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ABSTRACT

A contact center routes an incoming customer contact by selecting an agent based on a number of factors. One of those factors is agent proficiency, which is typically configured as different skills and attributes that are associated to an agent. Currently, such skills and attributes are manually configured in contact center solutions and updated by an agent's supervisors and management operatives based on their periodic assessment of an agent's performance and skills. Techniques are presented herein that support an automated solution for the updating of the skills, attributes, and proficiencies that are associated with contact center agents. Under aspects of the presented techniques, agent particulars may be tuned continually, on an ongoing basis, based on the different types of data that is collected during contact center operations (including, for example, call handling metrics, customer survey results, etc.) and historical metrics. Such an automated approach obviates the need for contact center supervisors and administrators to constantly tinker with agent re-skilling during contact center operations and enables a contact center to automatically provide the optimal experience for customers, agents, and supervisors.

DETAILED DESCRIPTION

As an initial matter, it is important to note that the use of the term "call" in the narrative that follows may refer to any media channel (such as, for example, voice, email, Short Message Service (SMS), chat, social media, etc.) and not just voice calling.

A contact center routes an incoming customer contact over any media channel (such as, for example, voice, email, web chat, or social media) by selecting an agent based on a number of factors. Such factors may include the potential a priori identification of the customer, attributes associated with the customer, context provided by the customer for that particular interaction (during, for example, the self-service phase of the interaction), the proficiency of an agent to handle the customer and their context, etc.

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Agent proficiency in a contact center environment is typically configured as different skills and attributes that are associated to an agent. Such skills and attributes are manually configured in contact center solutions and updated by an agent's supervisors and management operatives based on their periodic assessment of an agent's performance and skills.

There are many data points that influence the updates to an agent's skill levels and attributes. These include, but are not limited to, an average handle time, a percentage of first call resolutions, customer survey scores, key performance indicators, etc. Manually analyzing such a volume of data, and then subjectively updating an agent's skills based on that manual analysis, is a labor-intensive and error-prone task for contact center supervisors and business operatives. Additionally, such manual updates lag behind the real-time data that is available to the contact center. A suboptimal assessment of an agent's skills and proficiencies leads to contact center operational inefficiencies and poor customer satisfaction, eventually resulting in an adverse impact on business outcomes and revenues.

To address the challenges that were described above, techniques are presented herein that support an automated methodology for computing and updating agent skill levels and proficiencies on a continual basis based on all of the data that is available to a contact center. The presented techniques enable the routing of an incoming interaction to the agent that is best suited to handle that interaction at that instance in time, resulting in an optimal experience for the customer, the agent, and contact center operations as a whole.

The presented techniques support the derivation of a methodology that may automatically compute the proficiency of agents during contact center operations in a continual manner by using the factors that were previously mentioned. After a customer contact has been handled, metrics that are used to compute an agent's proficiency and skill levels (including, but not limited to, the measures that are described below) may be collected and analyzed as described and illustrated below. The results of that analysis may then be used to immediately update an agent's proficiency levels, which, in turn, may then be used by a contact center's routing algorithms for routing subsequent contacts.

As noted previously, the techniques presented herein incorporate a number of metrics. The next section of the instant narrative discusses those measures and describes how they may be calculated.

One metric may include a customer satisfaction score. The value of such a score may be derived from survey metrics that are optionally provided by a customer after the end of an interaction. A customer satisfaction score rates an agent's handling of the call and the customer's level of satisfaction with the call and with the resolution of any issues. Another metric may encompass a first call resolution metric. For example, a customer becomes highly dissatisfied when they need to make repeated calls to a contact center to get their issue resolved. This metric captures the percentage of calls that an agent handled that resulted in resolving a customer's issue during the very first call that was placed by the customer.

Yet another metric may encompass a net promoter score. This quantitative score is typically an optional input that is provided by a customer in a post-call survey that indicates whether the customer would be willing to recommend the business to their professional and personal networks (as the case may be) and their level of willingness to accept a promotion. Yet another metric may encompass handle time, which is a measure of how long an agent normally takes to handle an interaction. The optimum value depends upon a number of factors (including the type of media channel, the type of customer, the complexity of the issue, etc.) and is typically established in service-level agreements (SLAs) that are set by the contact center operatives and a business. For example, a voice call for product information may need to be handled within three minutes, while an email for a product or service issue may need to be answered within 72 hours. Another metric may include a business conversion score, which is a measure of how often an agent is able to upsell additional products and services to satisfied customers.

