

## **Method of balancing influence in a group call by manipulation of participants' voices**

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### **ABSTRACT**

The method presented in this publication helps address the issue of the influence of dominant participant of the group call on other callers when each opinion is valuable and can bring something relevant to the overall assessment of the situation.

People subconsciously associate certain features of a voice, such as the lower pitch, as related to authority. In our method, we would like to change that reception, weaken the influence of dominating people by changing the sound of their voice in such a way that other callers wouldn't become intimidated by them. The change would include raising the pitch of voice but is not limited to one such modification.

This method can also be used to increase the influence of more submissive conversation participants by modifying their voice.

### **PROBLEM**

One of the most critical advantages of teleconferencing is time-saving. In a group call information from all participants can

be gathered much quicker. One can also discuss any doubts and work out a common position. Group call could be used when public safety officers exchange information about an incident. In a large group of people, some of them may argue about some fact, but each view is equally important to assess the situation.

Although a group call is a great method for handling incidents and getting perspective from different participants, every group talk may have an issue of influencer presence. Somebody from participants can be very assertive or have higher authority than others, and he can silence other speakers, influence their opinions, "explain" what others say, which can distort information. Let's call that person an influencer. As described below, even the characteristics of the voice may make the person have an increased influence on the opinion of others.

On the other hand, we may have in a group conversation a person with useful insights or information, but without enough attention from other conversation participants, due to her manner of speaking / the characteristics of the voice.

Several studies claim that there is a link between the characteristics of the voice and the influence of the person over the group. We know from [Ref. 1] that people who pitch their voice lower in the first moments of a conversation are seen as more dominant, and thus more influential. We even know that people change their voice when they perceive another person as dominant ([Ref. 2]).

## **SOLUTION**

Artificial Intelligence system listens to the talk on a group call, explores the behavior patterns of the participants and analyzes the characteristics of their voice assessing the potential influence on others. It determines an influence metric for each person in the group call.

When the impact of each participant on others is known the system balances the influence of participants in conversation through manipulations of sound.

- When a person deemed to be an influencer talks, before transmitting her voice to the conference call, the system modulates its characteristics to change reception among listeners. E.g., it heightens the voice pitch.
- In the opposite case, when a less influential person talks, her voice is modulated to increase her influence by, e.g. lowering the voice pitch.

According to cited scientific research from [Ref. 1] and [Ref. 2], the effect manifests itself quite early

