Abstract— **This paper proposes a two stage feature extraction scheme for Brain Computer Interface (BCI) based on Steady-State Visual Evoked Potential (SS-VEP). From the output of a visual stimulation paradigm, i.e., electroencephalogram (EEG), the first stage localizes the presence of delta, theta, alpha, beta frequency ranges using frequency band powers and asymmetry ratios. The second stage, time-shift denoising separation extracts specific features using a spatiotemporal filter, which demarcate stimulus evoked features from various rhythms of EEG. This scheme shifts the waveforms by a series of time delays and subsequently linear combinations are formed by repetitive stimulus presentations. These time shifts enables synthesis of filter outputs and increases the quantum of feature extraction. The adaptability of the scheme to changing characteristics of the signal is demonstrated. Furthermore, the results can be transferred to various subjects and also exhibit plausibility.**

Keywords— **Brain Computer Interface (BCI), Steady-State Visual Evoked Potential (SS-VEP), Time-Shift Denoising Source Separation (TDSS), Electroencephalogram (EEG)**