

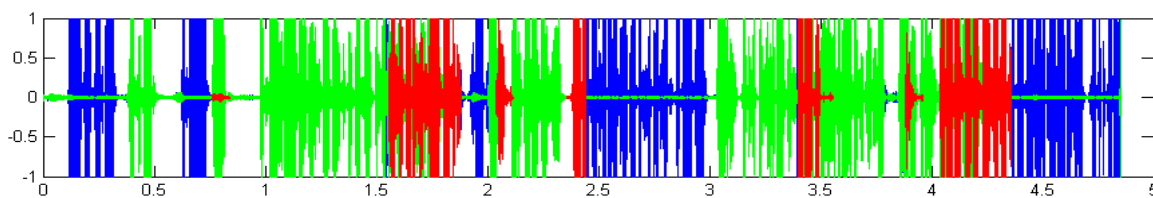
**The Relationship Barometer:**  
Mobile Phone Therapy for Couples\*

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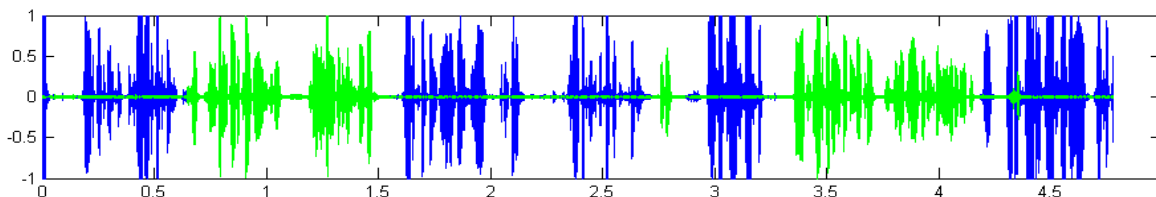
The number of 'long-distance relationships' around the world has recently surpassed ten million. Today most marriages and serious relationships between two professionals will contain periods of time when the couple cannot be colocated. During these times when face-to-face interaction is rare, the importance of other mediums of communication greatly increases. And the medium of choice for most geographically separated couples remains the telephone.

Our group is working on leveraging the computational horsepower currently dormant in today's 'smart phones' to augment interactions between people. Rather than simply providing a static connection, we are interested in making these devices increasingly aware of the bits being transmitted and received. It is our hope that simple conversation analysis applications will enable existing mobile devices to soon act both as a barometer and a facilitator for a relationship.

Aspects of a relationship can be characterized by extracting conversation features such as speaking rate, volume, duration, pause during speaker transitions, number of interruptions, and time spent holding the floor. These objective numbers allow some of the underlying dynamics of the relationship to emerge without the bias of self-report or even a third party observer. As can be seen in the figure below, particularly negative interactions have distinctive values of these parameters that are fairly easy to classify - interactions at significantly higher volume, speaking rate, and interruptions are all indications of a potential fight. Normal interactions typically consist of equal turn-taking and speaker transitions that are characterized by a pause between speakers.



**Figure 1.** A 30-second segment of a negative interaction: pause between speaker transitions: -300ms, normalized volume: .85, speaker overlap: 17%



**Figure 2.** A 30-second segment of a typical interaction: Pause between speaker transitions: +550ms, normalized volume: .53, speaker overlap: 2%

Although these extracted conversation features may not always lead to a correct interaction classification, when collected over time they can provide insight into the health of a relationship. For example, a weekly summary aggregating these features will enable new communication applications such as 'relationship alerts'. These alerts would serve as a warning of events such as a significant drop in amount of quality communications with a significant other, or that the user has held the floor in 80% of those recent interactions.

Perhaps the most exciting aspect of this research is the potential for intervention: phones that actively influence a conversation by strengthening the positive features while dampening aspects that have a high probability of propagating a negative interaction. Automated mediation techniques are being explored to help transfer the floor to a participant who is being dominated in a conversation. Although modifying perceived volume, pitch, and interruptions makes misclassifications important to avoid, sophisticated probabilistic modeling has shown some initial promise in this area of conversation analysis. This technology will enable tomorrow's phones to play a far greater role than simply supplying a clear connection between you and your loved one - soon they will be trying to do their part to facilitate your interactions.

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