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REVIEW

A review on optimum substrate surface roughness to create better wetting

[version 1; peer review: 3 approved, 2 approved with reservations]

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Abstract

Surface roughness or texture is one of the key parameters for liquid fluids or the liquid metals to achieve good or poor wetting. In certain applications surface roughness of smooth surface [mirror finish] is treated as slippery surface for poor wettability however in few applications' roughness surfaces is considered as better wetting especially for liquid metals. In this regard, to understand the optimum surface roughness of the substrates to achieve good wetting is essential. In the present review paper, an attempt has been made to find the better roughness value of the substrate for better wetting of liquid metals or alloys based on substrates and fluids.

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A Comprehensive Review of 5G Wireless Network Evolution

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Abstract. Due to the demand for faster connections, the world's telecommunications companies are working together to improve fast connectivity. Thanks to fifth-generation (5G) wireless technology, devices such as smartphones, smart watches, smart homes and connected cars are increasingly connected to the internet. This is an exploration of a rapidly changing world. The cellular architecture of the industry must adapt to accommodate these changes. This study focuses on the design of 5G mobile networks and explores potential strategies that can improve infrastructure and meet customer needs. More importantly, this article highlights the importance of two key concepts in 5G: device-to-data (D2D) communications and multiple input multiplexing (MIMO) technology. Thanks to extensive research and the use of reliable online sources, the use of 5G e9 mobile networks is well established and developed.

Keywords: 5G Wireless Technology, Cellular Architecture, Connectivity Demand.

I Introduction

The latest news in January 2022 says that 5G technology is a major breakthrough in wireless communications, providing faster speeds, lower latency and better connectivity than the pre-4G/LTE era. The emergence of new technology is not only interesting, but also important for understanding what will happen in the future. This research is part of the early development of the fifth generation of wireless communications equipment and technology known as 5G. 5G technology is gaining prominence in new applications and industries due to better, deeper and more powerful access. The main purpose of this article is to trace the development of this technology over the years and provide good and consistent evidence of its progress. We are exploring the field of technology development to update data analysis and mining techniques. This approach has proven useful in analyzing numerous published international reviews focusing on 5G.

5G-based telecommunication systems are designed to address challenges more effectively by leveraging the foundations laid by widespread use of 4G prototypes. While no single organization owns 5G, various companies within the mobile phone industry have made significant contributions to its development. Qualcomm, in particular, has played a pivotal role in introducing the foundational technologies that have propelled the industry forward, setting the stage for 5G as the next wireless standard.

South Korea is anticipated to lead the global deployment of 5G networks, positioning itself at the forefront of this technological advancement. Projections suggest that by 2025, 60% of mobile phone users in South Korea will be utilizing 5G networks. Notably, Huawei Technologies Co. has been identified in a recent study as holding essential rights to core aspects of next-generation 5G technology. Despite efforts by the Trump administration to exclude the technology from its supply chain, Huawei continues to provide financial support for the development of 5G.

Wireless systems employing broadband Orthogonal Frequency-Division Multiplexing (OFDM) in the millimeter-wave spectrum (10mm to 1mm) ranging from 30 GHz to 300 GHz have the potential to deliver speeds of up to 20 Mbit/s at a distance of 2 km from the data source. The millimeter-wave band emerges as a promising solution that could support global network usage for wireless internet. Fig.1. below represents an introduction to 5G technology.

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Review on Existing Note-Taking and Task-Management Apps

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ABSTRACT

The constantly changing universe of note-taking and task-management applications has become an essential aspect of our digital life. This evaluation delves into the complexities of current programs, revealing their features, strengths, and limits. This study intends to aid users in making educated decisions about selecting an app adapted to their specific needs by critically analyzing the present status of these tools. Note-taking and task-management software play a critical role in organizing and optimizing individual and communal efforts in the changing world of digital productivity tools. This in-depth examination aims to delve into the detailed features, user experiences, and technology landscapes of existing note-taking and task-management applications. This evaluation seeks to provide users and developers with a detailed perspective of the emerging digital productivity ecosystem by scrutinizing the strengths and limits of popular platforms.

Key words: Note-taking apps, Task-management apps, User experience, Technological evolution, User-centric design, Strengths and limitations, Digital productivity.

1. INTRODUCTION

Note-taking and task management are integral aspects of personal and professional life, which are crucial in enhancing organization, productivity, and overall efficiency [2],[3]. In both situations, reaching objectives, fulfilling deadlines, and keeping a clear sense of direction depend on one's capacity to gather, arrange, and prioritize information [5].

Effective note-taking in daily life helps people to record thoughts, revelations, and crucial details, which improves memory retention and makes them useful references in the future [1]. On the other side, task management assists people in keeping track of their obligations, whether they be long-term objectives, personal projects, or everyday duties [1]-[4]. The combination of these behaviors promotes a well-organized and balanced personal life.

The need for effective note-taking and task management is much greater in the professional setting [8]. Professionals need strong tools to optimize their productivity since they frequently manage several projects, deadlines, and teamwork [6]. Effective task management and the capacity to take well-organized, searchable notes are essential for success in hectic work settings [8].

This evaluation aims to thoroughly investigate and assess current note-taking and task-management software. Through our analysis of different applications on the market, we hope to shed light on their features, usability, and fit for varied user requirements [9],[10]. In order to maximize people's productivity and efficiency, this evaluation attempts to help people make educated judgments about the tools they decide to include in their personal and professional lives [7]. This study attempts to shed light on the advantages and disadvantages of note-taking and task-management applications in the modern digital world, whether for professionals, students, or anybody else looking to improve their organizational skills.

2. RELATED WORK

Exploration of related work provides a critical foundation for understanding the historical background, significant events, and influential elements that have impacted the trajectory of these digital productivity tools when digging into the world of note-taking and task-management software [12]. This section guides you through key research, analyses, and milestones, providing a thorough overview of the large body of work that has led to the current state of note-taking and task-management applications [13].

A. Historical Evolution of Productivity Tools:

The origins of note-taking and task management may be traced back to the early days of personal computing when primitive software attempted to digitize the old pen-and-paper methods [9],[10]. This section examines significant publications that have traced the growth of personal information managers to the introduction of dedicated note-taking programs [8]. Understanding the historical progression provides readers with insights into the obstacles, breakthroughs, and paradigm shifts that have created the digital productivity environment [12].

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A Review on Supply Chain Management using Blockchain

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ABSTRACT

Supply chain management is a process of transporting goods and products from source to destination. There are several problems that we encounter with current supply chain management (SCM) systems which include security, traceability, transaction transparency, stakeholder involvement, fraud, and instabilities. Blockchain emerges as a technology that can effectively and transparently manage data and foster trust. It can also help with payments made without the need for a third party or transaction authorization and verification in the supply chain. This study presents an overview of the literature on blockchain in the context of supply chains, including its benefits and challenges.

Key words: Supply chain, Blockchain, Smart Contracts

1. INTRODUCTION

Supply Chain Management (SCM) refers to the process of moving goods and services from one point to another, involving various stakeholders. This process has been in existence since ancient times when the very first product or service was created and sold. With the advent of industrialization and digitalization, SCM has become more sophisticated, allowing companies to produce and deliver goods and services more efficiently. For instance, Henry Ford's standardization of automobile parts was a game-changer that enabled mass production to meet the demands of a growing customer base. Over time, incremental changes have brought additional levels of sophistication to SCM systems. However, SCM has essentially remained a linear and siloed function that was managed by supply chain specialists for generations. An efficient SCM can bring tremendous changes and profits to the organization.

Despite its advantages, current SCM has many drawbacks, including issues related to transparency, security, traceability, and reliability. To improve SCM, integrating Blockchain technology is one solution that can help overcome various challenges in the process.

Blockchain was invented by Satoshi Nakamoto in 2008 to track the data which is also known as serve public transaction ledger of cryptocurrency bitcoin which is known as the first digital currency which solved the double spending problem without using any third-party interaction. Blockchain is used in various fields like payment and money transfer, monitoring supply chains, digital ID's data sharing, copyright, IoT management, health care, etc.

A blockchain is defined as a distributed ledger that maintains a continuous connection between the list of data called blocks. These are interconnected using cryptographic techniques. Each block contains the address of the previous block which is known as Hash. Hash is a timestamp of the transaction. Each block containing a hash has a unique identifier, password, or fingerprint. The previous block's hash link is connected to the next block like this the whole blockchain is internally linked.

There are four key components behind blockchain they are:

- Shared ledger: It will store the overall data of each transaction.
- Permission: Permission ensures the transaction is secure.
- Smart contracts: It is the set of rules created and used by a business transaction which is stored in blockchain and they are automatically executed.
- Consensus: Here all parties should agree to verify the network for transactions.

