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Visual Assistance for Blind Person by Using Machine Learning Technology

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Abstract: The advent of powerful computers and the availability of massive amounts of data has sparked renewed interest in Machine Learning. Many fields now make use of machine learning, from the processing of medical images to the development of fully driverless vehicles. Object detection in photographs is becoming a major field of study. Bounding boxes can now be drawn on detected objects by computers. Computer vision is another name for this. To help the visually impaired and the blind, we recommended using computer vision machine learning techniques for object detection. This project details the steps required to train a convolutional neural network on the ImageNet dataset so that it can perform object detection and provide descriptive narration for a visually impaired user. The ultrasonic waves emitted by these sensors are utilised for obstacle detection, while other types of sensors can tell you whether or not there's a fire nearby, how deep the water is, and whether or not it's day or night outside. When an impediment or a fire is detected, a buzzer alerts the person. When there is water or darkness ahead, a vibration motor alerts the traveller. The system places a call via GSM to the nearest caretakers if anything out of the ordinary happens. The suggested framework identifies an item in their immediate vicinity and conveys feedback in the form of dialogue; readers are alerted to these messages via headphones. The proposed framework is meant to provide a straightforward and fruitful path. The purpose of the deterrent discovery for the sight impaired is to let them to walk independently by giving them a sense of fake vision by providing data about the natural position of the static and dynamic elements around them.

Keywords: Arduino, Fire Sensor, Water Sensor, Ultrasonic Sensor, Vibrator motor, Buzzer, GPS and GSM.

1. Introduction

Since the advent of powerful computers and the availability of vast quantities of data (big data), Machine Learning has attracted a lot of attention [3]. Machine learning is currently utilised in numerous fields, ranging from medical image processing to driverless vehicles [4]. Object detection in photos is one of the most actively studied topics nowadays. Bounding boxes can now be automatically drawn by computers around detected items[5-8]. Another name for this is "computer vision." Our proposed solution would use computer vision machine learning techniques to recognise items and make them accessible to the visually impaired and the blind. To help the visually challenged, this project details the process of training a convolution neural network on the ImageNet dataset so that it can recognise items and describe them verbally [14]. Through the use of ultrasonic waves, ultrasonic sensors may identify obstacles in their path; a fire sensor can detect the presence of fire; a water level sensor can determine if water is in the way; and a light sensor can determine if it is night or day. If there is a hazard like a fire, a buzzer will alert the person. The presence of water or darkness is signalled by a vibration motor. When something goes wrong, the system automatically places a call via GSM to the nearest monitoring personnel. Through the use of headphones, the proposed framework can tell apart articles and communicate critique as discourse. It is hoped that the proposed framework would provide such a straightforward and fruitful means. So that they can walk on their own, those who are blind or have low eyesight can benefit from the deterrent discovery by receiving information about the natural situation of the static and dynamic elements around them [15-19].

The term "Embedded" refers to something that is physically affixed to another object. One definition of an embedded system is a computer system in which the software is physically integrated into the hardware. An embedded system may be a standalone entity or an integral component of a larger system. An embedded system is a computer system with a built-in microcontroller or microprocessor that is programmed to carry out a specified function [20-24]. As an embedded system, a fire alarm can detect simply the presence of smoke. A Real-Time Operating System (RTOS) monitors the application code and supplies the means for the CPU to carry out a task in accordance with a predetermined timetable and delay policy. System behaviour is specified by the RTOS. It determines how the application should operate while it is being used. Embedded systems on a smaller scale may not have RTOS. A microcontroller-based, software-driven, dependable, real-time control system meets the criteria for an embedded system. What Makes an Embedded System Unique [25-31].

Single-purposed - Embedded systems are designed to carry out a single, specific task. For instance, a pager's primary purpose is to serve as a pager. limitations can be particularly stringent in an embedded system, but this is true of all computing systems. Cost, size, power, and performance are only some of the characteristics of an implementation that may be measured with design metrics. It needs to be small enough to fit on a single chip, fast enough to process data in real time, and power efficient enough to keep the battery alive as long as possible. Real-time and reactive computation is required of many embedded systems as they must immediately respond to changes in their operating environment. Microprocessor or microcontroller-based systems are required. The software is typically included in ROM, therefore it must have some sort of memory. There is no requirement for additional computer memory [32-39].

Hardware-software (HW-SW) systems rely on software to add functionality and adaptability. Hardware is utilised for speed and safety purposes. An Embedded System's Rough Outline [40]. A sensor is an electronic device that takes a reading of some physical quantity and outputs an electrical signal that may be read by a human observer or some other electronic instrument, such as an analog-to-digital converter. A sensor has a memory where it saves the measured value [41]. The sensor's analogue signal is transformed into a digital one via an analog-to-digital (A-D) converter. ASICs and processors work together to take readings from sensors and store the results in memory. A digital-to-analog converter, or D-A converter, takes the digital data from a processor and returns it in analogue form. A D-A converter's output is fed into an actuator, which then saves the approved output after comparing it to the real (anticipated) output [42].

Internet of Things

The term "Internet of Things" is commonly used to describe situations in which devices that aren't traditionally thought of as computers are able to generate, exchange, and consume data with little to no human intervention. However, there isn't a single, all-encompassing explanation for it [43-49]. Through the use of computers, sensors, and networks, Enabling Technologies are able to monitor and operate items that have been in use for decades. However, several recent changes in the technology business are coming together to make the Internet of Things a more practical reality. Ubiquitous connectivity, widespread IP-based networking adoption, affordable computing, miniaturisation, and data advancements are all examples. Different types of technical communications models are used in various IoT implementations, and they are referred to as "Connectivity Models." The Internet Architecture Board lists device-to-device, device-to-cloud, device-to-gateway, and back-end data-sharing as four prevalent communication types. These examples illustrate the variety of ways in which user value can be delivered by Internet of Things devices [50-63]. Hardware and software are used in tandem to create an IoT device. Complex computing operations and interactions with the physical world are implemented with specialised hardware components. Microcontrollers run the code that processes data from sensors and manipulates the system based on the results. In this lesson, we'll look at how the system's hardware and software interact with one another (fig.1). The microcontroller is introduced as a link between software and hardware, and its interface with hardware is discussed. The connection between software and microcontrollers in IoT devices is typically supported by an operating system. We will explain what an IoT operating system is and how it differs from a traditional OS [64-72].

