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BASIC CONCEPTS OF COMPUTER SYSTEM SECURITY



**BASIC CONCEPTS OF
COMPUTER SYSTEM
SECURITY**

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BLOCKCHAIN TECHNOLOGY

Principles, Design, and Applications

Dr.D.Roja Ramani | Dr.P.Chinnasamy

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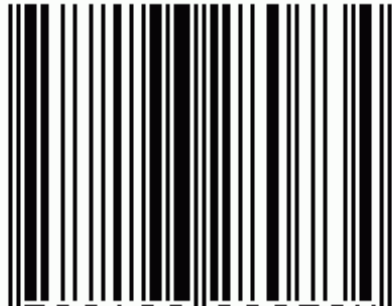
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PREFACE

In the rapidly evolving landscape of modern technology, few innovations have garnered as much attention and transformative potential as blockchain technology. Its emergence as a groundbreaking concept has disrupted traditional industries and challenged the status quo across various domains. As we stand on the precipice of a new era, it becomes increasingly imperative to understand the principles, design, and applications of this revolutionary technology.

This book is a comprehensive exploration of blockchain, delving into its fundamental principles and mechanisms, the intricacies of its design, and the diverse array of applications that have arisen as a result. As you embark on this journey with us, you will uncover the underlying principles that make blockchain an exceptionally secure, transparent, and decentralized system.

Our aim is to provide both newcomers and seasoned professionals in the field with a thorough and up-to-date understanding of blockchain technology. From its origins in the creation of Bitcoin, to the subsequent evolution of various blockchain platforms, this book elucidates the historical context that led to its development and the driving forces behind its ongoing advancement.

Delving into the design of blockchain, we will explore the inner workings of consensus mechanisms, smart contracts, cryptographic techniques, and governance models. As we demystify these complex concepts, you will gain a profound appreciation for the ingenuity behind blockchain's construction, allowing you to critically analyze and comprehend its potential applications.

The practical applications of blockchain extend far beyond cryptocurrencies, encompassing industries such as finance, supply chain management, healthcare, voting systems, and beyond. Throughout this book, we showcase real-world examples of blockchain implementations and illustrate how they have revolutionized existing processes and enabled

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IoT FUNDAMENTALS: CONCEPTS, TECHNOLOGIES, AND APPLICATIONS

IoT Fundamentals: Concepts, Technologies, and Applications

Dr. Ajmeera Kiran | Dr. T. Bhaskar
Dr. Manyam Thaile | Dr B Ben Sujitha

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CONCEPTS, TECHNOLOGIES, AND APPLICATIONS

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PREFACE

Welcome to "IoT Fundamentals: Concepts, Technologies, and Applications," a comprehensive exploration of the fascinating world of the Internet of Things (IoT). This textbook is designed to be a comprehensive guide for students, researchers, and professionals seeking to understand the fundamental principles, cutting-edge technologies, and diverse applications that shape the IoT landscape. The Internet of Things has emerged as a transformative force, revolutionizing industries, societies, and the way we interact with the world around us. By connecting everyday objects and devices to the internet, the IoT enables unprecedented levels of data gathering, analysis, and automation, leading to smarter decision-making, enhanced efficiency, and new possibilities that were once deemed unimaginable.

This book aims to equip readers with a solid understanding of the foundational concepts that underpin the IoT paradigm. Starting with an overview of the historical developments and the evolution of IoT, we delve into the core principles, including communication protocols, data processing, and security considerations. Through clear and concise explanations, we guide readers through the intricacies of IoT architecture, device connectivity, and cloud computing, empowering them to grasp the intricate interplay between hardware and software in IoT ecosystems.

Our journey into the realm of IoT continues as we explore the wide array of IoT technologies, ranging from sensors and actuators to wireless communication protocols and edge computing solutions. By presenting real-world examples and case studies, we highlight the versatility of IoT applications across industries such as healthcare, agriculture, transportation, manufacturing, and smart cities.

In this rapidly evolving field, staying up-to-date with the latest trends and advancements is crucial. Therefore, we have endeavored to incorporate the most recent developments, including advances in AI integration, blockchain applications, and the rise of 5G networks in shaping the future of IoT.