Blockchain technology allows for self-validation of transactions and involves multiple nodes. It provides transparent information to all users and stores data in multiple locations, making it less risky. Additionally, the data on blockchain cannot be changed or deleted once it is recorded.

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Secure Transactions in a Chip: A Contemporary Review of Smart Card Innovations

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ABSTRACT

Smart card technology has emerged as a powerful tool in the field of secure identification, authentication, and transaction processing. This abstract provides a comprehensive overview of smart card technology, highlighting its key features, applications, and benefits. Smart cards, also known as integrated circuit cards, are portable devices that incorporate a microprocessor and memory to securely store and process information. These cards have revolutionized various industries by enabling secure access control, secure payment transactions, and secure storage of sensitive data. The abstract begins by exploring the fundamental components and architecture of smart cards. It delves into the different types of smart cards, such as contact-based and contactless cards, and explains the communication protocols employed in their operation. Furthermore, the abstract discusses the extensive range of applications where smart cards have found widespread adoption. These applications include identification cards, payment cards, healthcare cards, transportation cards, and more. The abstract highlights the advantages of using smart cards in each of these domains, such as enhanced security, convenience, and interoperability.

Key words: Smart Card, Security, Adoption/Acceptance, Satisfaction, Privacy, Non-repudiation, Authentication, Integrity, Verification, Information Technology.

1. INTRODUCTION

Smart card technology is already being used in a variety of techniques throughout the world; nevertheless, the need of security in information technology has risen, particularly in applications involving data exchange and online transactions. Furthermore, research in security have been identified as a factor that may influence smart card adoption by information technology acceptance[1]. The major goal of this research is to analyze smart card security principles and estimate a result of security related smart card usage[2]. To that purpose, a survey of 640 university students was conducted to examine the security of smart card technology adoption[5]. Unlike the conventional magnetic stripe cards employed in Automated Teller Machines (ATMs), smart cards leverage a ground breaking approach to access control the integration of a Personal Identification Number (PIN)[21].

Smart cards are so-called because they include a microprocessor. Even these cards are occasionally meant to be "chip cards" or "integrated circuit cards." The chip card looks like a credit card that also functions as a computer.[4] Unknowingly, chip cards have become a critical component of human life. Chip cards are reliable instruments that give valid user identification, as well as multi-functional, low-cost devices that can be readily changed for both logical and physical access. Digital access management encompasses well-known principles such as password checking as well as more security is provided[20].

advanced cryptographic authentication procedures such as Windows login, remote Network access, network verification" physiological identification storage, and others. ID cards and building access management are examples of physical access control. chip cards are used in a variety of additional applications, including well-being and services, cards, banking (such as ATM Credentials),"network verification, prepaid phone cards, and identification (such as Citizen cards, Staff identification cards, and Subscription cards). telecommunications (mobile phone subscriber identification and administration), transit Passes e-Passports and physical access control, Bank notes, Motor vehicle licenses.

It is critical to emphasize that the underlying issues with chip card technology must be addressed before the technology can be further developed. Various research has produced ideas and models to characterize and evaluate user approval, each of

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5G's Integration with Edge Computing

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ABSTRACT

This study addresses the transformative integration of 5G networks with Edge Computing and Mobile Edge Computing (MEC) and explores the collaborative standards established by industry associations such as ETSI and 3GPP. The article explores the multiple possibilities of this integration, encompassing consumer and operator services, and meeting the demands of new technologies such as augmented reality, virtual reality and the Internet of Things. The strategic coexistence of distributed MEC is explored, while the security and privacy challenges of MEC are explored, emphasizing layered security and blockchain technologies. The study highlights the role of 5G and MEC in reshaping the communications landscape, providing affordable and efficient computing at the network edge, and improving network performance and quality of experience (QoE). As the 5G and MEC ecosystem evolves, the paper predicts a transformative impact on connectivity, speed, reliability and responsiveness across industries, and emphasizes the continued importance of research and development in shaping the future of communications and computing.

Key words : 5G, Edge Computing, Internet of Things, Mobile Edge Computing, Network.

1. INTRODUCTION

Edge computing is a computing paradigm that enables edge servers in mini-clouds (or edge clouds). Extend cloud operations at the network edge to perform computationally demanding tasks and store massive amounts of data close to user equipment (UE). 1]–[3] . Traditional cloud computing, which is a centralized computing paradigm that provides continuous access to high-performance data centers approved to allow user devices to offload computing and storage space to data centers [4]. This is because user devices have limited processing, data processing and storage capabilities. Edge computing continues to be promoted as a top requirement for next-generation applications such as augmented reality and virtual wireless interactive communications. These highly interactive applications are computationally intensive and have high quality of service (QoS) requirements, including low latency and high performance (eg. ultra-reliable low-latency data transfer (URLLC), touch screen) [5]–[7]. Most importantly, these applications are expected to generate massive amounts of data, up to 30.6 exabytes per month [8]. The limited number of UE Limited Warranty options need to receive and store massive amounts of real-time data, process, compute and analyze the data, and make and distribute mini-cloud-based decisions locally. Therefore, mini-clouds of edge servers are functions of the cloud but at a different scale and are instead located locally in remote data centers that may be located far from the user's devices[9]. This white paper describes the evolution of edge computing. In 5G Some analyzes were performed on 5G-specific computing platforms. Especially mobile edge computing (MEC) [10], [11]. Also [12], [13] discuss laterality and its related issues in 5G environment and MEC architecture. [14] provides an overview of edge computing, including key applications and challenges from the perspective of traffic networks. Our role is first. Currently: Raw computer classification in the field of 5G Objectives, software platform, objects; Using 5G technology, performance measurement, performance computer screen; Cross-sectional assessment of how 5G data processing; Public reasons for the research project. This project is timely due to the arrival of 5G and the growing use of edge computing.

2. BACKGROUND

This part provides an overview of 5G, and computing technology and MEC.

2.1 Requirements of 5G Systems

The advent of 5G technology represents a significant leap in connectivity, promising incomparable speed, minimal latency and expanded capabilities in various applications. The success of 5G systems is based on several key requirements that support their functionality. First, 5G systems are expected to deliver high data rates, facilitating seamless experiences in applications such as augmented reality and high-definition video streaming. In addition, the very low latency of 5G,

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Advancements and Applications of Blockchain Technology: A Comprehensive Analysis

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ABSTRACT

The digital code of blockchain technology has revolutionized every aspect of business, commerce and industry. This new system eliminates the need to store and manage codes by providing timely and immutable data. Unlike the traditional systems, these blocks are not specific to a particular organization but are monitored by a network of nodes or computers. Strong encryption protection and connect all blocks together. Blockchain's immutability and security have revolutionized fundamental concepts such as trust, ownership, identity, and financial transactions[6]. This technology enables secure, fast, transparent and pseudonymous transactions. A source of in- formation about blockchain, this article provides an in-depth study of blockchain's history, principles and popularity. Additionally, various consensus algorithms used in the blockchain technology are also carefully examined. Originally conceived as a system for cryptocurrencies, blockchain has evolved into a transformative force across industries. The article discusses the concepts, methods and applications of blockchain technology.

Blockchain's decentralized structure, driven by decentralized ledgers and encrypted confirmation, ensures reliability, and security and transparency of information transactions. This research contributes to the growing body of knowledge about blockchain and is useful for researchers, practitioners, and policymakers who want to better understand the technology's impact and future directions. Additionally, this article will examine various applications and real-life examples of blockchain technology and addresses related issues and problems [2-8]. The presentation of non-current events expands the range of the potential applications. This study provides a better understanding of all aspects of blockchain by providing an overview of the products.

Key words: Cross-Chain Technology; Crypto economics; Initial Coin Offering (ICO); Toke- nomics; Supply Chain on Blockchain; Identity Management on Blockchain; RegTech (Regulatory Technology); Compliance on Blockchain; Blockchain and Internet of Things (IoT); Blockchain and Artificial Intelligence (AI).

1. INTRODUCTION

It turns out that advances in blockchain technology are very different. The first period represented by Bitcoin focuses on digital currencies and financial transactions. The new era offers smart contracts that can complete the process with a simple transaction [4]. The third generation expands blockchain applications to areas such as healthcare, and government, and science. The revolutionary potential of blockchain lies in its ability to increase trust, transparency and security in the digital economy. [10] Blockchain speeds up the process and reduces debt by eliminating the need for intermediaries such as banks and lawyers. This machine has the power to change contracts, financial transactions and every aspect of daily life. As blockchain technology advances, discussions with four groups of artificial intelligence (AI) and digital intelligence show that it is creating an impact beyond initial use. However, for widespread adoption, issues such as scalability, management issues, and collaboration need to be addressed.[2] In this dynamic environment, the blockchain trajectory is emerging, heralding a future of distribution, security and transparency that will redefine the way we exchange and interact in the digital age.

