TED TALK VIDEO NOTIFICATION BOT

A MINI PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

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- SAIKRISHNA H(220701238)

ABSTRACT

The **TED Talk Video Notification Bot** is a Robotic Process Automation (RPA) solution developed using UiPath to automate the tracking and notification of new TED Talk videos on YouTube. The project addresses the inefficiencies of manually monitoring updates on the TED Talk YouTube channel by automating the entire process, from video discovery to subscriber notification.

The bot operates by periodically accessing the TED Talk YouTube channel to extract video details such as title, description, and URL using web scraping techniques. It compares these details against previously recorded data to identify newly uploaded videos. Once new videos are detected, the bot organises the information in a structured format and sends personalised email notifications to a predefined list of subscribers, ensuring that they receive timely updates without any manual effort.

This project demonstrates the integration of core RPA functionalities, including web automation, data handling, and email communication. The use of UiPath tools such as web scraping, data manipulation through DataTables, and automated email dispatch ensures a seamless and reliable workflow. Additionally, the bot incorporates exception handling mechanisms to address potential errors, such as network connectivity issues or changes in web page structure, ensuring robustness and accuracy.

The TED Talk Video Notification Bot highlights the practical application of RPA in streamlining repetitive tasks, enhancing productivity, and improving user experience. By automating content tracking and notifications, the bot reduces manual effort, eliminates errors, and provides a scalable solution for TED Talk enthusiasts and educational communities to stay updated with the latest video releases.

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ABBREVIATIONS:

Abbreviation	Description
RPA	Robotic Process Automation
NLP	Natural Language Processing
API	Application Programming Interface
Gmail	Google Mail, used for sending and receiving emails
Excel	Microsoft Excel (used for data storage and tracking)
UI	User Interface

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CHAPTER 1: INTRODUCTION

1.1 General

Live In today's fast-paced digital world, staying updated with the latest content has become essential for content consumers and platforms alike. TED Talks, with their wealth of knowledge and thought-provoking content, attract a large audience of viewers across various fields, including education, technology, and social change. For dedicated followers, manually tracking the release of new TED Talks on YouTube can be overwhelming, particularly given the vast amount of content uploaded across multiple channels. As a result, an automation solution is necessary to simplify this task. The **TED Talk Video Notification Bot**, developed using UiPath RPA, serves this purpose by automatically detecting new video uploads on the TED Talk YouTube channel and notifying a set of subscribers. This eliminates the need for users to manually check for new videos and ensures they never miss an update.

1.2 Objective

The objectives of this project include:

1. Automating the start of YouTube/Instagram livestreams for each segment.
2. Sending personalised email notifications with segment-specific links to subscribers.
3. Tracking email engagement and livestream participation through an Excel-based system.

1.3 Existing System

Currently, viewers manually visit the TED Talk YouTube channel to look for new uploads. This requires frequently browsing through the channel and checking the most recent videos for new content. For users who follow multiple channels or multiple topics within TED, this becomes a repetitive and tedious task. Furthermore, without an automated system, users are at risk of missing new uploads, leading to frustration and a suboptimal user experience. Content platforms also lack an efficient way of notifying subscribers about new videos without manual intervention, leading to a disjointed process that consumes time and resources.

1.4 Proposed System

The **TED Talk Video Notification Bot** automates this entire process, eliminating the need for manual checks and ensuring timely updates. By integrating web scraping, data organization, and email notification capabilities, the bot ensures that users are automatically notified via email whenever a new TED Talk video is uploaded. The bot checks the TED Talk YouTube channel for new uploads, compares them with previously recorded videos to avoid duplication, and sends a notification email containing the video details (title, description, URL) to a set of subscribers. This solution reduces manual effort, enhances user experience, and provides a scalable way to track new content without missing updates.

Subscriber Data Structure

The **Subscriber Data Structure** table outlines the format of the Excel sheet used for storing subscriber information. This table includes key details like subscriber names, email addresses, and segment preferences. Each subscriber's data is structured to ensure easy retrieval and processing during the workflow. The structure helps in generating personalised emails by referencing the subscriber’s preferred segments. Below is an example of how the data is stored in the Excel sheet:

Name	**Email**	**Segment Preference**
John doe	john.doe@example.com	Segment 1, Segment 3
Jane Smith	jane.smith@example.com	Segment 2
Alice Johnson	alice.johnson@example.com	Segment 1

CHAPTER 2: LITERATURE REVIEW

2.1 General

Automation is revolutionising industries by handling repetitive tasks and improving efficiency. In particular, Robotic Process Automation (RPA) has gained significant traction across various sectors, including customer service, healthcare, and entertainment. In entertainment, especially for content-driven platforms, RPA is proving to be a valuable tool for automating data scraping, content tracking, and communication processes.

