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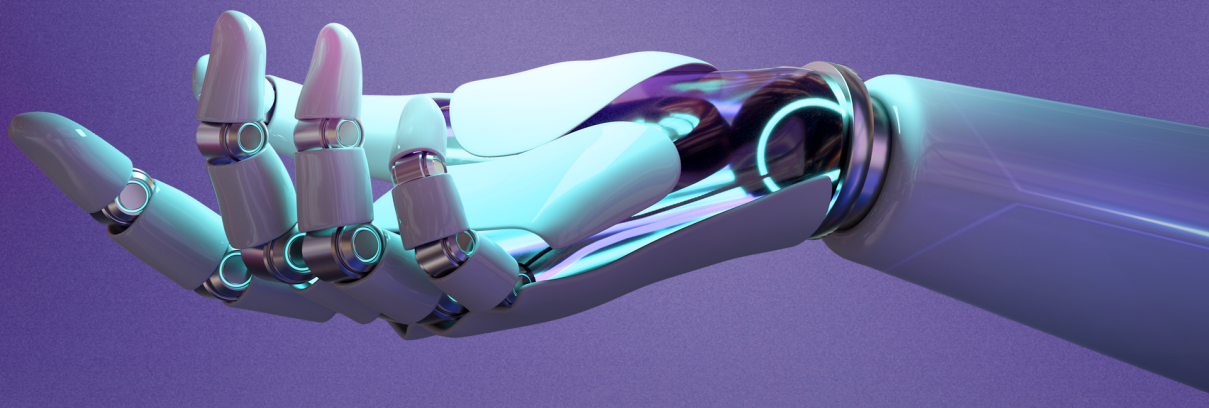
COMPUTER SCIENCE & ENGINEERING

(THEORY AND PRACTICES)



COMPILED & EDITED BY

R.N.BARAL

Computer Science & Engineering

(Theory and Practices)

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Contents

Preface

The term "Computer Science & Engineering" seems more serious, as if it means using some theoretical knowledge to create something precise and substantial. Engineering is a profession practised by civil, mechanical, aeronautical, and other engineering specialists. Each of them carries out their jobs in the actual world while applying their theoretical learning to produce tangible results. Even though their "something real" is less palpable than that of other engineers, Computer engineers nonetheless produce "something real."

To stay up with the advancements in the IT industry, computer science and engineering courses have been rapidly expanding. The development of courses to teach cutting-edge computer science topics in college and university programmes has been a hard issue for specialists and educators since the invention of the computer. For such a project, suitable reading material and an introduction to basic computer principles are needed. The computer textbooks used in colleges either focus on describing specific tools like word processing, multimedia, and spreadsheet applications, or they are too advanced and have no educational value. Some classes begin at a very high degree of complexity, making it impossible for pupils to understand the basics.

The theory or practise of computer engineering today is not nearly as rigorous as those more well-established technical professions. Although programming generally does not follow such strict procedures, aeronautical engineers are required to do so because mistakes in their calculations might have serious consequences. We must, however, embrace and rely on increasingly rigorous engineering approaches as computing systems become more embedded into our daily lives. With this book, we wish to show people the way to computing with methods that are more dependable. The idea that this branch of engineering can be viewed as "programming integrated through time" is one of the major revelations we make in this book. What procedures can we add to our code to make it resilient to essential modification over its entire life cycle—from conception to introduction to maintenance to deprecation—and enable it to be sustainable? In our opinion, IT/CSE oriented organisations should bear in mind these key concepts when developing, architecting and creating products and process, which are highlighted in the book.

Dr. R.N.Baral

Editor

Intelligent Irrigation System Using Arduino

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Abstract
Manual irrigation, such as drip and can watering, is still commonly employed in agriculture. On the other side, conventional irrigation techniques are ineffective and incorrect, leading to either insufficient or excess watering. Farmers also struggle to forecast the appropriate volume of water at the exact time. It could be risky for rural areas to manually monitor crop fields because human error is another possibility. This article suggests an affordable intelligent irrigation system employing an Arduino microcontroller that can be utilized in a field or a typical home garden. By employing Arduino as its central processing unit, the proposed system is designed to water the plants automatically whenever the soil moisture sensor detects a water shortage in the soil.

Index Terms
Arduino Uno, Microcontroller, Relay Module, Soil Moisture Sensor.

INTRODUCTION

All humans benefit greatly from plants in numerous ways, as is well known. By creating oxygen and naturally purifying the air, plants contribute to a healthy environment. Water is essential for plant growth. Fresh water is required for agriculture and energy production, economic development, and human and ecological survival. Based on AQUASTAT statistics, the agriculture sector utilized 69% of total extracted freshwater in 2010, while the manufacturing industry used 19% and the household sector used the rest [1]. As a result, water could be regarded as a vital demand in agriculture for potential food security globally [2]. Yet, the continuing increase in water demand by the residential and commercial sectors, as well as increased concerns about environmental quality, have made it challenging for every nation to minimize farm water usage while meeting fresh food requirements [3]. Therefore, it is crucial to create scientific and technological methods for the efficient use of water. Manufacturers and scientists are attempting to develop capable and cost-effective automated methods for regulating water usage, thereby reducing much of the waste [1].

Farmers and gardeners who care for plants must perform the task of watering the plants. Watering plants properly is crucial because it directly affects the growth of the plants. Plants can get wilted or rotted when there is insufficient or too much water in the soil. Watering plants can be done manually or mechanically using devices. This study is concerned with the development of a prototype device and an automatic plant watering system. The emphasis of the device's prototype is on measuring the amount of soil moisture to regulate water flow when watering plants [4, 5]. The purpose of this study is to ascertain whether the watering system can regulate the amount of water the plants require based on the moisture content of the soil [6].

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Arduino is a programmable hardware framework that is designed to manage circuits logically. The fundamental element of the Arduino interface board is a programmable logic chip that may be configured in C++ [7, 8]. Based on project needs, the device can receive an input, execute a program, and generate a variety of outputs.

This paper describes the design of an intelligent irrigation system using Arduino microcontrollers. A soil moisture sensor is utilized in this system to measure and monitor soil moisture. The technology will water the plants automatically whenever the moisture content of the soil is too low and switch off the water pump whenever the soil moisture level is too high.

OVERVIEW OF THE SYSTEM

Figure 1 depicts a functional block diagram of the automated watering system. It comprises several functional units, such as the acquisition unit, monitoring unit, microcontroller block, and the automatic functional block.

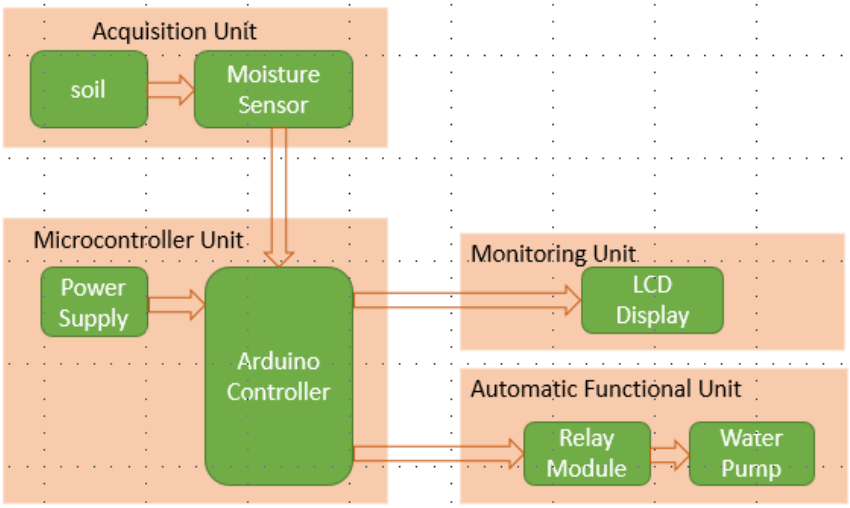

Figure 1: Block Diagram

Acquisition Unit

This unit comprises a single sensor for soil moisture that collects readings from the soil. The moisture level in the soil determines whether a low or high signal is sent to the Arduino microcontroller to indicate whether it is dry or wet. It will deliver a voltage output when the soil is moist and a relatively high voltage when the soil is dry. The Arduino microcontroller is directly connected to this sensor.

Microcontroller Unit

The microcontroller utilized in this unit, an Arduino Uno, is the main piece of hardware for this work. It analyzes the input after receiving it from the soil moisture sensor in accordance with the instructions stored in the microcontroller.

Automatic Functional Unit

The system's automated watering functionality is encompassed in this unit. The two main components of hardware for controlling the automated function are a relay module and a DC watering motor. The relay, an automatic electric switch, turn the switch from off to on using an electromagnet. The switch is responsible for controlling the electric pulse that flows through the water pump. Arduino transmits a signal to the relay module if the moisture level drops below the minimum threshold, allowing the electricity to flow via the water pump to irrigate

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the plant [9]. The water pump will quickly stop pumping water if the system deems that there is an adequate quantity of water in the soil. The electrical path will then be blocked by the relay.

PROPOSED SYSTEM

Figure 2 depicts the proposed system architecture of the intelligent irrigation system. The procedure begins at the soil moisture sensor, as can be seen in Figure 2. The sensor gauges the moisture content of the soil and transmits the information to Arduino for processing. The information will also be transmitted simultaneously to the relay to instruct it to turn on or off the water pump.

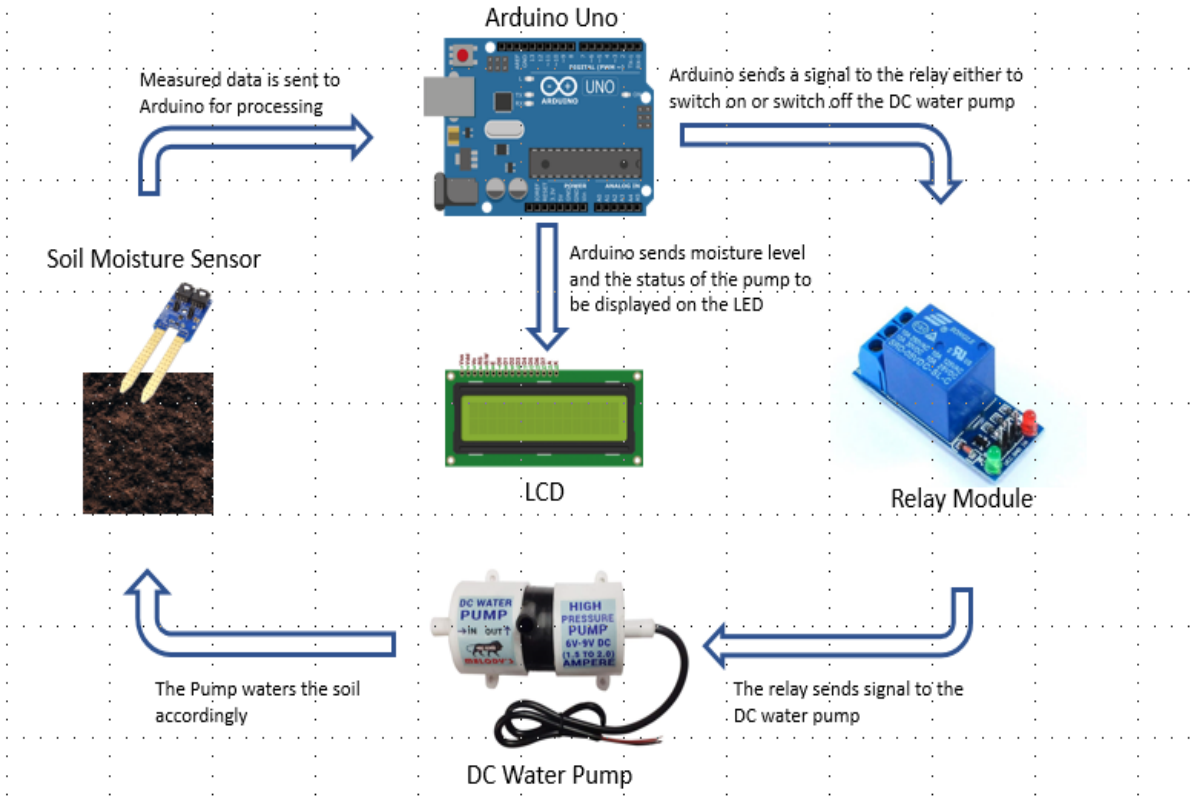

Figure 2: Architecture of Intelligent Irrigation System

Hardware Requirements

Figure 8 depicts the complete hardware schematic for the proposed approach, which incorporates the Arduino board and all required auxiliary components.

Figure 3: Arduino Uno

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Arduino Uno

The Arduino Uno is a microcontroller board built on the ATmega328P architecture that is open source. An Arduino board has 14 digital input/output pins, six analog inputs, an USB interface, an ICSP header, a power jack, a 16MHz quartz crystal, and a reset button. Figure 3 depicts Arduino Uno board. Everything required to utilize the microcontroller is included; all you need to do to get started is attach it to a computer via USB cable, charge it with a battery, or use an AC-to-DC adapter. The Arduino controls all of the hardware that is linked to it and acts as the project's main control component. When using an Arduino IDE self-download program and attaching it to a computer via USB, it offers a platform for programming.

Soil Moisture Sensor

This sensor records the soil's moisture content whenever the soil is dried, the unit production is enhanced; otherwise, it is reduced [11]. Figure 4 shows soil moisture sensor.

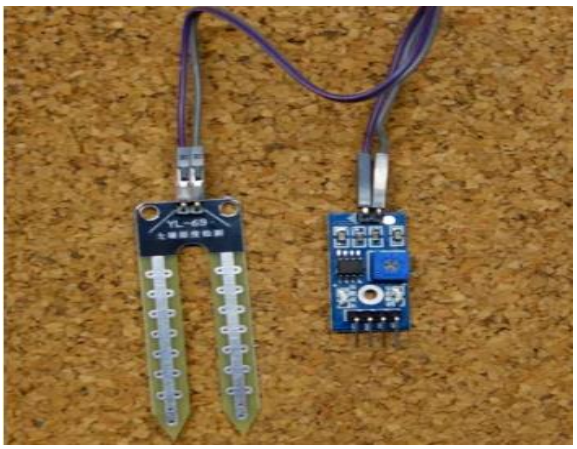

Figure 4: Soil Moisture Sensor

Liquid Crystal Display (LCD)

It is a wide panel screen that utilizes the ability of liquid crystals to modify the color of light. The content produced by the Arduino's code will be shown on the screen using screen graphics created by the backlight. In the current study, the status of the pump and the soil moisture level status are both displayed on the LCD panel, which is programmed into the Arduino board early on. Figure 5 depicts LCD display.

