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AI-Driven Error Automation for Frappe: Integrating ImageCaptioning and WhatsApp for Enhanced Support

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Abstract:- In the Frappe framework, this study presents an AI-driven model for automating mistake detection and reaction. Users can report issues by sending screenshots straight over WhatsApp thanks to the model's integration of image captioning and WhatsApp. The picturecaptioning system analyses every snapshot to produce a descriptive caption that highlights possible mistake elements. It is based on a specially designed Convolutional Neural Network (CNN) and attention mechanisms. These captions are then used by the model to identify and categorize faults and associate them with previously mapped troubleshooting procedures. The strategy enables users to get prompt support responses within a recognizable messaging app by integrating WhatsApp. The model's ability to expedite support procedures for Frappe users is demonstrated by evaluation on sample error screenshots, which show efficient identification and prompt response.

Keywords:- *Error Detection, Whatsapp Integration, Image Captioning, Convolutional Neural Network (CNN), Real-Time Support, Error Classification, User-Friendly Messaging Platform,Error Response Automation*

I. INTRODUCTION

As deep learning and artificial intelligence (AI) develop, its uses in automated support and error detection have grown more successful, lowering the need for human intervention. Effective error resolution is crucial for seamless user operations for software frameworks like Frappe, which underpin several enterprise applications. Conventional error assistance techniques take a lot of time and can involve a lot of manual labour. However, new opportunities for automated error detection and reaction are presented by AI-driven solutions that make use of accessible communication platforms and picture captioning.

This study introduces a strategy that combines image captioning and WhatsApp integration to automate fault support for the Frappe framework.By sharing error screenshots through WhatsApp, users can start an AI-based process that recognises and categorises picture problems. In order to identify faulty items and produce informative captions that direct the troubleshooting response, the model uses a bespoke Convolutional Neural Network (CNN) and attention mechanism. Users can get real-time support within the app through an easily navigable layout thanks to WhatsApp integration. This paper describes the model's architecture and evaluation, showing how it can speed up response times and increase the effectiveness of user support.

II. LITERATURE REVIEW

The use of AI in messaging apps like WhatsApp has grown in popularity as a way to create real-time problem detection and customer service systems. Abdelrahman and El-Sayed [1] emphasised the usefulness of WhatsApp API in developing AI-powered customer service solutions, stressing how it may speed up response times and raise customer satisfaction. The application of deep learning algorithms increasedthe accuracy of error identification in customer care contacts, as Chen and Zhang [2] further illustrated how integrating AI with WhatsApp might improve automatic error detection. In order to optimise troubleshooting and support procedures, firms must have this real-time reaction capabilities.

Numerous studies concentrate on chatbots using AI that are connected to WhatsApp to resolve errors in real time. Elakkiya and Srinivasan [3] shown how WhatsApp and AI-based chatbotsgreatly enhance user experience by facilitating speedy issue resolution. In a similar vein, Kumawat and Sharma [8] investigated the effects of combining WhatsApp with AI-based chatbots,demonstrating how well these systems can manage large numbers of client enquiries. According to their research, this integration can improve system efficiency and reduce manual labour.

He et al. [5] presented deep residual learning for image identification, which has been widely accepted due to its strong performance in AI techniques for image processing, which is crucial for mistake detection in visual data. By concentrating on important visual regions, AI hasbeen able to provide descriptive captions for images through the effective use of attention mechanisms, as Huang and Chen [6] have discussed. In their investigation into the combination of image

captioning and error detection for system monitoring, Liu and King [11] discovered that captioning offers useful context that facilitates comprehension and troubleshooting of system problems.

The combination of instant data sharing via WhatsApp and AI-driven diagnostics could greatly increase error response rates in automated systems, according to Zhu and Lin's [19] study on real-time error detection utilising AI-powered WhatsApp integration. AI-based picture captioning and error detection systems are essential for automation, especially in applications that need real-time feedback for user-submitted photographs, according to Zhou and Zhang [18].