A variety of systems have been designed to automate content discovery, such as TV show trackers, streaming alerts, and web scrapers that identify new content. In the context of YouTube and other video platforms, automation can help users stay informed about new videos without needing to manually monitor channels. Research highlights the benefits of automation in improving efficiency and user satisfaction. The TED Talk Video Notification Bot follows a similar approach to these existing systems, extending the idea of automating video tracking to educational content.

2.2 Related Work

Automation in content tracking and notifications has been a growing field, particularly in entertainment and media industries. Several similar systems have been developed to automate the process of tracking and updating users about new media content. For instance, **TV Show Trackers** are bots that automatically monitor the latest episodes of television shows, notify users when new episodes are released, and allow them to follow their favourite shows. These systems use web scraping techniques to extract data from various TV streaming websites, such as Netflix, Hulu, or network websites, and send alerts based on the viewer's preferences.

One prominent example is the **TV Show Tracker bot**, which uses web scraping to gather episode details and automatically compiles them into a personalised report or notification. The system monitors a range of popular TV show databases, such as IMDb, and tracks when new episodes are scheduled to air or have been uploaded to streaming services. This type of automation has proven particularly useful for people who follow multiple shows and want to stay informed without the need to manually search for episode details.

In the context of YouTube, various systems have been developed to track video uploads and notify users about their favourite content creators' latest videos. These systems often rely on YouTube's API or web scraping tools to fetch video metadata such as titles, descriptions, and upload dates. However, many of these systems lack a user-centric notification feature that customises alerts based on user preferences. For example, the **YouTube Content Tracker** bot is a simple notification system that scans specific YouTube channels and sends alerts to users about new video uploads. However, this system lacks personalization and integration with other platforms like email, making it less suitable for users who require more tailored notifications.

The development of personalised solutions in content tracking has been explored in previous research. **Zhu and Zhang (2020)** emphasise the importance of personalization in content management systems. They suggest that integrating automated notification systems that allow users to customise their content preferences—such as selecting specific genres, creators, or keywords—can enhance the overall user experience and ensure that users receive content that aligns with their interests. This approach is crucial for services like the **TED Talk Video Notification Bot**, which aims to notify subscribers about specific topics within TED Talks based on their preferences.

Additionally, **Tsai and Lin (2018)** conducted a study focused on using web scraping to automate content tracking for television shows. Their system scrapes information about TV shows and creates personalised schedules for viewers based on their preferred genres or shows. However, their system lacked integration with email or SMS services, which limited its usefulness for proactive user engagement. The **TED Talk Video Notification Bot** enhances this idea by not only scraping video details but also integrating a notification system, ensuring that users are automatically informed about new content as soon as it is available.

The combination of **RPA** and **web scraping** technologies has also been explored in academic research. **Chien et al. (2015)** developed an automated system for TV show tracking, which focused on using RPA to collect episode data from multiple sources. Their system aimed to reduce the time spent manually tracking show episodes and to ensure timely notifications for viewers. While their system was effective in providing episode updates, it did not incorporate a feedback mechanism for user customization. The **TED Talk Video Notification Bot**, in contrast, allows users to set preferences for specific TED Talk topics or speakers, making the notification system more tailored to the individual user.

In summary, previous works in content tracking and notification systems have highlighted the potential of **RPA** and **web scraping** for automating content discovery. However, most systems focus on general media content, lack integration with personalised notification services, and do not offer customization features. The **TED Talk Video Notification Bot** builds on these systems by offering tailored, timely notifications about new TED Talk videos based on user preferences, ensuring that users receive relevant and up-to-date content. This approach exemplifies how RPA can be leveraged to improve the way users interact with digital content, streamlining repetitive tasks and providing a more personalised experience.

CHAPTER 3: SYSTEM DESIGN

3.1 System Flow Design

The TED Talk Video Notification Bot follows a systematic workflow to automate the process of scraping new TED Talk videos and notifying subscribers. The system flow design is a vital aspect of any automation project as it outlines the sequence of steps the system follows to achieve the desired outcome. The flowchart for this project shows the steps involved in accessing the TED Talk YouTube channel, scraping the video details, storing the data, comparing it with existing records, and notifying the subscribers.

