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NSE Stock Monitoring using Robotic Process Automation

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Abstract: ***The core objective of the project is to automate the backend office work of monitoring stocks daily. The project uses "Robotic Process Automation" to download the daily stock values from NSE website, feed the data into an Excel Sheet and send it to the required recipient through E-mail. Software for robotic process automation (RPA) is designed to perform basic tasks across applications just like human workers. A process with multiple steps and applications is taught to the software robot, such as taking received forms, sending a receipt note, verifying the completeness of the document, uploading the form in a folder, and updating a spreadsheet with the form name, the date submitted, etc. Like deep learning, with some support from programmers, the software robots used in robotic process automation are programmed by the employees to do the tasks in a specific workflow. The software is not learning on its own or trying to adapt new efficiencies or new insights such as tools for enterprise resource management (ERM). RPA acts as a remote worker assistant by clearing up the burdensome, simple tasks that eat up part of the day of each office worker.***

Index Terms: *Robotic Process Automation; NSE; Enterprise Resource Management (ERM) software.*

I. INTRODUCTION

Robotic process automation (or RPA) is an evolving type of business process automation technology based on the concept of automated robots or AI employees. " A pre-configured software instance that uses business rules and pre-defined operation choreography to complete the autonomous execution of a combination of procedures, operations, transactions and tasks in one or more unrelated software systems to produce a human exception management outcome or service " (IEEE Corporate Advisory Group 2017). These instances of preconfigured software reproduce the work done by humans and are called robots, or robots of software. In short, RPA robots automate human tasks. Robotic process automation (RPA) uses state-of - the-art software systems to manage highly structured, routine and repetitive computer tasks automatically. A robot can take the wheel and get the job done for tasks that are largely driven by rules, schedules, or events. In fact, typical back office staff spend up to 80% of their day on such mundane activities. Such employees fill in paperwork, conduct routine calculations, and process orders all items that are important to customer satisfaction but boring to employees.

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RPA converts these systems to a robotic workforce. This staff is efficient and boredom-friendly and safe. It can also be much more efficiently organized than a human workforce. RPA can do almost any complex rule-based work and can do so by communicating with any application software or website. It is a digital link to the computer user interface's human world. Which kinds of system processes can be automated? You're naming it. If it can be done by a human, a robot can do it in almost the same way. RPA is not a replacement for the workers of human customer service. It is suitable for tasks that do not require human interaction — tasks that are often considered unattended tasks. Most tasks require a human connection, but in many situations it is also possible to automate at least part of the work.

II. EXISTING SYSTEM

Literature Survey

The concept was extracted from the core content of IT Function and Robotic Process Automation from LSE, Robotic Process Automation: Dynamic Roadmap for Successful Implementation from SKEMANN, Robotic Process Automation: The Next Transformation Lever for Shared Services from UMSL and Robotic Process Automation for Auditing. Journal of Emerging Technologies in Accounting from IEEE .A typical company is operating its activities using several and disconnected IT systems. While business process adjustments, these IT structures are not changed frequently due to uncertainty issues of budget, pacing, and implementation. Therefore, the business process does not represent the IT system's defined technical process. Human staff were employed to fill the gap between systems and processes to resolve this technological and organizational debt. Example: A company has made improvements to the Sales process, allowing a compulsory 50 percent advance to validate the product's reservation. This is not yet established in the IT program, however. A human worker will only have to manually check the details of the invoice and payment and process the order if a 50% advance is made. The issue? — Men. A organization would need to hire new employees or prepare existing employees to model the IT system and business process with any improvement in the business process. Both solutions take both time and money. However, with any successful business process shift, recruiting or re-training will also be required.

III. OUR PROPOSAL AND CONTRIBUTIONS

A. RPA AND IMPLEMENTATION METHODOLOGY

We can deploy virtual workers with robotic automation that mimic human workers. In the case of a process change,

a change in some lines of software code is always faster and cheaper than hundreds of employees being retrained.
Here are some reasons for the advantage of Robotics Process Automation
• A human can work 8 hours a day on average, while robots can work 24 hours a day without any fatigue.
• The average human productivity is 60% with few errors compared to the productivity of Robot, which is 100% without errors.
Robots handle multiple tasks very well compared to a human being.