A. The short term for blockchain and other technologies

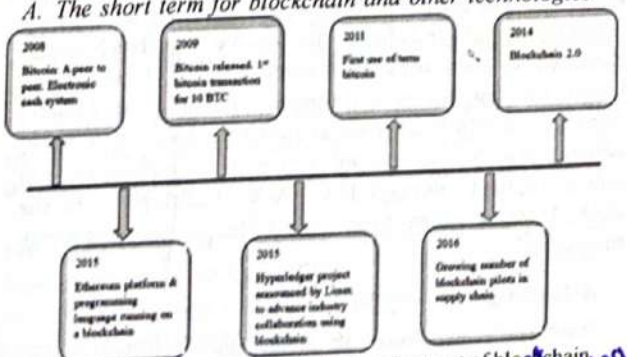

Figure 1: Crucial milestones in the development of blockchain technology. [6–10].

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Review: Tiny Face Detection and Recognition Techniques

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ABSTRACT

The exponential growth of video and image databases has created a need for intelligent systems to automatically analyze information, as manual efforts are no longer feasible. Faces plays a crucial role in social interaction, conveying identity and emotions, thus requiring efficient and accurate analysis. Deep learning techniques has brought about a significant revolution in face detection, despite their increased computational requirements.

This paper presents a comprehensive analysis of representative deep learning-based methods for face detection, focusing on their accuracy and efficiency. It also compares and discusses popular and challenging datasets, including their evaluation metrics. Additionally, a thorough comparison of successful deep learning-based face detectors is conducted, evaluating their efficiency using Floating Point Operations (FLOPs) and latency as metrics.

The results and findings of this study can serve as a valuable guide for selecting suitable face detectors for various applications. Moreover, they can contribute to the development of more efficient and accurate detectors. The paper aims to address the pressing needs for intelligent systems that can automatically understand and analyze visual information in an increasingly data-driven world.

Key words; Deep learning based face detection, Facial expression recognition, Neural Network Architectures

1. INTRODUCTION

Face detection poses a significant challenge in the field of object recognition, particularly when it comes to detecting small objects. In this context of face detection, we delve into three crucial aspects: scale invariance, image resolution, and contextual reasoning. Scale invariance is a fundamental property in recognition and object detection systems, enabling robust detection across different scales[6]. The exponential growth of video and image databases has made it increasingly burdensome for humans to manually process and analyze the vast amount of visual data available. Faces hold paramount importance in social interactions, serving as a means to convey identity and emotions. To address the demanding task of automatically comprehending and examining visual information, deep learning technique has emerged a powerful solution, exhibiting remarkable breakthroughs in face detection. However, these advancements come at the cost of heightened computational requirements[8].

This paper aims to provide a comprehensive exploration of deep learning-based methods for face detection, with a specific focus on their accuracy and efficiency. The goal is to shed light on the advancements in this field, analyzing various techniques and their performance. Additionally, the paper highlights the need to strike balance between accuracy and computational efficiency on face detection systems.

Figure 1 showcases examples of successful face detection, demonstrating the capabilities of the discussed methods[13].

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Safeguarding Networks: The Role of Cryptography

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ABSTRACT

Due to complex network threats, network security faces unprecedented challenges in a rapidly changing environment. These details highlight the importance of cryptography in protecting networks from today's threats. The development of technology has led to the increase in connected devices, the expansion of parking areas and the need for security measures. Honest and confidential information is protected by encryption technology using complex methods and algorithms. The brief reviews state-of-the-art cryptographic techniques and highlights the importance of quantum-resistant mechanisms against the threat of quantum computing. It explores how cryptography can be used together with technologies such as blockchain, artificial intelligence and the Internet of Things, and emphasizes its importance in ensuring the security of these areas. It envisions the development and implementation of post-quantum cryptography, covers concepts such as homomorphic encryption and zero-knowledge proofs, and addresses issues of cryptographic efficiency and creative control. It aims to protect networks from new threats and ensure secure data exchange by meeting the need for strong cryptographic protection in the evolving business environment.

Key words: Cryptography, Quantum computing, Block chain, Internet of things, Artificial intelligence, Encryption

1. INTRODUCTION

Due to the complexity of cyber threats, cyber security has become one of the most important issues in today's rapidly changing environment. The number of stops has increased due to the growth of connected devices and the development of digital ecosystems driven by the Internet of Things (IoT). In addition to providing previously unheard-of connections, this expansion also creates previously unheard-of vulnerabilities, making the network vulnerable to serious cyber-attacks[1]. Cyber-attacks are becoming increasingly complex and create many problems in protecting sensitive information, network infrastructure and networks. information. Criminals are threatening to use a variety of attacks, including ransomware, phishing, malware, and zero-day attacks, and they are always evolving to bypass traditional security measures [28]. The importance of cryptography in network security cannot be overstated. Sensitive data is encrypted to ensure confidentiality and data integrity is maintained to ensure data is not altered during transmission or storage. Additionally, cryptography allows access to security controls and aids in authentication by verifying the identity of communicators.

Due to the development of technology and the increasing number of cybercrimes and cyber-attacks, cryptography plays an important role in improving cyber security. It is important for organizations to understand and use strong encryption techniques and algorithms to reduce risk and protect their digital assets [14].

This article aims to explore the complex world of cybersecurity issues in today's technological world. . Its main purpose is to demonstrate the important role cryptography plays as an important tool in protecting networks against threats. It also highlights the importance of cryptography in protecting the confidentiality, integrity and authenticity of information in a dynamic digital environment.

2. FUNDAMENTALS OF CRYPTOGRAPHY

The study of secure communication, or cryptography, has a long and rich history dating back thousands of years. Its development has resulted from constant changes and modifications to accommodate security changes, starting from old ciphers to modern encryption algorithms.

2.1 Historical evolution

After centuries of development, cryptography has become an advanced field that adapts to the needs of today's technological environment. The historical trajectory includes the transition from traditional encryption methods (such as changing and modifying passwords) to the introduction of modern encryption algorithms and methods that change the approach to security. The development of post-quantum

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Violence Detection Using Deep Learning

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ABSTRACT

Due to the increased risk of exposure to violent and harmful content brought about by the spread of online video content, robust systems for automatic detection and filtering have to be developed. This research suggests a novel method for deep learning-based violent content detection in videos. Our model examines both temporal and spatial characteristics in video frames by utilizing the power of recurrent neural networks (RNNs) and convolutional neural networks (CNNs).The suggested system uses a two-stream architecture, where one stream is used for temporal information using bidirectional LSTM (Long Short-Term Memory) networks to capture sequential dependencies, and the other stream is devoted to spatial analysis using 3D CNNs for frame-level understanding [1]. To ensure strong generalization, the model is additionally trained on a varied dataset that includes both violent and non-violent content. Transfer learning is used with pre- trained deep learning models on large-scale datasets to improve the model's performance [5]. Comprehensive tests show how well the suggested method works to reliably identify violent content in videos of different genres and settings. The system demonstrates its potential for incorporation into online video platforms to give viewers a safer and more secure experience by achieving state-of-the-art outcomes in terms of precision, recall, and F1 score [4]. The suggested deep learning-based approach supports further initiatives to lessen the negative impacts of violent content in digital media and promote a safe and healthy online community [1]. Using Deep Learning to Address the Problem of Violent Video Detection: A Bright Future for Security and Safety.

The proliferation of violent content is a key concern posed by the ever-increasing abundance of online video content. This puts personal safety, public safety, and platforms' capacity to properly filter information at risk. Presenting deep learning, a potent technique that presents a viable way to automatically identify violent content in videos [2]. To sum up, deep learning presents a potent and exciting way to address the pressing problem of violent video content. We can create a more secure online environment for everyone by utilizing this technology properly and resolving the issues it raises [5]. Further investigation into cross-modality learning and real-time detection shows promise for even higher efficiency and accuracy.

Key words: Deep Learning Methods, Multi Model Feature Extraction, Machine Learning, Fight, Violent Flow, Motion feature extraction, Feature fusion baseline.

1. INTRODUCTION

Due to the ongoing rise in abnormal behaviour in different contexts, human behaviours detection in general and violence detection in particular have recently gained significant attention in Computer Vision (CV) research. Additionally, because of the complexity of the environment (i.e., social interaction) and the challenge associated with extracting a particular characteristic that is associated with a particular occurrence, violence detection is one of the most challenging problems in CV [3].