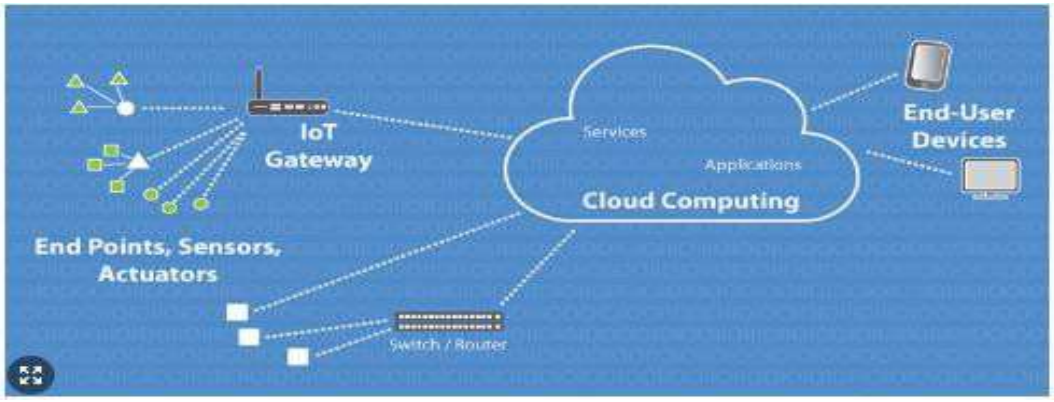

Figure 1: IoT Working

Internet-enabled smart devices with built-in CPUs, sensors, and communication hardware gather, transmit, and act on data they gain from their surroundings within an IoT ecosystem. Connecting to an IoT gateway or other edge device enables IoT gadgets to pool their sensor data, which can then be transferred to the cloud or analysed locally. Sometimes, these gadgets share data with one another and take appropriate action based on that exchange. Most of the work is done automatically by the devices, but humans are still required to engage with them in some way (to set them up, provide instructions, or access the data, for example). Web-enabled devices' networking and communication protocols are heavily influenced by the IoT applications themselves [73-88].

The Internet of Things (IoT) enables organisations to reevaluate their current strategy and adapt to the changing landscape of their industries and marketplaces. Consumer IoT, Enterprise IoT, Manufacturing, and Industrial IoT are just few of the many real-world applications of the Internet of Things (IoT). Many industries can benefit from the Internet of Things, not just the ones listed above. In the residential market, for instance, smart homes allow for remote management of heating, lighting, and electronic gadgets by computer, smartphone, or another mobile device. Wearable devices equipped with sensors and software can gather and analyse user data, communicating user information to other technologies to improve user experience. Public safety also benefits from the usage of wearable technology, such as when it is used to expedite emergency response times by optimising the routes taken by first responders, or when it is used to monitor the health of construction workers or firefighters in potentially dangerous environments. The Internet of Things (IoT) has several applications in healthcare, including improved patient monitoring through the collection and analysis of data. Internet of Things (IoT) solutions are commonly used in hospitals for tasks like drug and equipment inventory management [89-97].

Literature Survey

The Ultrasonic Smart Stick: A Device to Aid the Visually Impaired The world we live in today is fast-paced, and in order to keep up, we need all stick together. However, due to the impact of disability, some sectors of society are falling behind. Blindness is one of them. People who are visually impaired need the assistance of others in order to go places and do things. Therefore, we are offering the Ultrasonic Walking Stick for the Blind to help alleviate this issue. The construction of this stick and its usefulness for the visually impaired are discussed in this study. There are many approaches, and we borrow useful ideas from them all. [1] [9]

Creating a Robotic Obstacle Detector to Aid the Visually Impaired The ability to see is crucial to our survival. Most of us have encountered people with vision impairments and are familiar with the challenges they confront on a daily basis. When walking, the blind use sticks to feel for impediments, but this tool can assist them locate items on the floor. The field of obstacle detection has led to significant developments in primary safety systems and the interplay between primary and secondary safety systems. A gadget that can automatically identify obstacles in the path of a blind person is called an obstacle detector. The primary purpose of this device is to facilitate mobility for the visually impaired. This study presents an assistive technology for the visually impaired, in the form of an Android app. After the gadget has been constructed, it is put through rigorous testing in three different environments, such as calm, windy, and wet circumstances. The device's accuracy is good enough to be considered in all three scenarios. Hearing the distance and location spoken by a computerised human voice is a useful feature [2][10].

Accessible Wireless Navigation for the Blind: There is a large number of visually impaired people in the world, yet current technology cannot meet their demands. This suggests that a significant portion of our population is being overlooked by current research. Our study's ultimate goal is to develop a working prototype that integrates GPS, Cloud Computing, Light and Pulse Sensing, and Sound Navigation and Ranging (SONAR) systems. This device will incorporate sensing and wireless components to give the user haptic input for reliable navigation. Finding cost-effective and interoperable solutions, combining obstacle detection with position detection, and adopting open-source code and efficient coding approaches were among challenges we faced during our research. Our prototype relied heavily on an existing open-source product that could be commercialised at a reasonable cost. The cane and guide dog are obsolete in comparison to our method. Disabled persons need this gadget most so that they can live independently and in good health [11].

The use of ultrasonic sensors for obstacle detection is becoming increasingly common in areas such as vehicle control, medical applications, robotic movement control, etc. Multiple sensors, including ultrasonic, infrared, radar, laser, etc., can accomplish this. Ultrasonic sensors offer a number of advantages over other methods of measurement, including low cost and excellent dependability. In this paper, we compare these sensors for usage in a miniature car prototype running on a Raspberry Pi to measure distance in vehicular applications and give an output for obstacle detection [12]. Wearable computers can aid the user in a variety of tasks by acting as intelligent agents and analysing the current situation to identify the best course of action. These agents typically use the user's location as the primary context for doing so. The user's future motions, however, might also be predicted using spatial context. We provide a method that automatically organises GPS data collected over time into meaningful clusters across geographic regions of varying scales. The information is then used to create a Markov model that can be referenced for usage in both individual and group settings [13].

