July 2023

DETERMINING WAIT TIME FOR RETURN OF MISSED CALL

Ray Fallon

Keith Griffin

Follow this and additional works at: https://www.tdcommons.org/dpubs_series

DETERMINING WAIT TIME FOR RETURN OF MISSED CALL

AUTHORS:
Ray Fallon
Keith Griffin

ABSTRACT

Techniques are presented herein that help a calling party understand how long they should expect to wait, following a missed telephone call to a called party, to receive a return call from the called party. In support of that functionality, the presented techniques may learn about a called party's behaviors (through, for example, entries in their electronic calendar, entries in a to-do list, etc. and their calling patterns) and create (e.g., reminder) entries in a called party's calendar. A first aspect of the presented techniques encompasses determining an amount of time that should be allowed for a call between a calling and a called party; a second aspect encompasses determining when a called party is next available to make a call; and a third aspect encompasses determining the times when a called party typically returns calls.

DETAILED DESCRIPTION

Normally, when a person makes a telephone call to someone who is not available, they receive a voice greeting indicating that the person that they are trying to reach is unavailable to take their call and they are then prompted to leave a message. However, such a caller would like to know, at least approximately, when they might receive a call back. For example, an important sale or decision could be missed because the caller does not have a sense for when their call will be returned. It would be helpful if the caller could receive such an indication based on the availability of the called party and on the called party's behavior in responding to telephone calls. As well, the timely return of a missed call may be further impacted by a called party not remembering when to return a call or not budgeting sufficient time for such a return call.

Techniques are presented herein that support an automated facility for helping a calling party understand how long they should expect to wait, following a missed telephone call to a called party, to receive a return call from the called party. The presented techniques

6914

leverage information regarding the availability of a called party and the called party's behavior in responding to telephone calls.

The presented techniques may be understood through an illustrative example where a first person (Party A) calls a second person (Party B). Party B may be on another call, may be unavailable to take Party A's call, or may decide not to take the call. According to the presented techniques, Party A will receive a voicemail greeting indicating when they might expect to receive a call back from Party B based on Party B's schedule and their callback pattern.

A first aspect of the techniques proposed herein encompass determining the amount of time that should be allowed for a call between Party A and Party B. Such a call will take a certain amount of time to complete, with that time depending upon Party A, Party B, and the nature of the call. The presented techniques only determine the approximate time that calls take between both of the parties or, if not enough information is available, the approximate time that general calls last from Party B. The techniques do not attempt to discern from the nature of the call how long such a call will take, although aspects of the presented techniques could be extended to make such a determination.

While the presented techniques learn over time, they may be initially seeded with a normal amount of time that people take to make calls, which may be referred to as $t(g)$. If information about an organization is known, then such a measure may be supplanted with a time $t(o)$ if the variance is smaller than for $t(g)$. If sufficient information is known about Party B, then the time that Party B normally takes on calls ($t(u)$) may be used instead. Finally, if enough information is known about calls between the two parties (i.e., between Party A and Party B) then that time ($t(ab)$) may be employed. Each of these values (i.e., $t(o)$, $t(u)$, and $t(ab)$) may be adjusted over time depending upon how long calls take within an organization, for Party B and between Parties A and B, respectively. For the purposes of the balance of the instant discussion, the above-described time may be referred to as $t(x)$, where $t(x)$ is either $t(o)$, $t(u)$ or $t(ab)$ whichever has a smaller variance.

A second aspect of the techniques proposed herein include determining when Party B is next available. Determining when someone can, or is willing to, return a call is subject to human behavior and is, therefore, not an exact science. Additionally, it is important to set reasonable expectations and it is better in the end to exceed those expectations. For

those reasons, the presented techniques learn from a user's behavior rather than make initial assumptions. However, such a learning process does not guarantee that calls will be returned when they are predicted. Consequently, the presented techniques continue to learn and use calendar reminders to help keep Party B appraised of when Party A was notified of a predicted callback.

Operationally, the techniques of this proposal may be initiated by sending a voicemail greeting to Party A announcing that Party A can expect a call back from Party B as soon as possible (or some equivalent language). Note that this may comprise a standard voicemail greeting during which no specific callback time is given.

Next, Party B's calendar may be used to determine when Party B is next available. This could be straight away if, for example, they just decided not to answer the telephone. The techniques also allow sufficient time for a return call to be made (i.e., the time amount t(x)). An entry may then be created in Party B's calendar containing a speech-to-text copy of the above-described message, an identification of Party A, an indication of when the voicemail system announced that a call would be returned, and the anticipated call duration t(x).