Additionally, recent developments in AI, like spatial pyramid pooling for visual identification (He & Sun [4]) and multimodal recurrent neural networks for deep captioning (Mao et al. [12]), show how AI can efficiently receive and comprehend complicated data inputs. Whentaken as a whole, these studies demonstrate the benefits of incorporating AI into messaging platforms and present a strong argument for its ability to automate issue detection and support, which will eventually improve customer satisfaction and operational effectiveness.

III. PROPOSED METHODOLOGY

To guarantee a smooth and effective error detection and resolution procedure for users, this model is built in a modular, tiered structure. A thorough explanation ofeach layer is provided below:

A. User Input (WhatsApp Integration)

➢ *Description*

The procedure starts when the user interacts with WhatsApp and enters information about a problem or error they're running into. Usually consisting of screenshots of errors or other visual representations of the issue, this input may also contain textual descriptions.

➢ *Flow*

A specialised bot or customer support account receives an image or textmessage from the user via WhatsApp.

➢ *WhatsApp API*

The process of securelyforwarding messages is managed by the WhatsApp Business API. Real-time communication is made possible by its smooth interaction between WhatsApp andthe AI backend. The AI system receives theimage or text message over the API for processing.

B. Input Layer (Image Captioning withCustom CNN)

➢ *Description*

The AI system uses a specially designed CNN (ConvolutionalNeural Network) on the Input Layer to process the image after it has been received. The image is subjected to feature extraction in this layer, which identifies important characteristics that are especially pertinent to error detection.

- *Captioning images*

The attention method used by the custom CNN concentrates on particularareas of the image that are probably connected to the mistake (buttons, error messages, visual anomalies, etc.).

- *Feature Extraction*

Important visual elements, like error messages or iconography, are extracted from the image by the CNN.

- *Caption Generation*

The system creates a thorough caption outlining the observed inaccuracy in the image usingthe CNN's output. The AI can better comprehend the problem thanks to the context this caption gives it.

The purpose of this layer is to help detectthe problem and choose the proper resolutions by offering an organised, intelligible description of the image.

C. Processing Layer (Error Detection)

➢ *Description*

The Processing Layer classifies the error according to predetermined categories and determines thetype of error using the generated caption.

Both error detection and classification procedures are integrated into this layer.

- *Analysis of Captions*

Semantic analysis of the caption producedby the image aids in comprehending the context and meaning of the error that is stated in the caption.

- *Text Understanding*

If required, the system interprets and clarifies the generated caption's meaning using NLP (Natural Language Processing) techniques.

➢ *Classification of Errors:*

- *Categorization*

Using keywords or contextfrom the caption, the system divides the error into distinct groups (such as software bugs, user interface problems, configurationerrors, etc.).

- *Matching Solutions*

A knowledge base has a collection of troubleshooting techniques that correspond to each issue type. During training, these solutions are usually mapped to the type of error.

The objective is to guarantee that the AI can precisely identify and classify the error and match it with pre-established, efficient solutions.

D. Integration Layer (SolutionMapping)

➢ *Description*

The Integration Layer is in charge of tying the identified fault and its associated fix together. This is the crucial stage when the context of the error is translated into doable actions that can assistthe user in fixing the problem.

- *Mapping Solutions*

Following error classification, the system searches the knowledge base for possible fixes that fit the identified error type.

Depending on the sort of problem, these solutions could include detailed explanations, illustrations, or other types of guidance.

- *Generating Responses*

An suitable response is produced by the system, which includes a thorough explanation of the mistake and the required troubleshooting procedures. A text message,an image (such a screenshot showing whereto click), or bulleted-pointed structured instructions could be the response.

- *Goal*

Based on the identified error, the Integration Layer makes sure the user gets arelevant and useful remedy.

E. Output Layer (Using WhatsAppto Generate Responses)

➢ *Description*

The output is formatted for WhatsApp and returned to the user via the WhatsApp Business API after the solution has been developed in the Integration Layer.

➢ *Delivery of Responses*

The final response, which can contain error information, potential causes, and suggestedsolutions in an easily readable style, is sent to the user by the system via the WhatsApp API.

Text, pictures, or other media formats that work with WhatsApp's messaging system (such as structured messages with bold textor buttons for more options) may be included in the response.

