to go digital.

- Some industries like banking were becoming more subject to regulation. In other words, there was a compelling need to find ways to lessen the paperwork and improve audit, security, and control.

History of Automation (3/3)

- RPA technology was starting to get more sophisticated and easier to use, allowing for higher ROI (return on investment).

- Large companies were starting to use RPA for mission-critical applications.

- Demographics were also key. As the millennials started to enter the workforce, they wanted more engaging work. They wanted careers, not jobs.

- Fast forward to today, **RPA is the fastest growing part of the software industry. According to Gartner, the spending on this technology jumped by 63% to $850 million in 2018 and is forecasted to reach $1.3 billion by 2019. Or consider the findings from Transparency Market Research. The firm projects that the global market for RPA will soar to $5 billion by 2020.**

Scope and Techniques of RPA

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Common techniques in RPA (1/5)

- The following techniques are often combined to automate end-to-end business processes, reduce manual effort, improve accuracy, and increase operational efficiency. RPA can be applied across various industries and functions, including finance, human resources, customer service, supply chain, and more.

Common techniques in RPA (2/5)

- **Screen Scraping**: This technique involves extracting data from the user interface of legacy or third- party applications. Screen scraping bots can read and interpret data displayed on screens and interact with these applications by mimicking human actions.

- **Workflow Automation:** RPA bots can automate complex business processes by executing a series of predefined steps. These bots can interact with multiple systems and applications, transfer data between them, and perform actions based on specific rules and conditions.

Common techniques in RPA (3/5)

- **Text and Data Extraction**: RPA bots can extract information from various unstructured or semi- structured sources, such as emails, documents, PDFs, websites, and databases. They can use techniques like Optical Character Recognition (OCR) to read and understand text, extract relevant data, and populate it into target systems.

- **Decision Making:** Bots can make decisions based on predefined rules or algorithms. By analyzing data, conditions, and triggers, they can determine the appropriate actions to take, such as approving or rejecting transactions, escalating issues, or applying specific business rules.

Common techniques in RPA (4/5)

- **Integration and API Automation:** RPA bots can integrate with different applications, systems, databases, and APIs to exchange data and trigger actions. They can authenticate, connect, and interact with these systems to perform tasks like data synchronization, data entry, and data retrieval.

- **Exception Handling:** Bots can handle exceptions or errors that occur during the automation process. They can log errors, notify stakeholders, and perform predefined actions to resolve or escalate issues. Exception handling allows bots to handle variations in data or unexpected scenarios.

Common techniques in RPA (5/5)

- **Cognitive Automation:** RPA can be enhanced with cognitive technologies like natural language processing, machine learning, and artificial intelligence. This enables bots to understand and process unstructured data, learn from patterns, make predictions, and perform more complex tasks.

- **Orchestrators and Monitoring:** RPA platforms often include centralized control panels or orchestrators. These tools manage and monitor the execution of bots, schedule tasks, allocate resources, track performance, and provide analytics and reporting capabilities.

What can RPA do?

- Robotic process automation (RPA) is a software technology that makes it easy to build, deploy, and manage software robots that emulate human's actions interacting with digital systems and software. Just like people, software robots can do things like understand what's on a screen, complete the right keystrokes, navigate systems, identify and extract data, and perform a wide range of defined actions.

Why RPA ?

- Robotic Process Automation is economically capable as compared to any other automation solutions.

- It is the new buzz word in the IT industry. It has shifted the traditional way of doing the business task manually into an automatic task within an organization.

- RPA technology uses bots that interact with web applications, web sites, excel worksheets, and emails to automate the tasks just like a human.

Benefits of RPA (1/4)

- RPA is also relatively easy for a person to use since there is no requirement for understanding complex coding.

  - **The bottom line:** The people implementing RPA will get to their objectives quicker and the IT department will have more time to devote to higher priority items. This is important as there remains a trend of less investment in IT.

  - **Compliance:** Just one violation of a government regulation can have a serious adverse impact on a company. It could even be a threat to its very existence.

Benefits of RPA (2/4)

- **Customer Service:** Nowadays, people want quick and accurate responses from their companies. But this is difficult to provide, especially when a company is overwhelmed from incoming contacts. But this is where RPA can make a big difference. The bots are programmed to make sure that all the necessary steps are taken – at scale. The result is often an increase in customer satisfaction metrics, like the Net Promoter Score (NPS).