Since different metrics are measured against different scales and may be assigned different ranges, the techniques presented herein normalize all of the involved metrics to the range of zero (0) to one (1) to be able to compute proficiency scores through the combination of various metrics.

For example, a customer satisfaction score and a net promoter score are typically expressed in a range from 1 to 5 or in a range from 1 to 10. An average handle time is frequently measured in terms of seconds, which must be normalized to a value between 0 and 1. Contact centers typically define the optimum handle time for an interaction as a range. For a voice call, they may set the maximum value as 200 seconds and the minimum

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value as 100 seconds. These values are defined by the contact center administrators based on their business requirements. A normalized handle time score may be computed using the following formula:

$$HandleTimeScore = 1 - (\frac{HandleTime - MinHandleTime}{MaxHandleTime - MinHandleTime})$$

It is important to note how potential boundary conditions in the above-described calculation are addressed by the techniques presented herein. If the calculated value is greater than 1 (i.e., the handle time is less than the minimum handle time) then it will be fixed to 1. If calculated the value is negative (i.e., when the handle time is greater than the maximum handle time) then it will be set to 0.

A business conversion score will typically be a binary value – i.e., either an interaction resulted in new business or it didn't. Such a value essentially measures the ability of an agent to induce customers to sign up for new business. A business conversion score may be computed using the following formula:

$$BusinessCovnersionScore = \frac{SuccessLeads}{TotalLeads}$$

According to the techniques presented herein, in addition to the above-described metrics a number of call context attributes may also be captured for each interaction. A first call context encompasses business function. This value captures the business request for which an incoming call is made to a contact center. Such a call may be made for business functions such as support, sales, billing, etc. and may be used for verticals such as banking, telecommunications, consumer products, etc. Importantly, the content of this field will be the name of a business function and not a metric. A second call context encompasses language. This value captures the language through which a customer interaction is completed. Such a language may be English, Spanish, French, Hindi, etc. Importantly, the content of this field will be the name of a language and not a metric.

Figure 1, below, presents elements of an illustrative processing flow that is possible according to aspects of the techniques presented herein and that is reflective of the above discussion.
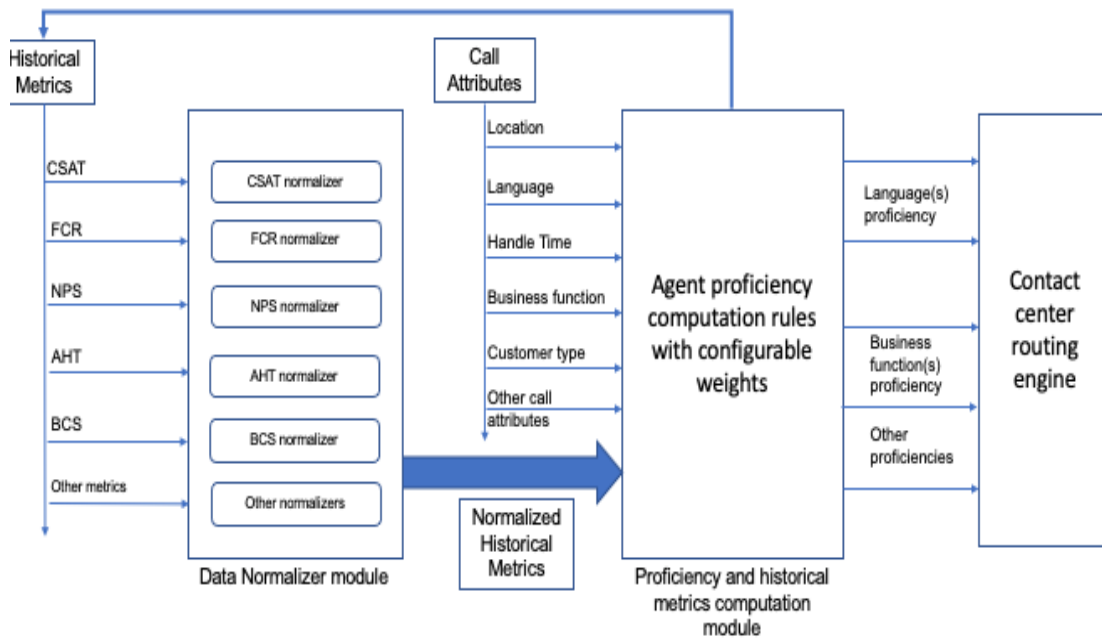
Figure 1: Illustrative Process Flow

