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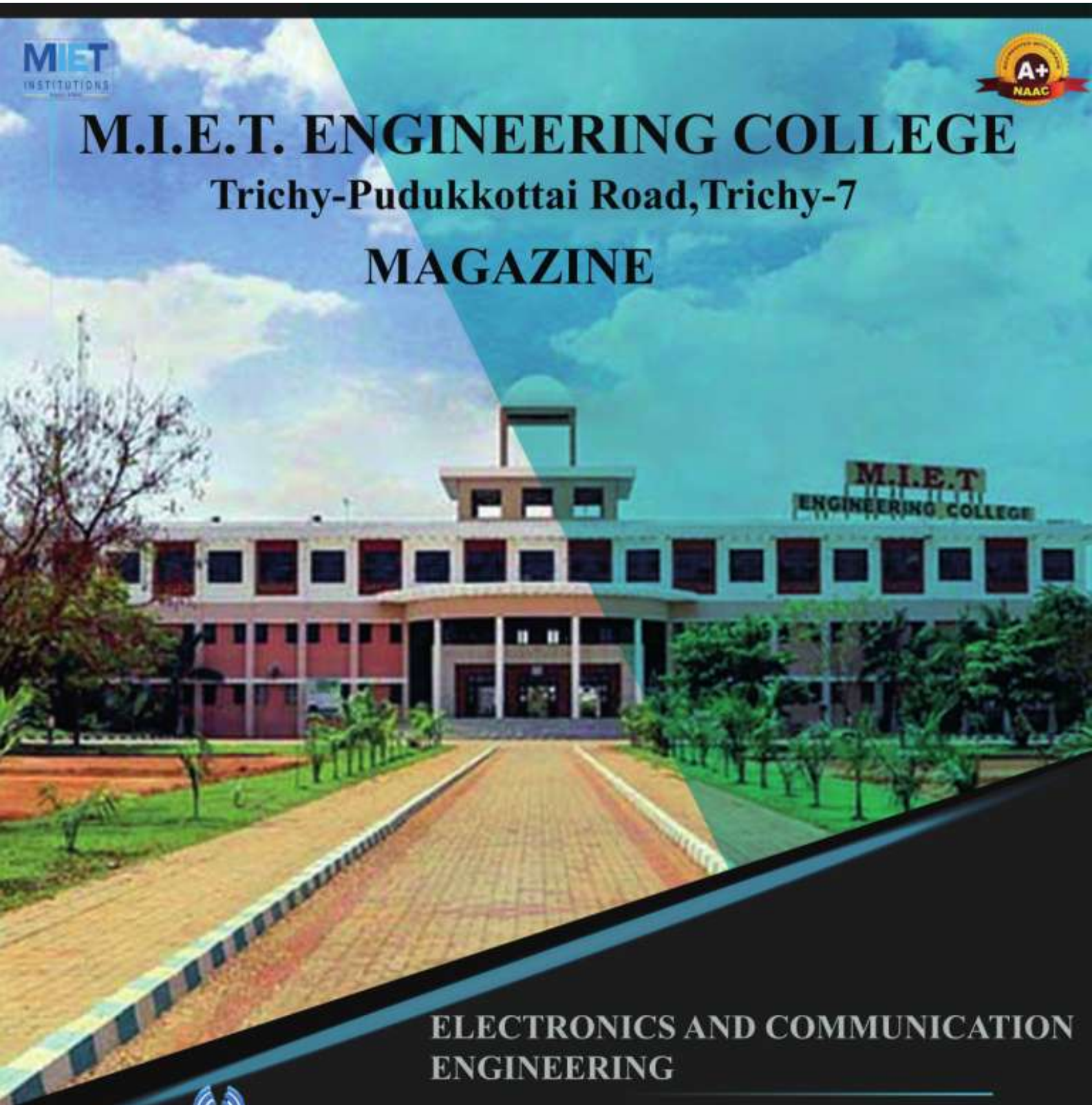
M.I.E.T. ENGINEERING COLLEGE

