4. METHODOLOGY

Experimental Setup

The experimental setup consists of 20 watts solar PV panel with a small DC motor capable of rotating the panel according to the direction of the intensity of solar radiation. The solar panel has LDR (light sensor diode resistor) which tracks the maximum insulation and automatically prompts the DC motor to the required direction. The motor is powered by 5 AH, 12 Volts battery. For the storage purpose an array of battery cells of 60 AH capacity will be used an inverter of 850 VA is used. To control the direction of rotation and the speed of the motor a microcontroller 8051 is being used. The inverter consists of switching devices DC to DC booster convertor to boost the DC voltage of 12 Volts from the battery up to 400 Volts. The boosted DC is then converted to 230 Volts AC, using a full bridge inverter which has switching devices such as IGBT and MOSFET. During the conversion process the PWM signals of about 20000 KHz frequency to 50 KHz will be fed to the gate of the switching device. This results in enormous amount of heat dissipation. The quantum of heat so generated will lead to premature failure of the switching components. Therefore it is necessary to monitor the temperature for avoiding the premature failure of the components. This task is being accomplished by providing a suitable sensor. Relevant parameters such as ambient temperature, voltage, current and power are periodically measured and analyzed using ANN (artificial neural network) technique.
ANN analysis technique:

In recent years, ANN’s have been applied to many areas of power system analysis and control. These include load forecasting, static and dynamic security assessment, dynamic load modeling alarm processing and fault diagnosis, in addition to significant demonstrations of ANN capabilities in modeling and system identification. These applications take advantage of the powerful mapping ability of ANN’s and their inherently parallel and distributed processing characteristics for performing ultra high-speed computation. The application of ANN’s to STLF has gained a lot of attention recently. The availability of historical load data on the utility databases makes this area highly suitable for ANN implementation.

In the proposed research work Artificial Neural Networks (ANN) technique is used in analyzing multi variant input conditions to optimize for specific output required conditions.
A typical ray diagram of ANN analysis is shown in figure. When reveals that for a given input there is a number iteration conducted to achieve the required output of optimum conditioning may be obtained. These useful to run the power system for optimum efficiency.
5. FUTURE WORK PLAN

- With the present experimental setup using thermo couple and FBG Temperature sensor, additional data's will be generated from conducting further trials for variable load.

- Applying ANN technique the said data will be analyzed to arrive at the optimum condition.

- Based on the result further conclusions will be drawn for completing the thesis.
6. INFERENCE

- Better output of the solar power system can be achieved.

- Greater returns can be realized by the better performance of the device.

- Failure rate of the solar PV device can be reduced.