The processing pipeline that was illustrated in Figure 1, above, incorporates different contact center metrics (as described previously) such as customer satisfaction (CSAT), first call resolution (FCR), net promoter score (NPS), average handle time, business conversion score (BCS), and other historical metrics. During the agent proficiency computation stage, each call's agent and customer location, language, handle time, business function, customer type, and other call attributes may be used within the computation. The module that was indicated in Figure 1, above, may also provide feedback that may be employed to update the relevant historical metrics such as average handle time and business conversion score.

In order to compute an agent's proficiency, a contact center may, according to aspects of the techniques presented herein, choose to employ a simple update mechanism whereby the metrics for each interaction are used to recompute the proficiency and skill levels at the end of each interaction. Alternatively, a contact center may choose to employ more sophisticated mechanisms such as a moving average over a rolling window of n samples, as expressed through the following formula:

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$$Metric = \sum_{i=1}^{n} \left(\frac{NormalizedMetric}{n} \right)$$

In addition to the above-described activities, under the techniques presented herein other mathematical computations may also be employed and the computed measures may be provided as metric input as feedback for historical metrics.

The computation of proficiency may be based on single normalized metrics or on a combination of multiple normalized metrics with a weighting factor for each metric. The following formula illustrates the calculation of the overall proficiency of an agent for a business function through the use of multiple metrics:

$$Proficiency_{BusinessFunction} = AverageHandleTime_{metric} * P + CSAT_{metric} * Q + FCR_{metric} * R + NPS_{metric} * S$$

In the above formula, the variables P, Q, R, and S represent weighting factors that are established by a contact center administrator for their deployments.

The following formula illustrates the calculation of the language proficiency of an agent for a specific language through the use of multiple metrics:

$$Proficiency_{Spanish} = CSAT_{Spanish} * P + FCR_{Spanish} * Q + AverageHandleTime_{Spanish} * R$$

In the above formula, the variables P, Q, and R represent different weighting factors.

Proficiency may be computed as a value that lies within a range from 1 to 10, where a value of 1 is the lowest rating and a value of 10 is the highest rating. Such a proficiency may be applicable once an agent handles a minimum number of calls within a business function.

According to the techniques presented herein, the computed proficiencies may be updated against an agent and the contact routing algorithms may then use that data to select the most optimal agent for a particular interaction.

Aspects of the presented techniques may be further explicated through two illustrative use cases. Under a first use case, a credit card holder calls a contact center multiple times to revert an incorrect interest charge. To address this customer's grievances, the most proficient agent must be selected to address the problem and improve the customer's overall satisfaction. This may be achieved by selecting an agent with the following proficiencies:

$$Agent\ Selection = Proficiency_{CreditCard} \geq 8\ \&\&\ FCS_{CreditCard} \geq 8\ \&\&\ CSAT_{CreditCard} \geq 8$$

Under a second use case, a Spanish-speaking customer wishes to establish a new mobile connection from a telecommunications company. To convert the potential new business into actual business, the best agent must be selected based on the proficiencies that are needed to handle the instant business lead. This may be achieved by selecting an agent with the following proficiencies:

$$Agent\ Selection = Proficiency_{Sales} \geq 8\ \&\&\ BCS_{Sales} \geq 8\ \&\&\ Language_{Spanish} \geq 8$$

As described and illustrated in the above narrative, the uniqueness of the techniques presented herein encompasses the automated measurement of competency based on actual agent work history and customer feedback regarding an agent. The accuracy of such an approach is high as it is based on real-time contact center data and it will be continually tuned as the agent handles the contacts, leading to more autonomous contact centers. The approach will also add an additional capability for reporting on agent proficiency, so that it serves as feedback for agents to improve their proficiency levels.

In summary, techniques have been presented herein that support an automated solution for the updating of the skills, attributes, and proficiencies that are associated with contact center agents. Under aspects of the presented techniques, agent particulars may be tuned continually, on an ongoing basis, based on the different types of data that is collected during contact center operations (including, for example, call handling metrics, customer survey results, etc.) and historical metrics. Such an automated approach obviates the need for contact center supervisors and administrators to constantly tinker with agent re-skilling during contact center operations and enables a contact center to automatically provide the optimal experience for customers, agents, and supervisors.