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Theoretical Perspectives and
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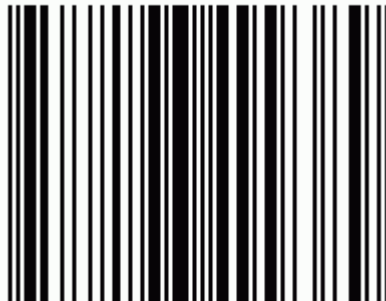
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LOUD COMPUTING DEMYSTIFIED: FROM BASICS TO ADVANCED STRATEGIES

CLOUD COMPUTING DEMYSTIFIED: *From Basics to Advanced Strategies*

**Dr.N.Shirisha
Mrs.A.Prashanthi
Ms.V.Rani Sailaja
Dr.B.Balakiruthiga**

**CLOUD COMPUTING DEMYSTIFIED:
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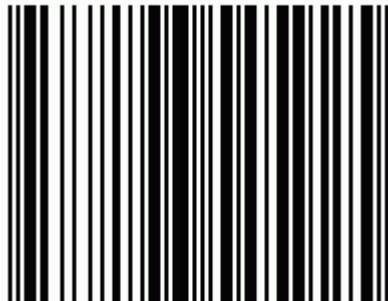
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NETWORK SECURITY: STRATEGIES FOR ROBUST AND RESILIENT SECURITY