- **Employee Satisfaction:** Yes, your team should also enjoy the benefits of RPA. After all, it means that they do not have to spend their valuable time on tedious activities. The result may be less turnover and higher productivity.

Benefits of RPA (3/4)

- **Wide Application:** It's common for an enterprise application to focus on a certain part of a company's departments or functions. But RPA is wide. It can be used for virtually any part of a company, such as legal, finance, HR, marketing, sales and so on.

- **Data Quality:** It should be greatly improved as there will be less chance of human error. In fact, there will probably be much more data because of the scalability of the automation. In other words, the datasets for analytics and AI will be more robust and useful.

Benefits of RPA (4/4)

- **Digital Transformation:** This is a major priority for CEOs. But many companies have legacy systems that would be expensive to replace or integrate. However, RPA is an approach that can help with this process, which is often quicker and less costly.

- **Scalability:** If there is a sudden jump in demand, it can be extremely difficult to hire new employees. But RPA can be a solution. It is much cheaper and faster to ramp up new bots to meet the demand.

Components of RPA

- Any Robotics process automation platform provides some basic components, which together build the platform.

- The following are the basic or core components of RPA:

  - Recorder
  - Development Studio
  - Plugin/Extension
  - Bot Runner
  - Control Center

RPA Components
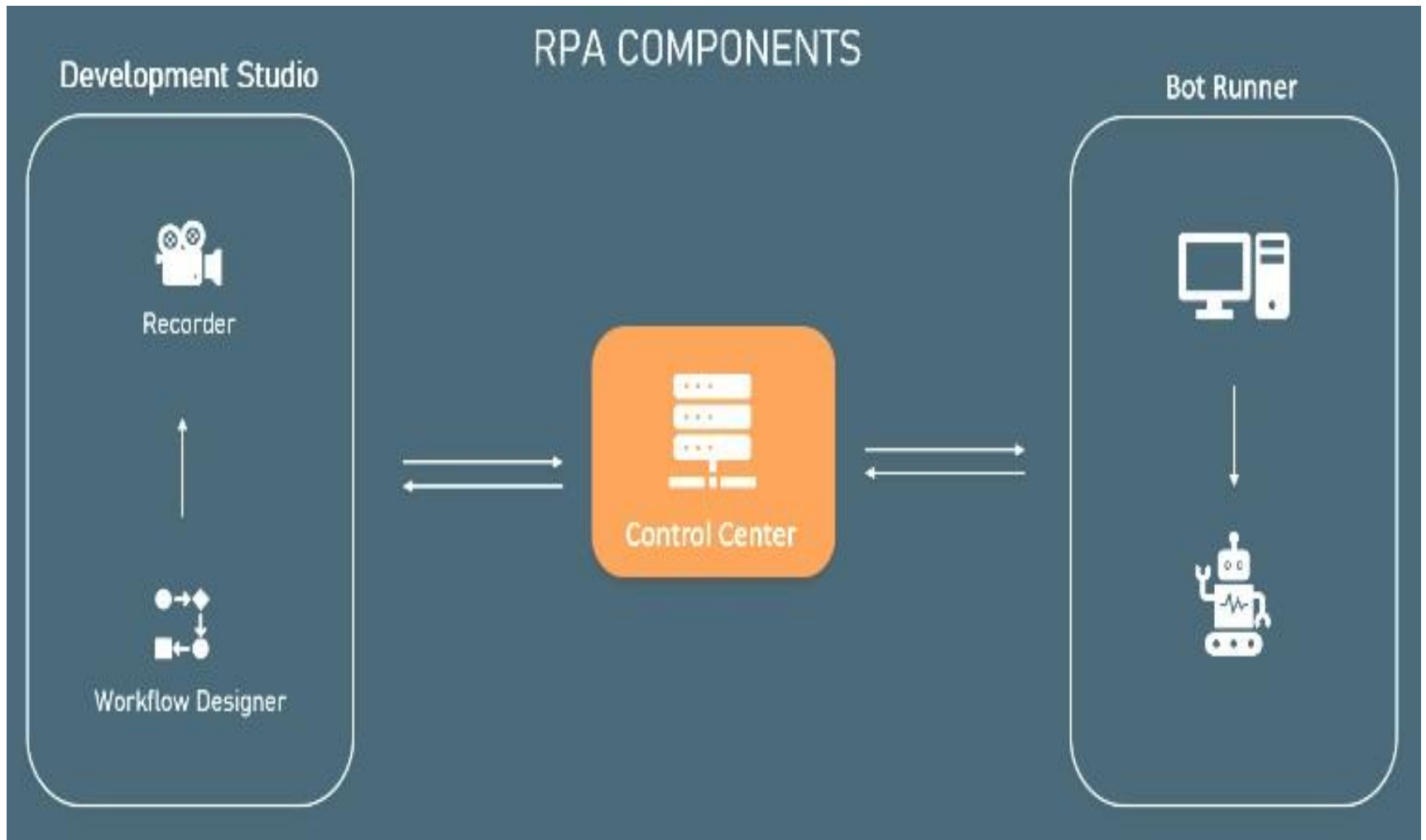
1. Recorder

- The recorder is the part of the development studio that developers use to configure the Robots.

- It is like the macro recorder in Excel, the bot recorder in any platform, records steps.

- It records mouse and keyboard movements on the UI and this recording can be replayed to do the same steps again and again.

- This enables rapid automation. This component has played a very big role in the popularity of RPA.

2. Development Studio

- The development studio is used by developers to create Robot configuration or train the Robots.

- Using the development studio, a set of instructions and decision-making logic is coded for Robots to execute.

- Some platforms provide flow-charting capabilities such as Visio, so it becomes very easy to plot steps in a process, whereas some other platforms require coding.

- In most studios, in order to do commercial development, developers need to have a fair amount of knowledge of programming,

Example, loops, if else, variable assignment, and so on.

3. Extensions and Plugins

- Most platforms offer many plugins and extensions to ease the development and running of bots.
- In many applications, such as Java SAP, it is not easy to individually identify controls of the UI through traditional techniques.