Trichy-Pudukkottai Road,Trichy-7

MAGAZINE



ELECTRONICS AND COMMUNICATION ENGINEERING

2021-2022

0431-2660-302

www.miet.edu

MIET ENGINEERING COLLEGE

DHWANI 2021-22

VOLUME: 10

Er. A MOHAMED YUNUS, B.E, M.Sc., Engg.
Chairman
M.I.E.T. Institutions

CHAIRMAN's MESSAGE:

An excellent faculty committed to quality teaching and research, a flexible curriculum responsive to the changing needs of industry, excellent computer facilities, state-of-the-art infrastructure, a well-stocked library - contribute to the excellence of our undergraduate, postgraduate and doctoral programmes. The admission process of M.I.E.T. attracts many corporate recruiters who are happy with the Management, attracts bright young minds to this institutions. M.I.E.T where you connect with other motivated students, experienced and dedicated faculty, corporate go-getters, an extensive alumni network and excellent placement opportunities. In short you connect with success.

Dr. A NAVEEN SAIT, M.E., Ph.D
Principal
M.I.E.T. Engineering College

PRINCIPAL's MESSAGE:

"Effective leadership is not about making speeches or being liked; leadership is defined by results, not attributes." He took care of establishment, faculty recruitment and development of Human Resources required for the institution. He always emphasizes on the need of having qualified and quality teachers in the field of Technical Education and steered the Institute in the right direction with unblemished reputation. M.I.E.T. is proud of outstanding teaching and a wide range of programmes delivered by research-active faculty. Its commitment to providing a research-informed education which helps students to develop advanced skills and follow their chosen career. Above all, he had the capacity to translate vision into reality. He nourished a compelling vision, a comprehensive plan, relentless implementation, and a core of engaged and talented followers to realize his dream. Beyond doubt, M.I.E.T. has a distinctive blend of enviable teaching and learning environment coupled with well-educated staff and talented pool of students to achieve your academic ambitions. Under his stewardship, the Institute was well poised to develop knowledge and transferable skills to prepare the stakeholders for the future.

Mr. K JAVID,M.E.
HOD/ECE

HEAD OF THE DEPARTMENT MESSAGE:

I am writing this message with full of pride and joy watching the talents of our department produce a quality produce like Dhwani. The goal ofour magazine is to enhance and enrich the technical talents of our young minds and deploy the great technical knowledge of our faculties. I wish that the magazine provides new developments in Electronics filed and encourages our students to do research and new projects. I congratulate and thank all the students and faculty coordinator who have made untiring efforts to bring out this magazine. I wish them all the very best for releasing more such magazines in future.

EDITORIAL BOARD

VISION OF THE INSTITUTION

To be a center of excellence in Technical Education through Technical, Ethical and Professional skills for meeting the diverse needs of the Society, in particular Muslim minority community and the Nation.

MISSION OF THE INSTITUTION

- To impart Quality Education, Training and Research in the fields of Engineering and Technology.
- To provide a conducive learning environment that enables the students to achieve professional and personal growth.
- To expose the contemporary issues of society, ethical practices and to create environmental awareness.
- To provide the required infrastructural facilities for developing the professional and innovative skills.

VISION OF THE DEPARTMENT

To be a top-class technical hub in imparting knowledge in cutting edge areas of Electronics and Communication Engineering, providing pleasant learning environment, nurturing scholars of excellent proficiency to meet the global and socio-economic challenges of the country

MISSION OF THE DEPARTMENT

- To provide remarkable teaching and research environment through state-of-the-art facilities.
- To strengthen the soft as well as hard skills of students to achieve technical and academic excellence.
- To raise the students to become responsible citizens with good human values and encourage them to work for the well-being of society.
- To develop the skills of lifelong learning and professional growth of students through utilization of the high-standard infrastructure facilities

Department Activities

I. Value Added Course (VAC)

Two value added Courses have been conducted in the department, even semester, with an aim to enhance the hardware knowledge of the students and sharpening the soft skills. An overview of the courses are given below.