Project Descriptions

Ultrasonic sensors are utilised for obstacle detection in numerous contexts, including but not limited to vehicle control, medical applications, robotic movement control, and so on. Ultrasonic, infrared, radar, laser, and other sensors can all be used for this purpose [98-101]. Ultrasonic sensors offer the

lowest cost per measurement and the highest dependability, among other benefits. In this study, we compare and contrast the use of these sensors for a miniature car prototype powered by a Raspberry Pi to generate an output for obstacle detection [12]. As intelligent agents, wearable computers may aid the user in a variety of tasks depending on the situation. These agents typically utilise location context while attempting to ascertain the user's intent. Predicting the user's behaviour in the future is another viable application for geographical context data [102-111]. We provide a technique that automatically organises large amounts of GPS data into meaningful clusters across several sizes. Once these locations are collected, a Markov model is built that can be used in both independent and group settings [13] (fig.2).

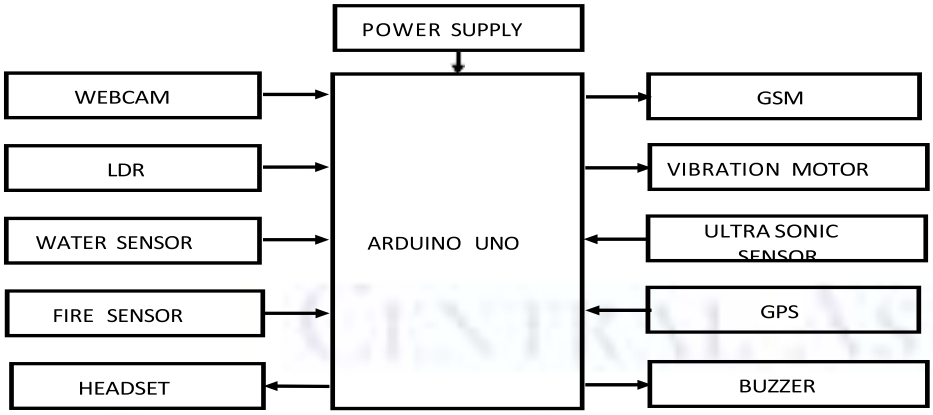

Figure 2: Block Diagram

Ultrasonics are so versatile that they are now being used to accurately monitor grain bins, water levels, drones, and even cars at drive-thru windows at restaurants and banks. Commonly used collision detection equipment include ultrasonic rangefinders (fig.3).

Figure 3: Ultrasonic Sensor

Laws of Physics for Sound Waves:

Certain numbers of cycles per second are associated with particular sound wave frequencies. Sounds between 20 Hz and 20 KHz are audible to humans [112-119]. However, ultrasonic detection typically use a frequency range of 100 kHz to 50 MHz. The velocity of ultrasound at a particular time and temperature is constant in a medium. W = C/F (or) W = CT

- Where W = Wavelength
- C = velocity of sound in a medium
- F = Frequency of wave
- T=Time Period

Most ultrasonic inspection techniques make use of either longitudinal or shear waves. The longitudinal wave is a type of compression wave in which the velocity of the particles is perpendicular to the direction of wave propagation. The particle velocity in a shear wave is perpendicular to the wave's propagation direction. With ultrasonic detection, high-frequency sound waves are introduced into a test object to gather data without hurting or modifying the thing in any way. In ultrasonic detection, we compare two values. How much energy is transmitted and how long it takes to reach its destination [120-125]. Thickness can be determined by measuring velocity and time. The speed of sound in a material multiplied by its thickness Fight Time Sensors for detecting particles and propagating waves Ultrasonic sensors, also known as transceivers or transducers, will be used to transmit sound waves and detect a returning echo. They function by transforming electrical energy into mechanical energy in the form of sound and vice versa, much like radar. Contact transducers, angle beam transducers, delay line transducers, immersion transducers, and dual element transducers are some of the most popular types of transducers. Contact transducers are commonly used to detect and measure surface flaws like voids and cracks. In order to generate refracted shear or longitudinal waves in the test material, angle beam transducers rely on the reflection and mode conversion mechanism. Transducers that use a delay line are a type of single-element, longitudinal wave transducer. An advantage of using a delay line transducer is that it allows for better near-surface resolution. The element's vibrations are dampened by the delay before the return signal is received from the reflector. When compared to touch transducers, immersion transducers have the following advantages: Uniform coupling lessens scan time, improves sensitivity to small reflectors, and reduces sensitivity fluctuations [126-131].

Lighting and appliance controls typically require repeated human operation and upkeep. Power could be wasted during the process of controlling appliances owing to human error or exceptional conditions. The light-dependent resistor circuit can be used to adjust the power going to the loads according to the available light, thus solving the issue. A light-dependent resistor, or LDR, is a semiconductor device with a very high resistance. What is an LDR and how does the light-dependent resistor circuit work? Find out in this article [132-139] (fig.4).

Figure 4: Light Dependent Resistor (LDR)

Photoconductivity, some optical phenomena, provides the basis for an LDR's operation. The material's conductivity drops as a result of photon absorption. When exposed to light, the electrons in the LDR's valence band rush to the material's conduction band. However, in order for electrons to jump from one band to another (valance to conductance), the energy of the photons in the incident light must be greater than the band gap of the material. When this occurs, a large number of charge carriers are driven to the conduction band. As a result of this mechanism, the resistance of the gadget drops as the current through it increases. The cost and complexity of light-dependent resistors are minimal [140-145]. These gadgets are employed anywhere when accurate detection of light or its absence is important. Alarm locks, streetlights, light intensity metres, and burglar alarm circuits are just a few of the many places you'll find LDRs put to use as light sensors. In order to illustrate this idea, we have described a specific project: the use of LDRs to reduce energy consumption through intensity-controlled street lighting. A flame detector is a type of sensor that can detect and react to the presence of fire. Depending on the setup, a flame detector may trigger an alarm, shut off a fuel line (like a propane or natural gas line), or set off a sprinkler system. A flame detector's ability to respond faster and more accurately than a smoke or heat detector is a result of the mechanisms it employs to detect the flame; in applications such as industrial furnaces, their role is to confirm that the furnace is working properly; in these cases, they take no direct action beyond notifying the operator or control system [146-149].

