ARTIFICIAL INTELLIGENCE BASED E-COMMERCE CHATBOT

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Abstract:
This study aims to empirically cover the impact of the use of artificial intelligence through chatbots on online retail in terms of content implemented in the communication process. The presented research brings a contribution to the specialized literature by analyzing the perceived utility and demonstrating the facility, key concepts of the Technology Acceptance Model. In this sense, ten online stores in Romania were studied, selected according to the number of users, the research was carried out through a non-reactive method – content analysis. The data collection method was that of the "mysterious client" to not generate a change in the behavior of the entities studied. The interpretation of the data obtained through the content grid allowed a horizontal and vertical approach that led to a series of results that confirmed the low level of performance of market leaders and the high potential of this type of technology applied in the field. Regarding the impact of the use of chatbots, it has been shown that poor quality of the content displayed to users affects the consumer's journey, with the point of satisfaction not being reached in these conditions.
Keywords: Artificial intelligence, natural language understanding(NLU), Rasa framework, E-Commerce.

1. Introduction

Creating a positive experience in providing services to consumers has become a key strategy for gaining competitive advantage, and the ever-changing technology and the complex nature of a new society have changed the volume and diversity of the development of e-commerce has improved online activity and as buyer intelligence is accelerated using technology, retailers are trying to keep pace with the pace of evolution to qualify on the map of consumer perception. In the context of the contemporary market dominated by a "deep electronic phenomenon", its use is increasing, it is on the side of customers who have become more and more cautious and informed about the products and services they purchase. Thus, the artificial intelligence technologies used to involve end customers in the retail value chain appear. They focus on interaction at all stages of the consumer: pre-purchase, purchase, and post-purchase, improved support services, and sales support functions. Given the relatively new nature of the technologies specific to Artificial Intelligence integrated into e-commerce, especially chatbots, the studies present pros and cons regarding their acceptance. Some illustrate meeting user expectations, but others also argue against them. Polarization can be considered the ideal framework for the introduction of the research of the Technology Acceptance Model, first proposed by Davis (1985). Based on Rational Action Theory (TRA), TAM presents determinants of behaviors described as consciously intentional. In other words, a user's behavior is determined by the intention to use computer systems according to the perceived utility and the perceived ease of use. The authors of this study consider that the two concepts underlie the use of AI technology and can be analyzed from the perspective of the behavior of online commerce companies (hereinafter retailers) in the communication process.

What is natural language processing (NLP)?
Natural language processing, which evolved from computational linguistics, uses methods fromvariousdisciplines,suchascomputerscience,artificialintelligence,linguistics,anddatascience,toenablecomputerstounderstandhumanlanguageinbothwrittenandverbalforms.

What is natural language understanding (NLU)?
Naturallanguageunderstandingisasubsetofnaturallanguageprocessing,whichusessyntacticandsemantic analysisoftextandspeechtodeterminethemeaningofasentence.

1.   Objective:

To develop a project that Saveseffortand timefor E-commerce retailers and customers. This project has been undertaken which benefits the customers who shop online. The idea is to Simplify the process of online E-commerce platforms.

2.   Literature review:

Given that it is perceived as a relatively new technology, the chatbot application has been around for a long time, and the terms used have varied over time. This was recognized as an automatic conversation system, virtual agent, dialogue system, or chatterbot. The first notable appearance in the field is the chatbot ELIZA, developed by Joseph Weizenbaum in 1956, which was built using simple word-matching techniques, to simulate a psychotherapist, succeeding for the first time. given the interaction between a person and a computer through natural text language. Chatbots are currently defined as software tools that interact with users on a specific topic in the most natural way possible, and the message is conveyed in the form of text or voice to illustrate the applicability of this technology, it is mentioned that chatbots have been introduced in the Facebook platform (2016) with the role of accelerating and facilitating customer service processes, managed by organizations. Since then, they are considered an "important technological trend" with natural language skills, which can be configured to "converse" with use and provide information about products and services, or place orders online in real-time.