To put it another way, accurately detecting a violent situation requires two main feature extraction methods: 1) Spatial or shape feature extraction, and 2) Temporal or time features extractions. The spatial features represent the relationships or interactions between single frame pixels, but they are insufficient to identify the violence.

In the meanwhile, the most well-liked study in violence detection uses surveillance footage to extract spatiotemporal elements that aid in the clear identification of violent cases. In order to improve overall classification performance, this paper proposed various architectures based on extracting spatiotemporal features using various techniques (e.g., 3D Convolutional Neural Network (CNN) Convolutional Long Short-Term Memory (Conv-LSTM) networks integrating transfer learning with LSTM or Conv-LSTM). Additionally, the architectures included a combination of attention modules (i.e., channel attention and spatial attention).

Based on the UBI-Fights video data, a great deal of important work has been done recently in the area of violence detection. For instance, in order to provide weak/self- supervised learning, Bruno Manuel Degrading in suggests a complex iterative learning framework based on Bayesian filtration for the instances of unlabeled input. Further more, the author employed the late decision fusion ensemble technique to improve the overall performance of three models using the random forest algorithm, which has fifty decision trees [2].

The results showed that this framework performs 0.819 for the Area Under the Curve (AUC) metric and 0.284 for the Equal Error Rate (EER) measure on the UBI-fights data. Proposing different architectures based on integrating the Convolutional Block Attention Modules (CBAM) with various layers such as ConvLSTM2D or Conv2d&LSTM layers; to catch the spatiotemporal features, and increase the focus on the important ones.

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Review On E-Commerce Application with Leveraged Cryptosystems and Big Data

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ABSTRACT
The fast improvements in technology and the growing desire for safe and easy online purchasing have caused a dramatic shift in the e-commerce market in recent years. The merging of big data analysis and encryption, two potent instruments that are transforming how companies run and customers interact in the digital marketplace, is at the core of this change. In e-commerce applications, cryptography, the study of secure communication, is essential for maintaining transaction integrity, protecting user privacy, and securing sensitive data. Businesses may optimize pricing strategies, improve auction efficiency, and obtain important consumer insights by practicing big data analysis, which is the art of gleaning insights from large volumes of bidding data. This in-depth analysis explores the diverse applications of big data analysis and cryptography in the e-commerce industry, delving into their complex worlds. We look at the underlying ideas behind these technologies, the range of applications they can be used for, and how they affect the entire e-commerce ecosystem.

Key words: Cross-border, data process, legacy, Blockchain, Attack detection model.

1. INTRODUCTION

The e-commerce industry is thriving because the introduction of the internet completely changed how we conduct business. This international phenomenon has completely changed the way business's function, giving them the ability to access a larger customer base and offer flawless online purchasing experiences to customers all over the world. But as e-commerce has expanded, it has also presented new difficulties, namely with regard to guaranteeing the effectiveness and security of online transactions.

The manner that consumers and organizations do business has changed dramatically as a result of the explosive expansion of e-commerce. Alongside this expansion, there has been a rise in the demand for effective and safe e-commerce solutions. In order to meet these demands, big data analysis and cryptography are essential.

Big data analysis and cryptography have become crucial instruments for overcoming these obstacles and advancing e-commerce. Big data analysis delivers insightful information on customer behavior and market trends, while cryptography offers a strong basis for secure communication and data security.

2. THE DEVELOPMENT OF CROSS-BORDER APPLICATION

Cross-border e-commerce application is an activity in which the transaction is proceeding through electronic transaction platforms accomplished by delivering commodities through logistic service among the dealers [1].

As one of the Backbones of international trade, the logistics industries worldwide was over 8.4 trillion euros in 2021 and is expected to be 13.7 billion euros by 2027. Parallel to this the global total logistics costs soared to 9 trillion U S dollars in 2020, by this there is still room for the development of cross-border import.

Cross-border e-commerce has 6 characteristics including global, invisible, anonymous, instantaneous, paperless and evolves [1]

3. THE PROCEDURE OF APPLYING BIG DATA INTO MARKETING OF E-COMMERCE

The application of big data to marketing of E-commerce are divided into four procedures [4]

3.1 Data Collection

Firstly, data collection plays a major and important part in data processing. In the model of B2C e-commerce enterprises, the usefulness of data, whether and where to collect should be confirmed in this stage other irrelevant data such as work, age and gender of the uses will become key elements for the successful and accurate implementation of market model [5].

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PDE-based Specular Highlight Elimination

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ABSTRACT

Dealing with reflections in images captured through glass would be real headache, as they can obscure the important stuff behind the glass and make the whole image look messy. This is a major problem in many computer vision tasks.Early studies reported that a popular way to tackle the challenge of removing reflections from [1] single images in deep learning. In this article, we take a deep dive into the research on this topic from 2015 to 2021, focusing on how deep learning is being used for [5] single-image reflection removal [4].We searched through a bunch of important online databases and libraries, like IEEE Xplore, Google Scholar, ScienceDirect, SpringerLink, and ACM Digital Library, to find relevant research papers. After carefully going through them, we picked out 25 papers [9] that fit the criteria for our review.We analyzed these papers to answer seven major questions about how deep learning and [3] neural networks are being used for [6] single-image reflection removal. This will hopefully give future researchers a good understanding of what's been done in this area and help them build on that knowledge.The review also highlights the important challenges that data scientists are facing in this area, and also some promising directions for future research. . And importantly, it provides a list of useful datasets that data scientists can use to benchmark their own deep learning techniques against other studies. Whether you're a researcher hungry for the next challenge or just someone who wants to understand how it all works, this review will equip you with the knowledge and inspiration to delve deeper into this fascinating field.

Key words: Anisotropic diffusion, boundary constraints, diffusion coefficients, image inpainting, non-local methods, partial differential equations (PDEs), specular highlight modeling, texture preservation ,Variational Framework

1. INTRODUCTION

Isolating reflections in images is tricky, especially for diverse materials like plastics, leaves, wood, and skin. This separation matters because the final image is a blend of specular (mirror-like) and diffuse (rough) reflections, weighted by the material's inherent reflectivity. Breaking down an image into these parts unlocks several benefits.

The Lambertian model perfectly captures diffuse reflection, making it a powerful tool for real-world 3D scene analysis and object recognition, even when surfaces aren't perfectly Lambertian.

Specular reflections, besides influencing our perception, are crucial for certain computer vision algorithms. Furthermore, separating specular and diffuse components is vital in 3D modeling and photo editing, allowing independent manipulation and recombination of these layers. This paper tackles the challenge of separating reflection components in diverse images, potentially including textured surfaces. It focuses on surfaces accurately described by Shafer's dichromatic reflectance model, where specular reflections match the light source's color, and diffuse reflections depend on the material's properties[10] . The goal is to split an RGB image into an RGB "diffuse image" and a black and white specular layer. This is quite challenging, especially if the light source color is unknown. Existing methods handle this by combining color information across the image, differentiating between global and local approaches [40] . Global methods, like those by Klinker et al. and Tan and Ikeuchi, rely on explicit segmentation or known light source color. Local methods, on the other hand, focus solely on local interactions, assuming known light source color. Examples include iteratively reducing the specular component by analyzing neighboring pixels and minimizing an error function based on local variations.

This paper introduces a general framework using continuous-domain partial differential equations (PDEs) to formalize the concept of "local interactions" for specular/diffuse separation. [11] This method selectively shares color information between nearby image points through multi-scale erosion, adapting to both textured and untextured surfaces. The framework is extended to videos, incorporating motion information as an additional clue.

In practical applications, the paper showcases results on high-resolution lab images and 8-bit internet images, demonstrating robustness to artifacts like low dynamic range, JPEG compression, and unknown light source color. Results on videos highlight [8] the adaptability of the proposed

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The Impact of 5G Networks on the Development of Connected and Autonomous Cars

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ABSTRACT

Smart The development of connected and autonomous cars (CACs) is set to revolutionize transportation, offering increased safety, efficiency, and convenience. However, the widespread adoption of CAC's relies heavily on the availability of reliable and high-speed wireless networks. This paper explores the impact of 5G networks on CACs, focusing on their ability to provide higher speeds, lower latency, and greater capacity. Additionally, it examines the benefits of 5G for CACs, including improved safety, increased efficiency, and the emergence of new transportation services. The paper concludes that 5G networks play an important role in advancing CAC technology and driving its adoption. 5G networks pave the way for the emergence of new transportation services that can revolutionize the mobility landscape. With the high-speed and low-latency capabilities of 5G, CACs can seamlessly connect to other smart devices and infrastructure, enabling innovative services such as ride-sharing, on-demand transportation, and mobility-as-a-service (MaaS) platforms. These services can transform the way people access transportation, offering flexible and convenient options that cater to individual needs

Key words: 5G networks, connected cars, autonomous cars, vehicle-to-vehicle communication, vehicle-to-infrastructure communication, real-time data processing, cybersecurity, driver assistance systems.