1. Start: The bot begins by initiating the process.
2. Access TED Talk Channel: The bot opens the TED Talk YouTube channel using the Open Browser activity.
3. Data Scraping: Once the channel is opened, the bot scrapes the most recent video details, such as title, description, upload date, and video URL.
4. Check for New Video: The bot compares the scraped data with the data already stored in an Excel file. If the video already exists in the records, the process stops. If the video is new, the process continues.
5. Store Data: For any new videos found, the bot stores the scraped details in an Excel file. This data serves as a record of past videos and is used for comparison in future executions.
6. Email Notification: After identifying new content, the bot sends an email notification to a predefined set of subscribers. The email contains the video title, a brief description, and the URL to watch the video.
7. Log Updates: The bot logs the email notification event and any videos processed in a log file.
8. End: Once all tasks are completed, the bot closes the browser and ends the process.

The flowchart, as depicted in the diagram below, provides a clear and structured representation of the entire process from start to finish.

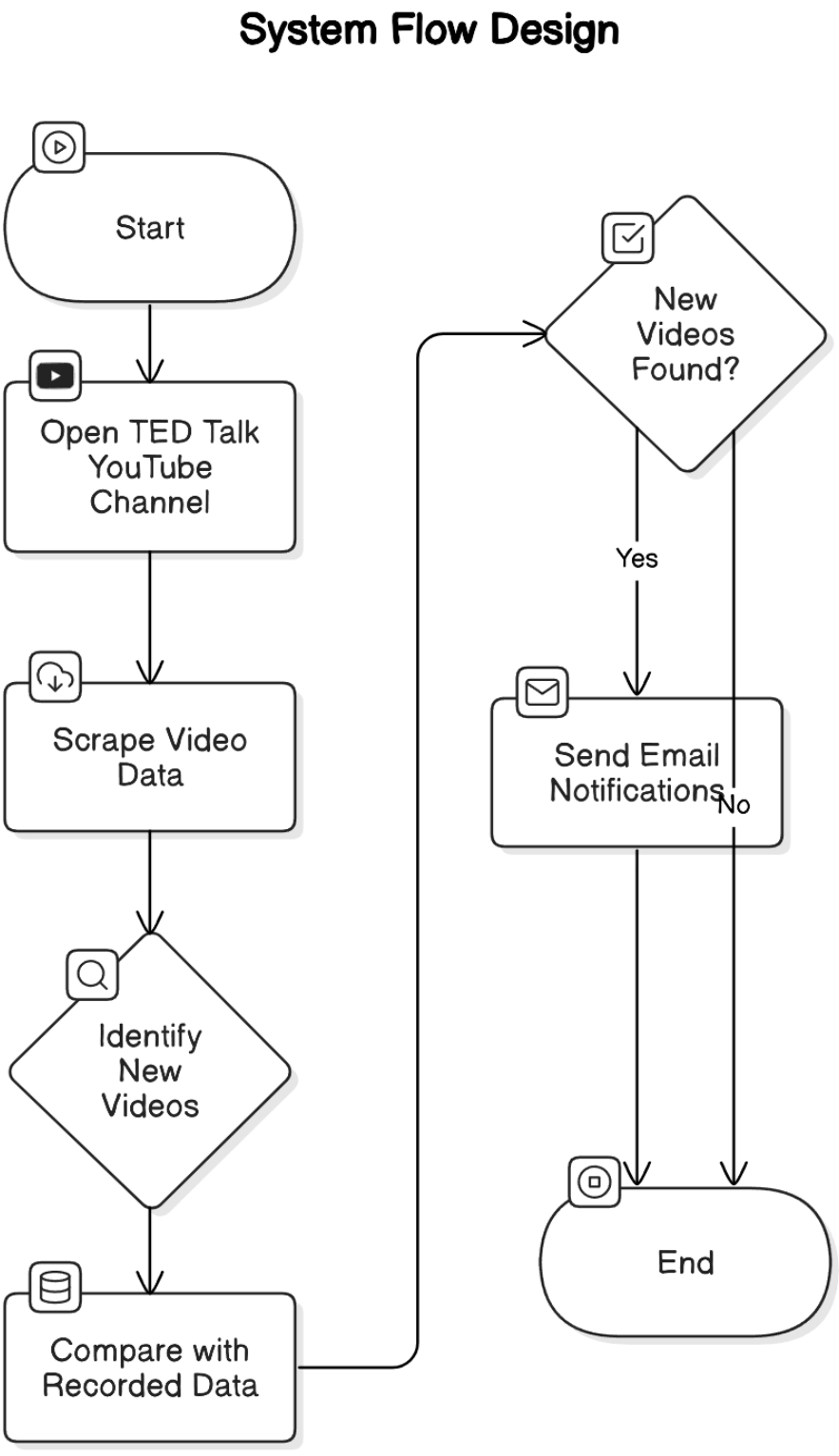

Figure 3.1: System Flow Design

3.3 Architecture Diagram

The **Architecture Diagram** visually represents the system's overall design, illustrating the major components involved and their interactions. It helps to understand how data flows through the system, from accessing the YouTube channel to sending email notifications.