1. Certificate Course in LABVIEW

Objective:

LabVIEW is a graphical programming environment engineers use to develop automated research, validation, and production test systems. It can be used to measure physical systems with sensors or actuators, validate electronic designs, develop product test systems and design industrial equipments. The certificate program aims to introduce the students to the various functions available in LABView.

Course Instructor

The course was handled by Mrs .S. Madumitha, , Assistant Professor, Department of ECE.

Details of the course

The course duration was for three months, with 30 classes included. 41second year students had enrolled for the course and successfully completed the course.

2. Certificate Course in TinkerCAD

Objective:

The course will introduce the participants to the TinkerCAD, a free-of-charge, online 3D modeling program that runs in a web browser. he Circuits section of Tinkercad is a simulator for an electronic circuit with a Arduino Uno or a Micro Bit board or a ATtiny chip in the browser. The code can be made with CodeBlocks[13] which are graphical code pieces that can be put together by shifting them with the mouse cursor.

Course Instructor

The course was handled by Mr Suraj Kumar S, Assistant Professor, Department of ECE

Details of the course

The course duration was for three months with 30 hours. 85 second year students had enrolled for the course and successfully completed the course.

II. Guest Lectures

1. Open source operating system for IoT Devices

Resource Person : Mr.Manikandan
Sr,Embedded Engineer
Oppila Microsystems Pvt Ltd,Bangalore

2. Industrial 4.0

Resource Person : N.Santha
Sub Divisonal Engineer, BSNL,Trichy

FACULTY ARTICLES

On- chip antenna- new approach to miniaturization of ICs

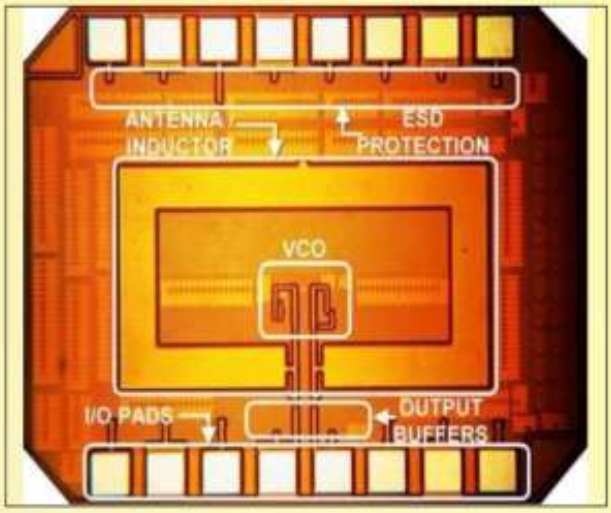
Mr. Suraj Kumar S, AP/ECE

Inter-chip wireless communication at Industrial, Scientific and Medical (ISM) band of 2.4 GHz finds large number of applications in the fields of biomedicine, agriculture and industrial automation. In these applications, where small size, low cost transmitters and receivers with very low power consumption is required.

Effective scaling of Complementary Metal Oxide Semiconductor (CMOS) devices has led to the production of low cost, small size chips with high operating frequency. However, off-chip antennas have larger size and though several miniaturization techniques are being applied, the reduction in size is at a very small pace compared to the chip size reduction. Also, the off-chip antennas are connected to the chip through transmission lines like coplanar waveguides, which makes the integration more difficult.

Miniaturisation in the transmitter and receiver chips for short range wireless applications can be achieved by replacing off-chip antennas with on-chip antennas. On-chip antennas are integrated inside the chip on one of the metal layers provided by the substrate stack-up as shown in Fig. 1.1. The footprints of the on-chip antennas are comparable to the chip size and thus small size chips can be obtained. It also helps in the cost reduction by eliminating bondpads, bondwires and transmission lines and lowers power consumption by avoiding buffers.