Figure 5: LCD

Relay Module

This module is an electromagnet-controlled switch. It is utilized to open and close the electric path leading to the pump in order to turn on and off the DC watering motor. The Arduino code is used to control it. Figure 6 shows relay module.

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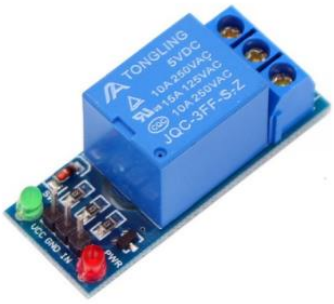

Figure 6: Relay Module

DC Water Pump

In this work, a DC water pump of the H-Bridge type is used. To finish the watering procedure, it pushes the water out of the second hole after pulling water from the source. Figure 7 shows a DC water pump. It is controlled by a relay module, wherein on/off settings are adjustable depending on the signal from the Arduino.

Figure 7: DC Water Pump

HARDWARE IMPLEMENTATION AND DISCUSSION

As demonstrated in Figure 8, the Arduino serves as the system's center and attaches all the necessary hardware. Arduino board processes and makes decisions based on the data collected by the moisture sensor concerning soil moisture levels. The LCD screen displays the information that the Arduino gleaned from the moisture sensor. It displays the status of whether the soil moisture content of the soil is perfect or not. In order to decide whether to turn on or off the water pump, the relay module receives the data that has been collected at the same time. If the scenario demands the activation of the water pump, the water pipe connected to the pump will start pumping water up from the source of water and send it to the other side of the pipe to continue watering the soil.

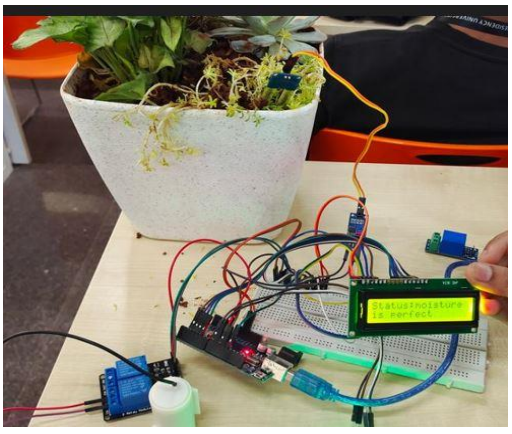

Figure 8: Hardware Implementation System

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After inserting the soil moisture sensor into dry soil, the LCD shows that the pump is "ON". This signifies a lack of water in the soil, and the water pump will be activated to begin the watering process. The LCD displays "OFF" for the pump state when the moisture sensor is submerged in wet soil. This signifies that there is sufficient water in the soil to stop watering, and the water pump will be turned off. In Figure 8, it is shown that the LCD displays "Moisture is perfect", which indicates soil moisture quantity is perfect and no need to turn on the pump.

CONCLUSION

The major goal of this study is to build an intelligent irrigation system that can water plants without the need for human involvement. After refining the utilization of water resources for agricultural production, the proposed intelligent system is proved to be practicable and economical. Additionally, the proposed system offers a monitoring feature that allows users to examine the soil moisture based on the readings shown on the LCD. The recommended system has been designed and tested to run automatically. An intelligent watering system can be set up in the future to monitor moisture levels in accordance with the requirements of the various plants.

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Gesture & Pattern Recognition using Man–Machine Interface (MMI)

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Abstract

One of the most important initiatives aimed at collecting hand mobility information is glove-based systems. They have been studied for over 30 years, and they continue to be of interest to a wider range of scientists. The main goal of this activity is to enable young people with hearing and speech disabilities to learn and communicate normally using sign language. The device proposed in Target can convert hand movements into electrical impulses and send them to a microcontroller, which converts the signals into alphabets or commands. Bridging the gap in communication between the community and the outside world would be of great benefit to these disabled children. It is a low-power, affordable, compact, and highly adaptable system. This work provides techniques to engage students and help them develop important 21st-century skills such as creativity, problem-solving, critical thinking, and presentation skills. Solo Ideas truly empowers students to build problem-solving skills through efficient collaboration and strong motivation. A breadboard, potentiometers, resistors, and an Arduino UNO are the main parts used to do this.

Index Terms

Sign language, Gesture recognition, Pattern recognition, Man-Machine Interface (MMI).

INTRODUCTION

In modern society, mute and deaf people find it very difficult to communicate with normal people because they lack the amenities that normal people should have. In reality, it becomes the same problem as two people speaking two different languages , and having no common language makes communication difficult. Solving this problem requires a physical translator, which is not always easy to arrange. Similar problems arise between hearing and deaf people. Although technology has advanced rapidly in this information age, sign language remains the only means of communication for deaf people. When interacting with people outside the sign language community, it is helpful to use sign language as a resource for those familiar with it.

PROBLEM STATEMENT AND MOTIVATION

Communication plays an important role in growth as it is integral to both the day-to-day operations of an organization and the lives of its members. Your ability to grow as a person is

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limited by a lack of communication. However, not everyone is born with the ability to hear and speak. They talk about sign language. Most people unfamiliar with this sign language find it difficult to communicate without an interpreter.

A sign language translator is the best option to help deaf people communicate smoothly in multiple languages through technology. Sign language (by the deaf) is a formal language to communicate using the sign language system. Glove-based systems have been used in many projects for automatic interpretation of the gestural language used by deaf people [1]. Systems built for these projects are sensitive to factors such as the number of characters that can be classified (ranging from a few to thousands), the type of characters (static or dynamic), and the percentage of correctly classified characters. It was various. The most rudimentary systems could only understand manual alphabets or finger spelling (a set of static hand-finger configurations that represent letters).

RELATED WORK

Takashi and Kishino [2] and Murakami and Taguchi [3] used data gloves to recognize the Japanese alphabet. Hernadez-Herbollar used AcceleGlove to recognize the American alphabet [4]. The most complex system uses a variety of dynamic hand-finger combinations to represent words and grammatical structures in sign language. For example, Gao and his colleagues used his Cyber Glove for Chinese [8] - [9], and Liang and Ouyoung used his Data Glove for Taiwanese [10]–[12]. Kadous used the Australian Power Glove [6], Vamplew used his Australian Cyber Glove [7], and Kim and his colleagues used the Korean Data Glove [5]. To convert sign language into text or speech output, some systems include two built-in interfaces [13]-[15]. For example, Talking Globe used Cyber Globe to convert, record, identify, and translate American Sign Language into text or spoken English [16]. Many technological applications, from gesture research to medicine, involve collecting hand movement data. One of his most important initiatives aimed at collecting hand mobility information is a glove-based system. They have been studied over his 30-plus years, and they continue to be of interest to a wider range of scientists. The most popular device for capturing hand movements, the glove-based system, has been in development for about 30 years, and many researchers are still involved in this work. I decided to investigate a glove system for understanding sign language.

OBJECTIVES

The aim of this project is to develop gloves with sensors such as the Flex sensor that can recognize various sign language movements. A flexion sensor is attached to the finger and monitors how much the finger flexes during movement. A sensor simulation was first performed to extract the recorded data. The Arduino UNO board then receives the captured data from the sensors, processes it further, and sends the data. Information is displayed as text. This text information is displayed on the LCD panel.

EXPERIMENTAL SETUP

Arduino UNO: Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.

Flex Sensors: A flex sensor or bend sensor that measures the amount of deflection or bending

Potentiometer: A potentiometer is a three-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider. If only two terminals are used, one end and the wiper, it acts as a variable resistor or rheostat.

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- Hardware, Software, and Tools used:
- Arduino UNO
- Flex Sensors
- Gloves
- Potentiometer
- Jump wires
- Breadboard

Fig. 1 & Fig. 2 describes the block diagram and components of the working module respectively.

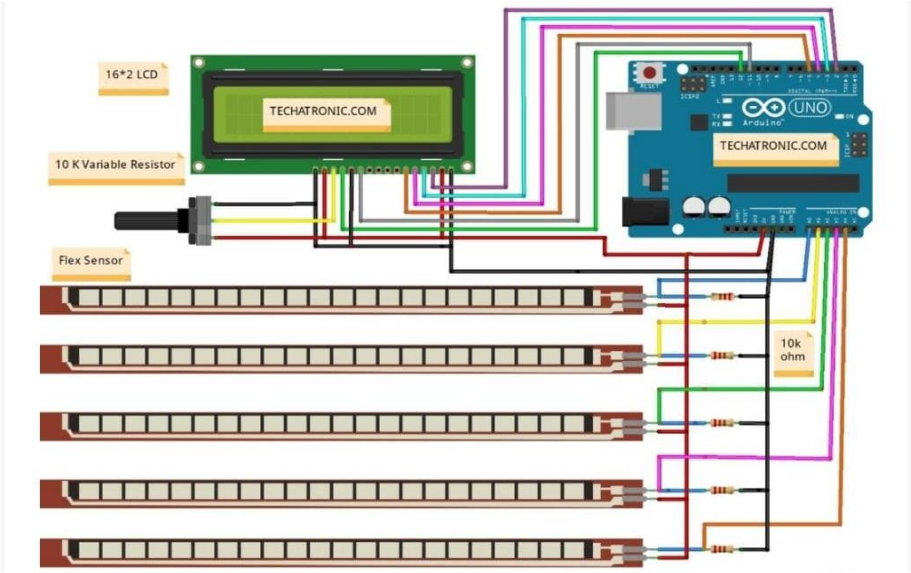

Fig. 1 Block Diagram

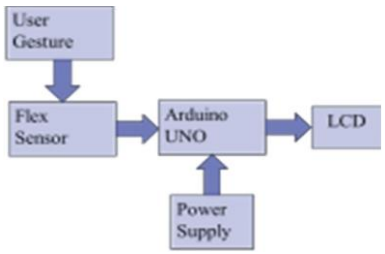

Fig. 2 Components of Working Module

RESULTS AND DISCUSSIONS

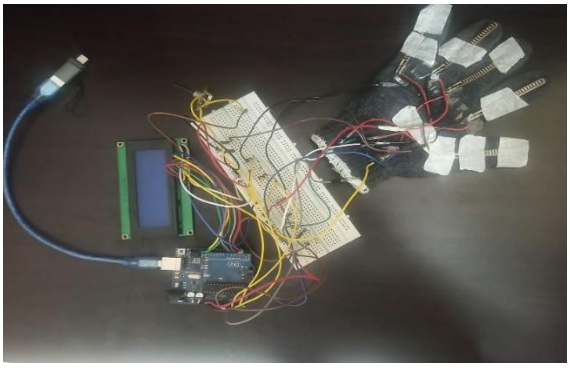

Fig. 3 Working Model - 1

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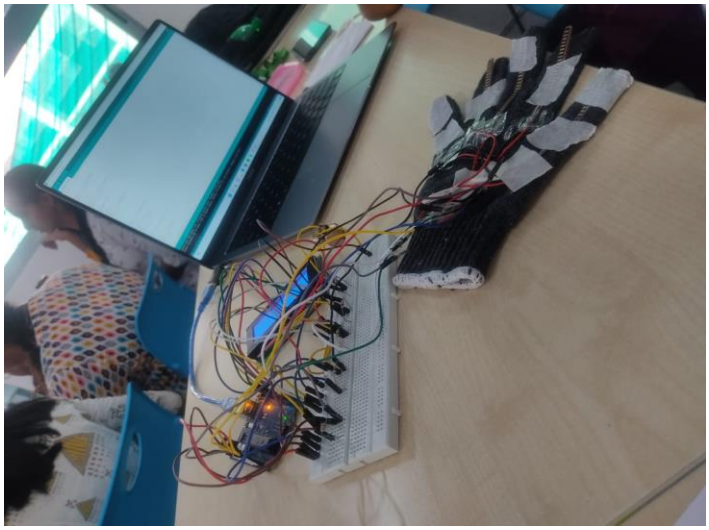

Fig. 4 Working Model - 2

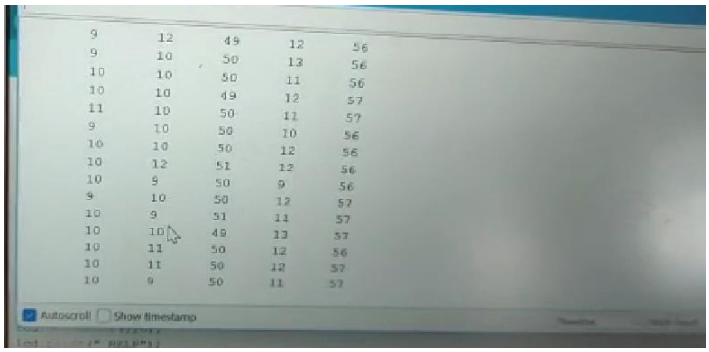

Fig. 5 Data Values

Fig. 6 Experimental Output

CONCLUSION

Therefore, our process of converting sign language signals into plaintext is useful for real-time communication. A talking glove is a kind of human interface that translates hand sign language into alphabetic characters. A device developed in conjunction with assistive technology to help the deaf and dumb in society and improve their communication skills. A talking glove is a kind of human interface that translates hand sign language into alphabetic characters. A device

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developed in conjunction with assistive technology to help the deaf and dumb in society and improve their communication skills. We are working with Assistive Engineering to release devices that assist people with disabilities. This product is intended for deaf and dumb people. This project uses a human interface device that translates American Sign Language gestures into letters of the alphabet.

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Home Automation for Gas Leakage

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Abstract

Gas Leakages are one of the major concerns of accidents in residential as well as commercial places in our day-to-day life. A slight ignorance can lead to a major mishap that can lead to loss of many lives. In order to combat such situation, a gas leakage detection and monitoring system is a mandatory measure that one must install at vulnerable places. The aim of this paper is to automatically detect and stop the Gas leakage using MQ6 sensor and communicate using SMS alert using GSM. This system also connects and controls the other components at home including TV, switch boards, doors, windows etc. If there is a leakage of gas, the sensors will automatically open all the doors and windows and turns off the main power supply until the leakage of gas has been completely stopped.

Index Terms

Index Terms: (GSM)-Global system for Mobile communication, (SMS)- short message service, (LPG)- Liquid Petroleum Gas.

INTRODUCTION

The gas detection alert systems are majorly seen at modern buildings, hotels, warehouses etc. If the same system is installed at home, it will help to evade the accidents caused by leakages to some extent. The alert system helps to connect and thus control electronic devices like TV, light, refrigerator etc. It also gives an indication in case of gas leakage at home. This is a SMS based wireless technology that controls all home appliances. It revolutionizes the standards of living. The system is more adaptable and cost-effective as it uses the GSM technology. It uses the commands to switch OFF and ON the appliances. In case of LPG gas leakage, detector sends SMS. Overall, this product helps to increase energy efficiency.