1. **User Interface**: The system has a user interface where users can input their email addresses for notifications. Subscribers' information is stored securely to ensure that emails are sent only to authorised users.
2. **Web Scraping Layer**: This layer is responsible for extracting data from the TED Talk YouTube channel. It uses UiPath's **Data Scraping** activity to collect video titles, descriptions, URLs, and upload dates. The bot is programmed to access the TED Talk channel at regular intervals and scrape new data whenever new videos are uploaded.
3. **Data Storage and Comparison**: Scraped data is stored in an Excel file that serves as the record of previously processed videos. When the bot runs again, it compares newly scraped data with the existing records to determine if any new videos have been uploaded. The Excel file serves both as storage and as a reference for comparison.
4. **Email Notification Layer**: Once new videos are identified, this layer takes the scraped details and sends an email notification using UiPath's **Send Outlook Mail Message** or **Send SMTP Mail** activities. Subscribers are notified with the video details and a link to watch the TED Talk on YouTube.
5. **Logging and Reporting**: This component tracks the status of the process, including successful email deliveries, errors, or any videos that were skipped. The log file is updated with each successful execution and can be reviewed later for troubleshooting or reporting.

This architecture ensures that the system is modular, with clear separation between the scraping, data storage, and notification components, allowing for easy maintenance and scalability.

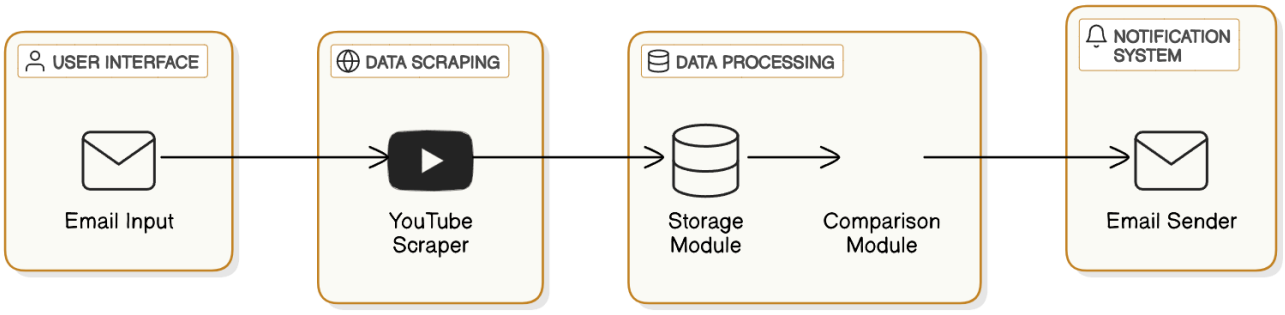

Figure 3.2: Architecture Diagram

3.4 Sequence Diagram

A **Sequence Diagram** is used to represent the interactions between various components of the system and the order in which those interactions occur. This diagram illustrates the flow of control between the **TED Talk YouTube Channel**, the **TED Talk Video Notification Bot**, and the **User**.

1. **User Action**: The user initiates the bot, which triggers the process to start.
2. **TED Talk Channel**: The bot accesses the TED Talk YouTube channel and retrieves the list of newly uploaded videos.
3. **Bot Scrapes Data**: The bot scrapes relevant video information, such as the title, description, and URL.
4. **Bot Stores Data**: The bot compares the scraped data with the previously stored data. If new content is found, the bot stores it in the Excel sheet.
5. **Bot Sends Notification**: Once new content is detected, the bot sends an email notification to the subscriber's email address.
6. **User Receives Email**: The user receives the email with the new video's details and a link to view it.
7. **Bot Logs Activity**: Finally, the bot logs the event and ends the process, preparing for the next execution.

This sequence allows for an efficient and reliable process that ensures subscribers are always informed about new TED Talks without manual effort.