Network Security: Strategies for Robust and Resilient Security



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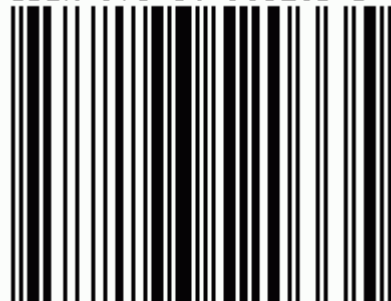
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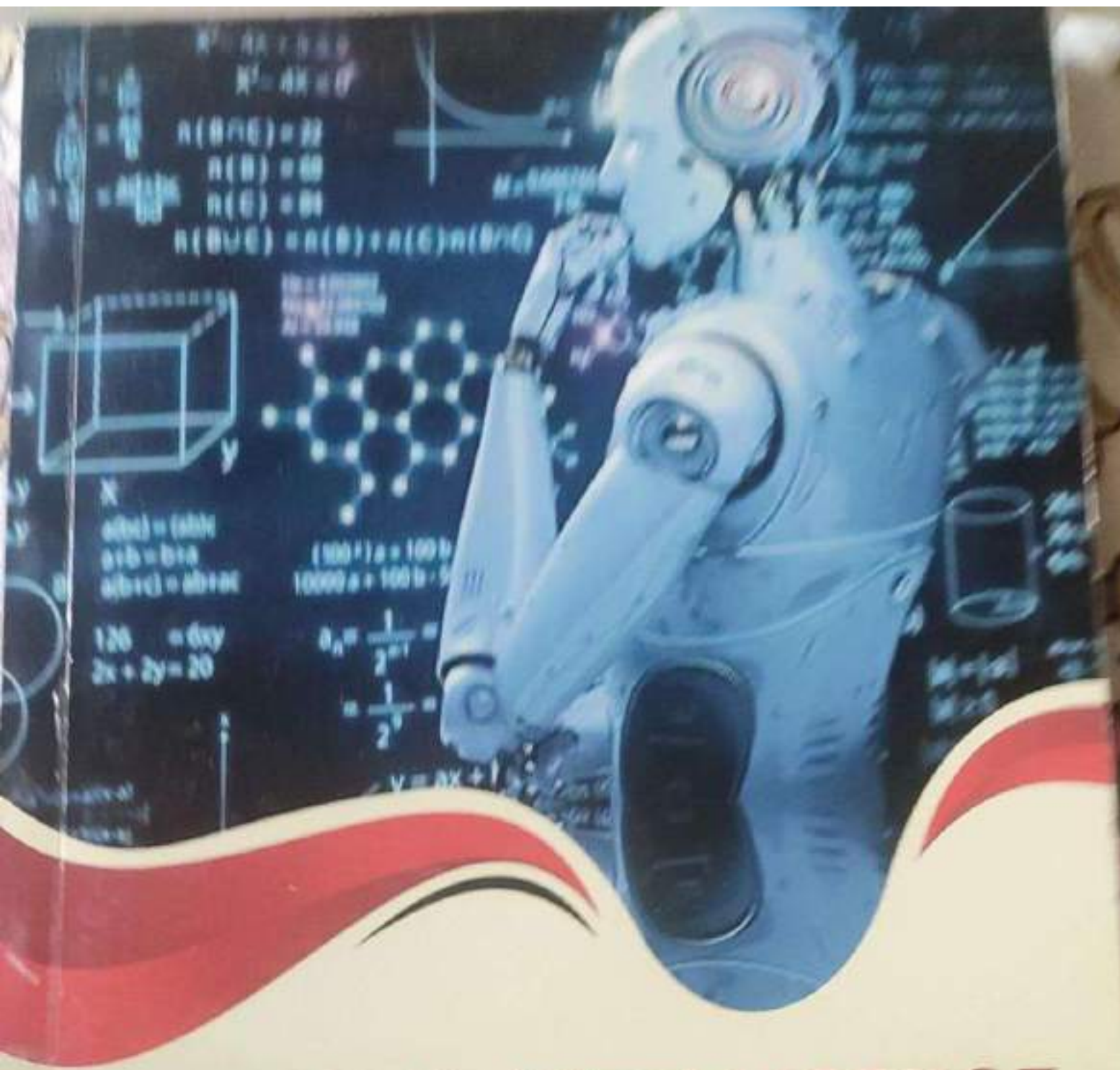
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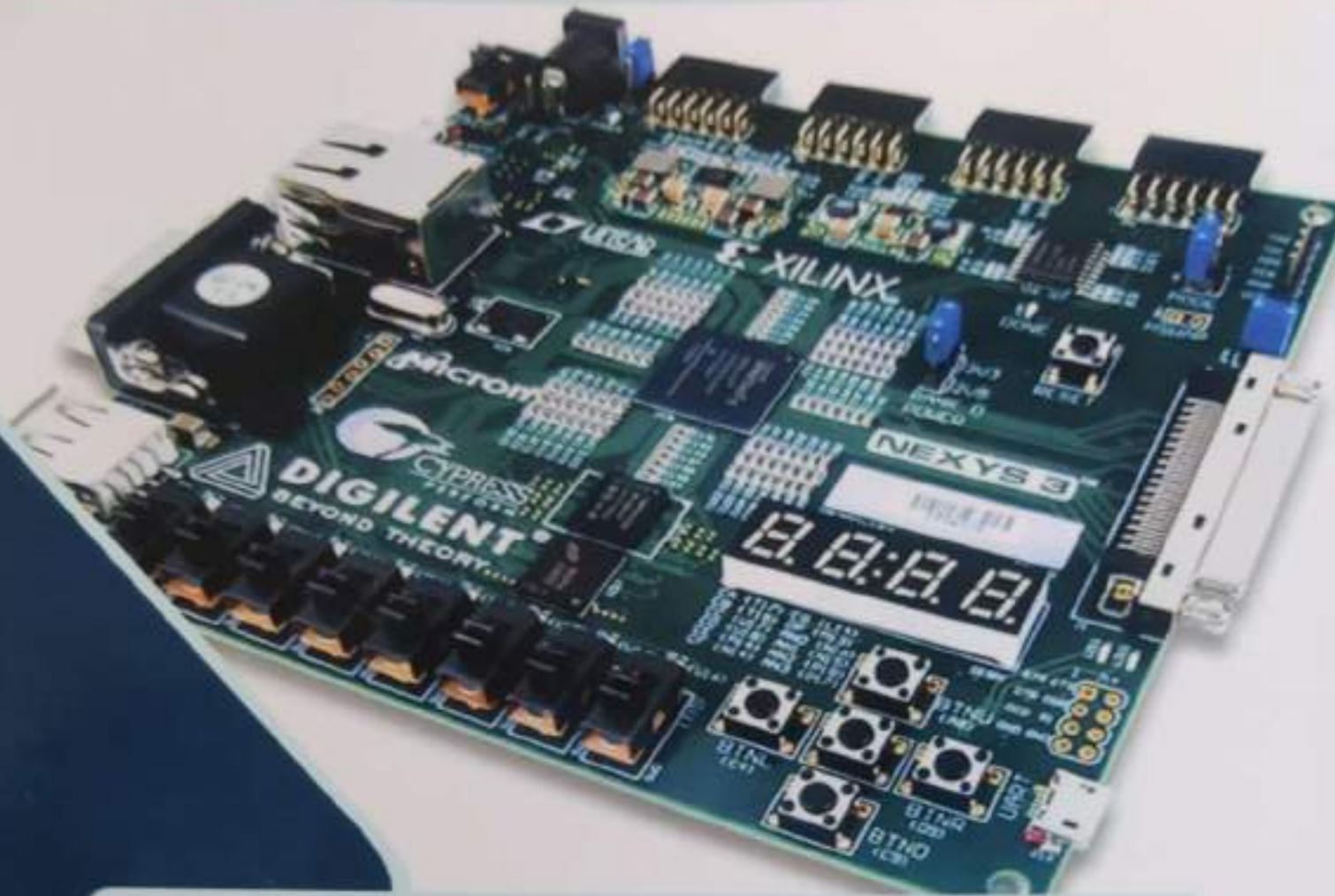
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Accelerated addition in Resistive RAM array using parallel friendly Majority Gates