➢ **Planning**

You need to define processes that you want to automate in this phase. The following guide will help determine the appropriate procedure

- Manual and routine procedures should be used. The process must be Rule-based.
- The input data should be in electronic format and must be readable.
- The existing System must be used as it is with no changes.

Next, steps in planning phase are

- Setup project team, finalize implementation timelines and approach.
- Agree on solution design for performing RPA processes.
- Identify the logging mechanism to find problems with running bots.
- Definition of a clear roadmap to scale up the implementation of RPA.

➢ **Development**

You begin to develop the automation workflows as per decided plan in this process. The implementation is simple, being directed by the wizard.

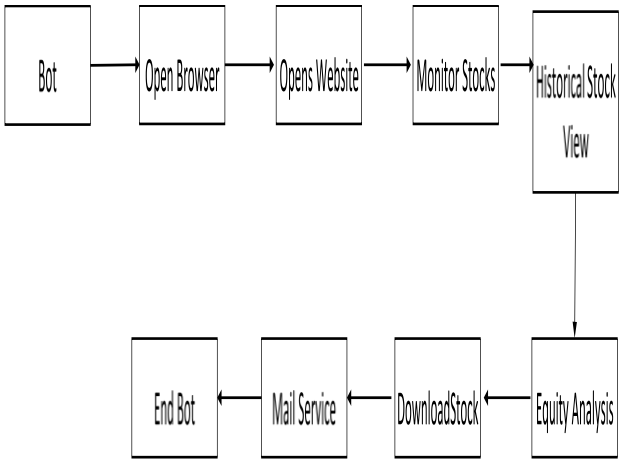
➢ **Testing**

In this step, you run test cycles to identify and correct defects in-scope automation.

➢ **Support & Maintenance**

Provide continuous support after living and assist in the prompt resolution of defects. Follow general maintenance guidelines with business and IT support team roles and responsibilities.

B. PROPOSED TECHNIQUE



The project focuses on the idea of automating one of the backend office work using RPA. The task taken here is to download the Equities Historical Record of the firm from the list of NIFTY50 displayed on the NSE India website daily on a specified time and mail it to the intended recipients who needs to analyze the data daily. The intended recipient or the target person who need to view the Equity record of the top firm from the NIFTY50 list of the NSE India website must do the process manually or must hire someone in the back office to complete the task, which will cost time and hiring charges if he employs someone to finish the process. The Equities Record of the top firm on the NIFTY50 list is required to analyze the data of the company, make decisions, and plan their next move by other concerned firms that are competitors to top firm on the list. This Equity Record of the top firm on the list must be analyzed on the opening time of the stock market daily.
Hence it is a manual, repetitive, rule based process where the data are in electronic format and readable. It is also possible to do the manual process using RPA as it is without any adjustment. Using "Robotic Process Automation" a bot is deployed to download the daily Equity stock values of the top firm from the NIFTY50 list of the NSE website, send it to the required recipient through E-mail.

C. ADVANTAGES OF THE PROPOSED SYSTEM

- Huge process numbers can be quickly automated.
- Price is significantly reduced as the RPA carries out repetitive tasks and saves valuable time and resources.
- You don't need programming skills to set up a mobile robot. Therefore, any non-technical staff may set up a bot to automate the process or even record their measures.
- Robotic process automation supports and allows all standard, error-free auditing processes.
- The robotic program will easily model the automation process and deploy it. The defects are tracked for each test case story and the sprint.
- Fast, smooth Build & Release Management
- Real-time detection of bug / defect discovery
- No human business means there is no need for training time.
- The robots of software are not getting tired. It increases, which increases the scalability.

IV. IV TOOL REQUIRED

A. NET FRAMEWORK

.NET Framework (pronounced as "dot net") is a Microsoft-developed software framework that mostly runs on Microsoft Windows. It includes a large class library called Framework Class Library (FCL) and provides interoperability of languages (each language can use code written in other languages) across multiple languages. Programs written for. NET Framework run in a software environment called Common Language Runtime (CLR), a virtual application machine that provides services such as protection, memory management, and exception handling. Computer code written using. NET Framework is referred to as "controlled code." The .NET Framework is made up of FCL and CLR.