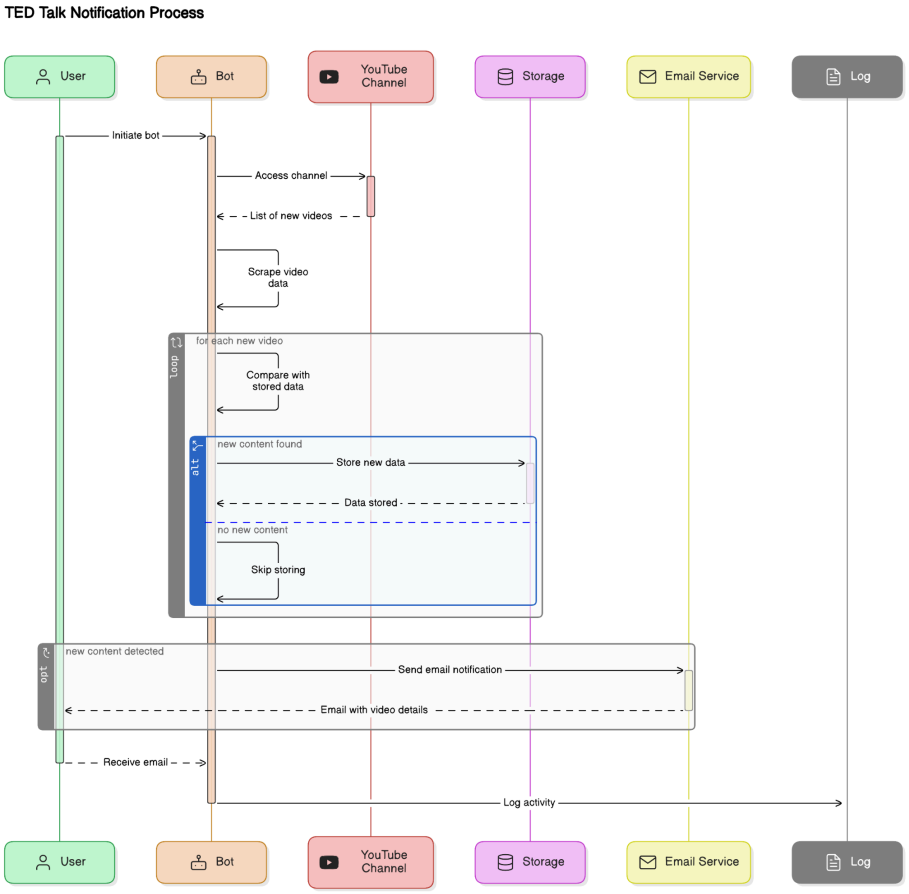

Figure 3.3: Sequence Diagram

CHAPTER 4: PROJECT DESCRIPTION

4.1 Methodology

To start building the TED Talk Video Notification Bot, first, UiPath Studio is opened, and a new process is created. UiPath Studio is an integrated development environment used to design automation workflows. After creating a new project, essential activities and packages are installed, such as UiPath.Mail.Activities for email integration and UiPath.WebAPI.Activities for web scraping.

4.2 Packages Required

To ensure the bot functions smoothly, the following UiPath packages are required:

- **UiPath.WebAPI.Activities**: For scraping data from YouTube.
- **UiPath.Excel.Activities**: For reading and writing Excel files to store video data.
- **UiPath.Mail.Activities**: For sending email notifications to subscribers.
- **UiPath.UIAutomation.Activities**: For interacting with the browser to scrape data.

These packages enable the bot to scrape content from YouTube, store it in an organized format, and send email alerts.

4.3 Project Workflow

The workflow consists of several key activities:

1. **Open Browser**: The bot opens the TED Talk YouTube channel.
2. **Scrape Video Data**: Using Data Scraping, the bot collects video titles, descriptions, and URLs.
3. **Store Data**: The video details are stored in an Excel file, where the bot compares new video data with previously recorded information.
4. **Send Email Notification**: If new videos are identified, the bot sends an email notification to subscribers.

Each of these steps is automated, ensuring the bot functions without human intervention.

CHAPTER 5: IMPLEMENTATION

The **TED Talk Video Notification Bot** successfully automates the process of tracking new TED Talk videos and notifying subscribers. This section includes screenshots to demonstrate the bot's functionality at each critical stage, from scraping video details to sending notifications. These visual outputs validate the execution of the bot and provide a clear understanding of the automation process.

5.1 Reading Data from Excel File

The bot begins by accessing the Excel file where previously scraped video details are stored. This file serves as a reference to identify newly uploaded videos. The bot reads this data using the **Read Range** activity, which loads the stored details into a DataTable for comparison.