The context described above favors the introduction of a concept regarding the customers' journey along the marketing funnel, which is marked by the four stages: awareness, consideration, purchase intention, and satisfaction. Chatbots, through the forces of AI technology, act in the middle area of the marketing funnel, in the consideration stage, so that, in the interaction of users with instant messages set by retailers, they show a behavior close to the desire to purchase. At this point, reference is made to the two motivations inherent in the TAM model and the extension of the theory by associating with the qualitative nature of the chatbots content: perceived utility and perceived ease of use being two concepts influenced by the user's experience about the chatbot implemented by retailer. If chatbots provide high-quality information, positive effects are expected, even loyalty to them. Otherwise, consumers do not move to the next stage and do not reach the desired level of satisfaction. The completion of the process of going through all the stages of the funnel that the user goes through may depend on the experience with the chatbot.

3. Methodology
A.   Architecturalmodel:

The diagram below provides an overview of the Rasa Open-Source architecture. The two primarycomponents are Natural Language Understanding (NLU) and dialogue management.

NLU is the part that handles intent classification, entity extraction, and response retrieval. It's shownbelow as the NLU Pipeline because it processes user utterances using an NLU model that is generatedbythetrainedpipeline.Thedialoguemanagementcomponentdecidesthenextactioninaconversat ion based on the context.This is displayedas the Dialogue Policies in the diagram.
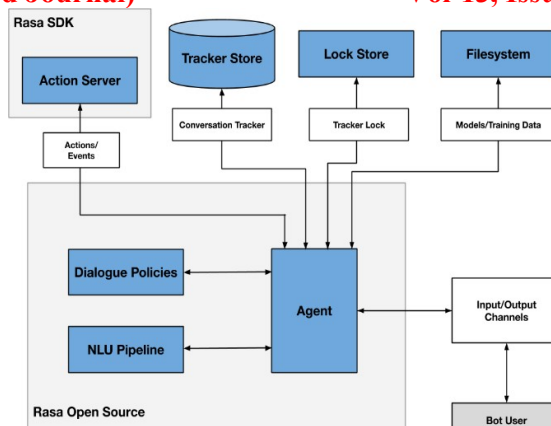
Fig 1.Architectural model

B.   Rasa framework files:

At the moment of writing this report, we have been using the latest version of the Rasa frameworkv2.xand in this release, the existing file structure and file extensions have changed from previousversions.Dealingwiththeframeworkchangedandbecamebetterandsmootherbyusingfileswith .yml extensions.

4.2.1. Intents: The file contains the Natural language understanding (NLU) model trainingexamples.

4.2.2. Entities: The important keywords that an assistant should take note of.

4.2.3   Utterances: Anything a user says. A single utterance is an entire sentence passed asinput to the Chatbot to intent.

Fig 2.nlu .yml file content

C.   Rasa NLU:

TheNLUmoduleisanswerableforconcludingalllanguageparsingtasks.Theforemostimportantofthose tasks are intent detection and named entity recognition. The implementation of the NLUmodule is modeled as a pipeline that processes the input text in consecutive steps called components.

So, it's crucial thing to grasp the components' lifecycle and the way they interact with one another.The figure below shows the Rasa NLU components' lifecycle. Before starting the pipeline, a contextobjectispassedamongcomponentsinorderthattheycandissipateinformation.

4.   Working and implementation
A.   The project consists of several parts, the most important of which are:

Actions section, which is the folder that contains 3 files in the Python programminglanguage. The

most important file is the Actions file, which contains custom Actions thatare built according to the need and purpose of the chatbot.

The data section contains 3 important files that cannot be dispensed with: thenatural language understanding file, which contains the training data necessary for the bot,which it is expected to receive during its operation from the user, and the rules file, whichcontains a certain structure that makes the bot act obligatory according to what exists,regardless of the circumstances in terms of the received data, and the story file, whichcontains scenarios of conversations with users, and all conversations are recorded withinthis file in .yml extension.