On-chip antennas replace the use of wires in intra-chip (within same chip) and inter-chip (between different chips) communications. At the transmitter side, the RF signal is given to a power amplifier (PA) to boost the power level of the signal. The PA is connected to an on-chip transmit antenna that converts the RF signal to electromagnetic signal. At the receiver end, the



on-chip antenna receives the transmitted signal, and feeds to a Low Noise Amplifier (LNA). The impedance of on-chip antenna can be conjugately matched to the PA at the transmitter side and LNA at the receiver side, leading to the elimination of transmission lines, bond wires, bond pads and extra pins allocated for external antenna.

At lower GHz frequency of 2.4 GHz, the on-chip antenna has lower gain and hence lower transmission range. It can be aperture coupled to an antenna designed in package for enhancement of the transmission range.

On-chip antennas replace the use of wires in intra-chip (within same chip) and inter-chip (between different chips) communications. In the latter application, the impedance of on-chip antenna can be matched conjugately or using on-chip components to a power amplifier at the transmitter side and a low noise amplifier at the receiver side. This leads to elimination of transmission lines, bond wires, bond pads and extra pins allocated for external antenna. With technology scaling and increase in operating frequency, the global interconnect delay would exceed the gate delay. To overcome this problem, on chip antenna can be used

Advanced Design System- Integrating antenna to chips
Ms Chandni, AP/ECE

In early days, there was a gap between RF circuit design and antenna. Now the focus ids on simulating both together and one of the finest tools for this is Advanced System Design (ADS).

ADS software is a useful tool for designers, engineers, and businesses to quickly design and produce high-quality components and systems.

This software makes it effortless to design and simulate parts, no matter how complex it is. In addition, it's easy to learn and adapt because of its intuitive interface.

ADS has revolutionized the world of circuit designing and system designing for electronics, automotive, and other industries, which are rapidly adopting this unique solution with out-of-the-box features and functionalities.

ADS software offers an integrated environment to design RF electronic systems like wireless networks, mobile phones, satellite communications, pagers, high-speed data links, and radar systems. Its initial release surfaced in 1985 named - Microwave Design System (MDS). ADS was introduced in 2016 with improvement in its speed, performance, and design flexibility.

Designers can use ADS in each step of their design process, from schematic capture, design rule checking, and layout to electromagnetic field simulation and time-domain and frequency-domain circuit simulation. This way, designers can easily characterize RF designs and optimize them without changing any tools or systems.

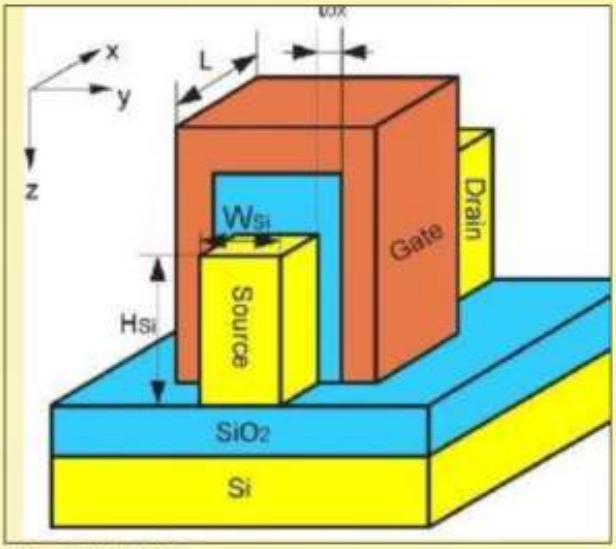


Fig. FniFET 3D structure

Some of the features of ADS are as follows:

- Design templates: ADS provides you with integrated design support through useful templates that you can use to get started quickly, without spending much time on each design piece in creating it from scratch.
- Component libraries: You will get an extensive library of components where you can find the required part to add to your design. This will also save a lot of your time. All you need to do is browse through different components and choose the ones needed for your design.
- Automatic syncing: ADS lets you synchronize the layout automatically to visualize the actual layout while designing the schematics.
- Flexibility: You can achieve greater design success with a full desktop flow. In addition, incorporate leading industry and foundry designs to make your designs AS PER STANDARDS.

