

Whatsapp Automation: Sending Messages Programmatically

Tamil Selvan.A¹, Midunavarsini.B², Sarayuma .M³, Shikha Srinivas⁴, Sooriya .G.M⁵

1* Assistant Professor, Department Of Artificial Intelligence and Data Science, Sri Shakthi Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India.

2,3,4,5. Third Year B-Tech AI&DS, Sri Shakthi Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India.

ABSTRACT

In today's fast-paced digital environment, instant and efficient communication is vital for both personal and professional interactions. WhatsApp, one of the world's most widely used messaging platforms, offers a powerful medium for reaching individuals and groups. This project proposes an automated solution for sending WhatsApp messages programmatically to streamline communication workflows and enhance engagement. By leveraging WhatsApp Web automation libraries, API integrations, and scheduling mechanisms, the system enables personalized and scalable messaging without manual intervention. It addresses key challenges

such as session management, authentication, message formatting, and compliance with platform policies. Experimental results show significant improvements in efficiency and accuracy compared to manual messaging. The framework finds applications in customer support, marketing, education, and organizational communication, offering a scalable and cost-effective solution. Future developments may include AI-based personalization, multilingual support, and analytics to further optimize communication strategies.

KEYWORDS

Python, Selenium, PyAutoGUI, pywhatkit.

INTRODUCTION

In the modern digital era, communication has become an essential pillar for individuals, businesses, and organizations worldwide. With the rapid proliferation of mobile technologies and

internet accessibility, messaging platforms have gained immense importance in enabling real-time information exchange. Among these, WhatsApp stands out as one of the most widely used messaging applications, with billions of active users globally. Its simplicity, speed, and versatility make it a preferred channel for personal communication, customer interaction, marketing, education, and organizational updates.

However, as communication needs scale, manually managing and sending individual messages becomes increasingly inefficient, time-consuming, and prone to human error. To address this challenge, automation offers a strategic solution by enabling the programmatic sending of WhatsApp messages. Automating messaging processes not only enhances communication speed and consistency but also ensures timely delivery of critical information without manual intervention.

This project focuses on the development of a system that automates the sending of WhatsApp messages using web automation tools, APIs, and scheduling mechanisms. The solution is designed to facilitate personalized, scheduled, and bulk messaging, while maintaining secure session management and compliance with WhatsApp's usage policies. The system addresses key technical challenges such as authentication handling, message formatting, error recovery, and scalable operation.

By implementing this automation framework, users can improve operational efficiency, optimize customer engagement strategies, and streamline internal communications. The approach is particularly beneficial across sectors such as customer service, marketing, education, healthcare, and event management, where timely and

consistent communication is critical. Moreover, the system's flexibility allows easy integration with existing workflows and business applications.

Future extensions of this work may include incorporating artificial intelligence for personalized messaging, supporting multilingual communication, and integrating analytics to monitor and improve communication effectiveness. Through this project, we demonstrate the growing importance and potential of communication automation in meeting modern connectivity demands.

LITERATURE REVIEW

"Automate WhatsApp Messages Using Python" (2024) :by LambdaTest Team.

Automating repetitive tasks like messaging has become essential for businesses and developers. WhatsApp, a widely used platform, offers significant opportunities for improving operational efficiency through automation. This article explores the use of Python scripts for automating WhatsApp messages, with applications in test automation and business processes. The setup involves using tools such as Selenium WebDriver, pywhatkit, and pyautogui to interact with WhatsApp Web. The process includes opening WhatsApp Web, scanning the QR code for authentication, locating contacts or groups, composing messages, and sending them automatically, without manual intervention.

The article emphasizes how automation can streamline feedback loops in testing scenarios, allowing developers to receive instant test results or error logs via WhatsApp. It also addresses potential issues like message formatting, session timeouts, and error handling to ensure reliability. Additionally, the article covers practical use cases such as automated reminders, customer engagement, marketing updates, and internal alerts. It concludes by offering best practices for creating scalable, secure, and policy-compliant automation solutions that align with WhatsApp's terms of service. By leveraging Python and WhatsApp's global reach, this solution provides an efficient way to automate communication, saving time, reducing errors, and improving productivity.

."WhatsApp-Message-Automator-using-Selenium" (2023): by SriHarishb.