ABSTRACT

Due to the limitations of CMOS technology, such as hard lithography, power consumption, and sub threshold effects, the researchers sought an alternative method. The unique properties of QCA technology, including as speed, low power dissipation, and small component size, motivated this research to investigate it as a CMOS alternative. This paper proposes a unique layout for a three-input single-layer majority gate. The proposed majority gate is used to create a revolutionary low-power RAM cell. Designing a low-cost memory cell would be a major difficulty since it is a component of the overall RAM, which is considered as the most important part of a digital gadget. The proposed RAM cell considerably decreases switching energy. The proposed structure have always had the following benefits: compact size, low consumed power, low cost, plus simple implementation. The recommended circuits are much more realistic for physical implementation since they are constructed on a single layer. The QCA Designer tool was used in this work for circuit design and execution, whereas the QCAPro programme was used for power analysis.

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Chapter 1

Deep Learning: Algorithms, Techniques, and Applications — A Systematic Survey

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ABSTRACT

Deep learning has become one of the hottest research topics in the machine-learning world, with tremendous success in several sectors. The summary and inductive reasoning procedures of deep learning are mostly used in this study. It begins by outlining the history and present state of deep learning globally. The second part of the chapter explains the fundamental structure, the traits, and a few types of traditional deep learning techniques, including the stacked auto encoder, deep belief network, deep Boltzmann machine, and convolutional neural network. Thirdly, it discusses the most recent advancements and uses of deep learning in a variety of industries, including speech recognition, machine learning, computational linguistics, and healthcare. Finally, it outlines the issues and potential possibilities for deep learning studies in the future.

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A Survey of VANET Routing Attacks and Defense Mechanisms in Intelligent Transportation System

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Abstract

Due to the tremendous growth in the vehicle industry, Vehicular Ad hoc NETWORKS (VANETs) have become important in wireless communication networks. High-speed vehicular nodes make the network highly dynamic. Besides, VANETs consist of several vehicles and extend the network scalability over the entire road area. Those mobility and scalability features create challenges in the design of the VANET routing protocol. Moreover, those features have made the routing protocols vulnerable to various routing attacks. The malicious vehicles in VANET make challenges in the design of an efficient and secure communication protocol. This survey summarizes the architecture of VANETs and discusses their security, the impact of attacks on routing efficiency, and challenges. The survey analyzes routing attacks on various VANET applications and the existing defence systems against various routing attacks in VANETs.

Moreover, it comprehensively covers the anonymous routing schemes, which help to hide the vehicular identity from others. Various intrusion detection systems are also discussed. Briefly, the survey covers most information about VANET and its security systems.