Successive approximation Register ADC

Ms. P Delphine Mary, AP/ECE

Millimeter wave (MM wave), also known as *millimeter band*, is the band of spectrum with wavelengths between 10 millimeters (30 GHz) and 1 millimeter (300 GHz). It is also known as the extremely high frequency (EHF) band by the International Telecommunication Union (ITU).

Millimeter wave is a band of electromagnetic spectrum that can be used in a broad range of products and services, such as high-speed, point-to-point wireless local area networks (WLANs) and broadband access. In telecommunications, millimeter wave is used for a variety of services on mobile and wireless networks, as it enables higher data rates than at lower frequencies, such as those used for Wi-Fi and current cellular networks.

Propagation restrictions dictate the use of small cell sizes for Wi-Fi and cellular networks. The short propagation distance can increase the number of access points (APs) to cover a large area but also means fewer client devices will share the bandwidth in each cell. Small cells also facilitate the reuse of channels across the WLAN coverage area.

Antennas for millimeter wave devices are smaller than for other frequencies, making them more suitable for small internet of things (IoT) devices.

Millimeter waves are absorbed by gases and moisture in the atmosphere, which reduces the range and strength of the waves. Rain and humidity reduce their signal strength and propagation distance, a condition known as *rain fade*. The propagation distance at the lower frequencies is up to a kilometer, while the higher frequencies travel only a few meters.

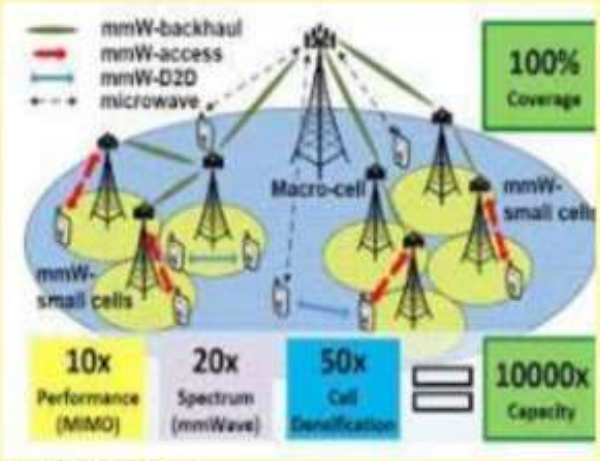


Fig. FinFET 3D structure

A millimeter wave travels by line of sight and is blocked or degraded by physical objects like trees, walls and buildings. Its propagation is also affected by proximity to humans and animals, primarily due to their water content.

Millimeter wave has numerous uses, including telecommunications, short-range radar and airport security scanners. In telecommunications, it is used for high-bandwidth WLANs and short-range personal area networks (PANs). Its high bandwidth capacity is ideal for applications like short-distance wireless transmission of ultra-high definition video and communications from small, low-power IoT devices. The limited propagation distance -- small cell size -- and high data rates make millimeter wave ideal for communications between autonomous vehicles.

In comparison, Wi-Fi currently uses frequencies in the 2.4 GHz, 5 GHz and 6 GHz bands, which are known as microwave *bands*. Cellular networks use frequencies in the 600 MHz to 700 MHz and 2.5 GHz to 3.7 GHz bands.

STUDENT ARTICLES

TOMATO LEAF DISEASE PREDICTION AND RECOMMENDATION USING MULTILAYER DEEP CONVOLUTIONAL NEURAL NETWORK

Mr. Vijay K, IV year,ECE

Tomatoes (Solanum lycopersicum) can be grown on almost any moderately well-drained soil type. Tomatoes crop and yield is suffered every year due to number of fungal diseases. Important fungal diseases limiting tomato production. Diseases caused by fungus is develop through soil-borne, above- ground infections and in some instances are transmitted through pest and insect feeding. However, the existing research lacks an accurate and fast detector of tomato leaf diseases for ensuring the healthy development of the tomato industry. This project is to develop an appropriate and effective method for diagnosis of the disease and its symptoms.