LPG being an odourless gas is not easy to detect in case of leakage. Hence, Ethanethoil is added as a powerful odorant to give odour to LPG. It is not only important to detect leakage but also to take measures to stop it. Hence, an accurate system is required not only to alert but also to turn off the main power supply. MQ6 gas sensor has to be used in order to provide good accuracy.

GENERAL-DESCRIPTION

Of the many LPG safety devices present in the market, most of them are proposed to detect the leakage of gas and home automation. But only a few deals with the prevention of accidents that are caused by LPG gas. This leads to the main question on what if there is a leakage and how to control it automatically to prevent accidents. The solution to this problem is our device. This

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device not only senses the leakage but also stops any further leakage automatically. It also alerts the user by sending an SMS.

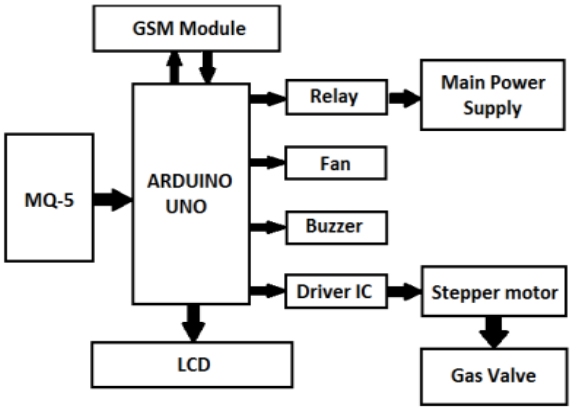

Figure 1: Block Diagram

This process starts when the gas leakage occurs. The gas sensor MQ6 senses it and gives an output to the micro controller. The micro controller used here is Arduino Uno which converts this output into digital format and sends the activation signal to other external devices attached with it. The external devices attached are stepper motor IC, buzzer, LCD (Liquid crystal display), GSM module and RF link. In the last step, buzzer gets activated simultaneously and messages display on liquid crystal display screen. GSM module is activated which sends warning SMS to the user. Stepper motor IC drives the stepper motor attached it. As a result, main power and gas supplies turn off. At the end, when the gas leakage is successfully stopped, then with the help of reset button the whole system gets back to the initial stage.

PROPOSED SYSTEM

On detecting the LPG leakage of 0.001%, the proposed system gets ready to take the required control action. A mechanical handle driven by stepper motor is used for closing the valve automatically once the gas leakage is detected. This action in turn prevents fire outbreak. By using the combination of a relay and the stepper motor, the electric supply of the place is shutdown thereby increasing the security of human life. Also, by using a GSM, alert SMS (Short messaging services) are sent to warn the users about the LPG leakage. The aim of this system is to reduce the probability of explosion due to gas leakage. Automatic process and a quick response time are the advantages of this system.

BLOCK DIAGRAM & DESCRIPTION

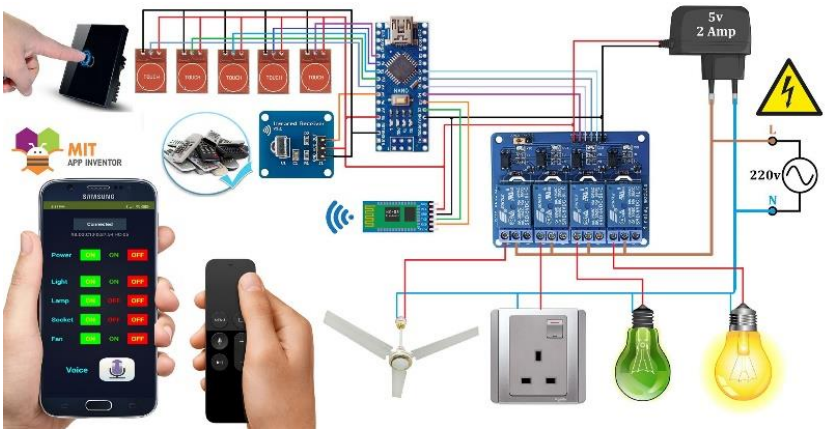

Figure 2: Home automation for gas leakage Circuit

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EXPERIMENTAL SETUP

The following Hardware tools were used for the experimental setup:

Arduino Uno: The Arduino UNO is a widely used open-source microcontroller board based on the ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O)pins that may be interfaced to various expansion boards (shields) and other circuits. The board features 14 Digital pins and 6 Analog pins.

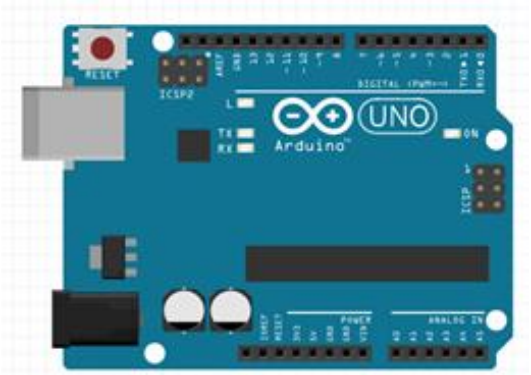

Figure 3: Microcontroller (Arduino uno)

Arduino Uno receives the signal from the gas sensor and then it turn off the main gas supply by the help of stepper motor which is attached to the valve of gas supply controller. Arduino also starts the buzzer and exhaust fan to remove leaked gas.

MQ6 gas sensor: MQ6 is a semiconductor type gas sensor which detects the gas leakage. The sensitive material of MQ-6 is tin dioxide (SnO2).It has very low conductivity in clean air This Gas sensor not only has sensitivity to propane and butane but also to other natural gases, low sensitivity to cigarette smoke and alcohol. The MQ-6 gas sensor is shown in fig. 2. This sensor can also be used for detection of other combustible gas such as methane.

Figure 4: MQ6 Gas sensor

GSM: SMS alerts are sent using GSM module to the user mobiles. On detection of gas leakage, the microcontroller (Arduino) sends a signal to GSM module, in which one of the tasks is to send the text SMS. GSM module requires one SIM card. This module is capable to accept any network SIM card etc.

Figure 5: GSM Module IC

Stepper motor: This system consists of stepper motor driver and stepper motor attached to valve. Stepper motor is connected to the stepper motor driver IC (L298). An external DC supply

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has been given to the stepper motor. The main purpose of the stepper motor is to turn off the main Gas supply.

Relay module: A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relay allows current to pass through it or it is in on state when a high signal is provided to it or otherwise it is in off state. Here, the relay is used as a switch for the main power supply of the premises where the device will be used. When there is no leakage high pulse is provided to the relay and when there is a leakage then a low signal is provided that turns off the main power supply.

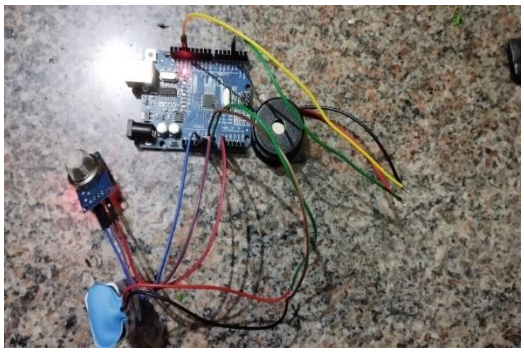

Figure 6: Gas Leakage Circuit system

Other components used were:

BC- 547 transistor and L-298 motor driver, LCD, Servo motor, Hc-05 Bluetooth module, Buzzer, 9V cell, Resistor 2ohm,1ohm, Jumper wires, Connecting wires, Switch board

Figure 7: Working Model of the Experiment

RESULTS AND DISCUSSIONS

The leakage of LPG gas was detected by the MQ6 gas sensor. The output from the gas sensor was sent to the micro controller that in turn sends activation signals to the attached external devices. Exhaust fan attached as a device gets switched on that decreases the concentration of gas inside the room. Then, the stepper motors were observed to be rotated for closing the knob of the cylinder and closing the main power supply. Because of this process, the leakage of gas the flow of current are stopped. The relay is switched to off the power supply of the house. The buzzer produces an alarm to indicate the gas leakage. Then, the user is alerted by an SMS through the GSM module.

CONCLUSION

In this paper, the gas leakage system was successfully designed with the help of the different components used. This system can be very useful in industries as well as for residential areas.

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The SMS messages sent can alert the people who are not present at the vicinity of the gas leak and can reduce accidents to a large extent. Another precautionary measure that can be noticed is the interruption of the power supply at the time of gas leakage that can prevent the electrical circuit malfunction.

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A Survey of Different Digital Forensic Tools

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Abstract

This paper will discuss a crucial matter in the field of computers, made all the more crucial by the fact that the field of computer forensics has seen tremendous growth in recent years. While many professions have clearly defined research agendas, digital forensics has evolved largely under the influence of its practitioners. As a result, rather than being the outcome of a research and development plan, the majority of the tools and methodologies have been created in reaction to a wide range of unique risks or circumstances. This research is analytical, bibliographical, documentary, and correlational since it has gone through the process of gathering trustworthy material from literature sources like books and scientific articles, in addition to having a rigorous analysis method.

Keywords

Security, risks, Computer Forensics, Evidence, Tools.

INTRODUCTION

All processes have been automated as a result of the exponential growth of computer software and the high level of security provided by digital information storage devices or networks, but there are also a number of reported vulnerabilities that should be handled with extreme caution to prevent falling victim to cyber fraud. Malicious actions by internal or external individuals to an organisation present themselves as open to data theft door through various resources hardware and/or software using different techniques or working methods depending on the scope and objective of hacker also known as hacker because of reports of vulnerabilities in information systems, either because of mistakes made by users themselves. To ensure the truth through evidence or computer evidence that could play a significant role in a judicial process, computer forensics has served as an aid to justice today since its origin. For this reason, their intervention is crucial. Additionally, it will enable safer correction of any mishap and the prevention of such events in the future. As a result, the purpose of this study is to examine the digital tools used in computer forensics by gathering bibliographic data, doing research on hypotheses, and evaluating indications for identifying tools that are more useful than others in the field of computer forensics.

THEORETIC FOUNDATIONS

A. Forensic science: The Forensic Sciences are the application of methods and scientific knowledge to locate, obtain, preserve, and evaluate criminal evidence and appropriately present it to a court. The recovery and examination of what are known as latent evidence, such as fingerprints, comparing DNA samples, etc., is the main focus of forensic sciences [1].

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B. Computer forensics: A new science called computer forensics is in charge of making sure that data sets, also known as digital tests, are recognised in legal and/or judicial proceedings by assuring their dentification, preservation, analysis, and presentation. It might be referred to as a computer approach that can record and analyse data for research purposes in order to obtain digital evidence that can be used to support justice and make a significant contribution to society [2].
C. Importance of Computer Forensics: A crucial consideration in a computer audit is how it can be used to gather concrete evidence that, if proven, can be used by higher authorities as a tool in criminal trials or other legal proceedings [3].
D. Cybercrime: Any illegal behaviour that: (a) is carried out via computers, computer systems, or other communication devices (computing is the means or instrument for a crime); or (b) is designed to steal information, steal passwords, perpetrate fraud, access bank accounts, etc [4].

METHODOLOGY

Three crucial criteria, such as relevance, thoroughness, and timeliness, should be applied while conducting research that is based on the literature. In order to provide the most accurate knowledge, bibliographical sources must be pertinent, meaning they must be aligned with the research's goal. Exhaustive because the information gathered should be carefully analysed and judged to be adequate; and finally, modern because it suggests that the sources are as up to date as feasible to guarantee enough up to date information. In order to obtain the tools that provide quality and completeness effective metrics designed by the authors, based on various tables compare available in articles, journals, and research, digital tools of computer forensics will be analysed through the functions performed by each, are reserved exclusively, or free.

Table 1. Forensics tools chosen for analysis

ANALYZED TOOLS
Paraben's P2 Commander 3.6
Guidance Software EnCase Forensic 7
AccessData FTK 5
X-Ways Forensic
Belkasoft Evidence Center
TechPathways ProDiscover
MACQUISITION 2013R2
PALADIN 4.0
NEMX
AUTOPSY
EMX
DEFT
CHAT EXAMIN ER
KALI LINUX

Source: Authors.

Numerous scientific journal articles, reference books, and the Excel tool for data tabulation were employed as sources for the data gathering. All of these materials were centred on the context of case tools and engineering requirements. Three crucial criteria, such as relevance, thoroughness, and timeliness, should be applied while conducting research that is based on the literature. To assess the research hypotheses, the variables of product license cost and the number of businesses offering digital forensics products will be connected in the analysis

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using the Pearson correlation method. The capabilities of the digital tools used in computer forensics will be examined in order to determine which ones can give quality and comprehensiveness. The IT market currently provides a wide range of digital tools for computer forensics that provide many services in computer security, greatly facilitating and improving the effectiveness of the work of professionals engaged in computer forensics. For this study, 15 random tools were selected as a population of multiple tools already present in the network shown.

Table 2. The operating system each computer forensics tool runs on

O.S / Tools	Windows	Unix	Mac Os	Web
Paraben's P2 Commander 3.6	1			
Guidance Software EnCase Forensic 7	1		1	
AccessData FTK 5	1			
X-Ways Forensic	1			
Belkasoft Evidence Center	1	1	1	
TechPathways ProDiscover	1			
MACQUISITION 2013R2			1	
PALADIN 4.0	1	1	1	
NEMX	1			
AUTOPSY	1	1	1	1
EMX	1			1
DEFT	1	1	1	
CHAT EXAMIN ER	1			1
KALI LINUX	1	1		
Total	13	5	6	3

Source: Authors.

Table 3. Based on its license cost and features, the computer forensics tools

TOOLS	PRICE	FUNCTIONS
PALADIN 4.0	0	37
AUTOPSY	0	33
DEFT	0	39
KALI LINUX	0	41
CHAT EXAMIN ER	99	14
EMX	399	47
NEMX	799	26
X-Ways Forensic	999,9	51
Belkasoft Evidence Center	1099	51
MACQUISITION 2013R2	1400	72
Paraben's P2 Commander 3.6	1495	78
TechPathways ProDiscover	2.195	39
Guidance Software EnCase Forensic 7	3600	71
AccessData FTK 5	4603	71

Source: Authors.

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Table 4. Between the cost of the licence and the capabilities of the tools, there is a Spearman link.

