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A study to investigate the effect of blood pressure symptoms on human voices

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Blood pressure is important because as it increases, the risk of future health problems increases. In patients with high blood pressure or hypertension, this pressure exerts extra pressure on the veins, heart, brain, eyes and kidneys and so on. As seen in studies that this increase has also been found to cause harm to internal organs. The blood pressure is to have a certain amount of effect on the speech sound formation. However, in the literature the amount of this effect is not fully revealed due to the nonlinear and chaotic structure of speech sounds. Nowadays, along with developing technologies and signal processing approaches, different formations of speech can be analyzed. In this study, it has been tried to reveal the relationship between blood pressure and the recorded speech sounds of a certain length. For this purpose, some features from a vowel has been extracted and estimations have been carried out by using regression models such as Support Vector Machines - Regression (SVMs-R), Multi Linear Regression (MLR). In simulation studies, it is observed that blood pressure variability in human voice can be followed up and differentiated with the proposed features. Experimental studies have also shown blood pressure can be differentiated into specific groups as normal-high, low - normal - high, although it cannot fully predict the change of blood pressure. As a result, the extracted features provide a novel relationship between human voice and blood pressure. To the best of our knowledge, this is the first study to validate the ability of extracted features to discriminate the speech sounds into subgroups depending on the blood pressure values in timescale with the help of the regression models.

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