



VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM

PROJECT REPORT ON
**“DESIGN AND ANALOG VLSI
IMPLEMENTATION OF NEURAL NETWORK”**
(SPONSORED BY KSCST)

Submitted in partial fulfillment of the requirement for the award of degree of

**BACHELOR OF ENGINEERING
IN
ELECTRONICS AND COMMUNICATION ENGINEERING**

Under the guidance of

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ABSTRACT

Biological systems process the analog signals like image and sound efficiently. To process the information the way biological systems do, we make use of Artificial Neural Networks (ANN). The focus of this project is the implementation of the Neural Network Architecture (NNA) with on chip learning in analog VLSI for generic signal processing applications. The artificial neural network architecture comprises of analog components like multipliers, adders and tan-sigmoid function circuit. The proposed neural architecture is trained using Back Propagation (BP) algorithm in the analog domain. The neural architecture is thus a complete analog structure. The multiplier block is implemented using Gilbert cell, the tan sigmoid function is realized using MOS transistor.

The functionality of the designed neural architecture is verified for analog operation like amplification and frequency multiplication. The network designed can be adopted for digital operations like AND, OR and NOT. The network realizes its functionality for the trained targets, which is verified using simulation results. Layout design and verification of the proposed design is carried out using cadence virtuoso with 180nm technology.