1. INTRODUCTION

The advent of the fifth generation (5G) of wireless communication has ushered in a new era of connectivity, promising unprecedented speed, reliability, and low latency. This technological leap not only transforms the way we communicate but also holds profound implications for various industries, including the automotive sector. In recent years, the automotive industry has been undergoing a paradigm shift towards connected and autonomous vehicles, leveraging the capabilities of 5G networks to redefine the driving experience.

The integration of 5G networks with connected and autonomous cars represents a pivotal moment in the evolution of transportation technology. As we move towards a future where vehicles are not merely modes of transportation but intelligent entities capable of communication, coordination, and decision-making, the role of 5G becomes increasingly crucial. This review explores the multifaceted impact of 5G on the development and deployment of connected and autonomous cars, delving into the technological advancements, challenges, and broader implications for society. To appreciate the significance of 5G in the automotive landscape, it is imperative to trace the evolution of connectivity in vehicles. From basic telematics systems to the integration of 4G LTE, each phase has laid the groundwork for the comprehensive connectivity solutions that 5G promises. The transition from disconnected, standalone vehicles to a seamlessly connected network of cars marks a transformative period in the automotive industry. The unique capabilities of 5G, including ultra-low latency, high data transfer rates, and massive device connectivity, open up new possibilities for connected and autonomous vehicles. The paper explores how these features enable real-time communication between vehicles, infrastructure, and cloud-based systems, fostering an environment where cars can make split-second decisions, enhance safety, and optimize traffic flow. As we embark on this exploration of the symbiotic relationship between 5G and the automotive industry, it is evident that the intersection of these technologies holds immense promise for the future of transportation. The subsequent sections of this paper will delve into specific aspects, shedding light on the intricate dynamics and unveiling the transformative potential that 5G brings to the realm of connected and autonomous cars These visual aids serve as integral components of the narrative, providing readers with a comprehensive and accessible understanding of the intricate interplay of the 5G networks and the development of connected or autonomous cars.

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Machine Learning Technique for Practical Engineering Use

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ABSTRACT

In the age of Industry 5.0, where the digital world generates massive amounts of data, AIML has emerged as a powerful tool for analyzing and interpreting this data. It has proven successful in various fields such as intelligent control, decision making, computer graphics, and computer vision and many more. The performance in AIML and deep learning methods has led to their widespread adoption in real-time engineering applications. These tools are necessarily required for creating intelligent, automated tools that can recognize the data in areas like healthcare, cybersecurity, and intelligent transportation systems. Machine learning encompasses different strategies, including reinforcement learning, semi- supervised, unsupervised and supervised learning algorithms. This study aims to comprehensively explore the utilization of ML in managing real world engineering applications, enhancing their functionality and intelligence. By investigating the applicability of various machine learning approaches in domains such as cybersecurity, healthcare, and intelligent transportation systems, this research contributes to our understanding of their effectiveness. Additionally, it addresses the research goals and difficulties associated with ML in practical life. This study serves as reference for industry professionals, academics, and decision-makers, providing insights and benchmarks for different use cases and real-world applications.

Key words : Reinforcement learning, Semi-supervised learning, Unsupervised learning, Supervised Learning

1. INTRODUCTION

1.1 Machine Learning Evolution

In the modern year, data has become a part and parcel of our lives, with real-time engineering applications generating substantial amounts of data in various formats, such as unstructured, semi-structured, and structured data. This wealth of data presents opportunities for developing intelligent applications across different domains. For instance, the author leverages cybersecurity data to derive valuable insights and applies them in the creation of automated and intelligent cybersecurity applications. Similarly, in this article, the author utilizes mobile data to gain meaningful insights and employs those insights to develop contextually aware, smart applications [2]. The success of real-time engineering applications relies on effective data management tools and technologies that enable the extraction of valuable knowledge and insights in a timely and intelligent manner.

Machine learning is a subfield of artificial intelligence, has gained significant traction in data processing and analysis, revolutionizing the way applications operate intelligently. In the context of Industry 4.0, which represents Industrial Revolution, machine learning has emerged as a prominent technology that enables applications to learn from experience and enhance system performance without explicit programming [7]. It plays a crucial role in automating conventional industrial and manufacturing processes by facilitating intelligent data analysis. By implementing various optimized and efficient machine learning algorithms, real-time engineering applications can tackle real-world problems through intelligent data analysis. These algorithms encompass different types, namely reinforcement learning, unsupervised learning, semi supervised learning, and supervised learning. They provide the framework for developing intelligent applications that leverage data analysis to address complex challenges.

1.2 Types of methods used in Machine Learning

Some of the Machine Learning approach are as follows:

1. Reinforcement learning

This technique involves training models to get the output/decisions through interaction with an environment and receiving feedback in the form of rewards or penalties. It is particularly useful in optimizing decision-making processes.

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IoT and its Potential for Transforming Industries

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ABSTRACT

The Internet of Things (IoT) includes connected devices that communicate over the Internet. This technology has the potential to change industries by increasing productivity, reducing costs and improving efficiency. In manufacturing, IoT devices improve machine maintenance, supply chain management and inventory management. Healthcare uses IoT for drug tracking and patient tracking. Transportation can benefit from improved visibility and streamlining of operations. In the energy sector, IoT optimizes use and reduces waste. New IoT applications can be used in a variety of industries to increase productivity, efficiency and effectiveness.

Key words: IoT, Technology, Cost, Efficiency, Information; Devices

1. INTRODUCTION

Internet of Things (IoT) is a developing technology that has the potential to transform several industries [6]. The Internet of Things (IoT) is a network that allows devices to connect to each other and communicate on internet. Examples of these devices include cell phones, wearable technology, home appliances, and work machines. IoT technology has the potential to reduce costs, increase productivity and improve efficiency across multiple sectors.

IoT encompasses a colossal potential to alter segments, and its employments are presently being seen in numerous distinctive businesses. IoT is utilized in fabricating, for occurrence, to move forward hardware support, supply chain administration, and stock administration. IoT gadgets may offer assistance producers spare squander, boost efficiency, and raise the standard of their items by being included into the fabricating handle [7]. IoT is being utilized in healthcare to track medication utilization and screen patients from a remove. Therapeutic experts can deliver patients criticism in genuine time by utilizing this innovation and keep a closer eye on their wellbeing. Quiet results can be upgraded as a result, and healthcare costs can be diminished.

IoT is being utilised in the transportation sector to enhance safety and organize the supply chain [1]. For instance, linked automobiles may talk among themselves to lessen traffic congestion and prevent accidents. IoT devices will be used in delivery routes and track the location of goods during transportation. This will lead to a quicker and more effective delivery of the items, cutting costs and raising client satisfaction. IoT gadgets may be utilised to optimise energy use and cut waste. Smart grids have the capacity to track energy that is being consumed and modify supply accordingly, cutting costs and enhancing supply dependability.

These represent just a small sample of the numerous sectors utilizing IoT. We should anticipate seeing even more cutting-edge IoT applications as technology advances, which will boost efficiency, lower costs, and increase production across a variety of industries.

Real-time data gathering and analysis is one of the key benefits of Internet of Things technology. This implies that companies could be able to make better judgments if they have access to correct and current information. IoT devices, for instance, can be used to continuously monitor machine performance in the manufacturing sector. This enables producers to recognize potential defects before they become serious problems and to take prompt corrective action.

A substantial amount of saving money is yet another benefit of IoT technology. Businesses may lower their operating costs and boost profitability by streamlining manufacturing processes, cutting waste, and increasing efficiency. It plays an important role in providing a sustainable environment hence creating a better business model. IoT technology implementation in a corporation, however, might also come with certain difficulties [5]. Data security is among the major difficulties. There is an increasing danger of cyber assaults as more gadgets are online. To safeguard their data and equipment from online attacks, organisations must put in place strong security measures.

2. APPLICATION OF IOT

2.1 IoT in Manufacturing

IoT technology is frequently employed in the industrial sector to streamline workflows, save waste, and raise standards. Companies may gather real-time data, analyse it, and make educated decisions to enhance efficiency and productivity by IoT device integration for industrial operations [6].