TOOLS	PRICE	FUNCTIONS
PALADIN 4.0	0	37
AUTOPSY	0	33
DEFT	0	39
KALI LINUX	0	41
CHAT EXAMIN ER	99	14
EMX	399	47
NEMX	799	26
X-Ways Forensic	999,9	51
Belkasoft Evidence Center	1099	51
MACQUISITION 2013R2	1400	72
Paraben's P2 Commander 3.6	1495	78
TechPathways ProDiscover	2.195	39
Guidance Software EnCase Forensic 7	3600	71
AccessData FTK 5	4603	71
Spearman correlation	**0,664290904**	

Source: Authors

CONCLUSION

According to the research's findings, it can be said that:

There are solutions that are already developed and made accessible for free that address specific computer forensics needs. These tools can now be used both online and offline. On the other hand, numerous instruments with high market costs have been developed in recent years, which may be a problem when the product is purchased by small enterprises. The "Paraben's P2 Commander 3.6" tool, which offers many processes that computer forensics need to carry out their work in computer security, is the one that demonstrated a wide range of functionality for computer forensics processes. All of the functions in this tool are aimed at enabling a thorough analysis of computer evidence in a case or incident. The analysis's Pearson product-moment correlation coefficient revealed that the number of functions that a computer forensics tool's cost per licence determines, leading researchers to draw the conclusion that more expensive tools frequently perform better when used for computer forensics work.

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A Review on the Role of Artificial Intelligence In Disease Diagnosis

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Abstract
Artificial intelligence plays an immense role in the field of human and veterinary diseases and cure. The detection of any type of disease in very important for the planning of proper treatment and good health of the patients. Artificial intelligence can improvise the diagnostic technique efficiently. With the help of Digital Pathology, a virtual image is made from glass slides. These images are available to view at workstations with Telepathology which is time efficient and significantly more accurate. Virtual Reality (VR) is experiencing the virtual world i.e., running a simulation on a computer using 3D virtualization with technological devices. A potential tool for Microbial Identification and Diagnosis has recently emerged which is called as Matrix Assisted Laser Desorption Ionization Time of Flight Mass Spectrometry (MALDI TOF MS). This paper reviews about how AI uses different techniques to diagnose the disease.

Keywords
Artificial intelligence, Disease diagnosis, Fussy logic, Pathology, Telepathy, virtual reality.

INTRODUCTION

Artificial intelligence is the reconstruction of human intelligence processes by computer systems or machines. this systems processes by merging huge data sets with intelligence, gaining information from patterns and features of an iterative algorithm and the analyzed data. And this Algorithms gain knowledge from different types of inputs or even experience over multiple years. Artificial intelligence is some times called machine intelligence because it is demonstrated by machines, in contrast to the human intelligence. There is no consistent definition of AI, but considered as "The capability of a machine to perform functions that is associated with human brain such as reasoning, learning, interacting, problem solving and decision making." Wide range of research areas are covered by AI such as natural language processing or robotics. Figure 1 shows the types of AI.

AI is categorized into three types, namely 1. generalized AI, 2. Super AI, 3. narrow AI. narrow AI being the most successful realization of AI helps in figuring out the most complex biological process that humans cannot do and thus help in the diagnosis. When a machine is given an unfamiliar task AGI (generalized AI) helps to find the solution of it without human intervention. AGI is a machine that is capable of thinking and using own intelligence just like human beings. AI has advanced so much in the technological field that it has paved the path towards autonomous disease diagnosis tools by using data sets to meet the challenges of upcoming human diseases detection at early stages. AI enables the computer and machines to

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learn from human intelligence behavior and help in clinical diagnosis. By using algorithms AI makes use of medical data sets to generate predictions and to develop over time by continuously processing the updated data [9].

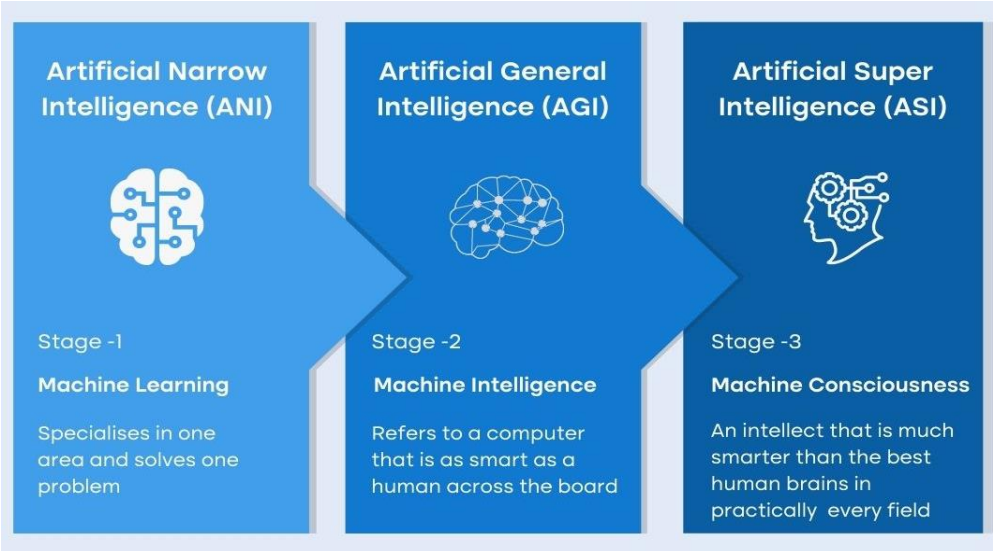

Figure 1: Types of AI [reference 24]

ROLE OF AI IN DISEASE DIAGNOSIS

The word fussy refers to ambiguous. Fuzzy logic offers flexible solutions for challenging issues. For decision-making systems like expert systems or pattern categorization systems, fuzzy logic is regarded as a reliable tool. It is essential to the medical assessment since it generates a precise examination report. These kinds of frameworks offer a quick and easy method for clinical assessment. They are also helpful when a professional or clinical specialist is not available. Based on the knowledgebase contained inside or obtained from specialists or subject-matter experts, these frameworks provide a result. Numerous clinical diagnosis systems developed and used in the medical industry rely on the fuzzy set concept. With the aid of creating new AI algorithms, it is always evolving to identify heart patients throughout the world [14]. Healthcare has always been at the forefront of innovation. It is challenging to stay on top of the curve given how frequently viruses and diseases mutate, but with the support of advancements in the fields of artificial intelligence and machine learning algorithms, leading to the development of new therapies and Animals and people both have longer and better-quality lives. AI refers to a machine's capacity to mimic human learning processes, such as image recognition and pattern recognition under challenging situations. How information is put together, evaluated, and created for patient care is changed by AI in the healthcare industry [10]

(A) AI uses four basic methods in disease diagnosis which plays very significant role, Pathology: As part of the transition to a digital workflow in modern pathology, digitized pathology slides are now viewed on computer displays. The processing, compression, storage, printing, and presentation of such pictures are frequently taken to mean or to be included by the phrase. A major benefit of a digital picture over an analogue image, such as a film picture, is the capacity to produce as many digital copies as needed without sacrificing image quality [5].

Telepathology: Telepathology is the practice of pathology remotely. For the sake of diagnosis, research, and teaching, telecommunications technology is employed to make it easier to transmit pathological image-rich data between two remote sites [5].

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Virtual Imaging: The interpretation of diagnostic medical imaging data and the inherent subjectivity and human error in the final conclusions present a significant challenge to the medical profession. To get around these issues, there is a critical need for standardized medical picture interpretation [13]. A traditional glass histology slide may be converted to digital form with a slide scanner and seen at a resolution comparable to that of light microscopy on a computer screen. Compared to general workflow, digital workflow requires more equipment and this leads to the requirement of additional informational technology and resource [5].

Virtual reality: The simplest way to define virtual reality is as a set of technologies that enable users to effectively interact with 3D computer databases in real time while utilizing their unique senses and abilities. Applications for virtual reality are being employed in the fields of mental health, anesthesia, emergency care, and disease diagnostics [5].

(B) Covid-19 diagnosis: The identification and treatment of COVID-19 is crucial in the fight against the virus. The majority of current diagnostic testing techniques are non-invasive, and they include viral throat swab testing, nucleic acid, serologic, and chest X-ray imaging. Fast and early diagnosis of infected individuals is essential for limiting the pandemic's spread and isolating the virus, and innovation in this field is unquestionably required. The X-ray, CT scan, ultra sound imaging and medical imaging diagnostics subsections that follow AI tools that have been created for the detection and diagnosis of SARS-CoV-2 and COVID-19 [3]

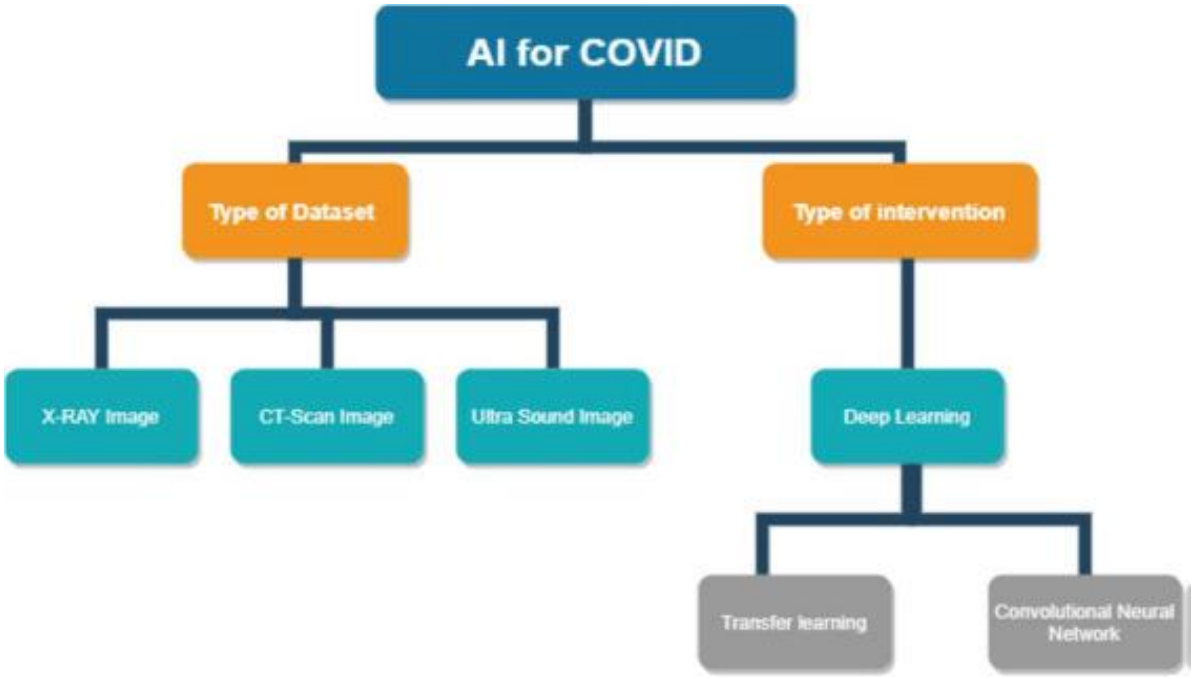

Figure 2: AI for covid diagnosis [reference 25]

Schuller et al. [1] presented a possible AI-based speech and sound analysis-based computer audition tool for COVID-19 diagnosis. Using AI approaches like Generative Adversarial Networks, the authors investigated automatic detection and monitoring of contextually meaningful events from speech or sound, such as pain, speech during a cold, and respiration for diagnostic exploitation (GANs). Wang et al. [2], An AI-based classification model was put out that uses the Gated Recurrent Unit (GRU) recurrent neural network algorithm with a bi-directional attention mechanism to separate the respiratory pattern from six other viral illness respiratory patterns.

(C) Cancer diagnosis: Medical imaging technology (MIT) has a lot to gain from artificial intelligence (AI), which is based on bioinformatics-based algorithms and computational

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models. It can spot any unusual cellular development and biochemical alterations in the body. AI-assisted MIT has a significant influence on neuroradiography and medical resonance imaging in addition to radiology. AI offers a wide variety of dynamic applications, including picture categorization and interpretation, data organization after that, information storage, information mining, and many more. AI is anticipated to significantly help the radiologist in enhancing the specificity of the diagnosis due to its broad application in biomedical imaging technologies. An algorithm-based smartphone software (https://www.skinvision.com) "Skin vision" can let a user undertake regular self-examinations for skin cancer using a phone and a picture of a skin area [4].

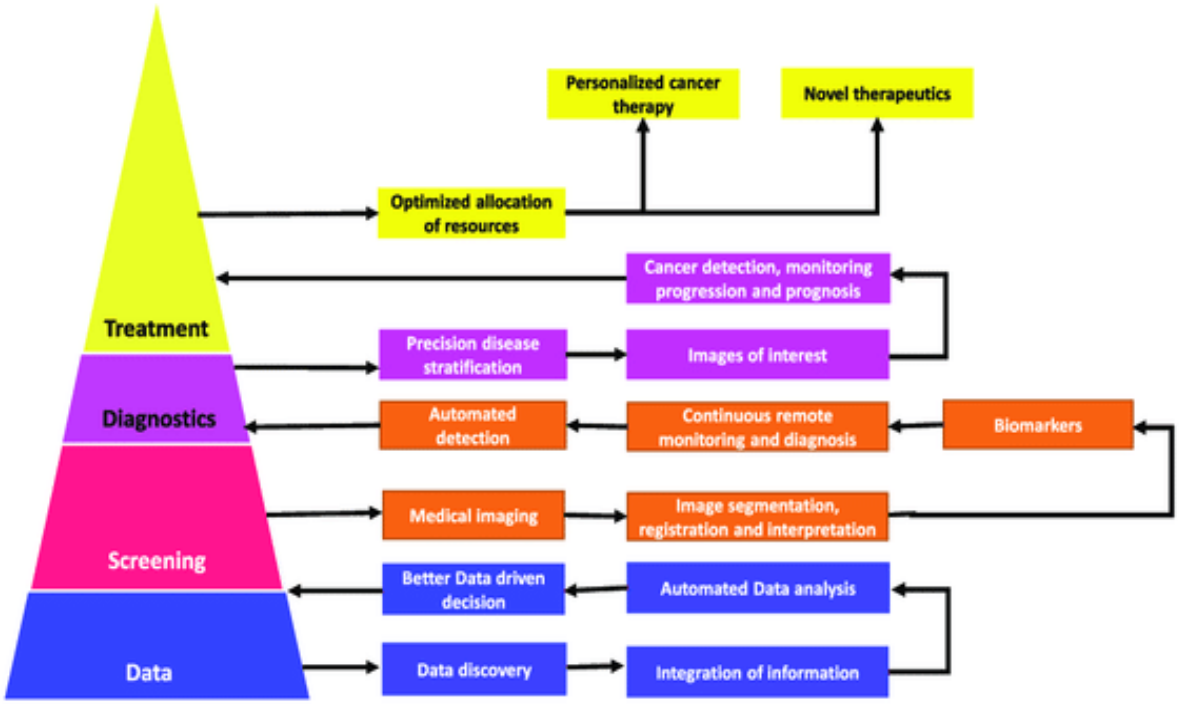

Figure 3: AI in cancer diagnosis [Reference 15]

(D) Heart failure diagnosis: Even for heart failure experts, the diagnosis of heart failure can be challenging. The clinical decision support system known as Artificial Intelligence-CDSS (AI-CDSS) has the potential to help doctors diagnose heart failure. To evolve the knowledge base with heart failure diagnosis, the AI-CDSS for cardiology was created using a hybrid (expert-driven and machine-learning-driven) method to knowledge acquisition. AI-CDSS learns from structured and unstructured data by combining machine learning and natural language processing methods. The accuracy of the system is improved by combining knowledge acquisition driven by experts and ML-driven rule development [5].