There is also a very important file, which is the domain that defines the universe inwhich your assistant operates. It specifies the intents, entities, slots, responses, forms, andactionsyourbotshouldknowabout.Italsodefinesa configuration for conversationsessions.

There are also configuration files, endpoints, and credentials that are responsible forthe overall properties and some permissions allowed for the bot and linking with chatchannelssuch as Slack and FacebookMessenger.

There is also the Models section, in which all models are stored after each bottraining. Every model we can say is like the nucleus or brain of the bot. The bot cannotworkand listen to the user'smessages and respond to themwithout the model.

After each bot training process, to get the latest results, you must choose thenewest model. Older models can be selected so that they can be compared with the newmodel in terms of additions.

B.   Testing environment and tools description:

Facebook   Messenger   and   Slack   were   used   as   test   environments   for thebotbutwereabandonedforreasonsmentionedinthechallengessection.Therefore, the testing of the bot was completed on the local host environmentby hosting the bot using NG Rock software, which creates a link that enablesusers outside the local environment to access and interact with the bot.

Not many testing tools were used, so to speak, a set of commands dedicated tobot testing were used by the developers of the framework, namely:

- rasa test.
- rasa data validate.
- rasa test NLU
- rasa data split NLU

5.   UI Description
A.   Rasa actions server terminal screen:

The Rasa action server runs custom actions for a Rasa Open-Source conversationalassistant. When your assistant predicts a custom action, the Rasa server sends aPOST request to the action server with a JSON payload including the name of thepredictedaction,the conversation ID, the contents of the tracker, and the contentsof the domain. When the action server finishes running a custom action, it returns aJSONpayloadofresponsesandevents.SeetheAPIspec for details about therequest and response payloads. The Rasa server then returns the responses to theuserand adds the eventsto the conversation tracker.