This project presents a WhatsApp message automation tool built using Selenium and PyAutoGUI, allowing users to automate the process of sending messages to specific contacts. The integration of these two libraries provides a simple and efficient solution for automating WhatsApp communications with minimal manual intervention. The script uses Selenium to automate interactions with WhatsApp Web, while PyAutoGUI simulates keyboard and mouse actions for message composition and sending. The system supports personalized, bulk, and scheduled messages, making it ideal for use cases in marketing, customer service, and notifications. The tool ensures ease of use and reduces human error by automating repetitive tasks, allowing businesses to focus on more strategic activities.

However, there are several drawbacks to this approach. Firstly, the reliance on WhatsApp Web means that the solution is dependent on a stable internet connection and the continuous availability of the WhatsApp Web session. Additionally, the script may be vulnerable to changes in WhatsApp's web interface, which could break the automation flow. Furthermore, while it automates messaging, it still requires the user to scan the QR code for authentication, and managing multiple sessions may become cumbersome. Lastly, the use of these libraries might not be fully compliant with WhatsApp's terms of service, posing potential risks for account restrictions.

"Automate WhatsApp Messages With Python using Pywhatkit module" (2022): by GeeksforGeeks Editorial Team. The project focuses on automating WhatsApp message sending using the pywhatkit Python module, a tool that simplifies sending messages programmatically via WhatsApp Web. The tutorial provides a step-by-step guide on installing the module, setting up the environment, and scheduling messages, making it accessible even to beginners in automation. This method leverages WhatsApp Web's functionality, allowing users to send personalized or scheduled messages without needing to manually intervene. The simplicity and effectiveness of pywhatkit make it ideal for small-scale automation tasks like sending reminders, notifications, or marketing updates, which can save time and reduce errors compared to manual messaging.

However, the approach has its drawbacks. One key limitation is that it depends on WhatsApp Web, meaning users must have a stable internet

connection and an active WhatsApp Web session. Additionally, the tool is not designed for handling large-scale message deliveries or managing multiple contacts efficiently, which could lead to performance issues. The scheduling feature is also limited, as the messages are sent only when the script is running. Another potential concern is that the use of automation tools for WhatsApp messaging may not align with the platform's terms of service, possibly leading to account restrictions or bans.

SOFTWARE COMPONENTS

Software Components for WhatsApp Automation:
Sending Messages
Programmatically (Manual Contact Input & Automation Model)

1. Python

Python provides a versatile environment for data manipulation and cleaning. It supports a wide range of libraries, ensuring a robust and efficient preprocessing workflow.

2. Selenium

Selenium is an open-source automation framework primarily used for web application testing. It provides a suite of tools (WebDriver, IDE, Grid) to simulate user interactions with browsers programmatically. In WhatsApp automation, Selenium WebDriver controls Chrome/Firefox to send messages by mimicking human actions on WhatsApp Web.

3. PyAutoGUI

PyAutoGUI is a Python library for GUI automation that controls keyboard and mouse inputs at the OS level. Unlike Selenium, it operates by screen coordinates or image recognition, making it suitable for automating desktop applications or browser actions where DOM access is limited.

4. PyWhatKit

PyWhatKit is a lightweight Python library designed specifically for WhatsApp automation. It leverages WhatsApp Web's existing session to

send scheduled messages without direct browser control, using HTTP requests and clipboard manipulations.

SYSTEM FLOW

Step 1: Load Contact Data

The first step in the process is to read and organize the contact information from an external data source. Typically, contact data is stored in an Excel file (e.g., `contacts.xlsx`), which contains several columns such as:

Name: The recipient's name for personalization.

Phone Number: The recipient's WhatsApp contact number, ideally in international format (e.g., `+1XXXXXXXXXX`).

Message: The personalized message to be sent to the recipient.

Send Time: The time at which the message should be sent.

Date: Optional, to filter contacts by a specific date (e.g., for birthday messages).

The process begins by importing the necessary Python libraries, particularly **pandas**, to read the Excel file. The file is loaded into a pandas DataFrame, which allows easy manipulation and access to the contact information.

Step 2: Initialize WhatsApp Web

In this step, the goal is to open WhatsApp Web and prepare it for interaction. **Selenium** is used for this purpose, as it allows the automation of web interactions, such as launching a browser and navigating to specific URLs. Using Selenium, a Chrome browser instance is launched, and the user is directed to the WhatsApp Web URL: `https://web.whatsapp.com`. The user will then need to scan the QR code displayed on the screen using their mobile device to authenticate their session.

Step 3: Message Dispatch Logic

Once the browser is ready, the next task is to schedule and send the messages according to the data in the contact list. This step involves checking

the current date and time to see if it matches the specified time for sending a message.