(E) Liver Diagnosis: Hepatology (the branch of medicine which deals with the study of Liver diseases) adopted artificial intelligence (AI) after gastroenterology (the branch of medicine which deals with disorders of the stomach and intestines.). However, research into using AI to treat liver disease has lately surged. AI may be used in hepatology to diagnose nonalcoholic fatty liver disease and identify liver fibrosis, as well as to distinguish between localized liver lesions and predict the prognosis of chronic liver disease. We anticipate that in the future, AI will assist in managing patients with liver disease, predicting clinical outcomes, and lowering medical mistakes [6].

(F) Skin disease diagnosis: The distinction between benign and malignant illnesses is not always clear-cut, and skin diseases are frequently present. Recent developments in the use of

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AI to medicine have been very astonishing. AI has demonstrated outcomes equivalent to those of human dermatologists for particular issues, such differentiating between melanoma and nevi. The performance of these systems must be evaluated in a setting that is representative of actual practice, which necessitates not only differentiating between malignant and benign lesions but also between skin cancer and a variety of other skin disorders, such as inflammatory and infectious conditions [12].

Researchers have created an artificial intelligence (AI) system that can categorize cutaneous skin issues accurately and serve as a support tool to enhance physicians' clinical precision. For a variety of skin conditions, Chakraborty et al. suggested a neural-based localization approach. They used Basel Cell Carcinoma and Skin Angioma, two images of diseased skin. In contrast to the neural network Caesarean Section classifier and neural network particle swarm optimization classifier, non-overwhelming arranging hereditary computation is employed to create the fake neural organization [7].

(G) Tuberculosis disease diagnosis: AI is proposed as a solution to help in the fight against TB. Applications of computerized reasoning in indicative radiography may offer precise ways to diagnose infections in low-income nations [1]. An automated method was put up by Bahadur et al. [11] to identify aberrant chest X-ray pictures caused by tuberculosis that had at least one disease, such as infiltration, fibrosis, pleural effusion, etc. This method groups healthy and ill individuals using feature sets in two layers of a hierarchical framework for feature extraction.

Table 1. Summary of the existing works

Reference number	Type of disease	Dataset	Methodology
[16]	Skin disease	Statistics on primary tumors gathered from the Institute of Oncology	Artificial neural network and multi-layer perceptron
[17]	Liver disease	Data gathered from patients in real-time	Logistic regression and classification
[18]	Kidney disease	Ultrasound images of kidney	Linear and quadratic based segmentation
[19]	Covid-19 disease	CT scan	Artificial intelligence
[20]	Diabetic disease	Dataset of pima Indian diabetes	SVM and fuzzy support vector machine
[21]	Tuberculosis	Smear microscopic pictures	CNN and image processing
[22]	Chronic disease	CINHAL dataset	SVM logistic regression and Software tool of artificial intelligence
[23]	Large Artery Occlusion detection stroke	CTA dataset	Artificial intelligence

CONCLUSION

Accuracy in illness diagnosis is essential for planning, efficient treatment, and assuring patients' wellbeing. Deep learning, neural networks, analytics, data, and insights make up the wide and varied field of artificial intelligence (AI), which is continually growing and changing

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to meet the demands of the healthcare sector and its clients. The results of this study show the importance of using AI in the healthcare system, especially for sickness detection. To effectively treat new illnesses and disorders, clinical diagnostics must continually overcome multiple challenges and improve. Even medical practitioners are aware of the challenges that need to be solved before illness may be recognized using artificial intelligence. At the moment, even doctors do not fully depend on AI-based methods since they are unsure of their capacity to foresee diseases and their related symptoms. It takes a lot of work to train AI-based systems so that they can anticipate illness diagnosis techniques with greater accuracy. Therefore, in the future, research on AI should be undertaken while taking the problem noted before into account to create a partnership between AI and doctors that is mutually beneficial. Furthermore, a decentralized federated learning model should be used to develop a single training model for illness datasets at remote locations for the purpose of disease early detection.

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A Review on Role of Artificial Intelligence and Machine Learning in Robotics

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Abstract
The robotics and artificial intelligence (AI) group's work together to construct intelligent entities in a fruitful way. In the fields of vision and deliberate action, this combination has led to significant advancements. The artificial intelligence community must make significant strides in order to facilitate future development of intelligent agents. This paper provides an evaluation of several robotic applications that use artificial intelligence and machine learning to address current issues in the fields of agriculture, medical, transportation, and robotics used for safety purpose.

Keywords
Robots, Artificial Intelligence, Machine Learning, Transportation, Robotics.

INTRODUCTION

Robotics is one of the fascinating fields of engineering which has the capability to mimic the human actions. It has been in use since good period of time to perform low level actions and to execute high risk and high precision operations in recent times. With the help of the robust technologies such as artificial intelligence and machine learning, application of Robotic science has moved to greater heights. Artificial intelligence (AI) refers to an human like behavior displayed by the system [1]. AI can evolve in solving different critical problems, helps in tackle logical reasoning and also assists in learning language[2-3], These two domains share a common goal of reducing the human efforts and to bring optimal results.

AI and robotics, the combination of these technologies is not only having the capability to save funds but also has the capacity to generate huge rewards in terms of revenue to companies Using them. Various sectors of corporate, manufacturing and production have already developed these systems and are utilizing the benefits. Industries such as Agriculture, Medicine, Transportation and logistics, Safety and others are examples of the real-time applications of the technology. The community of robotics has concentrated on issues with sensing, manipulation, and locomotion. Robots can employ flying, swimming, and walking for locomotion, as well as visual recognition of familiar objects, force sensing to help with manipulation, and other forms of locomotion. Some of them are humanoid robots, which have robotic bodies that are identical to human bodies that engage with the environment and human tools in an experimental manner.

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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN ROBOTICS

A. Agricultural Field:

Agricultural industry has been one of the most integral parts for the economy and social development of the country. The contemporary populace of the sector is of about seven billion, and the world is stricken by the shortage of food. To overcome these problem farmers can utilize the AI and robotic techniques to improve the crop yield. With Artificial intelligence (AI), farmers can set up the realistic computer simulations of their operations and run them on powerful computers to identify the areas for improvement with the data provided by the sensors such as soil moisture, temperature and weather forecasts. AI can help farmers set up their operations for optimal productivity.

Robots are widely used within the harvesting and selecting. These robots are also used to delicately grip the tomato to save you bruises, nick marks or damages. Van [4] created a robot device for collecting cucumbers where the robot moved along a track between the crops. It is by far one of the most well-liked robot applications in agriculture. Kondo [5], he has developed a robot that helps the farmers in tomato harvesting (fig. 1), and the Fruit was held using a grasper with fingers and a sucker. Because of the accuracy and velocity, robots can enhance the scale of yields and decrease weeds from crops that have being left within the farm. In this superior enterprise with the help of the artificial intelligence and robots' agriculture has end up the maximum excessive-tech business.

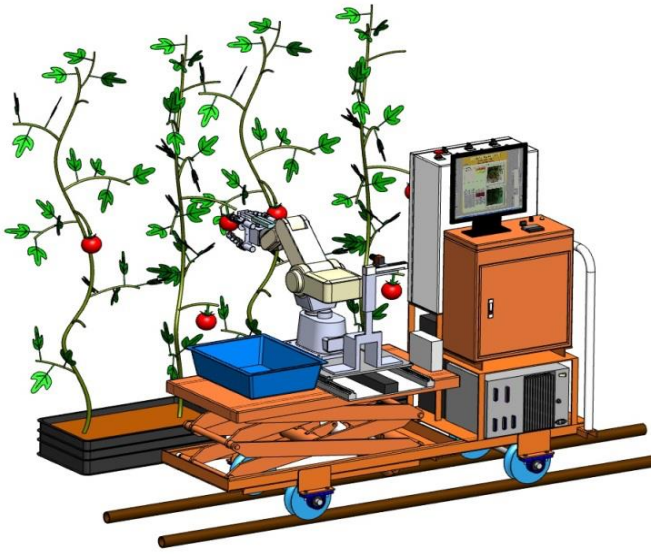

Figure 1: Robot picking tomato [20]

B. Medical field:

AI and robotics have revolutionized the medical industry by providing an advanced solution for treatments. The Internet of Health Things (IOHT) is a network of various connected medical gadgets that can analyze data to boost health of the patient [6]. Screening is an inexpensive and very effective in identification and controlling the spread of Covid-19 [7]. Dr. Spot has created a quadruped robot that contactless track vital indicators like body temp, breathing rates, pulse rate, and blood oxygen levels [8-11], as shown in figure 2. A method to identify Coronavirus-infected patients was introduced by Otoom ET a. [12-13] utilizing machine learning techniques in an IoT context. The patient's symptoms are collected, retrieved using IoT, and the devices are then sent to the cloud for storage. Machine learning techniques are utilized to analyze the acquired data in order to find coronavirus infections. One of the most advanced healthcare applications carried out by robots is therapeutic massage.

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Figure 2: Spot robot used in screening [8]

C. Transport field:

Due to the effectively expanding variety of automobiles and population boom, the capabilities of roads and transportation infrastructure have recently stagnated. Road accidents and traffic congestion have increased as a result. Noise, air pollution, and peak visitor seasons are more oblique issues related to traffic congestion [14]. With all of these issues in mind, it is crucial to come up with a way to address them and control traffic. Robots making our lives simpler may contribute to making all forms of transportation more secure and environmentally friendly. One of them, road transport, is where artificial intelligence has been most successfully implemented. While it has improved road transportation and provided useful ways, it has also presented significant obstacles, particularly in surroundings.

AI has the ability to make unfastened driving force's time, and make traffic extra efficient, parking easier, inspire vehicle and ridesharing. Railway transportation is likewise one of the fastest dependable, cost-effective delivery and most revolutionary sectors of the economy and the industrial revolution. The automation of train operation is facilitated by rail technology (ATO). With increasing degrees of autonomy; ATO passes control of operations from the driver to the train control system. Robots are widely used in carrying the various kinds of goods in medical, education systems like faculty, college, universities and also in industries. Logistic robotic automates the technique of storing and transforming items, they are regularly used in warehouses and garage, and facilitate to prepare and transport merchandise. Robots are utilized in the transportation industry to research the use of blind side tracking in cars to alert the driver to the presence of people, bicycles, cars, and other objects that cannot be seen from inside the vehicle. An increase in the use of robotic systems could lead to a reduction in overall emissions while also enhancing traffic and commodities mobility. It also lessens transportation congestion and pollution. Current-day automobiles use robotic control in the form of automatic braking, lane correction, and adaptive cruise control, among other features.

D. Safety Robots:

Accidental fires cause property damage and human casualties. It will be highly beneficial to have a firefighting robot that can both detect and put out fires. The majority of firefighting robots built in the past relied on sensors like flame sensors to find fire [15]. The distance between the sensor and the fire determines whether the sensors detect fire or not. Robots and artificial intelligence (AI) approaches can be used in these crucial situations to detect fire at a greater object detection range. Beyond the threshold value the sensors will not be noticed. Thermite fire fighters one of the maximum capable firefighting robots (Figure 3). An unmanned aerial vehicle which means the vehicle can fly without humans. It can fly

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autonomously and it is suited for dangerous mission. Autonomous this means having the power for the self-observer. Robots are dispatched to the distance with the aid of changing people for the protection reason. Sending the robotic to the space is safest then the human and also we will have remarkable advantages there, the robot which is sent to the space may be fixed with the digital camera in order that it captures each photograph in the area and discover the space and water. In recent days robots are dispatched to mars. Robot is also used in global Positioning systems (GPS). Robots are dispatched to the places where man can't go such as bomb detections and disposal.

Figure 3: Super Firefighter Robot: Thermite T3 [15]

Table 1: Robots in various sectors and its applications

Sl. No.	Type of field	Type of problem addressed	Technology used
1	Agriculture	Crop disease detection	Harvesting robots [18-20], robotic drowns
2	Medical	Human disease detection	Spot robots [8-11] , laboratory robots
3	Transport and logistics	Sorting and environment	Automated mobile robots
4	safety	Fire fighting	Thermite robotic fire fighters

CONCLUSION

The robotics along with artificial intelligence and machine learning can be implemented in different sectors such as area exploration, entertainment, food coaching, production and so forth. Even though robotics has exceled in solving multiple problems there has been a real time challenge that has still problematic. There is great scope for improvement in terms of enabling the hardware performance and developing robust algorithms that can be used to solve real time applications creating hurdles in smooth execution of activities.

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The Role of Artificial Intelligence and Machine Learning in Controlling Covid-19

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Abstract
The rapid spread of COVID-19 has prompted many countries to introduce pandemics. This has prompted the development of an enhanced version of the SIR, which takes into account the various factors that affect the development and maintenance of a disease. The SIR is a statistical model that can be used to analyze the magnitude of the cases and future projections. Understanding the various factors that affect the development and maintenance of a disease will help countries prevent the outbreak. This will also help them implement the necessary measures to minimize the impact of the disease on their economy and health. Due to the seriousness of the illness, medical experts have advised the infected individuals to seek medical help immediately. This paper aims to explore the various artificial intelligence and machine learning techniques that can be used to predict the severity of a disease and its transmission. It also reviews the various models and procedures used to predict the illness.

Keywords
Covid-19, Machine Learning, Artificial Intelligence, Medical Support Model, Vaccine.

INTRODUCTION

he world is in a crisis, currently dealing with a global pandemic from COVID-19. The biggest challenge that the entire world is facing now.[1][2] The pandemic is considered a health emergency in a few other countries. COVID-19 is the third novel coronavirus after SARS-cove and MERS cove, which causes diseases in animals, and birds and respiratory infections in humans. The most frequent signs of COVID-19 include dry cough, tiredness, and fever. [3] Most individuals can heal by taking proper treatment without needing different treatment like the 80 percent above. Most individuals and senior citizens who have problems with chronic medical issues such as cardiac disorders and diabetes are more prone to experiencing severe illness. There were various ways to detect COVID-19, including a Computed Tomography (C.T.) scan and a Nucleic Acid Test (NAT). [4] To a considerable part, the recent resurgence in A.I may be related to the effective use of machine learning by training an artificially neuronal system containing enormous labeled datasets. A sophisticated neural learning system would often include hundreds of hidden layers [5]. The current revival of A.I have sparked speculation over whether AI doctors would soon replace human physicians. While this remains to be observed, researchers think potential A.I-driven clever systems can considerably assist human

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physicians in generating better and faster judgments, and may even eliminate the need for human decisions in some cases (e.g., radiography) [6].

