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Vishwakarma Institute of Information Technology, Kondhwa(BK), Pune-48

Department of Computer Engineering

SOFTWARE ROBOTICS
TY B-Tech

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Project Title: Automated Preventive Maintenance Reminder

Group No: 4

Group Members:

Sr. No.	PRN	Roll No.	Name of Student
1.	22210475	324010	Sanika Butle
2.	22210533	324017	Sawani Doshi
3.	22210476	324024	Pratibha Ingle

Faculty Mentor: Dr.Disha Wankhede Mam

Index

1. Introduction

In today's industrial environment, timely maintenance of machinery is essential for ensuring operational efficiency, minimizing unplanned downtime, and reducing maintenance costs. Traditionally, organizations rely on manual methods—such as logs or spreadsheets—to track service schedules. These approaches are time-consuming, error-prone, and often lead to delayed or missed maintenance, resulting in equipment failures and production delays.

To address this issue, our project proposes the implementation of a **Preventive Maintenance Reminder Bot** using **Robotic Process Automation (RPA)** with **Automation Anywhere**. This bot is designed to automate the process of reading service records from an Excel file, computing the upcoming maintenance date based on predefined intervals, and sending timely email reminders to relevant stakeholders if the service is due. The solution not only reduces manual effort but also ensures timely and consistent maintenance operations.

2. Motivation

The motivation behind this project stems from the operational challenges faced in manual maintenance tracking systems. Industries often manage dozens to hundreds of machines, each with its own service interval and history. Manually monitoring these timelines results in:

- **Missed maintenance deadlines**, increasing the risk of equipment failure.
- **Inefficient resource allocation**, as staff may spend significant time managing schedules.
- **Inconsistent service quality**, due to the absence of real-time alerts.

By leveraging **Automation Anywhere**, we aim to eliminate human errors, standardize the reminder process, and enable proactive decision-making. Automating such a repetitive and critical task aligns with modern industrial goals of digitization, reliability, and performance optimization.

3. Problem Statement

Industries often lack a reliable, automated mechanism to track and remind about periodic machine maintenance. Manual tracking methods are inefficient, error-prone, and do not scale well with an increasing number of assets. The core problem this project seeks to solve is:

"How can we design an automated system that monitors service schedules and sends timely reminders to ensure preventive maintenance of machines without human intervention?"

4. Group Description

During brainstorming sessions, the team collectively identified key requirements for an effective solution:

- **Data Source**: Excel was chosen as the primary source for machine data due to its accessibility and widespread industrial use.
- **Platform**: Automation Anywhere was selected for its powerful bot-building capabilities, ease of use, and cloud-based automation features.
- **Logic Design**: We emphasized clear date comparisons, dynamic row processing, and robust error handling (e.g., empty fields, invalid formats).
- **Communication**: Email was selected as the primary channel for delivering reminders, ensuring swift and trackable communication.

We also evaluated multiple approaches for handling time zones, flexible service intervals, and future scalability.

5. Brief Description

 The bot automates the entire lifecycle of maintenance tracking through the following operations:

- It opens a designated Excel file containing machine service data.
- For each machine entry, it calculates the service interval based on values of rpm,torque and tool wear by formula:**100 + 30 - ($numTorque$ * 0.3 + $numWear$ * 0.4 + $numRpm$ * 0.01)** and then calculates next service due date.
- It then compares the calculated date with the current system date.

- If the service is due or overdue, the bot composes and sends a personalized email reminder to the corresponding recipient.

  This solution is reusable, modular, and designed to be easily integrated into larger enterprise workflows.

6. Tools Used

The project was implemented using the following tools and technologies:

- **Automation Anywhere A360 (Cloud Version)**: A leading RPA platform used to build the bot, manage workflows, and automate tasks.
- **Microsoft Excel**: Used as the structured data source for machine details and service records.
- **Email Client/SMTP**: Configured within Automation Anywhere to send maintenance reminders.
- **DateTime Functions**: Employed for accurate date conversions, calculations, and comparisons.

7. Objectives
 The primary objectives of this project are:

- To eliminate manual tracking of machine maintenance schedules.
- To dynamically calculate next service dates using predefined service intervals.
- To automate the sending of timely email notifications when service is due.
- To enhance efficiency, accuracy, and traceability in maintenance workflows.

8. Why Automation?
 Automation offers a strategic advantage in repetitive and time-sensitive tasks such as preventive maintenance scheduling. The reasons for adopting automation in this context include:

- **Error Reduction**: Minimizes human errors in date calculations and tracking.
- **Consistency**: Maintains a standardized reminder process.
- **Scalability**: Easily adaptable to handle large datasets and additional functionalities.
- **Cost-Effectiveness**: Reduces the need for dedicated personnel to manage schedules.

- **Timeliness**: Ensures no maintenance deadline is overlooked.

Automation transforms this manual workflow into a self-managed, reliable system

9. Flow Chart
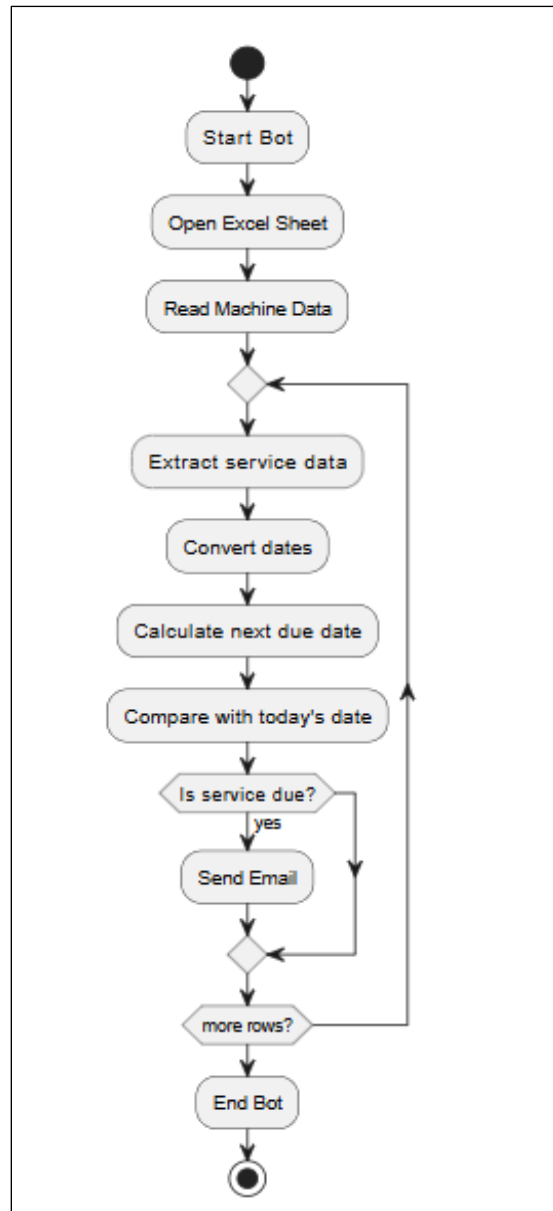
10. Conclusion

The implementation of the **Automated Preventive Maintenance Reminder Bot** demonstrates the power of RPA in addressing real-world industrial problems. The bot automates a repetitive and critical task, ensuring timely maintenance and reducing operational risks. It is accurate, efficient, and scalable, suitable for deployment in various sectors such as manufacturing, healthcare, and IT infrastructure management.

By integrating Automation Anywhere with Excel and email services, we created a solution that is both user-friendly and impactful. The bot's modular design also makes it easy to enhance and adapt for more complex workflows in the future.