B. APPLICATION PROGRAMMING INTERFACE (API)

An API is a set of subroutine definitions, communication protocols, and software building tools in computer programming.

It is a set of clearly defined methods of communication between different components in general terms. A strong API makes it easier to create a computer program by supplying all the building blocks that the programmer will then bring together. A web-based system, operating system, database system, computer hardware, or software library may have an API. An API specification can take many forms, but it often includes routine, data structure, object classes, variables, or remote calls specifications. Examples of various forms of APIs are POSIX, Windows API and ASPI. Usually, API documentation is provided to facilitate the use and implementation.

[1] REMOTE API

Remote APIs enable developers to access remote resources through protocols, common communication standards that allow the collaboration of different technologies, regardless of language or platform. The Java Database Connectivity API, for example, allows developers to query several different types of databases with the same set of functions, while the Java Remote Method Invocation API uses the Java Remote Method Protocol to allow invocation of functions that work remotely but appear local to the developer.

Remote APIs are therefore useful in preserving object abstraction in object-oriented programming; a method call, executed locally on a proxy object, invokes the appropriate method on the remote object using the remote protocol, and acquires the result to be used locally as the return value. A shift to the proxy object will also result in a corresponding change to the remote object.

[2] WEB API

Web APIs are specified interfaces through which a company communicates with applications using its services, which is also a Service Level Agreement (SLA) to designate the functional provider and disclose the service path or URL for its users of the API. An API approach is an architectural approach that focuses on offering an user interface to a set of services for various applications that serve different types of consumers.

An API is typically defined as a set of specifications when used in the context of web development, such as Hypertext Transfer Protocol (HTTP) request messages, along with a description of the response message structure, usually in the format of Extensible Markup Language (XML) or JavaScript Object Notation (JSON). An example might be a shipping company API that can be applied to an eCommerce-focused website to enable the purchasing of shipping services and automatically provide current shipping rates without the site developer having to enter the shipper's rate table in a web database. Although "internet API" has traditionally been practically synonymous with web service, the recent trend (the so-called Internet 2.0) has moved from Simple Object Access Protocol (SOAP)-based web services and service-oriented architecture (SOA) to more direct web resources and resource-oriented architecture (ROA) representational state transfer (REST) style. Part of this pattern is linked to the Resource Description Framework (RDF) web-based ontology engineering technology movement.

[3] WORKFLOW DESIGNER

UiPath Workflow Designer uses flowcharts and diagrams to provide a visual way of setting up automation. This allows you to create a workflow to help you model your business processes. They are a great way of setting up automation with little or no programming knowledge. Each activity process is represented by boxes and shapes. The arrow indicates the execution order and the orange triangle helps you to branch the process according to different inputs.

[4] ACTIVITIES

An Event is an activity that you can add to your workflow, such as pressing the OK button or typing a text in an input box. There is an event box on the left panel. By dragging it to the designer workspace, an action is applied to the workflow. Using the Record button is another way to add activities to your workflow. It automatically adds activities based on the actions you took during the recording of your desktop apps.

UipathROBOT - Executes, as an individual, the processes developed in Studio. Robots can operate unattended (run in any environment, whether virtual or not, without human supervision) or as assistants (the process is triggered by a human).

UiPATHORCHESTRATOR - A web application that allows you to deploy, schedule, track and manage robots and processes while centralized work queues allow business exception handling.

[5] WORKFLOW TYPES

In Studio, there are multiple types of workflows (sequences, flowcharts and transactional business processes) that help you build your automation workflow according to your requirements.

You need behaviors (actions you use to automate apps, such as clicking and typing) to create such workflows. Over 300 of these activities exist, allowing you to communicate with web browsers, desktop applications, PDFs, images, databases, terminals, Excel spreadsheets, email accounts and many others, while you can easily create HTTP and SOAP requests as well.