- RPA vendors have developed plugins and extensions to help with these issues.

4. Bot Runner

- This is also referred to as the Robot, other components make it run.

5. Control Center

- The objective of the control room is to provide Robot management capabilities.

- It monitors and controls a Robot's operation in a network.

- It can be used to start/stop Robots, make schedules for them, maintain and publish code, redeploy Robots to different tasks, and manage licenses and credentials.

RPA Tools

1. Automation Anywhere

- Automation Anywhere helps to automate and manage business processes for companies. They focus on RPA, cognitive data (machine learning and natural language processing), and business analytics. Their bots are capable of handling both structured as well as unstructured data.

- The system has three basic components:
  - A development client for the creation of a bot
  - A runtime environment for the deployment of a bot
  - A centralized command system for handling multiple bots, analyzing their performance.

2. Blue Prism

- Blue Prism aims to provide automation that enterprises can use according to their needs quickly and effectively
- Create a virtual workforce to increase automation and accuracy
- Blue Prism aims to do this by providing automation that is scalable, configurable, and centrally managed.
- It sells its software through its partners, some of which are Accenture, Capgemini, Deloitte, Digital Workforce Nordic, HPE, HCL, IBM, TCS, Tech Mahindra, Thoughtonomy, and Wipro.

3. UiPath

- UiPath is an RPA technology vendor who designs and delivers software that helps automate businesses.
- UiPath is a network for integrating software applications and business operations
- The RPA platform consists of three parts:
  - UiPath Studio to design the processes
  - UiPath Robot to automate tasks designed in UiPath Studio
  - UiPath Orchestrator to run and manage the processes

4. WorkFusion

- Work Fusion offers automation that is based on RPA and machine learning.

- It delivers software as a solution for automating high volume data.

- Work Fusion enables man and machine to work in tandem while managing, optimizing, or automating tasks.

5. Thoughtonomy

- Thoughtonomy delivers software that helps automate business and IT processes.
- It uses Blue Prism and other automation software and customizes it

6. KOFAX

- Kofax's RPA platform is capable of automating and delivering processes that are repetitive and rule-based.

- It uses Robots for extracting and consolidating information.

- The software platform consists of a management console to deploy and manage bots, Robot performance, and a monitoring system.

- This software can also group together high priority tasks that should be completed first by the Robot during times of high workload. Kofax's software, however, doesn't have machine learning.