According to the World Health Organization (WHO), the number of deaths directly or indirectly associated with COVID-19 PANDEMIC between January 1, 2020, and December 31, 2021, was approximately 14.9 million, ranging from 13.3 million to 16.6 million. The infection of the infected lungs is low at the onset of an illness in an infected patient with COVID-19. Pneumonia is a type of disease that infects the lungs. ([7] Symptoms of pneumonia are fever, trouble breathing, and tiredness. As a result, we can declare that Pneumonia and COVID-19 are nearly identical in that both affect the body's respiratory system, so screening is based on respiratory system use. The X-ray would be a safer way to go. [8] COVID-19 has asymptomatic and symptomatic cases. Of these symptomatic cases, some have adverse effects on people. As the life span of the virus is 72 hours, citizens were advised to sanitize and keep things hygienic around them. The death count has risen as patients cannot survive until the discovery of a vaccine. Deaths due to the virus could be controlled by identifying patients at early stages. Artificial intelligence be used to fight the pandemic situation? The AI-based drug will have high efficiency with minimal cost. Using A.I., the time to find the right combination could be reduced [9].

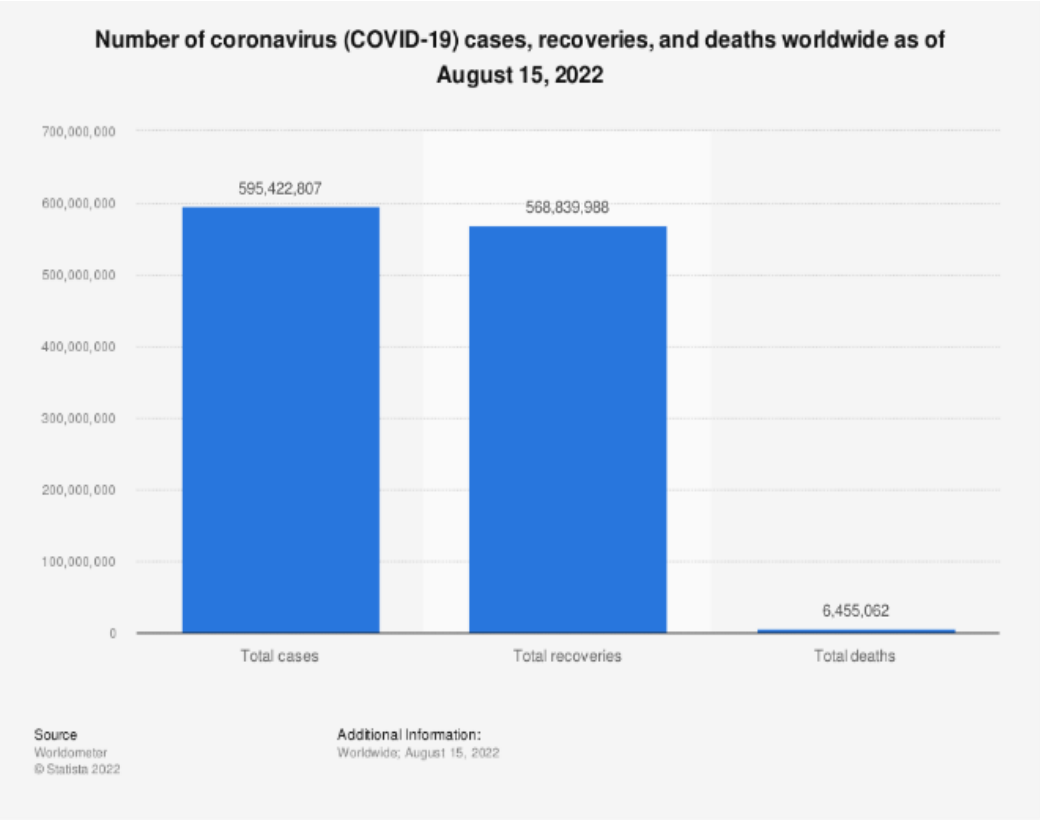

Figure 1: Total number of cases, recovery cases, and deaths by covid-19

As per the analyses of fig 1 India is only the country having the lowest number of cases in the world. It has been reduced by giving more tests for COVID-19, and prevention methods have been taken. The most critical data is the country needs to understand the situation is getting better and worse. Recovery cases are those that have been affected by the virus and have recovered and become normal. Affected patients of COVID-19 are being tested to heal in various ways.[10] The present number of cases is decreasing Day by Day as expected by India; as a result, the country is seeing the light of hope that the number of deaths will have become entirely evaluated by COVID-19.

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The promising methods being employed to aid radiologists in the early detection of coronavirus are artificial intelligence-based technologies, in particular deep learning and machine learning models [11]. Additionally, it reduces the radiologists' burden, enhances detection more precisely and effectively, and provides COVID-19 patients with quick assistance and special medical care. Drugs that can be utilized to treat unique disorders like COVID-19 can be found using AI in conjunction with medication repurposing. The fundamental problem with drug repurposing is diagnosing and identifying the drug-disease association. The adoption of such developing technologies has the potential to reduce this problem significantly. The COVID-19 epidemic is being fought with various AI applications, including viral detection, screening, diagnostics, medication repurposing or repositioning, prediction, and forecasting. Several techniques based on artificial intelligence (A.I) are utilized to identify, categorize, and diagnose medical [12]. Recent research and development in artificial intelligence have significantly improved COVID-19 screening, diagnostics, and prediction. It has led to better scale-up, prompt response, and most reliable and efficient outcomes, and occasionally even outperforms humans in specific healthcare tasks. Among many different disciplines of AI, machine learning (ML) and deep learning (DL) are the two most important. The following sections discuss the applications of both ML and DL in containing and preventing the COVID-19 pandemic. Application of some ML-based models is support vector machine (SVM), logistic regression, and decision tree [13].

An effective machine learning (ML) technique for tackling classification and regression issues is the support vector machine (SVM). Its excellent precision and performance have been used in many real-world applications, including in the health industry. Because of its outstanding performance, SVM has lately been employed to tackle the COVID-19 epidemic. Researchers created a model based on SVM utilizing X-ray images for the early identification and diagnosis of COVID-19. This model was developed by analyzing many laboratory and clinical features, and the performance of this model was better compared to other models [14]. Decision trees were built to determine the severity of COVID-19 in children.[15] The hospital in China provided the clinical laboratory and epidemiological information for 105 affected kids between February 1 and March 3, 2020. The findings revealed that 105 kids, including 64 boys and 41 girls, tested positive for COVID-19. The female infection rate is lower than the male infection rate (39.05% vs. 60.95%). The proposed model performed well, earning a 100 on the F1 scale [16]. A logistic function is used in the statistical technique of logistic regression (LR), which models a binary dependent variable. A more recent application of LR was to control the COVID-19 epidemic. Six hundred twenty laboratory sample data points were used to construct multivariate logistic regression for the diagnosis of COVID-19. Four hundred thirty-one samples made up the distribution for the training set, whereas 189 pieces made up the testing set. The suggested model's performance was adequate, with a positive predictive value of 86.35% and a negative predictive value of 86.62% [17].

ROLE OF AI AND ML IN COVID-19 DIAGNOSIS

Optical and digital microscope imaging, positron emission tomography (PET), magnetic resonance imaging (MRI), and computer tomography (CT) have all benefited greatly from artificial intelligence (AI). Several broad AI algorithms are now appropriate for modern medical systems. Through these tactics, a collection of ways for assisting global medical and health systems in combating COVID-19-like outbreaks may be summarized. [18] According to Khanabad et al. research, prediction of COVID-19 in this susceptible circumstance is required, and the use of machine learning algorithms helps the most. [19] According to their study, the Nave Bayes model obtained an accuracy of 96.2% compared to other machine learning classifiers. Britani et al. created a machine learning model to predict COVID using

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hematochezia data from standard blood samples such as white blood cell count. With respective scores of 91.3% and 95.6%, KNN and CNN both had the most excellent forecast accuracy. Abuja et al. proposed a unique technique with two classification levels based on four alternative transfer learning architectures.[20] The maximum training accuracy obtained is 99%, and the most incredible validation accuracy obtained is 97.3%. The architecture assesses the different learning models and chooses the one with the highest accuracy. The study was done using Chest X-Rays from 133 infected and healthy patients. LSTM obtained 94% accuracy when predicting the risk of COVID-19 infections from the supplied dataset using the prediction mentioned above model [21].

Research into the potential for commercially available anti-viral medications to treat or reduce the severity of COVID-19 infection in patients was conducted by researchers. They took advantage of the Molecule Transformer-Drug Target Interaction ML interaction prediction model, which had already been trained (MT-DTI). The MT-DTI model can accurately predict the COVID-19-infected proteins and drugs' binding affinities. Their research aimed to locate prospective FDA-approved medications that might inhibit the COVID-19 proteins. Without knowing the complete structure, MT-DTI may predict a target protein's chemical and amino acid sequences. This is advantageous because, initially, little was known about the general structure of the COVID-19 virus's proteins. There is almost little possibility of stopping a virus once it begins to spread and becomes a pandemic on a global scale without a vaccine. The best way to stop or halt the spread of a viral infection in the past was through vaccination. To protect against COVID-19and stop the pandemic, it is essential to produce a vaccine.

Three different vaccine types have been used in the research for the COVID-19 Vaccine so far. The Whole Virus Vaccine is an example of a traditional approach to creating immunizations against viral diseases. The COVID-19 S-spike protein immune response is extracted for use in the subunit vaccine. To assess how tiny viral strings, or "peptides," bind to human protein molecules, researchers employed machine learning (ML) approaches. The researchers produced the ML applications Optima and Evolve. It is possible to improve vaccination designs by using Optima. While evolve is used as a tool for evaluating vaccine designs and can be used to analyze proposed vaccinations using essential criteria, including population coverage [22].

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CONCLUSION

COVID-19 is a worldwide epidemic and a severe issue addressed all over the globe. Many nations over the world are working on different aspects of implementing restrictions regionally to stop the virus spread. Wisely medical services have played an essential role in combating COVID-19. Specialists accurately detected the disease using X-ray and C.T. images and PCR results. COVID-19 in India has been analyzed using approximate mathematical modeling and an enhanced version of the SIR epidemic model. In India, the fourth phase of the nationwide lockdown has been done. Restrictions based on zones were one promising approach to follow. Older adults with respiratory problems are at high risk, and those people have recovered if the virus COVID-19 attacks them. Testing the more significant number of people will help find the positive cases at the early stages, and the data will help in further analysis.

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Image Processing – Its Basic Steps and Applications

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Abstract
The enhancement of pictorial information enabling human interpretation as well as the processing of image data for storage, transmission, and representation for autonomous machine perception are the two main application areas that have sparked interest in digital image processing techniques.

Keywords
Image Processing, Digital Application, Segmentation, Enhancement, Quality.

INTRODUCTION

An image can be thought of as a 2D function, f(a, b), where a and b are spatial (plane) coordinates. The intensity or grey level of the image at any given position is determined by the amplitude of function at a certain location. Researchers refer to the image as a digital image when a, b, as well as the amplitude values of function are all finite, discrete variables. Processing digital photos using a digital computer is referred to as the field of digital image processing. You should be aware that a digital image is made up of a finite number of elements, each of which has a unique position and value. These components are also known as pixels, pels, and picture elements. The far more common phrase for the components of a digital image is "pixel."

Images play the single most significant function in human perception, which is not surprising given that vision is the most developed of our senses. Imaging devices, on the other hand, almost completely cover the electromagnetic (EM) spectrum, extending from gamma to radio waves, in contrast to humans, who are restricted to the visual range. Imaging machines, on the other hand, cover practically the whole electromagnetic (EM) spectrum, ranging from gamma to radio waves images, in contrast to humans, who are restricted to the visual band of the EM spectrum. As a result, there are many different applications for digital image processing [1].

BASIC TECHNIQUES FOR PROCESSING DIGITAL IMAGES

The initial step in the processing of digital images is picture acquisition. Keep in mind that acquisition could be as easy as receiving an image that has already been converted to digital format. Typically, preprocessing, such as scaling, is done at the image acquisition step. The following stage is image enhancement, one of the most straightforward yet appealing aspects of digital image processing. . The basic idea underlying enhancement techniques is to either emphasize specific features of interest in an image or reveal concealed detail.

The practice of image restoration includes enhancing an image's look. Image restoration is objective, in contrast to augmentation, which is subjective, because restoration procedures

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often are based on mathematical or probabilistic models of image degradation. To the contrary hand, enhancement is driven on subjective human preferences for what makes a "good" enhancement outcome.

The basis for representing images at different resolution levels is wavelets. Wavelets are particularly useful for compressing picture data as well as for pyramidal representation, which divides images repeatedly into smaller areas. As the name suggests, compression deals with methods for lowering the amount of storage needed to save an image or the bandwidth needed to send it. The previous ten years have seen considerable advancements in storage technology, but not in transmission capacity. This is especially true with Internet usage, which is distinguished by a sizable amount of visual content.

Tools for extracting picture elements that are helpful in the representation and description of shape are referred to as morphological processing. The move from systems that output images to processes that output image attributes begins with morphological image processing. Segmentation techniques separate an image into its individual elements or objects. Generally speaking, one of the most challenging tasks in digital image processing is autonomous segmentation. Imaging issues that need individual object identification can be successfully solved with the help of a tough segmentation approach. On the other hand, segmentation algorithms that are shaky or unpredictable virtually invariably result in failure. Generally speaking, the success of recognition increases with segmentation accuracy.

The result of a segmentation step, which is often raw pixel data but represents either the region's boundary (i.e., the set of pixels dividing one image region with the other) or all of the region's points, is followed by representation and description almost always. In either scenario, the data must be transformed into a format that can be processed by a computer. The act of giving an object a name (e.g., "phone") based on its descriptors is known as recognition. The methods for identifying specific items in an image are covered under the topic of recognition.

APPLICATIONS OF IMAGE PROCESSING

The use of image processing is widespread across a wide range of human endeavors, from the reading of biomedical images to remotely sensed scene interpretation. We just give a quick overview of some of these applications in this segment. For manufacturing as well as related industries to increase efficiency and product quality, automated visual inspection devices are crucial [2]. The silhouette of the filament is derived from a binary image slice of the filament in an automated vision-based inspection method. The non-uniformities in the pitch of the filament geometry inside the bulb are found by analysis of this silhouette. The General Electric Corporation created and deployed such a mechanism.