Water Level Sensor:

In order to control the concentration of a fluid within a closed system, level sensors are used. Most of these materials take the form of liquids. Level sensors, however, may also keep tabs on powdery particles and other solids. Level sensors have numerous applications in manufacturing. Fuel, oil, and sometimes specialised fluids like power steering fluid are just some of the liquids that cars utilise liquid level sensors to keep an eye on. They are also common in appliances like coffee makers and water heaters, as well as in industrial storage tanks used for slurries. The minimum and maximum levels of a liquid can be detected by even the most basic of level sensors. Many sensors can continually measure volume and provide precise information about the amount of liquid in a container in relation to its minimum and maximum (fig.5).

Figure 5: Water Level Sensor

The point level of a liquid can be detected using a variety of liquid-level sensors. Some models feature a magnetic float that bobs up and down in the water. A reed magnetic switch is triggered when the liquid level, and hence the magnet, hits a predetermined threshold. The minimum and maximum liquid levels in a container can be detected by flipping a switch located at the top and bottom of the container,

respectively. In addition, the magnet in many sensors is shielded from turbulence and interference by avoiding direct contact with the liquid.

Feel free to get in touch with our engineers if you have any questions or would want to discuss a project, even if you didn't find what you were looking for on this site. Online, you may find a wealth of supplementary resources and how-to tutorials for learning about vibration motors (fig.6).

Figure 6: Vibration Motor

The Global System for Mobile (GSM) is a digital cellular communication technology that is widely used around the world. The Global System for Mobile Communications (GSM) is the result of a standardisation committee founded in 1982 with the goal of developing specifications for a 900 MHz-based, pan-European mobile cellular radio system (fig.7).

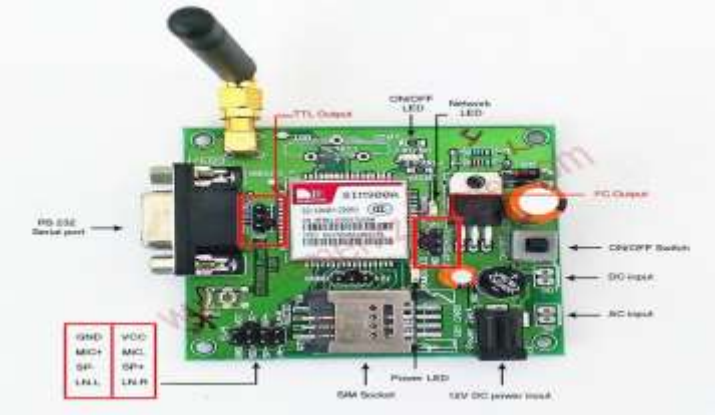

Figure 7: GSM Modem

An example of a wireless modem that is compatible with GSM networks is the GSM modem. If you're familiar with dial-up Internet, you'll feel right at home using a wireless modem. A wireless modem transmits and receives data using radio waves, while a dial-up modem uses a traditional telephone connection. A GSM modem can be either an external unit or an internal expansion card for a computer. The most common method of connecting an external GSM modem to a computer is via a

serial or USB cable. This PC Card / PCMCIA Card is a GSM modem that can be used in conjunction with a portable computer. It can be used in any laptop that has a slot for a PC Card or PCMCIA Card. A SIM card from a wireless carrier is needed to use a GSM modem, just as it is needed to use a GSM mobile phone. This SMS guide has already shown that AT commands are used by computers to operate modems. Standard AT instructions are supported by both GSM and dial-up modems. A GSM modem can be used in the same way that a dial-up modem would. Aiming for voice calls is not a good use case. If interfaces like a microphone and speaker are made available in the future for certain software, this may become a viable option. The modem can be useful for SMS thanks to its ability to store and send messages in advance. In an automated system, these texts could be sent in response to predetermined conditions. When only a few words would do, SMS is the way to go. An automated system or machine, such as a vending machine, a collection machine, or a positioning system where the navigator continuously sends SMS at predetermined intervals, could serve as the transmitter. In areas without access to GSM data calls or GPRS services, SMS may be a viable alternative.

When compared to alternative forms of communication, GSM will save you money if your application requires one or more of its characteristics. Each transaction should only require one to three lines of data. information about financial dealings, product sales and purchases, the status of consignments, etc. SMS texting can be used to transmit these brief but crucial bits of transaction data for as little as the price of a local phone call, and often at no cost at all, across the globe. As a result, you can send vital data to your headquarters from all over the world at a low cost. While GSM allows for the transfer of huge data faxes, the cost is comparable to or even more than that of landline networks. Having several data gathering stations dispersed throughout your city, state, country, or planet will yield the best results. Using GSM modems connected to PCs, GSM electronic terminals, and Mobile phones, the data can be transmitted from a variety of locations, including your branch offices, business associates, warehouses, and agents. Even though many businesses, such as warehouses, are located in outlying areas with limited or no landline or internet access, they will still have access to a GSM network. In comparison to landlines, the internet, and other communication mediums, GSM mobile networks have higher availability, making them the best choice for businesses that depend on constant connectivity. GSM wireless communication is also reliable in situations where you anticipate an attack on your communication infrastructure in the form of wire cutting or tape of landlines.

