KEY PERFORMANCE INDICATOR CALCULATOR FOR CALLS IN CUSTOMER SUPPORT CALL CENTER IN UGANDAN FINTECHS

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Abstract—The Key Performance Indicator for Customer Support call centers is a machine learning project that involves building a system and a model that takes in recorded voice calls as input, translates conversation to text using speech-to-text recognition, and process the text conversation to pick measurable insights such as Turn Around Time (TAT), Service Level Agreement (SLA) and other useful details in form of graphs or tabular aggregations which is easily interpreted by the company management and senior team to make more informed decisions.

Index Terms—Key Performance Indicator(KPI), Turn Around Time (TAT), Service Level Agreement (SLA), speech-to-text

I. INTRODUCTION

Reduced costs in telecommunications and information technology have made it increasingly cost-effective to consolidate information delivery functions such as Voice over Internet Protocol (VoIP), leading to the creation of groups that specialize in handling customer telephone calls. For many of these groups, their primary function is to receive customer-initiated phone calls. However, the data that is processed during voice calls is not analysed and evaluated, which limits organizations in evaluating their performance and effectiveness [7].

II. BACKGROUND

The fastest and easiest way to understand your customer base and their problems is to reach out to them. However, there are problems associated with this, such as time-consuming, the need for many trained workers, and practically it is done between a defined period [14].

Most customer-facing companies, such as fin-techs, at least have a complete customer experience or subcontract to external companies that provide both operational and technical support on behalf of their business [13].

The above customer support mods have a similar issue. Some of these issues included but were not limited to:
- Difficult to gain insight into recurring customer issues, business performance, employee recognition by customers, SLAs and other potential business areas requested by potential customers. Therefore, there is a need to incorporate artificial intelligence into KPI measurement systems.

III. SIGNIFICANCE OF PROJECT

A. Customer Support Call Center

Customer service call centers are the first point of contact between customers and businesses. These centers are responsible for answering customer questions, solving problems and providing information about products and services. In order to provide excellent customer service, companies need to have a system that accurately identifies and categorizes calls. A good call center management software should be able to identify the type of call and assign it to the appropriate agent based on their skills.

B. Key Performance Indicator (KPI)

A KPI is a quantifiable measure of performance that is used to evaluate the success of a business or organization. KPIs are often used to measure the effectiveness of marketing campaigns, sales strategies, and operational processes. Companies use KPIs to determine whether they are meeting their goals and objectives.

C. Machine Learning and Artificial Intelligence

Machine learning is a subfield of artificial intelligence that focuses on algorithms that teach computers how to learn without being explicitly programmed. Machine learning involves using statistical techniques to create computer programs that automatically improve over time.

IV. PROJECT SCOPE

- To develop a desktop application that uses machine learning to analyse and categorizes VoIP calls according to the organization's activities in relation to the issues being received through calls as well as making futuristic performance predictions.

- Developing a model using Machine Learning (AI) techniques to predict KPIs based on historical data.
- Collect data from various organizations that currently use VoIP systems in their work areas.
- Evaluating the performance of the model using real world data.
- Identifying the best performing model among different models developed.
- Analysing the results obtained from the evaluation phase and identifying the reasons behind the poor performance of some models.
- Providing recommendations to improve the performance of the model.
- Presenting the findings at the end of the project.
- Preparing a report about the project.

V. Problem Statement

The problem this project will address is the un-analysed voice calls received at the call centers. Performance evaluation of the organization tends to be hectic as there are usually large piles of data to evaluate in limited time. This gives a lot of room for making mistakes during evaluation.

Call center operators, put more emphasis on solving issues that come from calls but none on the number of calls received concerning a particular issue so that they can get long term solutions to the problem.

This project is designed to provide accurate information about calls by providing a summarized and categorized output of received calls in form of a simple graph or table. The project is aimed at increasing the accuracy of the information about voice calls. The final product will be a desktop that will analyze customer calls thereafter out puts the results in form of a KPI graph.

VI. Research Questions

Are Key Performance Indicators metrics collected efficiently for customer support personnel that handle customer calls?

Is the Turn Around Time for calls measured with a reasonable degree of accuracy by Customer Support Managers?

Is Issue logging and tracking at customer support calls the most effective way to get measurable and discrete insights from customers?

VII. Research Objectives

- To create an effective speech analysis system for phone call conversations in business customer support centers.
- To easily track the Service Level Agreements (SLAs) of phone calls made in business customer support centers.
- To get the average Turn Around time (TAT) between issue reception to issue resolution in business customer support centers.
- To accurately track Key Performance Indicators (KPI) for customer support personnel when they respond to customers in call centers.

VIII. Dataset Description

The following are sources of the dataset to be used to train the artificial intelligence model to perform kpi predictions:-
a. Data set Source 1

Link: https://ca.talkbank.org/access/CallFriend/eng-n.html

Description: Audio dataset is comprised of 58 participants, all USA residents ,Digital Object Identifier(DOI) 10.21415/T5B61M

Data set Features Include: Gender, Age and Location
b. Data set source 2.

Link: https://ca.talkbank.org/access/CallHome/eng.html

Description: Audio dataset is comprised of 120 participants, all USA residents ,Digital Object Identifier(DOI) 10.21415/T5KP54

Data set Features Include: Gender, Age and Location.

IX. Artificial Intelligence Methodology

The system will be able to receive calls and the voice analysis algorithm will perform real time voice analysis. At this level, accurate information is of a high importance since it determines how calls will be correctly categorized to the right service delivery in relation to the client's issue. The algorithm will use a combination of Speech recognition APIs from well-known portable languages such as Java and Python. The algorithm will be able to recognize speech through employing techniques such as:-

- Simple pattern matching where each spoken word is recognized entirely This kind of speech recognition is usually employed in the automated call center and has been answered by a computerized switchboard.
- Pattern and feature analysis where each word is broken into bits and recognized from key features such as the vowel it contains
- Language modeling and feature analysis, in which the knowledge of the grammar and probability of certain words and sounds following on from one another is used to speed up recognition and accuracy.

The algorithm will convert speech to text and then make comparison of this text to the inbuilt category features.

The category features will include the organizations service and products for instance for the case of a telecommunication company. Issues like airtime, sms, internet usage, mobile money, inquiries about service delivery and network signals will be included in the category features.

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