Automated visual inspection can be used to find broken parts in electromechanical or electrical systems. Usually, the defective parts produce greater thermal energy. The distribution of thermal energy in the assembly can be used to create infrared (IR) photographs. These IR images can be examined to determine whether parts of the assembly are defective. Finding surface defects is a crucial necessity across metal businesses. For instance, it is necessary to find any aberration on the top of the rolled metal in the hot or cold rolling mills of a steel company. Techniques for image processing, such as edge detection, texture recognition, fractal analysis, and others, can be used to do this. Remote sensing based image analysis is able to collect data on environmental assets, including agriculture, hydrology, mining, woodland, and geophysical resources. Images of the earth's surface are acquired by remotely sensed satellite sensors or a multi-Spectra) scanner mounted on an aero plane, and they are subsequently relayed to the Earth Station for additional processing [3, 4].

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For the aim of clinical diagnosis, a variety of imaging systems, including X-rays, computer-aided tomographic (CT) pictures, ultrasound, etc., are widely utilized [5]. In chest X-rays, the solid tissues look lighter as well as the structures containing air seem darker. Compared to soft tissue, bones are more radio opaque. The heart, the thoracic spine, the ribs, and the diaphragm dividing the chest cavity and the abdominal cavity are the anatomical components that are readily apparent on a typical chest X-ray film. The appropriate segments are checked for abnormalities in such areas of the chest radiographs. Cardiovascular diseases classification relies mostly on quantitative parameters like heart size and shape. Radiographic pictures may be subjected to image analysis techniques for a better diagnosis of cardiac problems. In order to diagnose breast tumors, characteristics (such micro calcification) can be found using digital mammography. Mammograms are analyzed using image processing methods like contrast enhancement, segmentation, feature extraction, shape analysis, etc. The tumor's regularity of shape decides if it is benign or malignant.

An important field of research is the use of image processing techniques in defense surveillance. The demand to monitor the land and oceans via aerial surveillance methods is ongoing. Here, segmenting various items in the image's water body is the main objective. Following segment extraction, each segmented object is classified using parameters such as area, position, perimeter, compactness, shape, length, breadth, and aspect ratio. These things could be anything from tiny boats to enormous navy ships. The qualities mentioned above make it easy to identify and pinpoint these things. We must be able to locate the distribution of these objects in the eight conceivable directions—north, south, east, west, northeast, northwest, southeast, and southwest—in order to be able to describe all possible vessel forms. It is feasible to interpret the complete oceanic picture from the geographic range of these entities, that is crucial for ocean monitoring.

An important use of image processing is the retrieval of a query image from a sizable image repository. Large multimedia collections and digital libraries have created a significant need for search tool development for indexing and retrieving information from them. There are currently numerous reliable search engines for getting text in machine-readable format, but there aren't many quick tools for getting intensity and color images [6]. An important field of image processing application is the tracking of objects moving, that allows for the measurement of motion parameters as well as the creation of a visual record of the moving object. Based on motion-based prediction techniques like Kalman filtering, extended Kalman filtering, particle filtering, etc., a system for identifying quick targets (such as a military aircraft, missile, etc.) is built. Target items that enter the sensor's field of vision are automatically acquired in object tracking systems that rely on automated image processing.

CONCLUSION

There are many uses for image processing, giving the researcher the choice to select one of his favorite fields. Although many research findings have been published, many areas of study remain unexplored. Additionally, digital image processing has emerged as the most popular type of image processing thanks to the quick computers and signal processors that were available in the 2000s. This is because it is not only the most flexible way, but also the most affordable.

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Smart Agriculture System: An Overview

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Abstract

The foundation of the economy and the most basic form of employment is farming. A huge portion of the world's population relies on agriculture to sustain daily life. The agriculture industry supports around 70% of India's population, and many of the crops are grown here. The majority of agriculture requires novel technologies to be managed because it cannot be productively done just through physical labour. So, we apply IoT innovation to the crucial aspect of farming. The previous approach to combining a clever water supply system with a clever idea in this approach, we make use of IoT concepts to address certain important issues pertaining to crucial aspects of farming. This project is a continuation of an earlier strategy, and its standout features include a sharp water system with great management and perceptive fundamental leadership in terms of precise continuous field information that manages temperature, moisture, and soil wetness of a particular crop. Every one of these operations will be controlled by a computer connected to the internet, and the work will be done by an Arduino board and sensors. Decisions must be taken based on the outcomes of the observation.

Keywords

Internet of Things (IoT), Smart Agriculture, Sensors.

INTRODUCTION

In today's world, most farmers lack the necessary expertise of farming and agriculture, which makes it more irregular. Prediction and forecasting are the foundation of the majority of agriculture and farming-related operations. When it fails, the farmers suffer severe losses, and some decide to end their lives. Since we are aware of the advantages of good soil and air, irrigational systems and other factors like temperature and moisture cannot be disregarded in the growth of crops. The internet of things is a developing area of technological, social, and economic growth. Consumer goods, large machinery, automobiles, mechanical and utility products, sensors, and other devices are all connected to the internet, providing the knowledge we need to change the way we operate and make life easier.

IoT systems are distinct from other systems and are more adaptable because they enable several automating features and benefits. These gadgets mostly make use of sensors, AI, and other two technical gadgets. It is a recent concept in the world of computers, and they are not yet commonly utilised. Some are being implemented, while others are being watched [1]. Technology like sensors and monitors can assist farmers in more accurate and ongoing crop quality monitoring. The Internet of Things will serve as the sole foundation for smart

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computation the following period (IoT). The Internet of Things (IoT) has been given the important task of transforming "Customary Technology" from homes and offices to "Cutting edge Everywhere Computing." By creating more productive industries, smarter cities, connected cars, etc., it will simplify our lives [1]. IoT is used in "smart farming" to link sensors with devices like Arduino so that tasks like reading data from the Arduino software and making decisions based on it may be performed. It aids in managing the PH scale, humidity, and temperature [2].

Utilizing technology in farming and cultivation demands a thorough understanding of agricultural practises and science. While building a system that should make the best cultivation process making agriculture system more effective and sustainable, many elements must be taken into account and thoroughly investigated. To improve the accuracy of the agricultural system so that it can be utilised by many farmers and implemented in various situations [2]. The rest of the paper is organized as follows. Section II gives a summary of the related work. Section III explains the benefits of an agriculture methodology. Section IV presents the system development and requirements. Finally, Section V concludes on the necessity of a smart agriculture and its future scope.

LITERATURE SURVEY

The goal of the article [3] is to use IOT and smart agriculture using emerging technology. The key to increasing the production of productive crops is to keep an eye on the environment. This paper's feature entails the creation of a system that can track temperature, humidity, moisture, and even the movement of animals that could destroy crops in agricultural fields using sensors and an Arduino board, and in the event of any discrepancy, send an SMS notification as well as a notification on the application created for the same to the farmer's smartphone using Wi-Fi/3G/4G. This hypothetical wireless robot is furnished with a variety of sensors to gauge various environmental factors.

Hardware for the Raspberry Pi 2 model B is also included for running the entire procedure. The ability to carry out activities including moisture detecting, frightening animals and birds, spraying pesticides, moving forward or backward, and turning on/off electric motors are the major characteristics of this revolutionary intelligent wireless robot. A wireless camera is mounted on the robot to allow for real-time activity monitoring. The proposed wireless mobile robot has been put to the test in the fields, where readings have been tracked and positive outcomes have been seen. This suggests that the technology is highly helpful for intelligent agricultural systems [4].

IOT uses farmers to connect to his home at any time and from any location. Smaller scale controllers are used to control and mechanise the home shapes while remote sensor structures are used to monitor the circumstances on the homestead [5]. Remote cameras have been used to view the circumstances in pictures and videos from a distance. IOT development can increase productivity while lowering costs compared to conventional development. In [6], IoT, or the Internet of Things, is essential to smart agriculture. Because IoT sensors may provide information about their agricultural fields, smart farming is a new concept. The goal of the article is to use IoT and smart agriculture using emerging technology. The main component to increase the production of productive crops is to monitor environmental conditions.

This paper's feature involves employing CC3200 single chip-based sensors to monitor the temperature and humidity in agricultural fields. The camera is connected to the CC3200 so that pictures can be taken and sent through MMS to the farmers' mobile devices over Wi-Fi.

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METHODOLOGY

The most labor-intensive industry is agriculture, which is a significant occupation. Agriculture is impacted by workforce migration from rural to urban areas, hence we need smart farming to:

1. Enable farmers with technology: Farmers will be more interested in employing technology and carrying out farming tasks if they are well-educated and knowledgeable about the benefits of using specific technologies. The user base will grow quickly as they teach others about these issues. As a result, there is a good potential of minimising the rural-urban movement, which has several benefits like alleviating urban overcrowding and pollution (soil, air, water, noise etc.). One of the biggest issues in these modern cities is noise pollution.
2. Increase output: If the farmer is knowledgeable about farming methods, such as when to grow specific crops, veggies, and more. Additionally, how much moisture is in the soil and when to water it. When farming and planting, they won't make any mistakes. They will produce more as a result. We can notify farmers about these things thanks to IoT.
3. Stabilize growth: Maintaining stable agricultural and other farming activities is referred to as stabilising growth. Given the likelihood of facing a food crisis, a price crisis, and most likely an economic collapse. If farmers have the right expertise and farming techniques, they can remain steady amid such crises. We attempt to assist farmers in resolving numerous issues by using IoT.
4. Sustain farming: Sustainable farming is the practice of producing plants and animals in a way that has few negative side effects and is long-lasting. For instance, in order to meet the need for human food, we must improve environmental quality and natural resources, but we cannot do this without the aid of technology and systems. IoT thus assists in satisfying this sustainable farming's demand.

In a polyhouse, the study attempts to measure several soil and atmospheric characteristics. The motor for spraying water will switch on when the temperature reaches a certain threshold, and the motor for drip irrigation will turn on when the soil moisture content falls below a set threshold. The measured parameters will be shown on the LCD after a predetermined amount of time. To represent sensors, we are using pot. An on/off switch attached to the breadboard is used to control the LCD's contrast. This seeks to provide effective environmental monitoring so that farmers can practice smart farming and boost their overall productivity and product quality. The proposed agriculture stick in these projects integrates Arduino Technology and a breadboard interface with a number of sensors to provide real-time data flow. Water must be available in sufficient quantities to accomplish agricultural tasks effectively. In this method, the agriculture IoT is connected to the Sensor Observation Service (SOS) to make sure that irrigation water is appropriately controlled, hence reducing water waste.

SYSTEM DEVELOPMENT

Three potentiometers are used as sensors in the system, which also has an Arduino Uno R3 and a computer power source. The measured parameters will be shown on the LCD after a predetermined amount of time. To represent sensors, we are using pot. A switch that is connected to the breadboard can be used to operate the LCD.

1. Temperature and humidity sensor: (DTH11) It has three pins: Ground, Output/Data, and Power supply V_{cc} 3-5V. A1 port of the Arduino, which reads the data, is connected

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to the first pin (power supply), second pin (output data), and ground is connected to the ground of the Arduino.

2. Soil moisture sensor: We utilize soil moisture to gauge how wet and intense the water is. To obtain the reading and display it on the LCD, we use analogue data from an Arduino.
3. Arduino Uno R3: The "Arduino Uno R3" is an ATmega328P microcontroller-based board with 20 pins (6 as PWM output and 6 as analogue input). Everything required to support the microcontroller is present. In the Arduino IDE, C and C++ are used.
4. Bread Board: Equipment called a breadboard is used to link integrated circuits and registers. Building and testing circuit connections is helpful. Registers and IC chips are put into the breadboard's many holes, both horizontally and vertically.
5. Jumper Wire: An electrical line called a jumper wire or hooked wire is used in Internet of Things applications to link an Arduino board to various sensors. It is typically employed to connect several parts.
6. DC motors: They transform electrical energy into mechanical energy, which we use here to irrigate water using drips and sprays as needed.

CONCLUSION AND FUTURE SCOPE

Since IoT farming applications are making it practical for farmers to acquire crucial information, their crop's quality is improving. The ability of IOT to be used for farming by introducing smart innovation to boost output must be understood by many landowners. If the user can successfully utilize IoT technology, the requirement for an expanding population can be met. The solution to the problem of assessing smart agriculture has been demonstrated in this article. This system can function as a best-in-class early warning system for risk, a monitoring system that continuously provides a record of the farms. It guarantees that using IoT may not only enhance sufficient specialized learning programming talent and equipment sector but also renders its usefulness for society. Smarter cities are the IoT's leading target for the future. IoT technologies contribute to a better quality of life and a better and smarter planet through transforming cities.

Some of the major IoT future applications are listed below:

1. Intelligent agrilogistic: It's all about agribusiness and shrewd food production. With a flexible chain- and compassing tracking and tracing system, it concentrates on providing services for fresh product quality and natural production processes.
2. Knowledge of Smart Food: In the future super market, it discusses client profiles, health and awareness, and typical days. We must take into account and provide a healthier but pleasurable food because the demand for it is growing. As a result, we must create an IoT system that aims to raise consumer awareness of food quality.
3. Smart Farming: We may gather data for many parameters using data mining and big data analysis, which will help us determine which crops are most suited for this specific location and season. The health of the cattle may be maintained by using sensors and devices, directly benefiting farmers.

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Creating Emoji with Facial Expression through Deep Learning Techniques: A Survey

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Abstract
There are various approaches to communicate a lot of our sentiments. The two arranged methods of correspondence are verbal and non - verbal. Outward appearances are an incredible method of correspondence including the trading of silent implications. It has allured a lot of exploration consideration in the field of PC vision and artificial insight. Numerous sorts of exploration have been accomplished for gathering these articulations. It is essentially done to get the assumptions of people. In this work, an API can be utilized to get pictures from any camera-based application progressively. HAAR course classifier is utilized to separate the picture highlights from the pictures got before. Backing Vector Machines (SVM) is utilized to characterize those highlights into comparing articulations. What's more, these appearances are then changed over to their comparable emoticons, after that these emoticons are get superimposed over the real face demeanor as a veil.

Keywords
Emotion Recognition, Face Detection API, SVM, HAAR, OpenCV, Emoji, Computer Vision.

INTRODUCTION

Correspondence is a significant demonstration of trading data between two distinct people or gatherings. The individual sending the data is alluded to as the sender while the individual gaining the data is alluded to as a collector. The non-verbal correspondence of informing includes the trading of silent signals. Nonverbal correspondence is ubiquitous. They are consistently present in each correspondence interaction. It includes 93% of human correspondence and in this 55% comprises of human signals and activities. Outward appearances like Laughing, crying, gazing, and body motions like pointing, crossed-legs, and some the hand motions like thumbs signals are a portion of the non-verbal interchanges.

