CRUNCH Seminars at Brown, Division of Applied Mathematics

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Wrist Pulse Signals Analysis based on Deep Convolutional Neural Network

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Concerning computer aided analysis of the Traditional Chinese Medicine Pulse Diagnosis, the recognition effect of wrist pulse signals is undesirable because of its morphology complexity and the features ambiguity. To solve the problem, we propose a new methodology based on classifier using Shannon Energy Envelope, Hilbert Transform (SEEHT) and Deep Convolutional Neural Networks (DCNN). In this paper, we demonstrate the pulse wave extractor: SEEHT, which is better than traditional one in case of wider, small pulse wave or sudden changes in wave amplitude. Then DCNN is trained by adding noise to increase the sample size for excavating potential features. The proposed methodology is validated using data from Shanghai University of Traditional Chinese Medicine. Various experimental results show that the proposed method significantly outperforms other well-known methods in case of feature ambiguity.