The number of transactions that can be processed by SMS is impressive. Similar to email, your server can store a large number of incoming SMS messages even when disconnected from the internet. Compared to SMS texts, which are nearly instantaneous, e-mails take time to arrive. Take, for example, store proprietors accepting credit cards using GSM networks rather than traditional landlines. Local transaction servers are often overloaded since they require numerous phone lines to process each transaction, yet a single GSM connection may process hundreds. Unlike traditional phone lines, GSM terminal modems can be easily moved to a new place. In addition, GSM terminals enable mobile access to the server via a mobile phone. GSM modems, terminals, and mobile phones can all be purchased, SIM cards can be activated, and the necessary software can be configured. Global Positioning System is an abbreviation for this. The Global Positioning System (GPS) is a satellite-based navigation system

used to pinpoint a physical feature on Earth. The United States military used GPS technology in the 1960s, and the following decades saw its widespread adoption by the general public. Automobiles, smartphones, fitness trackers, and geographic information systems (GIS) now all feature built-in GPS receiver

Approximately 12,000 miles (19,300 kilometres) above Earth's surface, 24 satellites make up the Global Positioning System. Once every 12 hours, at a speed of around 7,000 miles per hour, they complete an orbit of Earth (11,200 kilometres per hour). Since the satellites are uniformly dispersed, any location on Earth has a direct line of sight to four of them. The precise location, orbit, and time of each GPS satellite are broadcast continuously. In order to pinpoint its location, a GPS receiver triangulates the signals it receives from a constellation of satellites. A connection to at least three satellites is necessary to pinpoint a receiver's location, and four is preferable for improved precision. A GPS unit won't function properly unless it can communicate with the necessary constellation of satellites. The time required for this operation ranges from a few seconds to many minutes, depending on the quality of the receiver. For instance, a car's GPS device can often connect to satellites more quickly than a watch or smartphone receiver. In order to improve GPS detection speed, most GPS systems employ a form of position caching. A GPS receiver can quickly anticipate which satellites will be in range by recalling its last known position.

The GPS satellites orbit the Earth twice daily at precisely calculated intervals. GPS receivers are able to pinpoint the location of each satellite thanks to the unique signal and orbital characteristics transmitted by each satellite. To determine a user's location, GPS receivers use this data in conjunction with triangulation. The GPS receiver basically calculates the distance to each satellite based on how long it takes to receive a signal from the satellite. A user's location can be calculated by the receiver using distance measurements from a small number of satellites and displayed digitally for use in tracking a jogging or golfing route, navigating to a new location, or planning future excursions. A GPS receiver has to be in constant contact with the signals from at least three satellites in order to determine your 2-dimensional position (latitude and longitude) and monitor your progress. If four or more satellites are in view, the receiver will calculate your three-dimensional position (latitude, longitude and altitude). Depending on the time of day and your location on Earth, a GPS receiver may be able to track anywhere from eight to more than thirty satellites. These days, you can wear a device that does it all. When the GPS unit knows where you are, it can figure out things like.

The modern GPS receiver's parallel multi-channel architecture ensures pinpoint accuracy. When first turned on, our receivers quickly acquire satellite signals. They are able to keep a tracking lock even when surrounded by lots of trees or tall buildings. The precision of GPS receivers can be impacted by environmental and other causes of error. The typical accuracy of a Garmin GPS receiver is 10 metres. Precision improves while sailing. WAAS enhances the precision of some Garmin GPS receivers (Wide Area Augmentation System). By including atmospheric corrections, precision can be boosted to within three metres with this capability. To use WAAS satellites, you need neither special hardware nor any additional expenses. Differential GPS (DGPS) can correct GPS distances to within one to three metres, giving users even more precision. The most popular DGPS correction service is run by the United States

Coast Guard and consists of a series of towers that take in GPS signals and relay the corrected signal using beacon transmitters. Users need a differential beacon receiver and beacon antenna in addition to their GPS to get the corrected signal. Web + Camera = Webcam, hence the name. It should come as no surprise that a webcam's intended use is for online video transmission. Webcams are little video recorders that can be placed on a desk or attached to a computer screen. Although some webcams use Firewire, the standard connection is USB. Most webcams also come with software that may be used to record or live-stream the footage (fig.8).

Figure 8: Web Camera

The video stream can be viewed by other users via their Web browsers if the user's website allows streaming video. Webcams also provide live video conferencing with friends and family. Instead of sharing the video publicly online, users can host a private video chat with one or more friends and carry on a conversation in real time using both video and audio. A computer-connected camera is known as a webcam. They can be used for anything from shooting still photographs to streaming live video during business meetings. Webcams can be found both internally and externally on many modern laptops. If you intend to record or stream video using an external webcam, you may also need to invest in a microphone. A webcam can replace a digital camera and be used to take still photos. Once a webcam is turned on and its target shows on the screen, you can often snap a picture by pressing a key on the keyboard or clicking a button. After a picture is taken, it is stored on the hard disc of the computer. Short video messages can also be recorded with a webcam. Taking a video is as simple as clicking a button on the screen, just like snapping a picture. Unlike still images, videos require starting and then stopping the camera. The start and stop buttons are usually the same, with a red blinking circle when the camera is recording. A video is saved to the computer's hard drive (fig.9).