5.2 Opening the Browser

Using the **Open Browser** activity, the bot navigates to the official TED Talk YouTube channel. This step ensures that the bot accesses the correct page to scrape video details. The browser is opened automatically without manual intervention, demonstrating the bot's capability to mimic user actions.

5.3 Searching for TED Talks

The bot identifies the "Videos" section of the TED Talk YouTube channel, where newly uploaded videos are displayed. The bot scrolls through the page to load and access all visible content. This ensures that the bot captures the most recent uploads.

5.4 Scraping Video Details

The bot uses **Data Scraping** activities to extract information about each video, including:

- Video title.
- Description.
- URL.
- Upload date.

This data is formatted into a structured format and temporarily stored in memory for processing.

5.5 Sending Email Notifications

For each new video detected, the bot uses the **Send Outlook Mail Message** or **Send SMTP Mail Message** activity to send an email notification to a predefined list of subscribers. The email contains:

- The video title.
- A brief description.

- A direct link to the video on YouTube.

5.6 Notification Delivery Confirmation

After successfully sending the email, the bot displays a confirmation message. This ensures that the subscriber has been notified about the new TED Talk video.

5.7 Log File Update

The bot maintains a log file to record:

- Timestamp of execution.
- Number of videos processed.
- Email delivery status.

This log helps track the bot's performance and troubleshoot any errors that may occur during execution.

5.8 Received Email Notification

Subscribers receive an email notification with the new TED Talk video details. The email includes the title, description, and a clickable link to view the video on YouTube.

CHAPTER 6: Conclusion

The **TED Talk Video Notification Bot** simplifies the process of tracking and notifying users about new TED Talk uploads by automating repetitive tasks. By using UiPath's web scraping, data processing, and email notification capabilities, the bot ensures that subscribers receive timely and accurate updates about the latest TED Talks. This automation reduces the manual effort required to stay informed and enhances user engagement with TED content.

Through the implementation of exception handling and retry mechanisms, the bot is robust and reliable, even in the event of slow page loading or network issues. The TED Talk Video Notification Bot exemplifies the power of RPA in transforming tedious manual tasks into automated processes, improving both operational efficiency and user experience.

CHAPTER 7: FUTURE SCOPE

The **TED Talk Video Notification Bot** demonstrates how Robotic Process Automation (RPA) can streamline content tracking and enhance user experience. While the current implementation efficiently tracks new TED Talk videos and sends email notifications, there are several potential areas for future enhancement and scalability:

1. **Integration with Multiple Platforms**
   Expanding the bot to track and notify users about content from additional platforms, such as TED's official website, LinkedIn, or podcast directories, can enhance its versatility. This would provide users with a unified system for all TED-related content updates.
2. **Personalized Notifications**
   Adding features that allow users to set preferences for specific topics, speakers, or themes in TED Talks can make the notifications more tailored and relevant. This could be achieved by implementing a database to store user preferences.
3. **Mobile App Integration**
   Extending the bot's functionality to mobile platforms by integrating with push notification services like Firebase Cloud Messaging (FCM) or Apple Push Notification Service (APNS) can offer real-time updates directly to users' devices.
4. **Enhanced Analytics**
   Incorporating analytics to generate periodic reports on trends in TED Talk uploads, such as popular topics or highly viewed videos, could provide valuable insights to subscribers.
5. **Multi-Language Support**
   To cater to a global audience, the bot can be extended to support notifications in multiple languages, translating video details into the subscriber's preferred language.
6. **Voice-Based Notifications**
   Integrating with voice assistants like Google Assistant or Amazon Alexa could enable voice-based notifications for users, enhancing accessibility and convenience.
7. **Artificial Intelligence Integration**
   Leveraging AI and machine learning to analyse user interaction patterns could enable the bot to recommend TED Talks that align with individual user interests, enhancing personalization.
8. **Scalability for Enterprise Use**
   The bot could be scaled for enterprise-level deployment, enabling organisations or educational institutions to keep their teams informed about relevant TED content based on team-specific interests.

By implementing these enhancements, the **TED Talk Video Notification Bot** can evolve into a comprehensive content discovery and notification system, catering to a diverse user base and adapting to changing technological trends.

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- "Robotic Process Automation Handbook" by Tom Taulli: A comprehensive guide to understanding the principles of RPA and its applications.
- "Practical Robotic Process Automation" by Nandan Mullakara: Explores real-world RPA implementations and use cases.

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