[6] RECORDER FUNCTIONALITY

Using the recording function is the best way to create workflows. There are four types of recordings: Standard, Mobile, Cloud and Citrix. The first two will help you simplify desktop applications, while the others allow you to handle web applications and virtual environments properly.

[7] Variables and .net functions

You can store a value with a variable, but only of a certain kind. In addition to these, you can also use the. Net functions to boost the automation, for example. Trim that eliminates the spaces from a string's beginning and end, or. To String that converts a particular type of variable into a string.

[8] Robots and Orchestrator

Robots, the executors of UiPath, can work simultaneously with a wide number of applications. Orchestrator, the puzzle's final piece, is used to manage multiple robots that have been deployed.

This form of environment is usually found in large enterprises, many business processes need to be automated. The first thing you need to do is to register your Robot(s) in this web application. After that, in an atmosphere you need to put them together.
Workflows published on this site have to be connected to an environment, and you start executing from there: either right now or on a custom schedule.
You may run a process on one or more robots, a number of them listed, or on all the robots grouped in an area.

[9] Assets and queues

Since robots may need to share information, Orchestrator, assets adds a special type of variables. These allow you to store information (including credentials) in the database of the web app, making it easy to change a value used in multiple processes and access multiple robots. UiPath also uses work queues to distribute the load between multiple robots of a transaction process. They can be scheduled to start before or after a certain date, and it is possible to view detailed information in each queue item.

[10] Logs, audits, alerts and others

You can quickly see how the robots worked, what tasks were done or failed in the Logs tab. Therefore, each phase taken by the user can be audited, and notifications are sent by email to all those with the permissions needed.
In addition to other nice features such as importing users from an Active Directory community, separating automation processes between teams across multiple tenants, and presenting information in tidy charts, roles management is also available.

Control flow

Control flow is a term referring to the order in which specific actions are taken. You can do this in UiPath through the activities that you drop to your workflow, if ... Else or For every statement and carefully placed loops. Use of loops: Loops are structures used to automate repetitive tasks. By connecting a certain point in our workflow to an eariler execution, the simplest types of loops can be created in flowcharts. There are different actions (or containers) in series that replicate the activity inside the segment of the body. While the While and Do While loops operate by repeating a series of body actions while the condition defined is valid.
While - If the criterion is met, the body's collection of acts will be performed.
Do While - The actions will be executed and the actions will be executed again if the condition is met.
The For Each loop operates by iterating through a list of items, one object at a time, and performing some actions in the action's body.

Data manipulation

Both types of data can be stored in variables, and there are several types of variable that you can use in Studio.
They can be classified into 3 types:

- Scalar - Characters, Booleans or Numbers
- Collections - Arrays, Lists, Strings - are a collection of characters, and Dictionaries, which are used when extracting data from Orchestrator queues.
- Tables - are two dimensional structures that hold data indexed by rows and columns.

UiPath Studio also has a unique variable, the Generic Value variable, designed to make it easier to use basic activities. This type of variable can represent basic data types, including text, numbers, and date / time.

User interface automation

You or the robot take any direct actions on the program or web page you are automating: tapping, scrolling, keyboard shortcuts, etc. Input activities are those that allow you to extract information for further processing from an app and into Studio.

[11] Input methods:

- Standard-the mouse and keyboard drivers are used to simulate human activity.
- Simulate Form / Press-it's the fastest and works in the background, but it doesn't support shortcuts. Uses the target device technology to simulate the form or press.
- Window Messages-converts all text to a lower case, it is not able to empty a field before writing it, and it is not very fast.

[12] Output methods:

- Fulltext is the default method, and for most cases it is the best method. It's quick, precise, and in the background it works.
- The Native approach has the advantage of collecting word data, such as each word or character's screen coordinates.
- OCR - OCR technology is usually not 100% accurate, as you may know, but it works as a last resort in a scenario where none of the other direct approaches give us the desired results.

Selectors

Selectors are an essential part of the automation of UiPath Studio and UI in general. Learning how to produce and use accurate selectors helps you build reliable processes.