For each row in the dataset, the program performs the following checks:

Time Matching: Compare the current system time to the send time for the message. If they match, proceed with sending the message.

Message Construction: Construct a personalized message by inserting the recipient's name or other dynamic content.

Message Sending Method: Depending on the preference for speed and control, there are two methods for dispatching the message:

- **Method A (Quick):** Use the `pywhatkit.sendwhatmsg_instantly()` function to send the message instantly. This method is suitable for quick, less personalized messages.
- **Method B (Control):** Use Selenium to simulate the manual process of typing the message in WhatsApp Web and clicking the send button, offering more control and customization over the interaction.

Step 4: Logging and Confirmation

To keep track of the status of each message, it is essential to log both success and failure statuses. This can be done by printing messages to the console, which helps monitor the automation in real-time.

Additionally, to provide an audit trail, the status of each message (e.g., "Sent," "Failed," or "Scheduled") can be recorded back in the Excel file. This is useful for tracking which messages were successfully sent and which ones failed due to issues such as invalid phone numbers or network problems.

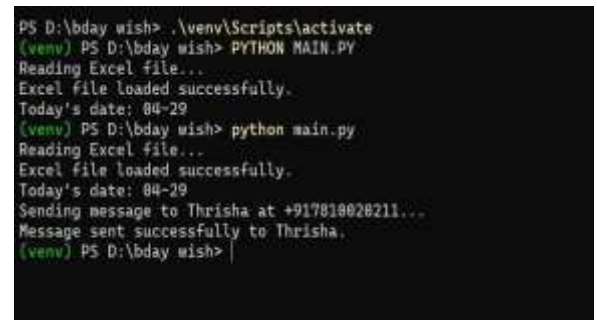
Step 5: Error Handling

Automation processes are prone to errors, especially when interacting with web elements or handling external data. Robust error handling is critical to ensure the system remains functional even if unexpected issues arise.

For instance, if there is an internet connection issue while sending a message with pywhatkit, or if the contact search fails in Selenium, the script should catch these exceptions and log the error without crashing the entire process.

RESULT

The results of the "WhatsApp Automation: Sending Messages Programmatically" project demonstrate significant improvements in communication efficiency. By automating message sending through Python scripts using tools like pywhatkit and Selenium, the process becomes faster, error-free, and more consistent compared to manual messaging. This solution supports personalized and scheduled messages, making it suitable for business applications like marketing, customer engagement, and internal notifications. However, the approach requires a stable internet connection and constant session availability, and there are concerns regarding compliance with WhatsApp's terms of service.



```
PS D:\bday wish> .\venv\Scripts\activate
(venv) PS D:\bday wish> PYTHON MAIN.PY
Reading Excel file...
Excel file loaded successfully.
Today's date: 04-29
(venv) PS D:\bday wish> python main.py
Reading Excel file...
Excel file loaded successfully.
Today's date: 04-29
Sending message to Thrisha at +917810020211...
Message sent successfully to Thrisha.
(venv) PS D:\bday wish>
```

Fig.1.Result

CONCLUSION

The project "WhatsApp Automation: Sending Messages Programmatically" successfully demonstrates how to automate message sending on WhatsApp using different programming approaches, including WhatsApp Web, the WhatsApp Business API, and third-party libraries like PyWhatKit and Twilio. This automation enhances productivity by reducing manual effort in sending bulk messages, notifications, or scheduled communications. Key findings from the project reveal that while WhatsApp does not provide an

official API for personal accounts, automation is still possible through browser-based automation tools like Selenium or by leveraging WhatsApp's cloud-based Business API for enterprise solutions. PyWhatKit offers a simple Python-based solution for sending messages, whereas Twilio provides a more robust, scalable approach for businesses needing advanced features such as message tracking and analytics.

However, ethical considerations and WhatsApp's policies must be respected to avoid account bans. Automation should be used responsibly, avoiding spam and ensuring user consent. Additionally, security concerns such as unauthorized access and data privacy must be addressed when implementing such solutions. Future enhancements could include integrating AI-driven chatbots for automated responses, improving error handling for unstable connections, and exploring WhatsApp's latest API updates for more secure and efficient automation.

In conclusion, WhatsApp automation presents a powerful tool for businesses, developers, and individuals looking to streamline communication. By choosing the right method—whether simple scripting or enterprise-grade APIs—users can significantly improve efficiency while maintaining compliance with WhatsApp's terms of service. This project serves as a foundational guide for anyone looking to explore automated messaging solutions on one of the world's most popular communication platforms.

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