One of the main uses of IoT in manufacturing is machine maintenance. Manufacturers can reduce downtime and improve overall equipment functionality by using IoT devices to track machine performance in real-time, which can identify

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Automatic Driver Drowsiness Detection System

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Abstract:

The proposed system aims to lessen the number of accidents that occur due to drivers' drowsiness and fatigue, which will in turn increase transportation safety. This has become a common reason for accidents in recent times. Several facial and body gestures are considered signs of drowsiness and fatigue in drivers, including tiredness in the eyes and yawning. These features are an indication that the driver's condition is improper. EAR (Eye Aspect Ratio) computes the ratio of distances between the horizontal and vertical eye landmarks, which is required for the detection of drowsiness. For the purpose of yawn detection, a YAWN value is calculated using the distance between the lower lip and the upper lip, and the distance will be compared against a threshold value. We have deployed an eSpeak module (text-to-speech synthesiser), which is used for giving appropriate voice alerts when the driver is feeling drowsy or is yawning. The proposed system is designed to decrease the rate of accidents and contribute to technology with the goal of preventing fatalities caused by road accidents. Over the past ten years, advances in artificial intelligence and computing technologies have improved driver monitoring systems. Several experimental studies have gathered data on actual driver fatigue using different artificial intelligence systems. In order to dramatically improve these systems' real-time performance, feature combinations are used. An updated evaluation of the driver sleepiness detection technologies put in place during the previous ten years is presented in this research. The paper discusses and displays current systems that track and identify drowsiness using various metrics. Based on the information used, each system can be categorised into one of four groups. Each system in this paper comes with a thorough discussion of the features, classification rules, and datasets it employs.

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A Systematic Review on Human and Computer Interaction

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Abstract- ***As technology continues to advance at an unprecedented pace, the interaction between humans and computers has become an integral part of our daily lives. This study provides a comprehensive review of the evolving landscape of human-computer interaction (HCI) research, focusing on the key concepts, methodologies, and advancements in this interdisciplinary field. The review begins by presenting an overview of the historical evolution of HCI, tracing its roots from early command-line interfaces to the current era of intuitive touchscreens and voice recognition systems. The fundamental principles of HCI, including usability, accessibility, and user-centered design, are examined in detail, highlighting their significance in enhancing the overall user experience. Moreover, the review explores various interaction modalities that have emerged over the years, such as graphical user interfaces, haptic feedback, augmented reality, and virtual reality. It examines the strengths, limitations, and potential applications of these modalities, shedding light on the future possibilities they hold for human-computer interaction. Furthermore, the review delves into the emerging trends in HCI research, including natural language processing, gesture recognition, machine learning, and affective computing. These advancements have paved the way for more personalized and adaptive interfaces, enabling computers to understand and respond to human emotions and intentions, thereby fostering deeper levels of engagement and satisfaction. The study also addresses the challenges and ethical considerations associated with human-computer interaction, such as privacy concerns, data security, and algorithmic biases. It emphasizes the importance of designing inclusive and ethical systems that respect users' rights and values.***

Keywords- ***Human-computer interaction (HCI), User-centered Design (UCD), Graphical User Interfaces (GUI), Augmented Reality (AR), Virtual Reality (VR)***

I. INTRODUCTION

A. *Background and Significance of Human-Computer Interaction:*

In the discipline of human-computer interaction (HCI), interactive computer systems that enable efficient and natural communication between people and machines are designed, developed, and studied [2]. The importance of HCI resides in its capacity to enhance computer systems, software programs, and digital interfaces' usability, effectiveness, and overall user experience understands the significance of creating technology that is usable and accessible for people with a variety of abilities, backgrounds, and preferences. HCI seeks to design interfaces that are simple to use, effective, and pleasurable to interact with by taking into account the cognitive, physical, and emotional elements of human users.

B. *Historical Development and Evolution of HCI:*

Since its inception, the field of HCI has witnessed substantial growth and development. Initially, command-line interfaces—which required users to enter text-based commands—were the primary means of controlling computer systems. However, the development of graphical user interfaces (GUI) in the 1980s completely changed how people interacted with computers by utilizing icons and visual representations. In the 1990s, as personal computers proliferated, HCI gained even more traction and became more widely available [14]. The rise of the Internet and the World Wide Web broadened the scope of HCI and prompted the creation of interactive multimedia content and web-based user interfaces.

In the 2000's, with the introduction of touchscreen and mobile technologies, HCI underwent yet another transformational phase. Direct and natural communication was made possible by touch interfaces and gestures.

II. PRINCIPLES OF HUMAN-COMPUTER INTERACTION

- Usability is a key idea in human-computer interaction (HCI) that focuses on creating user interfaces that are simple to understand, effective to use, and error-tolerant [16]. It entails taking into account elements like simplicity, consistency, clarity, and feedback mechanisms to boost user pleasure and productivity.
- Accessibility: People with disabilities, such as those who have visual, auditory, motor, or cognitive limitations, should be able to use computer systems and interfaces [19]. All users can have inclusive experiences thanks to design factors like screen readers, captioning, and alternative input ways.

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A Review Paper on Voice recognition and response (VRR)

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Abstract:

Voice recognition and response technology have undergone significant advancements, revolutionizing various domains such as personal assistants, smart homes, and customer service applications. This review study provides an extensive analysis of voice recognition and response, covering its historical development, evolution, current state, research trends, AI models, used case studies, applications, challenges, and future directions. By scrutinizing the progress in this field, the study aims to gain insights into the potential, limitations, and opportunities of voice-based interaction systems.

The introduction of voice recognition and response has transformed human-computer interaction by enabling machines to comprehend and respond to human speech. This study explores the historical development of voice recognition, tracing its evolution from early rule-based approaches to statistical modeling techniques like Hidden Markov Models (HMMs). The journey of voice recognition systems is elucidated, emphasizing breakthroughs in deep learning and the integration of artificial intelligence (AI) models.

Despite remarkable advancements, voice recognition and response systems face challenges such as ambient noise, speaker variability, and language nuances. Recent techniques, including attention mechanisms, transfer learning, and reinforcement learning, have been employed to address these challenges and enhance the robustness of systems. This study aims to shed light on the obstacles encountered by voice recognition technology and propose objectives for overcoming them.

Current advancements in voice recognition and response technology have led to the widespread adoption of voice assistants like Amazon's Alexa, Apple's Siri, Google Assistant, and Microsoft's Cortana. These intelligent voice assistants leverage natural language processing (NLP) and machine learning algorithms to provide personalized and context-aware responses. The practical applications of voice recognition and response in healthcare, automotive, education, and customer service industries are examined, showcasing how these systems enhance user experiences and enable hands-free operation.

In recent years, research has focused on developing end-to-end models using recurrent neural networks (RNNs), convolutional neural networks (CNNs), and transformer models. These AI models have demonstrated promising results in improving speech recognition accuracy and language understanding. By addressing the challenges faced by current systems, this study aims to contribute to the refinement of voice recognition and response systems and foster further advancements in the field.

Keywords: Voice recognition, AI models, Deep learning, Natural language processing, Reinforcement learning, Machine learning, Recurrent neural networks, Convolutional neural networks

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Machine Learning used in the field of Pharmacy

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ABSTRACT

The application of intelligence in technology is expanding to include machine-prevalent methods. It could reduce expenses and save time, all the while additionally enhancing our comprehension of how different formulations and process parameters interact. Artificial intelligence, which falls under the realm of computer science is concentrated on problem-solving through programming. It has evolved into a science of problem solving with applications in industries like technology, medicine and more. The research paper covers a range of topics such as discovering peptides from sources, managing and treating rare diseases ensuring proper drug adherence and dosage as well as discussing barriers, to implementing AI in the pharmaceutical industry. It also touches upon automated control procedures, manufacturing execution systems and using AI for treatment predictions.

Key words: Machine Learning, Pharmacy, Prediction, Artificial Intelligence, Drug, Robotics

1 .INTRODUCTION

A subfield of computer science, which is historical is artificial intelligence (AI)concentrates on utilizing programming, for problem solving. Over time It now functions as a problem-solving tool. discipline with applications in fields such, as business, medicine and engineering. The primary objective of AI is to identify and address real world challenges effectively[5].

The field of intelligence deals, with the challenges in processing information. Offers a conceptual approach to tackle them. There is a theorem that relates to such an explanation, known as a method. reference [4]. In the realm of studying intelligence algorithms are. Employed to analyze learn from and comprehend data. Artificial intelligence encompasses methods, machine intelligence methods, the identification of patterns, clustering and similarity based approaches. It's an expanding field of research, with applications.

2.HISTORY

The integration of intelligence, specifically artificial intelligence (AI), within the technological the environment has alteredstrikingly over theyears. Rooted in the realm of computer science, AI has surfaced as an effective instrument for problem-solving through programming. Its application spans varied industries, encompassing but not restricted to technology and medicine, where it holds thecapacity to streamline processes, save time and costs, and enhance our comprehension of complex interactions such as those between various formulas and procedures parameters.