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An Efficient Prediction of Kidney Disease Using Machine Learning Algorithms

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Abstract

Everyone is aiming to be health-conscious in today's environment, even though, owing to work and a tight schedule, one only pays attention to one's health when symptoms appear. Chronic Kidney Disease, on the other hand, is difficult to forecast, diagnose, and prevent since it has no symptoms or, in some situations, no disease-specific signs. It can cause lasting health harm. Machine learning, on the other hand, may be a solution to this issue because it excels at prediction and analysis. Using different machine learning techniques, we will assess datasets from patients with chronic kidney disease with many characteristics as well as 400 records. To develop a model that accurately detects whether a person has chronic kidney illness.

Keywords: Machine Learning, Logistic Regression, Classification, Decision Tree, Random Forest

Introduction

Chronic kidney disease (CKD) has gained a great deal of attention due to its high death rate. The World Health Organization claims that chronic diseases are becoming a significant threat to developing nations. Cardiovascular illness is brought on by the build-up of industrial wastes in the arteries, which also results in other health issues like high and low pressures, hypertension, sciatica, and musculoskeletal issues. Renal failure is another name for chronic kidney disease. It's a serious kidney condition that causes kidney function to deteriorate

over time. The patient may have the following symptoms if CKD is not detected and treated early: High blood pressure causes anemia, weak bones, poor nutritional health, and nerve damage. As a result, it is vital to detect CKD at an early stage, although this is challenging due to the disease's gradual progression and lack of distinct symptoms. Machine learning can be beneficial in predicting whether or not a patient has CKD because some patients have no symptoms at all. The prediction model is trained with historical CKD patient data using different algorithms.

Defect Exposure in Vegetables and Fruits Using Machine Learning Algorithms

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Abstract

Defects to agricultural food items like fruits and vegetables, resulting in a decrease of the quality and quantity of agricultural consuming items. The regular or most used day-to-day approach for defect detection is continuous watching and observation of crops either by farmers or further by some professionals. We have used image processing and classification techniques in machine learning to identify and detect diseases on agricultural products like vegetables and fruits. The main goal of the system being proposed here is to monitor and detect diseases in fruits and vegetables in their early stages to farmers for a healthy yield. Our System can deliver the most accurate results in a very short time while consuming minimal computational resources.

Keywords: Agriculture, Disease Prediction, Machine Learning, Fruits diseases

Introduction

Farmers normally observe visual symptoms of the disease on fruits and vegetables. The cause for diseases in fruits and vegetables can be excess or lack of mineral uptake by the plants from the soil. There are many varieties of defects that affect these agricultural items which potentially lead to cause social and financial losses. Prior exposure on crop situations like it's health conditions would help in the control of disease extending or spreading further. The goal of this model is to find those defects or diseases on these agricultural items like vegetables and other eatable items in the starting stage itself. This model takes input as an image of a fruit or vegetable and tell us from which defect it is suffering and with mentioned

accuracy percentage. According to the problem we had observed, giving the solution to it at most quickly and accurately would help a lot in solving this problem.

Literature Survey

According to the study and survey country India consists most of it parts as agricultural part, almost 1/3rd of our country's people stay in rural areas, where agriculture is their primary source of occupation and living. Prior identification of defects is very demanding content for research and work on. Almost there are many numbers of diseases caused by fungi, bacteria, nematodes, etc. Defects and infections in farming fields and crops will lead to a dynamic downfall in yield

Prediction of Liver Diseases at Earliest Using Machine Learning Algorithms

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Abstract

Medical practitioners are finding it difficult to predict the illness in its earliest stages due to the vague symptoms. Often, abnormalities don't show up until it's too severe. Our study will employ algorithms to enhance liver disease diagnoses to solve this issue. The current study's main purpose is to differentiate between people with liver disease and without liver disease using algorithms for classification. The research uses performance metrics to compare the categorization method. To help the medical community with liver disease diagnosis in patients, a GUI will be designed in python. The Graphical User Interface is easy to use for medical professionals to screen for liver diseases.

