

A Project Report
on
**BRAIN COMPUTER INTERFACE FOR DROWSINESS
DETECTION**

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Tumkur-572 103

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by

Dhananjaya H	(1SI09IT018)
Nagarjun T A	(1SI09IT031)
Nutan K	(1SI09IT036)
Siddalingeshwara	(1SI09IT052)

Under the guidance of

Mr. BASAVARAJU K S, M.Tech
Assistant Professor



Department of Instrumentation Technology
SIDDAGANGA INSTITUTE OF TECHNOLOGY
TUMKUR-572 103(Karnataka)
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ABSTRACT

Sleep is the nature's way of providing rest to human body. Sleeping while driving is a dangerous combination. Sleepiness slows reaction time, decreases awareness, impairs judgment and increases risk of crashing.

The aim of the project 'Brain computer interface for drowsiness detection' is to avoid accidents from drowsy driving and to save the life of the people. In this project brain signals are extracted through the electrodes connected to the scalp. To get brain signals which are free from artifacts, these signals are given to signal conditioning circuit to carry out amplification and filtering. This filtered brain signals are given to ADC to get the digital signals. The ADC is controlled through microcontroller. The 5V digital signals are converted to 3.3V signal from voltage level converter. These digital signals are given to DSP kit for signal processing. In DSP kit time domain brain signals are converted to frequency domain signals through fast Fourier transform algorithm. PSD (Power Spectral Density) for the frequency domain signals are calculated.

The power spectra gradient of alpha and theta bands are calculated, which are denoted as df_alpha , the average power gradient of alpha band, and df_theta , the average power gradient of theta band, respectively, Depending on the these values, alertness, slight drowsiness and deep sleepiness are detected.