

## Title: Multi-feature extraction, analysis, and classification for control and meditators' EEG

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Meditation has a metaphysical impact on human brain functioning. It is of utmost required to infer the cognitive effects of meditation using an electroencephalogram (EEG). In this novel work, the analyses of EEG signals' features are extracted for cognitive effects on a human brain for meditation intervention of 25 subjects. To analyze the meditation effects, this study examines the feasibility of statistical, spatial, spectral, coherence features, and time-frequency analysis of EEG signals for control and meditator group. Based on the effective features the various classifiers are used to compare the accuracy and distinguish a subject as control or meditator. The results demonstrate that the Support Vector Machine (SVM) gives better accuracy than Artificial Neural Network (ANN) and k-Nearest Neighbors (KNN). The statistical analysis shows that the Variance and Sample Entropy decreased in meditators whereas, in spatial analysis, the Mahalanobis distance increased. The spectral analysis stated that theta power has increased 88% of subjects whereas the alpha power is increased for the entire subjects after meditation. The coherence observed in the pre-frontal lobes' electrode pair is more in the meditators than in the control groups. Eventually, meditation improves relaxation, cognitive functions, calmness, and mental concentration.

### Biography

He has received Bachelor in. Engg. (Industrial Electronics) degree in 1990 and Masters in Engg. (Electronics Engg.) degree in 2001-02, from S.G.B. Amravati University, Amravati, Maharashtra, India. Presently, he is working as Professor & Head with Electronics and Telecommunication Engineering Department in Shri Sant Gajanan Maharaj College of Engineering, SHEGAON, Maharashtra, 444203, India. He has been awarded the Ph.D. degree in Biomedical Neuro-signal/Image analysis and processing, from School of Medical Science and Technology, Indian Institute of Technology, Kharagpur, West Bengal, India in 2016-17. He is a member of IEEE and life member of ISTE and IETE. He was co-opted as an executive member of IETE Centre Amravati, Maharashtra, India for consistent three year. His research interests encompass Neuro-signal processing, analysis, classifications and prediction. Bio-signal/image analysis and processing, disease prediction, and computational intelligence methods with emphasis on adaptive digital signal processing with an embedded system design.