Fig3.   Rasa X terminal screen

B.   **Rasa training log screen**:

Fig 4.   Rasa training log screen

Fig 5. Rasa action server screen

6.   **Results**
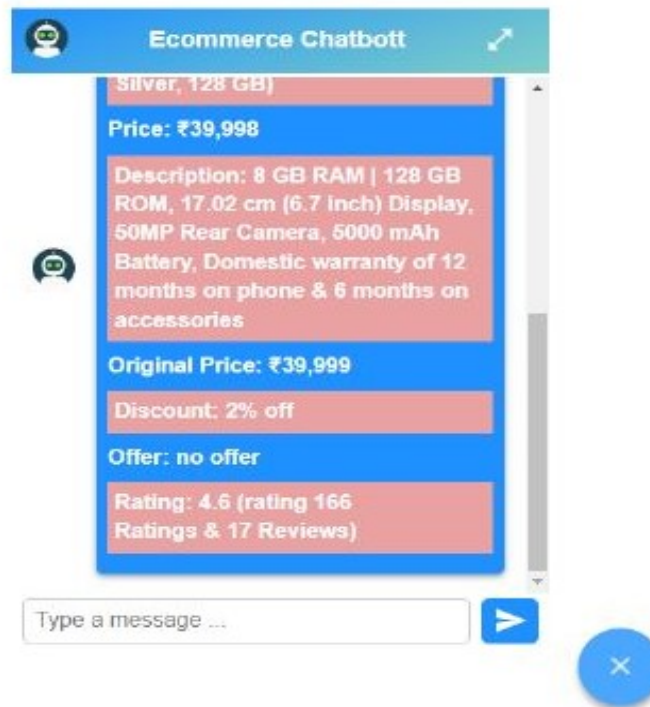
Fig 6 Mobile version
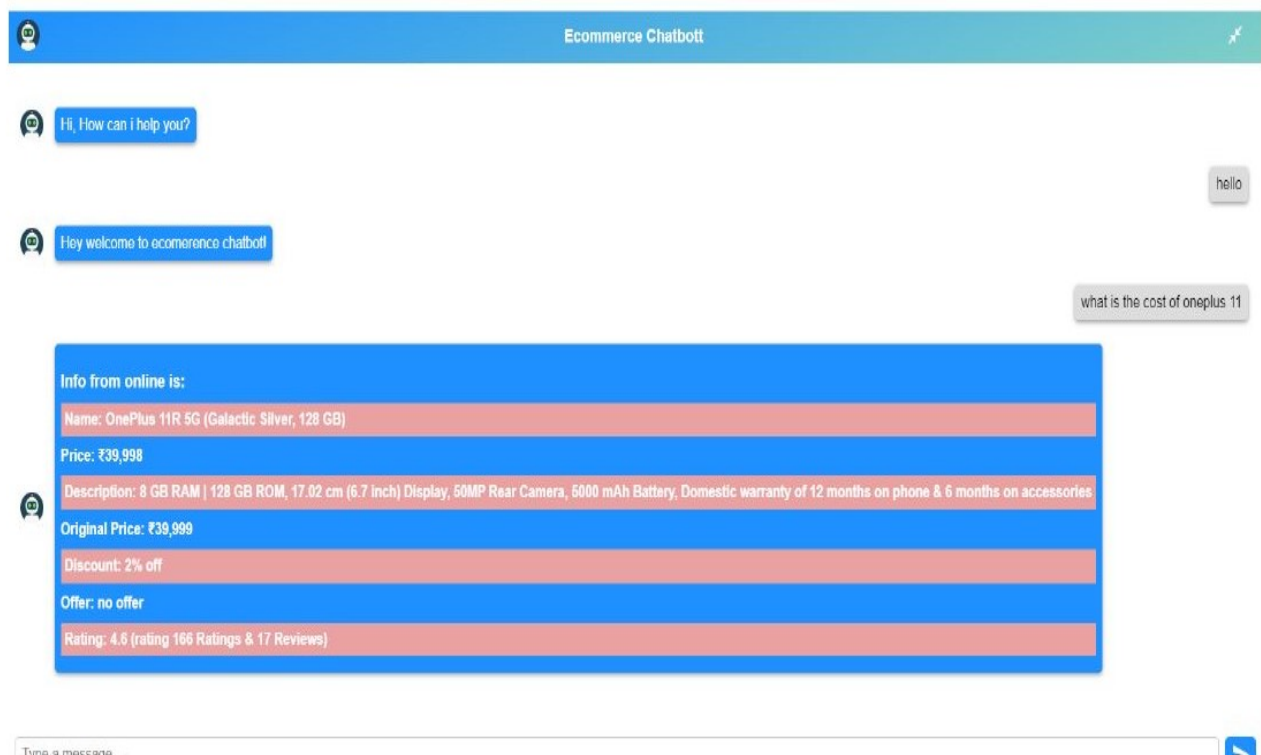
Fig 7 Desktop version
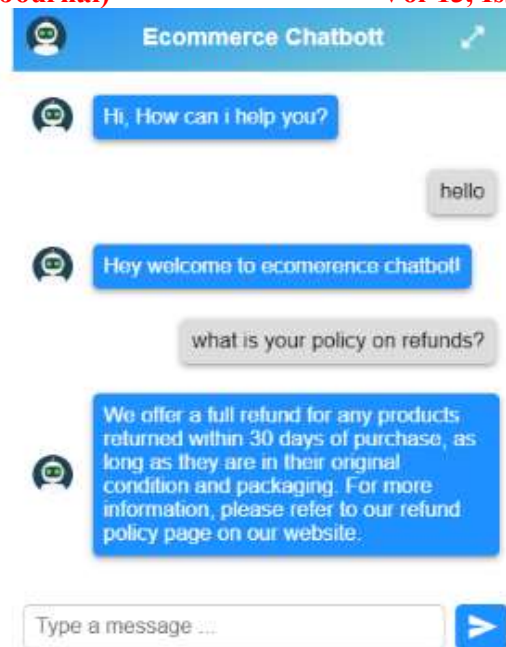
Fig 8Responses for user input (mobile version)
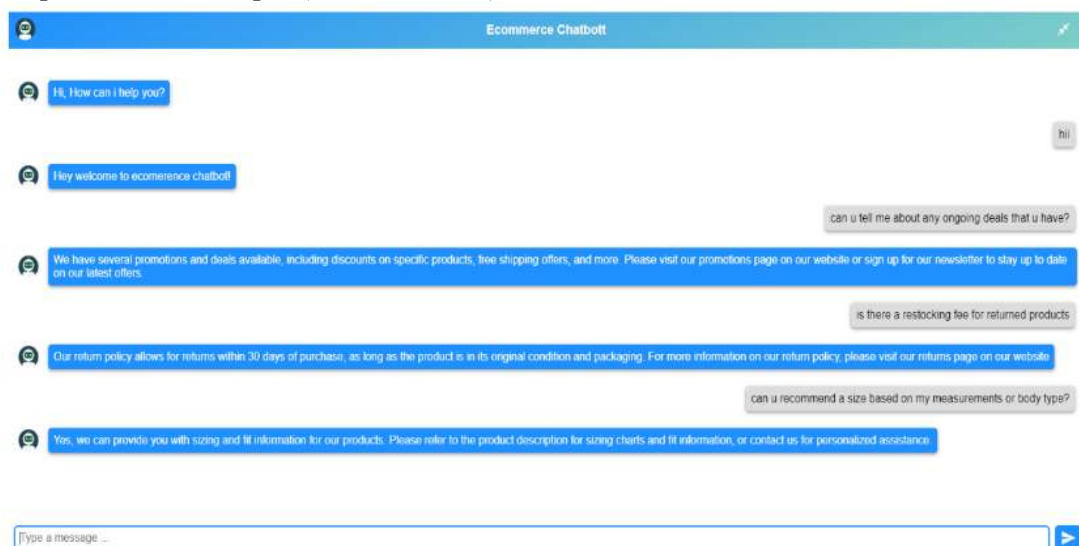
Fig 9 Responses for user input (desktop version)