RPA vs. Automation (1/4)

- Robotic Process Automation (RPA) is a type of software that automates a large number of repetitive and rule-based processes. RPA solutions enable users to create and deploy software robots that can perform human-like tasks. These tools also make use of pre-defined activities and business rules to perform a combination of tasks, transactions, and processes across software systems autonomously. RPA can achieve the intended output without the need for human intervention.

RPA vs. Automation (2/4)

- Traditional Automation, on the other hand, is the automation of any repetitive processes. It combines database and infrastructure application integration. It requires very little human interaction.

RPA vs. Automation (3/4)

Robotic Process Automation	Traditional Automation
It does not require any modification in the existing systems or infrastructure.	It requires certain customizations in the existing IT infrastructure.
It can automate the repetitive, rule-based tasks. It mimics human actions to complete the tasks.	It does not include the ability to mimic human actions. It only executes the pre-defined programmatic instructions.
A user can start using RPA without knowing any programming. RPA allows automation with easy to use flowchart diagram. Therefore, users do not require to remember language syntax and scripting. They only need to focus on the functionalities given under automation.	Users are required to have the programming skills to use Traditional Automation for automating functionalities. Programming language requirement depends upon the type of automation tool. Users need to remember language syntax and scripting.
RPA provides the easy and quick implementation. It requires less amount of time as RPA software is process-driven.	Traditional Automation can take several months for implementation. Test designing and feasibility studies take a longer time.
RPA allows users to assign work to hundreds or thousands of virtual machines that can perform the allotted tasks without the requirement of physical machines.	On the other hand, Traditional Automation uses different programming techniques to achieve parallel execution or scalability. Physical machines are required to perform parallel execution. Those physical machines should have the capability of providing good processing speed.

RPA vs. Automation (4/4)

Robotic Process Automation	Traditional Automation
RPA can be configured to meet the requirements of a particular user. It can be combined with several applications (e.g., calendar, e-mail, ERP, CRM, etc.) to synchronize information and create automated replies.	When it comes to customization, Traditional Automation is considered as a critical and complex technology compared to the RPA. The integration of different systems with Traditional Automation is a challenge due to the limitations of APIs.
RPA can be a little costly in the initial phase. But it saves a lot of time, money, and effort in the long run.	Traditional Automation is cheaper in the initial phase. However, it costs a lot more in the long run.
RPA is a more efficient option since it can make improvements instantly.	Traditional Automation requires more time, effort, and a considerable workforce.
With RPA, users can easily update any business flow due to its simplicity.	On the other hand, Traditional Automation may force users to change various scripts. Hence, maintenance and updation of this technology can be tough.

The future of automation (1/2)

- The buzzword today is the Fourth Industrial Revolution-the current age where technology is embedded within societies and even the human body-be it Robotics, 3D printing, nanotechnology, Internet of Things, or autonomous vehicles. This will fundamentally change the way we live, work, and interact with one another.

- Technological innovation has reached a stage where machines have now entered the realm of what was once considered exclusively human. For these reasons, there is a wide section of people who fear this age of Robots.

- There are various advantages of automation today; there are also fears surrounding its advancement, which are not completely unfounded. This time automation is capable of impacting a wide range of disciplines. Thus, unlike in the past where only blue collar jobs were at risk of being replaced by machines, this time even white collar jobs are believed to be at risk.

The future of automation (2/2)

- While this is not untrue, reports suggest that only around 5% of the total jobs may be totally replaced by automation. For other jobs, automation will only replace a part of the job and not completely take over.

- There are, of course, those jobs in the 5% category that run the risk of being completely automated. These are the jobs that are routine, repetitive, and predictable. A few Examples: telemarketing, data entry operation, clerical work, retail sales, cashiers, toll booth operators, and fast food jobs.

- However, like in the past, people should be able to find a way to adapt to the changes. With each generation, humans become smarter, more adaptable to change, and also progressive.

- Also, with automation mostly taking over routine and tedious tasks, humans are provided the opportunity to make better use of their capabilities-be it reasoning, emotional intelligence, or their creativity.

- What we can do is not fret over the inevitable rather prepare for it. One way of doing so is to start changing the pattern of education. The next generation should be taught how to recognize and adapt to changes quickly. An important aspect of their education should be to learn how to learn

Thank you