The historical trajectory of AI in technology dates back to the mid-20th century. The term "artificial intelligence" was coined in 1955 by John McCarthy, an American computer scientist, during the Dartmouth Conference. Early developments in AI were marked by ambitious goals and expectations, envisioning devices that could imitate humans intelligence. However, progress during the initial decades was gradual due to limitations in computing power and the complexity of modeling human cognitive processes.

A significant breakthrough occurred in the 1980s with the advent of expert systems, AI programs designed to emulate the decision-making abilities of a human expert in a specific domain. This era witnessed increased interest and investment in AI technologies, paving the way for applications in various industries.

The 21st century has witnessed a resurgence of interest in AI, driven by advancements in machine learning and neural networks. Big data, coupled with more powerful computing capabilities, has enabled AI algorithms to examine extensive quantities of

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Operational Security, Safe Quantum,Space Communications and Data Privacy Cyber Security

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BSTRACT

recent years the internet has become an important part of ily life for people around the world. 18 On the other hand, the effectiveness of the internet increases, cybercrimes also crease. Over the last 15 years, cybersecurity has emerged as way to accelerate the pace of change in cyberspace. ybersecurity refers to the procedures a country or ganization can use to protect its assets and information in berspace. Twenty years ago the term "cybersecurity" was tle known to the public [1].

ybersecurity affects not only people but also organizations governments. In recent years, everything has been going ell and it has used many technologies such as cybernetics, oud computing, smartphones, and Internet of Things chnology. Cyber attacks raise concerns about privacy, curity, and financial security. Cybersecurity is a set of chnologies, processes, and practices designed to prevent acks, damage, and unauthorized access to networks, mputers, operations, and machines. The main purpose of s article is to provide detailed information about types of bersecurity, why cybersecurity is important, cybersecurity meworks, cybersecurity tools, and problem points of bersecurity [2].

ey **words**: Cyber security, Cyber-attack, Phishing, yber-crime, Cyber security, Internet of Things (IoT) curity, Cyber security framework, Malware

INTRODUCTION

ybersecurity ensures the protection and integrity of mputing assets or data connected to an organization's twork to protect assets from threats throughout the ber-attack lifecycle. Currently, most economic, business, ltural, social, and government activities and interventions at l levels of government, including the interaction between people and organizations, if the government, government, and government institutions do not exist in cyberspace. Recently, many private companies and government institutions around the world have been facing cyber-attacks and poor communication. In today's technology world, protecting this data from cyber-attacks is a difficult problem. The purpose of the cyber-attack is to cause financial damage to the company[3].

In other cases, cyber-attacks may have a military or political purpose. Some of these damages include computer viruses, intellectual property damage, data services (DDS), and other attacks. For this purpose, organizations use various solutions to avoid being damaged by cyber-attacks. Cybersecurity monitors information in IT data updates in real time. So far, scientists around the world have proposed many ways to prevent or reduce the damage caused by cyber-attacks[3].

Some of these processes are in the operational phase, and some are in the research phase. The purpose of this study is to investigate and monitor the success of this model in the cybersecurity sector and examine current problems, weaknesses, and strengths of the program. Many new puppy attacks are discussed in detail. We discuss security standards and the history of early cybersecurity technologies. It also covers emerging trends and recent developments in cybersecurity, as well as security threats and challenges [12]. For IT and cybersecurity researchers, general audits are expected to be helpful. Keywords: cyber security, cyber-attack, phishing, cybercrime, cyber security, internet of things (IoT) security, cyber security framework, malware. The Internet is one of the most important inventions of the 21st century and has affected our lives. Today, the Internet has broken down all barriers and transformed the way we communicate, entertain, work, shop, make friends, listen to music, watch movies, order food, pay bills, and greet friends on birthdays and anniversaries. Our world is powered by digital information that supports critical services and infrastructure. Countries, organizations, and end users[4][5] are concerned about threats to the privacy, integrity, and

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A Review on Charging Station for E-Vehicle Using Solar with IOT

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ABSTRACT

A study that is built around the investigate imaginative plans for solar-powered electric vehicle charging stations. One extend envisions an Arduino-controlled framework tackling most extreme sun based control through an MPPT controller, showing battery levels and cautioning clients of control drops by means of web interface and GSM. Another centers on an Arduino-based station highlighting LDR sensors and cloud capacity for sun oriented vitality collected by sun based cells. In the interim, the WINSmartEV™ stands out as a commercially accessible, software-driven framework utilizing brilliantly planning, multiplexing, and adaptability to control different EVs proficiently. All these ventures highlight the potential of sun based EV charging stations to decrease fossil fuel reliance and nursery gas outflows, whereas advertising different highlights like farther checking, information capacity, and client cautions.

Key words : EV-Electric Vehicle, Arduino-controller LDR, GSM, MPPT controller

1. INTRODUCTION

The rapid climb in demand for conventional vitality sources such as coal, normal gas, and oil has driven analysts to investigate elective arrangements, strikingly renewable assets. Later a long time have seen increased discourses on fuel costs, especially taking after the deregulation of petrol and fossil fuel costs. The proceed towards dangers of supply disturbances have encourage heightens the center on elective drive prepare advances for automobiles. Intriguingly, electric vehicles (EVs) were pioneers on the streets within the 1800s, with Robert Anderson presenting the primary simple electric carriage. William Morrison, a US chemist, proceeded the investigation of elective car innovations by effectively creating a six-passenger electric vehicle that outperformed the speed of horse-drawn carriages[1]. Looking ahead, the coming years are balanced to encounter a noteworthy increment within the predominance of sun based electric vehicles (SEVs) driven by a few key factors. First and first, SEVs offer a compelling arrangement to moderate fossil fuel outflows by saddling the control of renewable assets. Their shrewdly integration with electronic prerequisites empowers real-time observing of accessible control through the Web of Things (IoT), permitting ideal administration of vitality utilization. At long last, progressed following frameworks empower exact checking of sun powered radiation all through the day, maximizing the effectiveness of SEV charging[1]. The far reaching appropriation of SEVs pivots on the improvement of a strong charging foundation. As the number of EVs on the street increases, promptly accessible charging stations in stopping structures and carports ended up pivotal, particularly for long-distance commuters who depend on charging to total their circular trips. The addition, tending to extend uneasiness, a common concern among EV drivers, can assist boost SEV selection. Finally, promptly open charging stations at work environments can reduce this uneasiness and possibly clear the way for littler, more reasonable batteries in SEVs[2]. Beyond physical foundation, guaranteeing satisfactory network capacity and strong electrical circuits is similarly critical to back the developing request for SEV charging. One imaginative arrangement lies in creating charging stations that can benefit different vehicles at the same time utilizing the same foundation. This requires brilliantly sharing of significant components like plug ports, circuits, and lattice capacity to guarantee effective, synchronous charging without over-burdening the system. The WINSmartEV™ framework serves as a prime case of such shrewd charging innovation. Outlined around brilliantly charge planning, multiplexing, and adaptability, this framework offers special capabilities for setup and expansion. Its impartial position towards equipment, control centers, and systems permits for consistent integration with assorted existing foundation[3][4].

2. LITERATURE REVIEW

1. B. Yashaswinibai et.al, In the year 2022, they are proposed the technology for a rapid growth advancement of IoT

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R-CNN Based Deep Learning Approach for Counting Animals in the Forest: A Survey

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ABSTRACT

This review paper delves into the pivotal realm of animal classification using images obtained through diverse techniques in forest environments. A robust framework is introduced, employing Transfer Learning (TL) within a Convolutional Neural Network (CNN) and leveraging the power of the Region-based Convolutional Neural Network (R-CNN) model for the construction of an automated animal identification system. This innovative framework is adeptly applied to analyze and identify focal species within captured images, contributing to the advancement of wildlife monitoring technologies.

The dataset under scrutiny comprises 6,203 camera trap images featuring 11 distinct species, including Wild pig, Barking deer, Chital, Elephant, Gaur, Hare, Jackal, Jungle cat, Porcupine, Sambhar, and Sloth bear. The inclusion of this diverse set of species ensures the robustness and applicability of the proposed methodology across a broad spectrum of wildlife scenarios.

