ness and feeling of transparent communication. The flexibility enables the codec to generate audio streams of different bitrates ranging from 6.6 to 23.85 kbps under its 9 coding modes: 6.6, 8.85, 12.65, 14.25, 15.85, 18.25, 19.85, 23.05, and 23.85 kbps, which allows the phone service adjusting in finer granularity, relative to G.7xx series, to fluctuating network conditions in packet networks.

For AMR-WB codec, all 9 coding modes fit the sampling rate requirement of PESQ model, so all 9 bitrates are used in the succeeding analysis. We treat AMR-WB as the subjecting codec and conduct the model construction experiment the same as in Section 2.2. The same logarithmic relationship between bitrate and MOS indicated by the Weber-Fechner's Law is revealed and the resulting parameters of the AMR-WB version of our WF-Regression model are (α, β, γ) = (6.56, 3.45, 0.10).

Similar to the comparison procedures of SILK results, Figure 4 provides visual indication of the accuracy of prediction. From Figure 4a, we can see that for contemporary codec as AMR, the prediction of PESQ and our model have rather similar distributions. From Figure 4b, the fact that the plotting of the two models entangles with each other indicates the similar prediction accuracy of the two. Likewise, accuracy of both models for AMR-WB encoded tracks is detailed in Table 4. Although our model performs generally better than PESQ, the improvement is not significant. The PESQ model for AMR-WB calls still provides a reliable prediction with its error ratio being bounded under 8.2%.

The fact that the two models give similar predictions on AMR-encoded contents raises also the confidence of our subjective experiments. Without this similarity, the insufficiency of PESQ's predictions on SILK codec could have been incurred by experiment error of our subjective test. Given that the correlation between the predictions of the two models is as high as 0.9808 and the p-value resulted from ANOVA test is 0.38, the two sets of predictions can be seen as identical, which support the reliability of our experiment setup.

5. CONCLUSION

We measure and model the perceptual quality of Skype calls based on the Weber-Fechner's Law of psychophysics. In that, the relationship between coding bitrate of Skype sources and the perceptual quality is strongly logarithmic. The model is robust with high prediction accuracy. The property that it can be calculated in real time shall assist the decision of rate adaptation for Skype calls under dynamic network environment. In addition, we have demonstrated the insufficiency of existed perceptual evaluation model, PESQ. Our result shows that the prediction of PESQ being too conservative with current codec which provide variable coding rates in a wider range.

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