Keywords: Classification algorithms, Machine Learning, Liver Disease Patients

Introduction

Liver, a significant organ presents solely in vertebrates that conducts a variety of vital biological tasks, including detoxification and the creation of proteins as well as bio-chemicals required for metabolism and survival. Diseases relating to the liver are considered fatal as they show very minimal symptoms which makes it harder for anyone to conclude the disease at its initial stages. Although there are numerous types of liver disorders, the liver will function normally though it is partially damaged. When it comes to the diagnosis and treatment of liver disorders and infections, time is important. Recognizing

the disease at the preliminary phases and taking the appropriate medications will drastically improve the rate of survival of the patient and minimize the chances of disease, making the patient's medical condition critical. As a result, detecting them at an initial stage is challenging. It is important to detect it and take the appropriate procedures to treat it. Detection of liver-related issues at the preliminary phases will help to increase the patient's chances of surviving. A patient medical condition whose liver disease has been diagnosed at the initial stages has a better chance of successful treatment than one who is diagnosed at later stages. From several recent

Detection of Lung Cancer Using Deep Learning Techniques

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Abstract

Lung cancer is a deadly form of cancer that is difficult to detect. As a result, it is more important for care to evaluate nodules swiftly and appropriately for both men and women. As a result of this research, CT was found. Images are better for getting accurate results. As a result, the majority of CT Images from scans are used to diagnose cancer. Therefore, a neural network helps in great way to detect cancer cells. CNN, image recognition, and Artificial intelligence together yield accurate values to detect cancer. Just by looking at a person's age, body weight, eating and drinking habits, and other diseases prediction of lung cancer can be done. Then using deep learning algorithms detection of the lung cancer can be performed if the predictions are positive. Deep learning performs beyond the typical machine learning approaches.

Keywords: Deep Learning, CT scan, Lung Cancer, Health Prediction

Introduction

Lung cancer arises when cells multiply uncontrollably. A variety of methods for detecting lung cancer in its early stages have been developed. In 2015, lung cancer was in the second place for the cause of death, according to a WHO poll, and it is now the fifth top cause of death in 2017. Smokers are the most affected, It accounts for 85% of all instances by (Bharathi and Arulananth (2017)). In recent years, various computer-aided diagnostic (CAD)

systems have been developed. Lung cancer must be detected early to avoid deaths and improve survival chances. Detection of lung cancer can be done by Artificial Intelligence i.e. deep learning. Therefore, neural networks help in a great way to detect cancer cells. CNN, image recognition, and machine learning together yield accurate values.

Literature Survey

Lung cancer incidence is directly inversely correlated with the frequency of heavy smokers.

Multiple Biometric Authentication Through Image Assessment Using Machine Learning

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Abstract

It is proposed to use a combination of three biometric identities: iris, palm print, and face. Firstly, Input images that contain noise undergo pre-processing from which key features are extracted. These features are compared with the existing images present in the database that are considered to be Authenticated. In this stage, we obtain Matching scores. A module fuses these individual scores obtained. The final fusion is capable of classifying a person to be authenticated or unauthenticated.

Keywords: Image Quality Assessment, Pre-processing, Feature extraction, Biometrics, DWT Segmentation, Image Fusion

Introduction

The process begins with image pre-processing, which includes noise removal and then feature extraction. We have to interpret the shapes of Iris, palm prints, and face properly because we need to train the computer which cannot distinguish the shapes as humans do. Another issue is that an image can be influenced by a variety of elements such as the angle at which we take the picture or the lighting conditions in the area (Valli, 2018; Chinnasamy et al., 2020; Chinnasamy et al., 2020).

Overview

The iris is a thin layer, circular component in the eye, and is responsible for the control of the diameter and size of the pupil which is proportional to the amount of light reaching the retina. The color of the iris is often referred to as “eye color.” Iris recognition refers to the capability of verifying

the identity of a person through his eyes i.e., Iris. The human iris is the space located around the pupil of the eye and is covered by the cornea layer which comes under the unique information of a person (Kavati, 2017).

For each subject, we collect palm print images from both left and right hands. These images are 8-bit gray-level JPEG files by our self-developed face recognition device. Subjects are required to put their face near the capturing hardware and make sure that he is in an evenly colored background. The device takes the biological features of a person.

Literature Survey

During a literature survey, we collected some information about the mechanisms of detecting fake biometrics. on the vulnerability of face verification systems to hill-climbing attacks using Bayesian we try to test the weaknesses of two face recognition systems via adaptation.