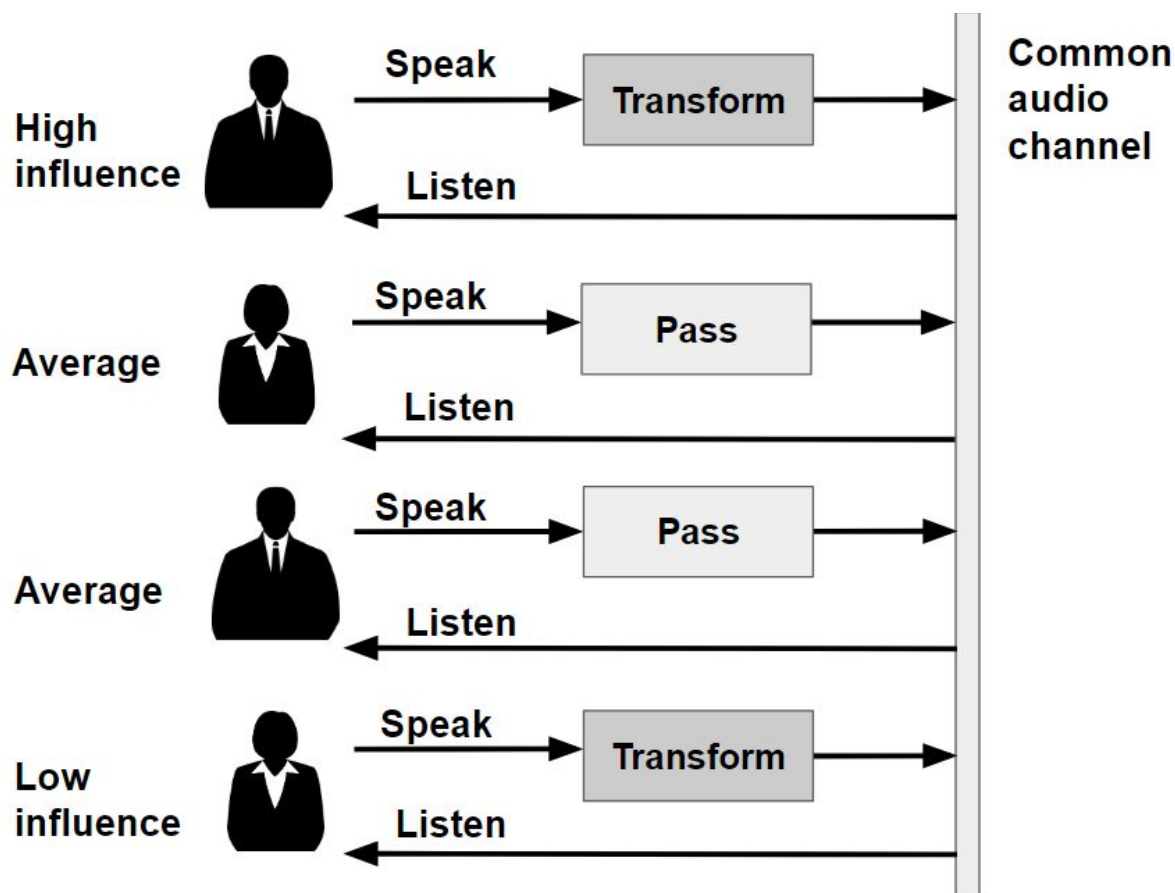
in the conversation, so when the identity of participants is known the system may use samples collected earlier to assess the possible influence of a person on a discussion before he/she starts talking.

In a possible enhancement to the invention, the system can strengthen the authority of some participants of the conversation depending on the context. E.g., apply voice modification to increase the influence of a person who explains the steps needed for evacuation.

## **OPERATION**

When the system prepares a group call, it can already know the identities of the connecting people and the characteristics of their voices. On the other hand, if an entirely new person connects, then she may be asked to give a brief introduction of herself. The system listens and analyzes the voice of such a person. All those voice samples, collected earlier or just obtained, are used for the preparation of an initial assessment of each conversation participant. The system analyzes the person's manner of speaking and the characteristics of her voice, and thus her possible impact on the group discussion.

In the group conversation, the system picks up the voice of each participant, modifies it if it deems it necessary, and then retransmits the sound to a common audio channel. Modifications may encompass changes of voice pitch, tone, timbre, speed, etc. By modifying the voices, the system balances the possible



**Figure 1**

influence of participants, strengthening submissive participants and weakening possible influencers. Assessments from the time of call preparation are used as input for required modifications, but parameters may dynamically change during the conversation.

People listen to other people voices transformed already and retransmitted by the system with minimum delay, which is the minimum time required for effective modifications, but the one which does not disturb the flow of conversation. Figure 1 is a conceptual diagram of such communication.

The system monitors the group call. It observes the manner of speaking of call's participants, the characteristics of their voice but also human behavior, e.g. to detect situations when people withdraw from statements because of the influence of others. That constant analysis is used to introduce changes to the parameters for voice modifications of conversation participants.

**CONCLUSION**

The method described in this publication addresses the problem distortion of opinions in a group

discussion when some people are influenced by others, perceived as those with higher authority. It solves this problem at least to some extent by manipulating voices of group call's participants to weaken the influence of dominating people and increase the impact of more submissive conversation participants.

## REFERENCES

1. "Listen, follow me: Dynamic vocal signals of dominance predict emergent social rank in humans", Journal of Experimental Psychology: General, <https://www.ncbi.nlm.nih.gov/pubmed/27019023>
2. "Perceived differences in social status between speaker and listener affect the speaker's vocal characteristics", Faculty of Natural Sciences, University of Stirling, <https://www.ncbi.nlm.nih.gov/pubmed/28614413>