Automated Customer Support System (Chatbot) to Enhance Web-based Financial Application Services using Artificial Intelligence

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Certification

This is to certify that Roqib Akintunde Akinyemi with matriculation number CU/PG/001893 carried out this research work titled "Automated Customer Support System (Chatbot) to Solve Web-Based Financial and Payment Application Services" in the Department of Computer Science, Faculty of Natural and Applied Sciences, Lead City University, Ibadan, Oyo State, for the award of Master of Science (MSc) in Computer Science and that this has not been previously submitted.

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Supervisor

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Dr. Wilson Sakpere **Date**
Head of Department
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Dedication

This research work is dedicated to God, my parents, my wife, and my children.

Acknowledgement

Foremost, I would like to express my gratitude to the leadership of the Lead City University, Ibadan for creating a medium for us to acquire knowledge for self-reliance.

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"Even though the above-mentioned institutions and persons have assisted in the process of this research work, I alone stand responsible for the errors, if any, found in the work".

Abstract

Customer support is perhaps one of the main aspects of the user experience for online services. However, with the rise of natural language processing techniques, the industry is looking at automated chatbot solutions to provide quality services to an ever-growing user base. In view of this, the chatbot was developed using Artificial Intelligence Markup Language (AIML) java interpreter library Program AB (an experimental platform for the development of new features and serves as the reference implementation) which helps match input and output predefined in the AIML file. AIML was used to preprocess and train the bot using ready-made AIML file for Frequently Asked Questions. Also, vaadin was used to build a web user interface to interact with the trained AIML bot. Finally, a google script was written to translate from any language to English for the bot to understand and send the response in the preferred language of the user. Findings showed that the response time of the bot is dependent of the network, as the design gave a score of 70%, 80%, and 90% for load testing, stability, reliability testing and usability testing, respectively. Also, the bot is compatible with different operating systems, both for forward compatibility and backward compatibility having a score of 95%. The bot was able to answer customer questions, enquiries and complaints and the response time of the bot depends on the strength of the network since it is web based. Hence, the system provided a simple, cheaper, and durable customer financial and payment application service. It is therefore recommended that any company incorporating a chatbot should make sure that the chatbot is highly secure due to attacks and routine queries. It should also be standardised to deliver a high level of performance since chatbots will not be able to solve all queries.

Keywords: Chatbot, Customer Support, Google Script, Online Service, Testing
Word Count: 298 Words

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List of Abbreviations

DARPA-	Defense Advanced Research Projects Agency
CALO-	Cognitive Assistant that Learns and Organizes
AIM-	Artificial Intelligence Marketing
AI-	Artificial Intelligence
ERP-	Effective Radiated Power
FAQ-	Frequently Asked Questions
LSTMs-	Long-Short-Term Memory units
AIML-	Artificial Intelligence Mark-up Language
XML-	Extensible Mark-up Language
NLU-	Natural Language Understanding
DM-	Dialogue Management
RG -	Response Generation
TTS-	Text-To-Speech
LSA-	Latent Semantic Analysis