- User interfaces and HTML web pages are built using a set of containers that are nestled inside each other. These attributes are stored by selectors in the form of an XML fragment so that a particular entity can be found from a window or document.
- Selectors are generated automatically by Studio most of the time and do not require any additional input from you, especially if the applications you are trying to automate have a static user interface.
- If these are no longer enough, you have to change them manually. This can be achieved by an advanced tool called UiExplorer in Studio. This helps you to communicate with objects of the UI and creates selectors automatically. More importantly, it helps you to explore all the UI properties, tags and values and make selector changes. For example, to dynamically modify values, you can include or exclude certain attributes or add wildcards.

Mail automation

From an RPA perspective, two situations for email interactions have been identified:

1. Input of a Process
- Names and IDs coming in subject or body
- Input files coming as attachments (.xls, .pdf)

2. Output of a Process
- Progress reports to managers
- Exception alerts

C. ATOM EDITOR

Atom is a free, open-source text and source code editor for Windows MacOS, Linux, and Microsoft with plug-in support written in Node.js and GitControl embedded, developed by GitHub. Atom is a web technology-built software application. Most of the extending packages have licenses for free software and are built and maintained by the community. Atom is based on Electron (formerly known as Atom Shell), a system that uses Chromium and Node.js to allow cross-platform desktop applications. It's written in and less in the Coffee Word. It could be used as an Integrated Development Environment (IDE) until in December 2018 the feature was ' retired'.' Atom was released as version 1.0 from beta on June 25, 2015. The creators call it a "the 21st century hackable text editor". Like most other configurable text editors, Atom enables users to install packages and themes from third parties to customize the editor's features and looks. Packages can be enabled, controlled and released through the package manager apm of Atom.

V. ALGORITHM

A. ALGORITHM

STEP 1 :'RPA Bot' is triggered.
STEP 2 : Bot starts the process and the default web browser is started.
STEP 3 : Google Search Engine is launched. The Search Engine's Text box is searched for "NSE Stocks" and the search results are displayed after the "Google Search" button is clicked
STEP 4 : The predefined keywords are matched with displayed website names in the search result and the most relevant "https://www.nseindia.com/website is opened in the browser.
STEP 5 : The Live Market→ Live Watch → Equity Stock page is opened.
STEP 6 : The equity page of the firm on the top of the Nifty50 is opened.
STEP 7 : The Equities Historical data is downloaded and saved in the assigned folder.
STEP 8 : The downloaded file is E-mailed to the assigned recipients through Google mail.
STEP 9 : The bot checks whether the process is completed or not.
STEP 10 : The bot is turned off and waits for the next trigger to start the process again.