Determining Traffic Signs Using Neural Networks and Feature Extraction

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Abstract


The traffic sign detecting system is an essential component that can provide the driver with assistance by analyzing the current condition of the road and suggesting alternative routes for safer travel. We can correctly recognize the traffic signs, which will raise the level of safety when driving. Autonomous vehicles are the focus of research at a number of major corporations, like Google and Tesla, among others. In order for these technologies to be accurately maintained, the vehicle in question needs to be able to independently recognize and react to traffic signs. At first, the picture is pre-processed, and the sign is identified by scrutinizing its essential components, such as its form, color, and so on. In this particular system, Feature Extraction and Neural Networks have been adapted.

Keywords: Detection, Classification, CNN, Datasets, Deep learning

Introduction

Automatic driving has become a hot topic lately and not only researchers but also companies are giving their energy to it. Many accurate and efficient decisions related to road safety, traffic rules implementation, etc can be made using this system. Traffic signs are identified by using certain key features and special colors, and many of the results in recognizing the traffic signs dependent on color segmentation. Traffic sign detection is very important in advanced driver assistance programs. This System is converted into two halves one is icon detection and recognition. Preprocessing of the image is the most crucial part of this approach which determines the result. It can also assist the driver

by determining the road state and also able to give better driving routes.

Road signs have certain fixed characteristics that are used for detection and classification. The traffic signs for each country are almost identical and contain simple colors and common forms. It is difficult to recognize the traffic marks as it is affected by external factors like weather. Therefore, traffic sign recognition is a difficult and important topic in  traffic engineering research. The study (Liu et al., 2018) proposes a CNN which relates to the transfer of learning approach. Big data collection is used for Deep CNN training, and (RCNN) acquisition is available in place of standard traffic training examples.

Hospital Data Security Using Blockchain and AI

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Abstract

Data security is crucial in the military, hospitals, government offices, colleges, and schools. In simple words, the process of securing data against illegal access and data corruption is described as data security. In order to achieve this security we can utilise key management, data encryption, hashing and tokenization. With the rising prevalence of data breaches, protecting your data is crucial. CIA-style data security. Confidentiality only offers access to authorized users. Access control lists, encryption, strong passwords, and two-factor authentication do this. Data integrity is preventing unauthorized changes that could corrupt it. Digital security enforces integrity. Availability is all for keeping software and security controls running smoothly. The blockchain is a secure chain of transaction blocks that cannot be hacked or modified after registration. Blockchain gives anonymity and decentralised identification. AI improves user security, analytical models, and data sets. SecNet secures data in cyberspace.

Keywords: Blockchain, Artificial Intelligence, Hashing, SecNet, cyberspace

Introduction

The amount of information that is being gathered has been constantly growing over the past several years. This data is used by a great number of businesses for both their business purposes and to conduct behavior analysis. We can generate tailored recommendations by performing in-depth analyses of the data and the patterns it exhibits. Sometimes this also results in unethical data sharing and the exploitation of data for personal use, which calls into question the availability of confidential information as

well as its integrity and secrecy. Some businesses often exchange clients' personal information for monetary gain, which might damage their relationships with those customers because the information may be misappropriated or stolen. Privacy and security measures must be beefed up immediately in light of the recent spike in the number of data breaches and instances of digital surveillance. We are investigating the feasibility of securing data by utilizing blockchain technology (Chinnasamy et al., 2019) in conjunction with artificial intelligence. The decentralized system decides when, what, and how much data can be

A Survey of VANET Routing Attacks and Defense Mechanisms in Intelligent Transportation System

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Abstract

Due to the tremendous growth in the vehicle industry, Vehicular Ad hoc NETWORKS (VANETs) have become important in wireless communication networks. High-speed vehicular nodes make the network highly dynamic. Besides, VANETs consist of several vehicles and extend the network scalability over the entire road area. Those mobility and scalability features create challenges in the design of the VANET routing protocol. Moreover, those features have made the routing protocols vulnerable to various routing attacks. The malicious vehicles in VANET make challenges in the design of an efficient and secure communication protocol. This survey summarizes the architecture of VANETs and discusses their security, the impact of attacks on routing efficiency, and challenges. The survey analyzes routing attacks on various VANET applications and the existing defence systems against various routing attacks in VANETs.

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