Feasibility Study on Blood Pressure Estimations from Voice Spectrum Analysis

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Abstract

Recently, preventive healthcare has attracted increased attention. Because of a demonstrable mortality rate, hypertension is a disease that should be prevented before it becomes severe. To decrease the mortality rate for hypertension, it is desirable for people to measure their own blood pressure (BP) on a routine basis. At present, many ambulatory BP gauges are available. Yet, it is unlikely that people will carry around an ambulatory BP gauge to measure their BP, even among those with a high risk of illness. Such methods are therefore ineffective for preventive healthcare. Therefore, it would be preferable to measure information related to BP easily and without a dedicated gauge. In this research, a BP estimation method is proposed using voice-spectrum analysis. If BP estimations from the voice spectrum are accurate, we may be able to measure BP with a smartphone's voice recorder. To evaluate the feasibility of such BP estimations, two subjects' BPs and voice data were measured, and the correlation coefficients were examined. Results showed that both diastolic and systolic BPs and the spectral component of the voice were not non-correlated ( > |0. 6|) at specific frequency bands. To estimate BP levels, a support-vector machine was proposed, and the correlation coefficients between measured and estimated BPs exceeded 0. 9. However, individual differences in the voice spectrum were not adequately addressed. In future research, individual differences will be investigated in a study involving more subjects.
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- C. Saunders, A. Gammerman, and V. Vovk, "Ridge Regression Learning Algorithm in Dual Variables," Proceedings of the 15th International Conference on
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