The integration of Transfer Learning withinthe Region-based Convolutional Neural Network (R-CNN) emerges as a crucial element, showcasing outstanding performance in species classification. Notably, the proposed model achieves a remarkable accuracy rate of 96% on the test dataset after a mere 18 epochs, employing a batch size of 32. This breakthrough holds the potential to expedite research outcomes, foster the evolution of more efficient and dependable animal monitoring systems, and consequently, alleviate the time and effort invested by researchers.In line with ethical considerations, the authors maintain anonymity in their contribution, focusing on the significant strides made in the classification andanalysis of camera trap images within the observed site. This paper positions itself as a noteworthy and impactful contribution to the broader field of wildlife research and technology.

Key words: R-CNN, Deep Learning, Neural Network, Transfer Learning, Recognition

1. INTRODUCTION

In the dynamic field of wildlife conservation and ecological research, there is an escalating demand for sophisticated methodologies to monitor and comprehend animal populations within the intricate ecosystems of forests. This review paper explores cutting-edge technology, placing a focal point on an avant-garde and deliberately anonymous deep learning approach—specifically, the Region-based Convolutional Neural Network (R-CNN) [3]. Positioned as a transformative force, this approach has the potential to revolutionize the landscape of animal counting, providing a nuanced and efficient solution to the multifaceted challenges presented by the dynamic and diverse nature of forest environments.

Forests, with their intricate and ever- changing ecosystems, host an extraordinary diversity of species intricately woven into the fabric of their environment. Monitoring and understanding these populations present formidable challenges that necessitate sophisticated and adaptive methodologies. Traditional approaches to animal counting, reliant on manual observation and enumeration, are often laborious, time-intensive, and susceptible to errors. Herein lies the promise of the R- CNN—a model renowned for its precision in localizing and classifying objects withinimages. Its adaptability to diverse habitats and species [4], coupled with its capacity for nuanced analysis, positions it as a transformative tool for wildlife population assessment in ecosystems where biodiversity is not only extensive but also intricately interwoven.

This paper embarks on a thorough exploration of the application of R-CNN in the domain of animal counting within forest environments. Through a discerning lens, we delve into the model's strengths and capabilities, scrutinize potential limitations, and chart pathways for future enhancements. The deliberate choice to maintain anonymity in authorship underscores the dedication to

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Diffuse Reflection Imaging for Detection of Surface Defect Based on Machine Learning

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ABSTRACT

Diffuse reflection imaging relies on the fundamental principles of light interaction with rough or matte surfaces, enabling light to scatter in various directions. Unlike specular reflection, which directs light in a single path, diffuse reflection occurs sporadically. Its distinctive quality lies in its effectiveness for imaging objects with irregular or non-reflective surfaces, offering comprehensive information challenging to attain through alternative imaging methods. As a burgeoning subfield within optical and computer vision technologies, diffuse reflection imaging holds immense potential across scientific, industrial, and medical domains. This abstract succinctly outlines the key aspects of diffuse reflection imaging and underscores its diverse applications, marking it as a promising and newly developed field with substantial implications.

Key words :Detection, Machine Learning, Reflection, Diffuse and Specular

1. INTRODUCTION

Diffuse reflection occurs when light scatters from a surface at various angles, differing from the singular direction of specular reflection. Unlike specular reflection, which influences image perception by focusing incident light on an object's surface, diffuse reflection disperses light or waves across the surface, significantly impacting image visibility, realism, and vibrancy[1]. The concept of lambertian reflectance is crucial for understanding diffuse reflection and serves as the basis for achieving uniform lighting in various imaging applications. It helps in comprehending how non-emitting objects become visible, as our eyes interact with diffusely scattered light to form a coherent image of our surroundings[2][3]. In computer vision, computer graphics, and remote sensing, diffuse reflection imaging plays a pivotal role in capturing and analyzing the appearance of surfaces exhibiting diffuse reflection[3]. Unlike specular reflection, which occurs at a fixed angle, diffuse reflection arises when light scatters in various directions upon striking a rough or irregular surface. This imaging technique is particularly valuable for examining surfaces with intricate textures and roughness, such as those found in paper, textiles, and natural materials like stone and wood. The microscopic interaction between light and a surface in diffuse reflection involves absorption and subsequent reemission in multiple directions, resulting in a smooth and uniform appearance without discernible highlights or shadows[7]. Ongoing advancements in diffuse reflection imaging techniques contribute to the realism of computer-generated images and the precision of surface analysis, shaping the evolution of computer vision, computer graphics, and remote sensing technologies. The innovations in this paper involve using both the grey code and a 4-step phase shift technique to accurately resolve the absolute segment of the considered image. The process of identifying image defects includes absolute segment conversion, gradient calculation, affine transformation for angle correction, a module matching approach for detecting diffuse reflection surface defects, and applying grey morphological opening and closing operations to the original image to obtain detailed information about the disorder's morphology and position[1][9]. Simulation results demonstrate that the proposed technique not only enhances the accuracy of diffuse reflection surface defect detection but also concurrently reduces the overall cost associated with disorder identification. These advancements hold practical significance, offering improved accuracy and cost-effectiveness in applications requiring diffuse reflection surface defect detection processes[6][10].

2. LITERATURE REVIEW

1. A Diffuse Reflection Approach for Detection of Surface Defect Using Machine Learning in 2022. the focus is on addressing the challenges posed by irregular diffuse reflection on surfaces, particularly in industrial settings where rapid advancements have become integral[15]. The presence

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A literature survey on public blockchain technology for Cryptocurrency

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ABSTRACT

Blockchain and cryptocurrencies have emerged as revolutionary technologies that have garnered substantial interest in the past few years. A blockchain functions as a distributed and transparent ledger, facilitating secure transactions without the requirement of intermediaries. Digital assets like Bitcoin and Ethereum are examples of cryptocurrencies, leveraging blockchain technology to enable secure and unrestricted transactions. These innovations have the potential to revolutionize industries such as finance, supply chain management, and healthcare. However, challenges such as regulatory concerns and scalability issues must be addressed for their widespread adoption. Overall, blockchain and cryptocurrencies offer new opportunities for innovation and financial inclusion.

Key words: Decentralized, transparent ledger, powers crypto currencies, scalability, comparative framework.

1. INTRODUCTION

A decentralized public ledger called blockchain, a revolutionary technology, securely maintains records over a network of connected computers [1]. Thanks to its ability to offer security, immutability, and transparency, blockchain has gained worldwide acceptance and acknowledgment [1]. By eliminating intermediaries and providing a tamper-resistant platform, blockchain fosters efficiency and trust across various industries. The rise of cryptocurrencies like Bitcoin, which seek to establish a decentralized environment where transactions and data are not under the jurisdiction of a single central authority, is evidence of their success [2]. The decentralized structure of blockchain has triggered a significant transformation in the perception of trust, paving the way for diverse applications beyond the realm of digital currency.

Blockchain technology's quick growth has been driven by its capacity to find workable solutions to persistent issues that were previously impractical [4]. The adoption of blockchain technology in international payments and financial transactions has revolutionized the way we engage in business. This innovative solution enables faster and more secure transactions, reduces costs, and enhances transparency [1]. Experts predict that blockchain's impact on the global economy will be remarkable, with an estimated commercial value of $176 billion by 2025 and an astonishing $3.1 trillion by 2030 [1]. The understanding that blockchain technology has the power to revolutionize businesses by simplifying procedures, boosting security, and encouraging dependence on a decentralized way is what is driving this rise.

The variety of blockchain implementations contributes to the ecosystem's expansion [3]. While Bitcoin remains the most renowned and extensively utilized blockchain, numerous other implementations exist to cater to various functions, handling strategies, and performance requirements [2],[3]. Constructing applications based on blockchain necessitates meticulous consideration of crucial technological features and configurations to ensure optimal system quality [4]. A framework has been estab'ished to assist decision-makers in choosing the best blockchain technology for their unique requirements by examining current industry products, technical forums, scientific literature, and real-world use cases [4]. This framework equips software architects, developers, tool selectors, and policymakers to decide on the best course of action after evaluating various blockchain solutions and their suitability for achieving desired results.

2. BACKGROUND

Blockchain technology is the foundational technology that powers cryptocurrencies. It offers a safe and open system for logging and verifying transactions. Each transaction is added to a block that is encrypted and connected to earlier blocks in a chain-like structure [1]. With the help of this distributed ledger technology, fraud and manipulation are prevented because everyone in the network has access to the same data. Blockchain is a decentralized technology, meaning no one organization has authority over the network, making it immune to censorship and hacker efforts.

Digital or virtual currencies that only exist in electronic form include Bitcoin, Ethereum, and Litecoin. Powerful computing systems execute complex calculations in a procedure referred to as mining, aiming to authenticate and incorporate transactions into the blockchain [5]. Cryptocurrencies offer various advantages compared to traditional currency, enabling fast and secure peer-to-peer transactions while eliminating the need for intermediaries such as financial institutions.

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