A deep learning approach that is based on Multilayer Deep convolutional neural networks (CNNs) can be used for the real- time detection of tomato leaf diseases. The deep-learning-based approach can automatically identify the discriminative features of the diseased tomato leaf images and detect the ten common types of tomato leaf diseases with high accuracy. In addition, the proposed approach can handle all the diseased tomato leaf images that were captured under real conditions in a tomato field environment. To analyze the proposed deep model, we have used visualization methods to understand symptoms and to localize disease regions in leaf.

Current progress on the tomato genome sequencing project has generated useful information to help in the study of tomato. In addition, the tomato belongs to the extremely large family Solanaceae and is closely related to many commercially important plants such as potato, eggplant, peppers, tobacco, and petunias. Knowledge obtained from studies conducted on tomato can be easily applied to these plants, which makes tomato important research material. Because of these facts, tomato serves as a model organism for the family Solanaceae and, specifically, for fleshy-fruited plants.

Correct diagnosis of symptoms in plant diseases, caused by bacteria, nematodes, fungi, phythoplasmal and viruses1-4, is very critical in supporting the productivity of rice plants. However, many regions in India have a huge problem because of a limited number of plant pathologists.

A new web-based diagnosis can be used for the diagnosis of disease in plants leaf. This paper also presents an automated system integrated with machine vision techniques that will assist the farmers get the accurate information about their Plants Leaf Disease.

For enhancing the robustness of CNN model, diseased images with uniform and complex backgrounds are collected not only in the laboratory but also under real field conditions. Furthermore, to solve the problem that diseased leaf images are insufficient and prevent overfitting of the CNN-based model in the training process, natural diseased images are processed to generate sufficient training images via data augmentation technology

A deep convolutional neural network is employed for the real-time detection of leaf diseases. The proposed deep-learning-based approach can automatically identify the discriminative features of the diseased apple images and detect the five common types of leaf diseases with high accuracy

FAULT PREDICTION OF INDUCTION MOTORS USING MACHINE LEARNING ALGORITHMS

Ms. Kavimitha S, IV year,ECE

Fault detection prior to their occurrence or complete shut-down in induction motor is essential for the industries. The fault detection based on condition monitoring techniques and application of machine learning has tremendous potential. The power of machine learning can be harnessed and optimally used for motor fault detection. The fault especially in induction motor needs to be addressed at a proper time for avoiding losses.

Machine learning algorithm applications in the domain of fault detection provides a reliable and effective solution for preventive maintenance. In this paper, a machine learning approach based on algorithms is developed to learn features from frequency distribution of vibration signals with the purpose of characterizing working status of induction motors like current, voltage and temperature and also updated in the IoT based application. It combines feature extraction procedure with classification task together to achieve automated and intelligent fault diagnosis.

The immunological principles are applied for induction motor fault detection. In Practical approaches need to be developed in industrial applications to take advantage of advanced and intelligent nature of machine learning. Experiments were conducted on two identical induction motors under healthy, single- and multi-fault conditions. A total of six motor loadings were tested for each healthy or faulty caseVR is a family of microcontrollers developed since 1996 by Atmel, acquired by Microchip Technology in 2016. These are modified Harvard architecture 8-bit RISC single-chip microcontrollers. AVR was one of the first microcontroller families to use on-

chip flash memory for program storage, as opposed to one-time programmable ROM, EPROM, or EEPROM used by other microcontrollers at the time

Stator currents and vibration signals of the motors are measured simultaneously during experiments and are used in developing the fault diagnosis method. Two signal processing techniques, Matching Pursuit (MP) and Discrete Wavelet Transform (DWT), are chosen for feature extraction. Three classification algorithms, support vector machine (SVM), K-nearest neighbors (KNN), and Ensemble, with 17 different classifiers offered in MATLAB Classification Learner toolbox are used in the study to evaluate the performance and suitability of different classifiers for induction motor fault diagnosis.

The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in °C). The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplifier.

Due to applications of induction motors in critical industrial processes, accurately detect various electrical or mechanical faults of induction motors are very important to avoid process down-time and large financial losses

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