By taking a gander at somebody's outward appearance, we can appreciate the other individual's sentiments. These non-verbal signs give more experiences and implying that isn't given by verbal correspondence. A significant lump of non-verbal correspondence includes the facial feelings displayed by an individual. Feelings address the psychological state alongside outward appearances, activities, or any actual changes. They are related with the current mind-set however vary from it, such that feelings are impermanent emotions over an issue while the mind-set is a summed-up notion that typically endures longer. Essentially there are seven distinct types of feelings communicated by people. They incorporate Happiness, Sad, Anger, Surprise, Disgust, Fear, and Neutral. The wide range of various feelings is the inductions of these feelings.

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Figure 1: Classification of Emotions

In this paper, we will investigate the location of the appearances progressively pictures utilizing promptly accessible APIs. Further, after the identification of the faces, utilizing HAAR Cascade, we can separate the highlights of the pictures and afterward measure them. Followed by which the feelings are arranged through SVM. These feelings are then changed into their indistinguishable emoji's which will be subsequently superimposed on the face.

LITERATURE SURVEY

This section describes the related research work done so far. The job of feeling is obvious in our everyday lives. People utilize various types of feelings to show empathy and set up associations with others. These feelings express the passionate conditions in our everyday lives. The thorough rundown of feelings goes from outrage to joy, pondering, doubt, incredulity, distress, and pain. Be that as it may, they are as often as possible saw in our day-by-day lives. Consequently, it is very straightforward the inward sensations of an individual with the utilization of outward appearances that are very obvious. Consequently, the outward appearances and enthusiastic acknowledgments are interrelated with one another. Utilizing outward appearances with ideograms and smiley's is the emoticon. The Japanese word, "emoticon" comprises of two sections: "the e signifies "picture" and moji signifies "letter". Emojis were utilized before emoticon as "emblematic portrayals for outward appearances dependent on accentuation denotes that could be covered utilizing a standard console. The two emoticons and emojis are often utilized in text informing, messages, and other electronic types of correspondence.

Besides, the utilization of emoticon has an extraordinary social impact regarding the outward appearances that are communicated by the emoticons. The Oxford word reference additionally viewed the year 2015 as the most compelling regarding the advancement of the emoticon and its effect on the way of life. The emoticon of the year was smiley with tears of happiness. This emoticon best delineated and communicated the feelings of people when they express their adoration and bliss forever. The employments of emoticon are worldwide and the portrayal of the feelings by individuals is clear in each culture and climate. The emoticon is additionally an impression of the particular culture of the country. Emoticons give the presence of outward appearances and feelings that are explicit to each culture. For example, the Japanese organizations have additionally created images that are especially identified with the way of life of the Japanese and they are not dependent upon the impression of the feelings of the entire world. Hence, the part of the variety of the way of life is fundamental and the emoticons significantly affect the existence of individuals.

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PROPOSED SYSTEM

The possibility of the proposed framework is to utilize an API that will recognize the face after which the picture can be prepared to utilize the HAAR course for facial element extraction. SVM Classifier is then used to classify the feelings into its seven particular sorts. Utilizing HAAR of the OpenCV bundle, the relating emoticons of the feelings can get superimposed over the subjects' appearances. In any camera module of any driving person-to-person communication applications, the utilization of APIs can diminish the preparing time for face recognition for which they have their in-assembled face location calculation which can recognize the face easily and follow by which the emojis can be actualized over the countenances as channels.

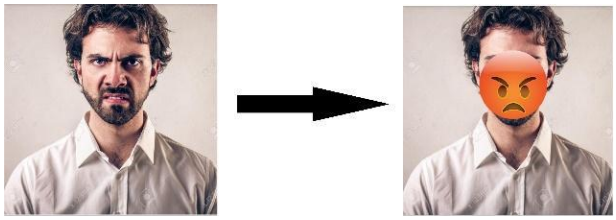

Figure 2: Transformation of facial expression into corresponding emoticon.

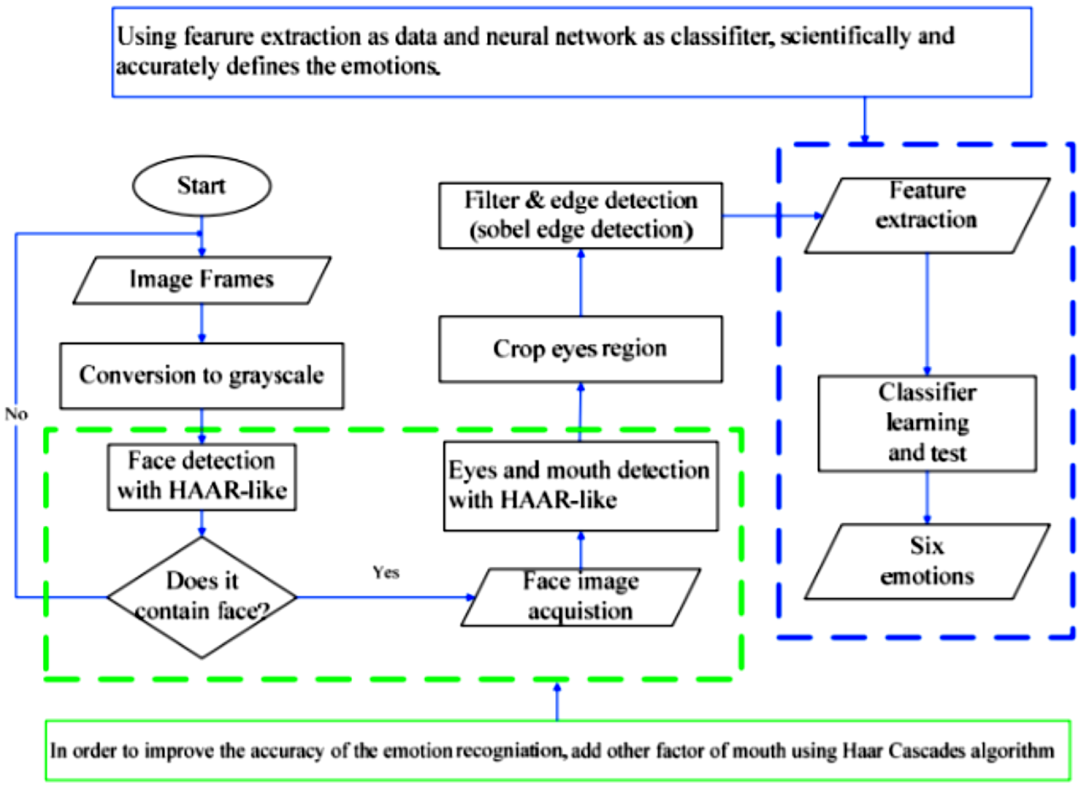

Figure 3: Proposed System Architecture

Haar cascade

The picture that is provided by the API is then given to the HAAR course in which some dataset has been given for preparing the information. For the advancement of a working model, we will utilize two datasets: Cohn-Kanade (CK+) and Japanese Female Facial Expression (JAFFE). HAAR-Like highlights have high precision to distinguish faces from various points. It extricates the facial highlights from the essence of the subject like eyes,

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eyebrows, and mouth articulations which we traverse the API. These outcomes are then conveyed to the Support Vector Machines (SVM).

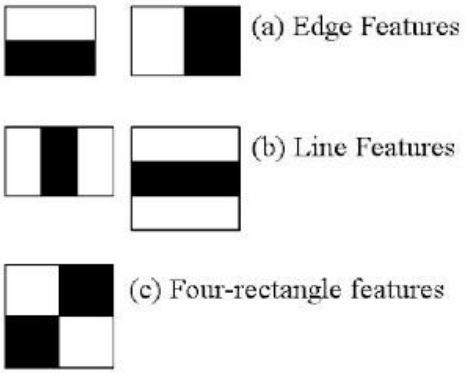

Figure 4. HAAR-Like feature for face detection

RESULTS AND DISCUSSION

Our proposed model will distinguish a face utilizing API and highlight extraction is done through HAAR Cascade. Feelings are ordered from the extractions through SVM. The Emojis are subsequently superimposed over the faces as indicated by the coordinating with feeling displayed by the subject. The last yield will be as demonstrated in Figure 6.

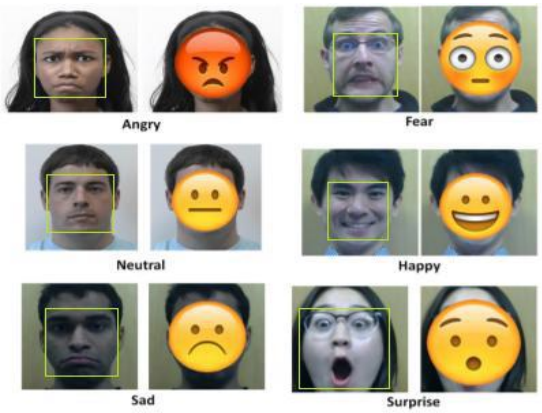

Figure 6: Emotion indicated by the emoticon

CONCLUSION

In this paper, Computer Vision has been utilized for the acknowledgment of facial feelings and changing over those feelings into their comparing emojis. Article face is identified utilizing any camera-based API. The Features of the appearances of the recognized face will be separated utilizing the HAAR course that will supply the component extractions of the looks portrayed in the picture for additional grouping into seven feelings by utilizing Support Vector Machines (SVM) that shows decent exactness esteem when contrasted with the other existing calculations. This proposed model can be utilized by the main long-range interpersonal communication controllers like Facebook, Instagram, and Snap chat for their camera-based applications including different impacts and channels.

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Scrum Framework Adaptation for Software Project Management: A Survey

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Abstract

The objectives of this study is to bring out the understanding of the concept of scrum framework for IT project management; what it is and what it is not. It is also aimed at comparing the pros and cons of both scrum and traditional methods of IT project management in a typical industry setting; the challenges of going purely scrum and so on. It is revealed that scrum framework outweigh the traditional methods in terms of benefits, but its implementation poses a lot of challenges due to a number of issues, paramount among them being organizational culture and empowerment of the project team. This has resulted in a number of industries sticking to the traditional methods despite the overwhelming benefits of scrum. In another school of thought, the combination of the two paradigms is the way forward. This work will be prospected to understand the insight of scrum framework and its utility in software project management.

Keywords

Scrum Framework, Programming, Spry, Framework, Project Management.

INTRODUCTION

Scrum is a spry programming advancement interaction to oversee programming projects. Scrum depends on three basic standards: noticeable advancement, consistent review, and variation. With Scrum, groups utilize an observational way to deal with adjust to changing prerequisites and needs. Groups utilizing Scrum center around conveying working programming to their clients on a successive basis. Scrum is a light-footed interaction to oversee programming improvement projects. Scrum isn't prescriptive on designing practices, yet rather it is a lightweight system dependent on a couple (good judgment) rules for overseeing projects. Scrum follows an exact interaction control in which the group adjusts dependent on experience instead of following a thorough arrangement of steps or an exceptionally definite arrangement. The word Scrum itself comes from rugby and alludes to a method of restarting the game. Scrum as far as we might be concerned today is the consequence of the work and cooperation of Jeff Sutherland and Ken Schwaber, around 1995. In 2001 Ken Schwaber and Mike Beedle composed the book Agile Software Development with Scrum, which made the practices contact a more extensive crowd and become a standard programming improvement measure.

LITERARY REVIEW

The state-of the-art shows some commendable work in rendering the understanding of the scenario of ambiguity in NLP in support of this survey work. Dexterity from the English

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Oxford living word references just signifies "moving rapidly and without any problem". Applying this equivalent definition to project the executives, portrays or uncovers the sharp move away from the conventional task the board strategy like the cascade, where we have various advances or cycles to go through, in a steady progression till the last interaction is done or executed before the venture closes. These cycles are to such an extent that one must be done or completed before the following interaction can start which much of the time defer projects and furthermore hinders the simple progression of the venture. This review centers on computer programming or programming improvement as an IT project, which is a deviation from any remaining undertaking the executive's fields like development, etc. In Agile venture the board, accentuation is set on the soonest conceivable opportunity to assemble the product and how effectively the product is worked for the client instead of exacting adhering to cycles and intricacy of plans and execution methods which by and large outcome in delays.

Spry venture the board is a theoretical computer programming structure in which programming is developed inside a relatively concise range of time and has a few emphases that bring about stable programming discharge. Lithe depends on a bunch of qualities, as per the Agile Manifesto, zeroing in on customer worth, iterative and gradual execution, extreme collaboration, little incorporated groups, self-association, and minuscule and consistent upgrades. Dexterous administration is regularly said to work best with little groups. The ideal spry undertaking group is little, gathered, conveys vis-à-vis consistently and has an ideal group size that doesn't surpass nine people, as indicated by Bustamante and Sawhney. Spry administration is regularly said to work best with minuscule groups.

Deft task the board Scrums are purposely iterative, steady techniques dependent in a group based methodology. Given that frameworks are for the most part growing today in liquid settings and rapidly evolving conditions, one of the principle purposes behind utilizing an iterative strategy is to help deal with the bedlam that may come about because of clashing interests and needs inside the task group. Iterative techniques are additionally used to help improve correspondence, expand cooperation, and protect the group from interruptions and hindrances. Generally speaking, the goal is to create an item quicker than conventional strategies.

(1) Individuals and connections over cycles and devices: With coordinated, the emphasis is on outfitting the abilities of people into a considerable group bringing about productive cooperation's for brisk and simple conveyance of undertakings. The center movements from the exacting adherence to cycles and apparatuses just like the case for customary systems.

(2) Working programming over complete documentation: With light-footed, the attention is on a product that works instead of zeroing in on expounding documentation.

(3) Customer joint effort over agreement exchange: With light-footed, banding together with the client is vital to conveying quality programming as per the general inclination of the client than simply demanding agreement terms, where expectations are restricted carefully to contract terms, and there is no space for adaptability.

(4) Responding to change over after an arrangement: With lithe, there is a ton of adaptability, where an arrangement isn't consecrated, however can be modified whenever there is the requirement for a change.

Scrum framework targets are following:

1. To assist peruses with understanding the idea of coordinated IT project the executives.

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2. To help IT project the board specialists comprehend the advantages of coordinated IT project the executives over different techniques from a writing perspective.
3. To help IT project the executives professionals see a portion of the difficulties and issues related with the full execution of spry IT project the board in firms from a writing perspective.
4. To submit reasonable thoughts on the best way to keep up the energy of light-footed IT project the executives full execution in firms to make it a triumph after its presentation since.

CONCLUSION

Scrum is a methodology that any research team can use. The researchers do not need to be physically in the same place because this method helps the team in both aspects: improving the team and improving the individuals. What is important to understand is that Scrum is open to change. There are no fixed rules that can modify every aspect. So it need daily meeting in every two or three days. If the Retrospective is not needed, it can be skipped. Everything can be changed and adapted to user needs. The outcome of this study has given sufficient evidence that there is inevitable ambiguity in NLP.

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