7. Advantages
A. Chatbot benefits for businesses:
- Personalized customer service
- Simplifies the purchase process.
- Reduce customer care costs.
- Improves user experience.
- Boost team productivity
- Service integration opportunity

8. Summary

The article contributes to the specialized literature through the detailed information obtained regarding the activity of retailers practicing retail in the online environment in Romania. By

addressing the Technology Acceptance Model, the paper presents a new perspective by extending the two inherent elements, perceived utility, and perceived ease of use, by applying measures to achieve a high degree of interaction in the process. communication via chatbots. The poor quality of the content displayed through the basic chatbots generates consumer dissatisfaction, especially in the pre-purchase stage, when users- potential customers - are interested in communicating in real-time with retailers. The article warns that chatbots are in an early stage of development, with a lack of personalization of messages, inappropriate timing of responses, and less relevant texts to request customers in different stages related to the marketing funnel. Following the results, the authors consider that although implemented at a basic level, artificial intelligence can help improve personalized support functions, if chatbots are technically competent to continue the conversation at the request of users and if the response time is publicly visible on retailers' Facebook pages, which increases users' commitment to them. The academic environment can play a particularly important role by encouraging entrepreneurial education for students, from the perspective of using new technologies for a competent and sustainable entrepreneurial ecosystem of the future.

It can be concluded that the managerial implications are represented by the development actions that retailers must initiate within the organization. The authors recommend to the organizations from the economic environment the monitoring of the stages in which the target public is and the analysis of the level of acceptance of the use of the new technologies within the course undertaken by the potential clients. From this point of view, the general conclusion of the paper is outlined around the scenario in which online stores in Romania must apply AI technology solutions through basic chatbots, to deliver information on the following issues: availability and cost of products in stock, products personalized, personalized assistance and popular products, transmitted by approaching a form of personalized addressing, by using the first name

9.   References

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