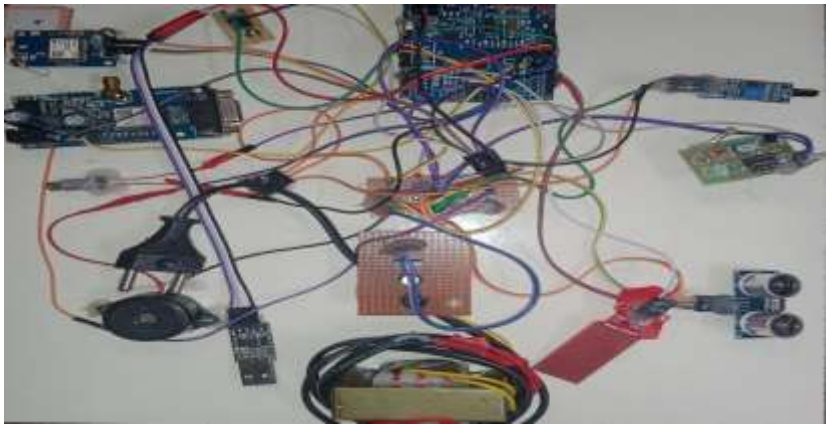

Figure 9: Hardware Setup

Conclusion and Future Scope

Persons do not impede. One's spirit can never be shattered. Our technological infrastructure is faulty and unable to function properly. Rather than accepting our impairments, we can transfer them through technical advancements. This system provides a quick-response, low-cost, dependable, portable, low-power navigation option. The system's sensors and other components are hardwired, but it's still quite lightweight. Wireless connectivity between system components allows for further enhancements, such as extending the range of the ultrasonic sensor and introducing a technology to calculate the speed of incoming objects. People who are blind or visually handicapped across the world were a major priority as we worked to create this liberating solution. In this report, we first provided a brief explanation of our project's motivation—an ultrasonic sensor, water sensor, fire sensor, light sensor, buzzer, and vibration motors comprise a smart guide model for visually impaired folks to lead them in their journey. The sight challenged can use this smart stick to help them find their way around. By emitting ultrasonic waves, ultrasonic sensors can detect obstacles in their path; fire sensors can detect the presence of fire; water level sensors may detect the presence of water in the path; and light sensors can determine whether it is night or day. If there is a hazard like a fire, a buzzer will alert the person. The presence of water, night, or darkness is signalled by a vibration motor. Blind persons may be located using GPS, and items can be recognised using object detection technology. Only eighty item classes are represented in the dataset of YOLO weights utilised in this model's training. The model's usability can be enhanced by include features like pothole recognition and directing the user in the direction they should go to avoid the barrier. However, the dataset still has plenty of room for new objects. There are nine distinct configurations possible, based on just three dimensions: height, breadth, and depth. In later steps, this can be enhanced to provide even more precise positioning of the object. If there are obstructions in the way, the camera or sensor won't be able to see the items. In the next steps, we will also think about this. The effectiveness of detecting in the dark should also be enhanced. The next step can additionally take into account the object's distance from the camera. The user can also identify hoardings or locations by reading the text boards or signage along the route. Better usability and convenience can be achieved by adding a module that pinpoints the user's precise location and guides them there while also recognising nearby objects.

References

1. Patil, Kanchan, Avinash Kharat, Pratik Chaudhary, Shrikant Bidgar, and Rushikesh Gavhane. "Guidance System for Visually Impaired People." In 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), pp. 988-993. IEEE, 2021.
2. Shi, Zihong. "Object detection models and research directions." In 2021 IEEE International Conference on Consumer Electronics and Computer Engineering (ICCECE), pp. 546-550. IEEE, 2021.
3. Rina Bora, Deepa Parasar, Shrikant Charhate , A detection of tomato plant diseases using deep learning MNDLNN classifier, , Signal, Image and Video Processing, April 2023.
4. Deepa Parasar, Vijay R. Rathod, Particle swarm optimization K-means clustering segmentation of foetus Ultrasound Image, Int. J. Signal and Imaging Systems Engineering, Vol. 10, Nos. 1/2, 2017.

5. Parvatikar, S., Parasar, D. (2021). Categorization of Plant Leaf Using CNN. (eds) Intelligent Computing and Networking. Lecture Notes in Networks and Systems, vol 146. Springer, Singapore.
6. Naufil Kazi, Deepa Parasar, Yogesh Jadhav, Predictive Risk Analysis by using Machine Learning during Covid-19, in Application of Artificial Intelligence in COVID-19 book by Springer Singapore. ISBN:978-981-15-7317-0.
7. Naufil Kazi, Deepa Parasar, Human Identification Using Thermal Sensing Inside Mines, 2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, India, 2021, pp. 608-615.
8. Yogesh Jadhav, Deepa Parasar, Fake Review Detection System through Analytics of Sales Data in Proceeding of First Doctoral Symposium on Natural Computing Research by Springer Singapore. Lecture Notes in Networks and Systems book series (LNNS, volume 169), ISBN 978-981-334-072-5.
9. Adhe, Shubham, Sachin Kunthewad, Preetam Shinde, and VS Kulkarni. "Ultrasonic Smart Stick for Visually Impaired People." Dimension 45, no. 20 (2015): 15mm.
10. Sangami, A., M. Kavithra, K. Rubina, and S. Sivaprakasam. "Obstacle Detection and Location Finding For Blind People."
11. Gilson, Sherin, Sagar Gohil, Faisal Khan, and Vishal Nagaonkar. "A Wireless Navigation System For the Visually Impaired." (2015).
12. Vidya, D.S Miss Delicia Perline Rebelo, Miss Cecilia Jane D'Silva" Obstacle detection using Ultrasonic Sensor"
13. Shbrook,Daniel,and Thad Starner" Using GPS to learn significant locations and predict movement across Multiple user"
14. Parasar, D., Jadhav, Y.H. (2021). An Automated System to Detect Phishing URL by Using Machine Learning Algorithm. In: Raj, J.S. (eds) International Conference on Mobile Computing and Sustainable Informatics. ICMCSI 2020. EAI/Springer Innovations in Communication and Computing. Springer, Cham.
15. M. Nie, J. Ren, Z. Li et al., "SoundView: an auditory guidance system based on environment understanding for the visually impaired people," in Proceedings of the 31st Annual International Conference of the IEEE Engineering in Medicine and Biology Society: Engineering the Future of Biomedicine (EMBC' 09), pp.7240–7243, IEEE, September 2009.
16. Shashank Chaurasia ,K.V.N. Kavitha ," An Electronic Walking Stick For Blinds" International Conference on Information Communication and Embedded Systems(ICICES 2014).
17. Parasar, D., Jadhav, Y.H. (2021). An Automated System to Detect Phishing URL by Using Machine Learning Algorithm. In: Raj, J.S. (eds) International Conference on Mobile Computing and Sustainable Informatics. ICMCSI 2020. EAI/Springer Innovations in Communication and Computing. Springer, Cham.
18. Deepa Parasar, Preet V. Smit B., Vivek K., Varun I., Aryaa S., Blockchain Based Smart Integrated Healthcare System, Frontiers of ICT in Healthcare, April 2023 Lecture Notes in Networks and Systems, vol 519. Springer, Singapore, EAIT 2022.
19. Deepa Parasar., Sahi, I., Jain, S., Thampuran, A. (2022). Music Recommendation System Based on Emotion Detection. Artificial Intelligence and Sustainable Computing. Algorithms for Intelligent