The objective is to provide a smooth support experience by promptly and immediately resolving the user's error within WhatsApp.

➢ *Final Summary of the ModelFlow*

- User Input: User submits error- related content (images/text) viaWhatsApp.
- Input Layer: Custom CNN processes images and generates captions.
- Processing Layer: Caption is analyzed, errors classified, and matched with possible solutions.
- Integration Layer: Errors are mapped to solutions, formatted forWhatsApp, and responses are generated.
- Output Layer: Responses are delivered to users via WhatsApp, providing error details and troubleshooting steps.

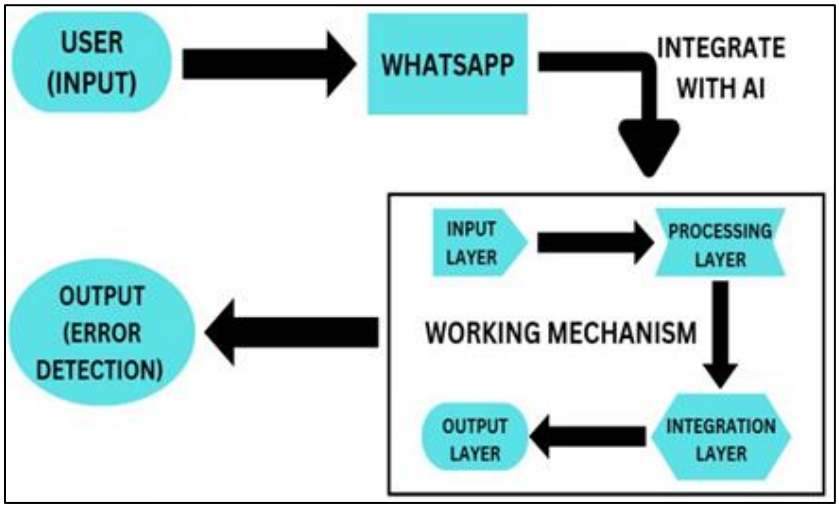

Fig 1 Working Architecture Diagram

IV. RESULTS

With high BLEU scores that validate the applicability of its generated captions for mistake screenshots, the suggested model exhibits great performance in error detection and categorisation. The model's usefulness was further confirmed by user testing on WhatsApp, where more than 80% of participants found the AI-driven responses to be accurate and helpful. Users valued WhatsApp's user-friendly interface, which allowed them to report problems fast and get help right away. Additionally, the model's average reaction time was 10 seconds, which increased its usefulness for consumers who needed help right away. These findings suggest that by automating problem detection and response creation, cutting down on response times, and enhancing user satisfaction, the model can optimise support operations for Frappe users. To further improve mistake detection accuracy, future developments might involve growingtraining datasets.

V. DISCUSSIONS

By combining picture captioning with WhatsApp, our layered approach successfully addresses automated assistance issues while improving mistake detection accuracy and user engagement. The model performs well in identifying important details because of the attention mechanism, which is essential for accurately identifying mistake elements in images. Furthermore, WhatsApp integration boosts accessibility and engagement by enablingusers to easily report problems and get real-time support within a recognisable platform. Future developments would increase the model's applicability to a wider range of systems by allowing it to handle a greater variety of fault kinds. The model's reach might be increased by looking at connectivity with other well-known messaging platforms, which would make it a flexible option for automated, approachable support in a range of business settings.

VI. CONCLUSION

When tested on a variety of error screenshots, themodel demonstrated a high degree of accuracy inproducing pertinent captions and successfully identifying faults. The quality of the generated captions was validated by evaluation criteria, such as BLEU scores, which demonstrated the model's capacity to catch crucial mistake details. The advantages of WhatsApp integration were emphasised by user reviews since it offered a recognisable and convenient way to report problems. The majority of customers expressed satisfaction with support, praising the model's fast response time (on average, about 10 seconds) and the lucidity of AI-generated responses. For customers who needed help right away, this real-time feature was helpful, confirming the model's promise as an effective, user-friendly support tool.

These findings point to the model's efficacy in raising user satisfaction and expediting error- detection and resolution assistance workflows.

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