Figure 1, below, presents elements of an exemplary calendar entry according to the techniques presented herein and reflective of the above discussion.
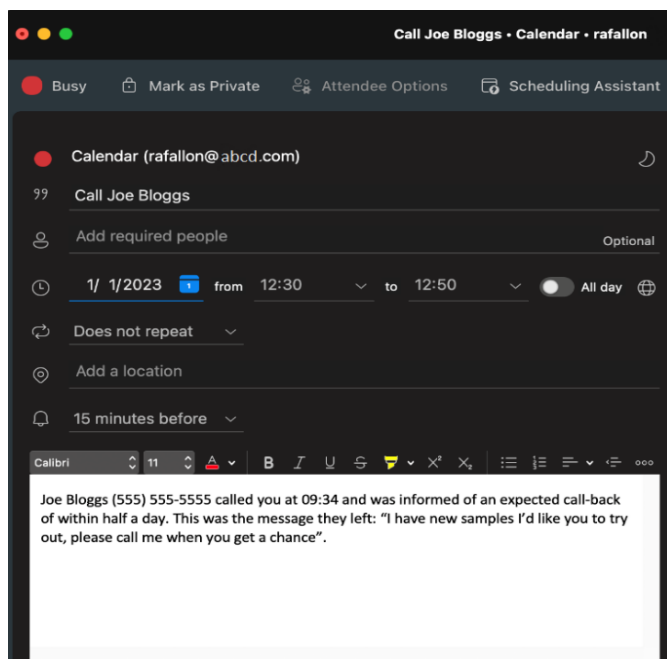
Figure 1: Exemplary Calendar Entry

Depending upon when Party B returns the call, the system may then learn to make more accurate predictions regarding when Party B is likely to return calls to various parties. For example, if Party B normally returns calls according to their calendar entries, then the techniques may adjust the content of above-described voicemail greeting (indicating when Party B is likely to return a call) to be closer to the time of the event in the calendar. However, if Party B tends to ignore such calendar events, then the voicemail system may continue to provide a generic greeting. Further, if Party B tends to make return calls sometime after an event, the techniques may learn from this and adjust the predicted callback time for future interactions to reflect such a usage pattern. It is important to note that the above-described activities may vary depending upon who Party A is, the behavior of Party B to the return call requests, and how that behavior changes over time.

A third aspect of the presented techniques encompasses determining typical times when Party B returns calls. People have different calling patterns. Some people must return a call as soon as they can, while other people are more disciplined and return calls together at, for example, lunchtime or the end of the day. Either way, a calling pattern may change depending on the identity of Party A. For example, an individual might be inclined to return a call to a customer more urgently than they would to a cold call. The presented techniques

may record the calling pattern of Party B for calls generally in a vector T(g) and for calls to Party A in a vector T(ab). The techniques may also employ clustering techniques and consider Party B's calendar. For example, if Party B calls Party A, even if there is a calendar entry for Party B, then obviously Party A is fairly important, so future calls may be expected to be returned more quickly than others. In another example, Party B may make calls when they have a certain amount of time (such as, for example, one hour) available to do so regardless of the typical duration of a call. This information may be used in conjunction with the above-described approach to send an email message to Party A regarding when they can expect to receive a call from Party B.

As noted previously, human behavior may play a part in the above-described activities. For example, just because someone is available to return a call that does not necessarily mean that they will make such a call. While some people are diligent in returning telephone calls, others are not. Additionally, whether or not someone will return a call may depend upon the relationship between the two parties (e.g., a customer call may be returned faster than a cold call). Predicting callbacks, like everything that resides in the prediction space, is not infallible, but it is better than simple rules or no mechanism at all. For example, such a prediction cannot take into account the possibility that Party B may reply to Party A through some out-of-bounds means such as placing a call on a different telephone, sending a text message, sending an email message, or even having a physical conversation in a corridor though the more integrated these systems are the better and they would enhance the mechanism. It is important to note that the presented techniques may be augmented to account for known or connected means (such as, for example, email systems or linked mobile telephones). However, for cases where return call information is known, it is logical to conclude that a return call may be predicted for those individuals who have roles that involve a significant number of telephone calls.

In summary, techniques have been presented herein that help a calling party understand how long they should expect to wait, following a missed telephone call to a called party, to receive a return call from the called party. In support of that functionality, the presented techniques may learn about a called party's behaviors (through, for example, entries in their electronic calendar and their calling patterns) and create (e.g., reminder) entries in a called party's calendar. A first aspect of the presented techniques encompasses

determining an amount of time that should be allowed for a call between a calling and a called party; a second aspect encompasses determining when a called party is next available to make a call; and a third aspect encompasses determining the times when a called party typically returns calls.