Systems. Springer, Singapore.
20. A. B. Naeem, B. Senapati, M. S. Islam Sudman, K. Bashir, and A. E. M. Ahmed, "Intelligent road management system for autonomous, non-autonomous, and VIP vehicles," World Electric Veh. J., vol. 14, no. 9, p. 238, 2023.
21. A. M. Soomro et al., "Constructor development: Predicting object communication errors," in 2023 IEEE International Conference on Emerging Trends in Engineering, Sciences and Technology (ICES&T), 2023.
22. A. M. Soomro et al., "In MANET: An improved hybrid routing approach for disaster management," in 2023 IEEE International Conference on Emerging Trends in Engineering, Sciences and Technology (ICES&T), 2023.
23. B. Senapati, J. R. Talburt, A. Bin Naeem, and V. J. R. Batthula, "Transfer learning based models for food detection using ResNet-50," in 2023 IEEE International Conference on Electro Information Technology (eIT), 2023.
24. B. Senapati and B. S. Rawal, "Quantum communication with RLP quantum resistant cryptography in industrial manufacturing," Cyber Security and Applications, vol. 1, no. 100019, p. 100019, 2023.
25. B. Senapati and B. S. Rawal, "Adopting a deep learning split-protocol based predictive maintenance management system for industrial manufacturing operations," in Lecture Notes in Computer Science, Singapore: Springer Nature Singapore, 2023, pp. 22–39.
26. Mishra, S., & Samal, S. K. (2023). An Efficient Model for Mitigating Power Transmission Congestion Using Novel Rescheduling Approach. Journal of Circuits, Systems and Computers, 2350237.
27. Samal, S. K., & Khadanga, R. K. (2023). A Novel Subspace Decomposition with Rotational Invariance Technique to Estimate Low-Frequency Oscillatory Modes of the Power Grid. Journal of Electrical and Computer Engineering, 2023.
28. M. Shah, K. Gandhi, B. M. Pandhi, P. Padhiyar, and S. Degadwala, "Computer Vision & Deep Learning based Realtime and Pre-Recorded Human Pose Estimation," in 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), 2023, pp. 313–319.
29. N. K. Pareek, D. Soni, and S. Degadwala, "Early Stage Chronic Kidney Disease Prediction using Convolution Neural Network," in 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), 2023, pp. 16–20.
30. P. Padhiyar, K. Parmar, N. Parmar, and S. Degadwala, "Visual Distance Fraudulent Detection in Exam Hall using YOLO Detector," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 1–7.
31. M. Manwal, A. M. Alvi, N. K. Turaga, A. Mittal, R. Rivera, and S. Degadwala, "Node based Label Propagation for Bitcoin Transaction Pattern Identification Over Similar Community," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 1147–1153.
32. D. Agrawal, H. Makwana, S. S. Dave, S. Degadwala, and V. Desai, "Error Level Analysis and Deep Learning For Detecting Image Forgeries," in 2023 7th International Conference on Computing Methodologies and Communication (ICCMC), 2023, pp. 114–117.
33. S. Pareek, A. Kumar, and S. Degadwala, "Machine Learning & Internet of Things in Plant Disease Detection: A comprehensive Review," in 2023 7th International Conference on Computing

Methodologies and Communication (ICCMC), 2023, pp. 1354–1359.
34. P. K. Purohit, A. Kumar, and S. Degadwala, "Design and Development of Protected Services in Cloud Computing Environment," in 2023 International Conference on Intelligent Data Communication Technologies and Internet of Things (IDCIoT), 2023, pp. 985–988.
35. H. Lakhani, D. Undaviya, H. Dave, S. Degadwala, and D. Vyas, "PET-MRI Sequence Fusion using Convolution Neural Network," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 317–321.
36. F. Ahamad, D. K. Lobiyal, S. Degadwala, and D. Vyas, "Inspecting and Finding Faults in Railway Tracks Using Wireless Sensor Networks," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 1241–1245.
37. D. Rathod, K. Patel, A. J. Goswami, S. Degadwala, and D. Vyas, "Exploring Drug Sentiment Analysis with Machine Learning Techniques," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 9–12.
38. C. H. Patel, D. Undaviya, H. Dave, S. Degadwala, and D. Vyas, "EfficientNetB0 for Brain Stroke Classification on Computed Tomography Scan," in 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), 2023, pp. 713–718.
39. V. Desai, S. Degadwala, and D. Vyas, "Multi-Categories Vehicle Detection For Urban Traffic Management," in 2023 Second International Conference on Electronics and Renewable Systems (ICEARS), 2023, pp. 1486–1490.
40. D. D. Pandya, S. K. Patel, A. H. Qureshi, A. J. Goswami, S. Degadwala, and D. Vyas, "Multi-Class Classification of Vector Borne Diseases using Convolution Neural Network," in 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), 2023, pp. 1–8.
41. D. D. Pandya, A. K. Patel, J. M. Purohit, M. N. Bhuptani, S. Degadwala, and D. Vyas, "Forecasting Number of Indian Startups using Supervised Learning Regression Models," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 948–952.
42. S. Degadwala, D. Vyas, D. D. Pandya, and H. Dave, "Multi-Class Pneumonia Classification Using Transfer Deep Learning Methods," in 2023 Third International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2023, pp. 559–563.
43. B. Bisoyi, D. Das, P. Srinivas Subbarao, and B. Das, "An evaluation on green manufacturing: It's technique, significance and rationality," IOP Conf. Ser. Mater. Sci. Eng., vol. 653, no. 1, p. 012032, 2019.
44. P. Srinivas Subbarao, "CSR and Socio-Economic Development–A case study of selected PSU's in the State of Odisha", Journal of Critical Reviews, Vol. 7 (13), 1407-1415, 2020.
45. S. S. Pasumarti and S. S. Pasumarti, "Work life balance: A challenge for employees in Indian IT and ITES industry," Rupkatha J. Interdiscip. Stud. Humanit., vol. 11, no. 2, pp. 1-12, 2019.
46. P. Srinivas Subbarao, "Influence of Demographic Factors on Recruitment and Selection of Employees in IT & ITES Industry", Journal of Advanced Research in Dynamical & Control Systems 11 (6), 52-61, 2019.
47. P. Srinivas Subbarao, "Accomplishment of Gandhian Globalization Is A Myth or Reality", International Research Journal of Commerce & Behavioral Science 4 (10), 2015.