B. FLOWCHART:

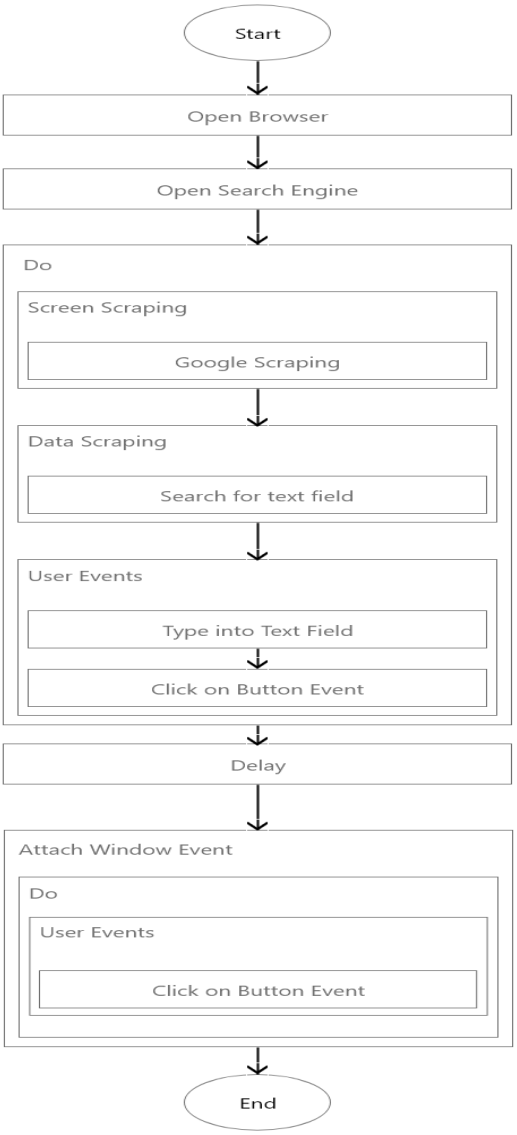
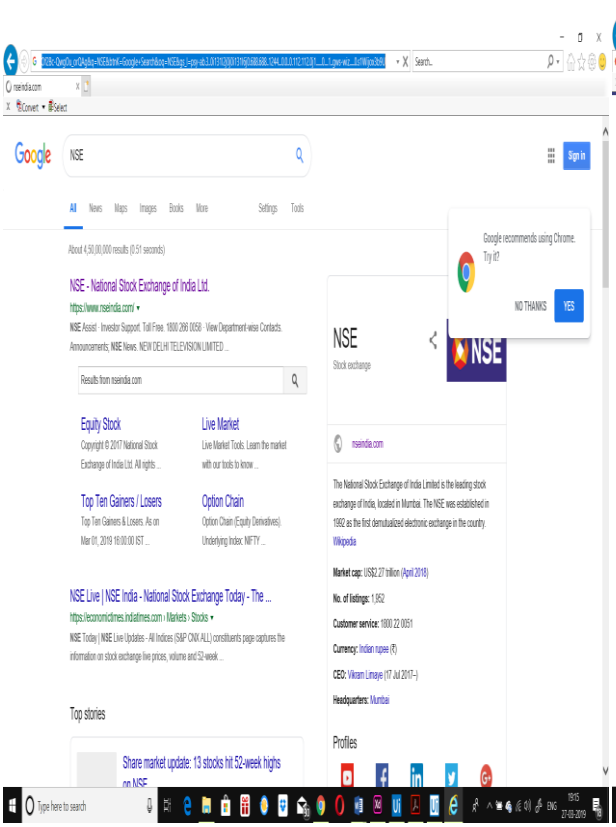
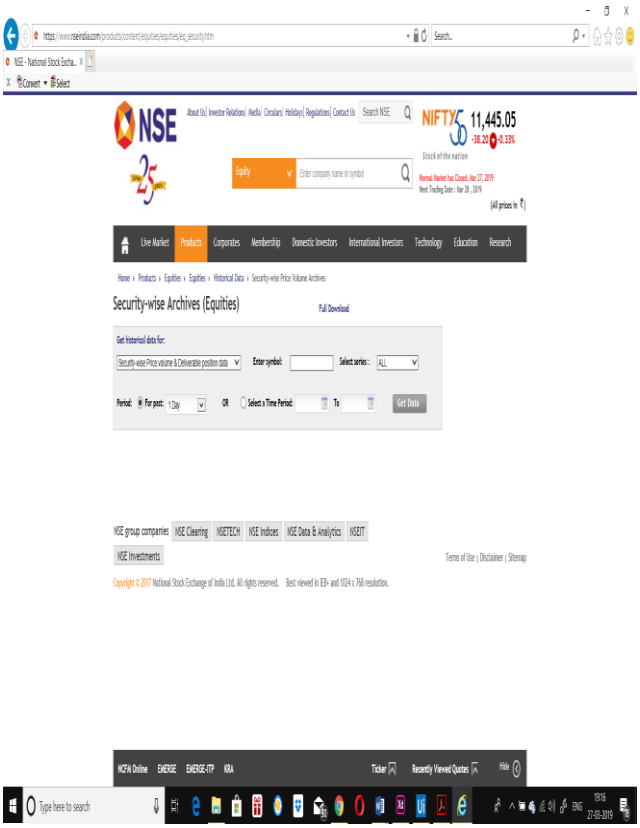
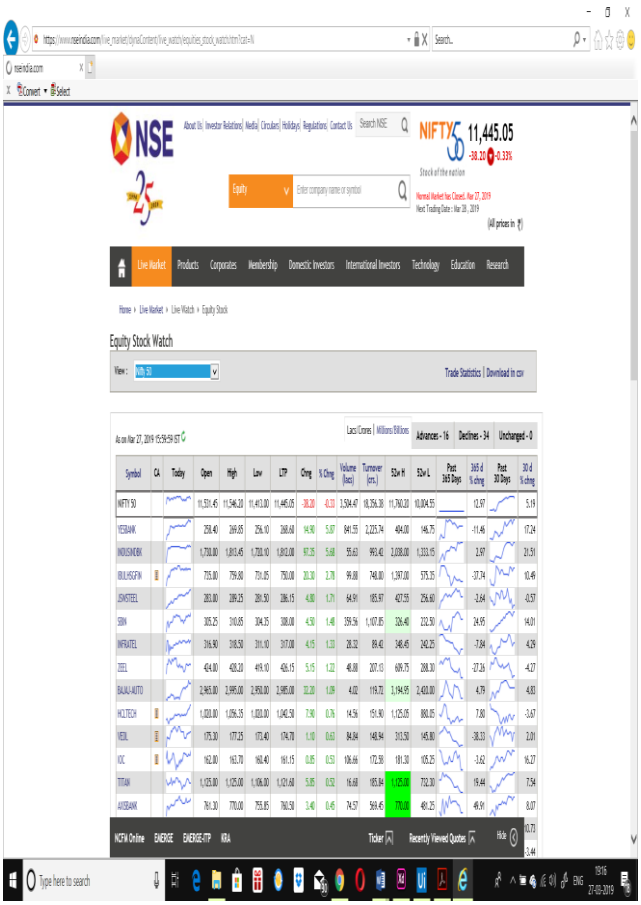


