Registration Seminar

Seminar Title	: SOLAR PV POWERED SVM-DTC INDUCTION MOTOR DRIVE FOR THE TEXTILE INDUSTRY
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Venue	: EE401
Date and Time	: 28 Jan 2025 (4:30 pm)

Abstract

: This work presents the design and implementation of a Solar Photovoltaic (PV) powered Space Vector Modulation Direct Torque Control (SVM-DTC) induction motor drive specifically tailored for the textile industry. The textile industry is one of the largest energy consumers globally, and optimizing its energy consumption is crucial for both economic and environmental sustainability. The proposed system utilizes a combination of solar PV panels and an induction motor drive system controlled SVM-DTC using DRL strategy. The solar PV system generates the required DC power to supply the induction motor, thus minimizing dependency on grid electricity and reducing operational costs. The use of SVM-DTC ensures precise control of the motor&rsquos torque and flux, improving its dynamic performance, response time, and efficiency. The design of the proposed system involves several key components: a solar PV array, a DC-AC inverter, an induction motor, and an SVM-DTC controller. The SVM-DTC controller is responsible to control the motor&rsquos torque and flux, ensuring smooth and efficient motor operation even under varying load conditions typical in textile machinery. A critical aspect of the design is the incorporation of maximum power point tracking (MPPT) algorithms to extract the maximum possible power from the solar panels, especially considering the variable nature of solar insolation. Adaptive DTC using Deep Reinforcement Learning (DRL) is an emerging approach that combines the strengths of traditional DTC and Reinforcement Learning (RL) to create a more flexible, dynamic, and efficient motor control system. In traditional DTC, the controller directly controls the torque and flux of the induction motor by applying an optimal switching pattern to the inverter. However, Adaptive DTC using DRL aims to improve the system's performance by learning optimal control strategies in real-time, especially under varying operational condition.