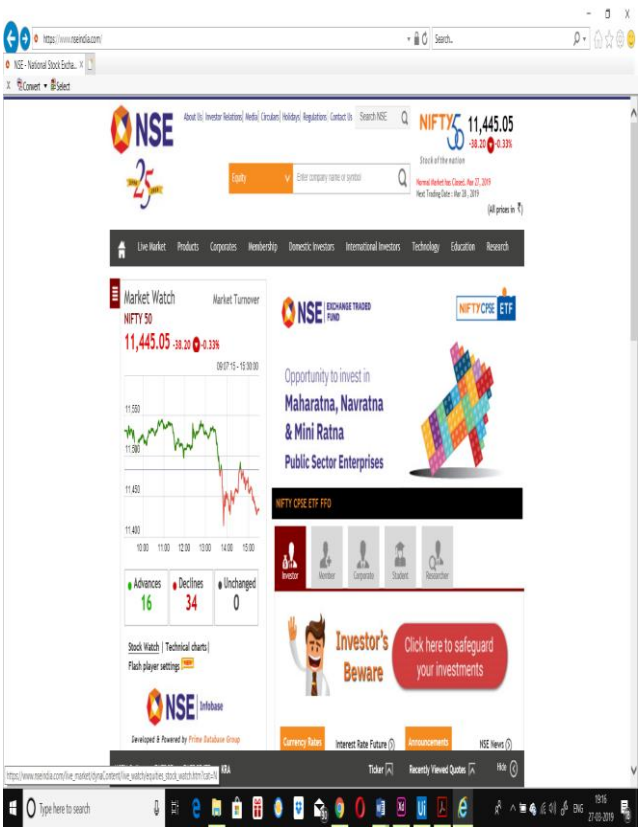
FIGURE 5.1

VI. RESULTS









VII. CONCLUSION

Academic studies predict that RPA is expected to drive a new wave of productivity gains and efficiency improvements on the global labor market, among other technological developments. Although not directly attributable to RPA alone, Oxford University conjectures that by 2035 may have automated up to 35 percent of all employment.

Since the days of simplistic screen scraping and simple process management tools first appeared in the 1990s, RPA techniques have evolved significantly. Today, RPA has changed how businesses around the globe approach their business activities, particularly in terms of operational improvement and streamlining. We can't know precisely how automation systems will evolve in years to come, yet we have good evidence that RPA's future is very promising. When RPA prevalence grows and automation experiences a greater degree of adoption in more diverse industries, not only will the full advantages of automation technology be understood, but they will also be leveraged as a crucial competitive advantage in a variety of crowded, growing industries.

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