48. P. Srinivas Subbarao, “Bank credit to infrastructure in India-Issues, Challenges and Strategies”, International Journal of Decision Making in Management 2 (1), 55-62, 2013.
49. P. Srinivas Subbarao and PS Rani, “Participative Management in Post Liberalization-A Case study of Indian Jute Industry”, European Journal of Business and Management 4 (8), 37-46, 2012.
50. PS Subbarao, PS Rani, “ Application of information Technology in Agriculture-An Indian Experience”, Global Journal of Business Management 5 (1), 2011.
51. V Batth, B Nayak, SS Pasumarti, “The study of financial performance of Indian public sector undertakings”, Global Journal of Finance and Management 10 (1), 21-43, 2018.
52. PSS CA Vijaya Batth, Bhagirathi Nayak, “Role of Independent Directors in changing business scenario in India”, International Journal of Scientific Research and Management 4 (2), 3878-3882, 2016.
53. Senbagavalli, M., & Arasu, G. T. (2016). Opinion Mining for Cardiovascular Disease using Decision Tree based Feature Selection. Asian Journal of Research in Social Sciences and Humanities, 6(8), 891-897.
54. Valli, M. S., & Arasu, G. T. (2016). An Efficient Feature Selection Technique of Unsupervised Learning Approach for Analyzing Web Opinions.
55. Senbagavalli, M., & Singh, S. K. (2022). Improving Patient Health in Smart Healthcare Monitoring Systems using IoT. In 2022 International Conference on Futuristic Technologies (INCOFT) (pp. 1-7). Belgaum, India.
56. S. Venkatasubramanian, D. A. Suhasini, and D. C.Vennila, “An Energy Efficient Clustering Algorithm in Mobile Adhoc Network Using Ticket Id Based Clustering Manager,” International Journal of Computer Science and Network Security, vol. 21, no. 7, pp. 341–349, Jul. 2021.
57. Venkatasubramanian, S., Suhasini, A. and Vennila, C., “An Efficient Route Optimization Using Ticket-ID Based Routing Management System (T-ID BRM)”. Wireless Personal Communications, pp.1-20, 2021.
58. S. Venkatasubramanian, A. Suhasini, C. Vennila, “Efficient Multipath Zone-Based Routing in MANET Using (TID-ZMGR) Ticked-ID Based Zone Manager”, International Journal of Computer Networks and Applications (IJCNA), 8(4), PP: 435- 443, 2021.
59. Veena, A., Gowrishankar, S. An automated pre-term prediction system using EHG signal with the aid of deep learning technique. Multimed Tools Appl (2023).
60. A. Veena and S. Gowrishankar, "Context based healthcare informatics system to detect gallstones using deep learning methods," International Journal of Advanced Technology and Engineering Exploration, vol. 9, (96), pp. 1661-1677, 2022.
61. Veena, A., Gowrishankar, S. (2021). Healthcare Analytics: Overcoming the Barriers to Health Information Using Machine Learning Algorithms. In: Chen, J.IZ., Tavares, J.M.R.S., Shakya, S., Iliyasu, A.M. (eds) Image Processing and Capsule Networks. ICIPCN 2020. Advances in Intelligent Systems and Computing, vol 1200. Springer, Cham.
62. A. Veena and S. Gowrishankar, "Processing of Healthcare Data to Investigate the Correlations and the Anomalies," 2020 Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC), Palladam, India, 2020, pp. 611-617,
63. A. Veena and S. Gowrishankar, "Applications, Opportunities, and Current Challenges in the

Healthcare Industry", 2022 Healthcare 4.0: Health Informatics and Precision Data Management, 2022, pp. 27–50.

64. K. Bhardwaj, S. Rangineni, L. Thamma Reddi, M. Suryadevara, and K. Sivagnanam, "Pipeline-Generated Continuous Integration and Deployment Method For Agile Software Development," European Chemical Bulletin, vol. 12, no. Special Issue 7, pp. 5590–5603, 2023.
65. S. Rangineni, D. Marupaka, and A. K. Bhardwaj, "An examination of machine learning in the process of data integration," International Journal of Computer Trends and Technology, vol. 71, no. 6, pp. 79–85, Jun. 2023.
66. T. K. Behera, D. Marupaka, L. Thamma Reddi, and P. Gouda, "Enhancing Customer Support Efficiency through Seamless Issue Management Integration: Issue Sync Integration System," European Chemical Bulletin, vol. 12, no. 10, pp. 1157–1178.
67. S. Rangineni and D. Marupaka, "Analysis Of Data Engineering For Fraud Detection Using Machine Learning And Artificial Intelligence Technologies," International Research Journal of Modernization in Engineering Technology and Science, vol. 5, no. 7, pp. 2137–2146, Jul. 2023.
68. L. Thamma Reddi, "Transforming Management Accounting: Analyzing The Impacts Of Integrated Sap Implementation," International Research Journal of Modernization in Engineering Technology and Science, vol. 5, no. 8, pp. 1786–1793, Aug. 2023.
69. M. Suryadevera, S. Rangineni, and S. Venkata, "Optimizing Efficiency and Performance: Investigating Data Pipelines for Artificial Intelligence Model Development and Practical Applications," International Journal of Science and Research, vol. 12, no. 7, pp. 1330–1340, Jul. 2023.
70. D. Marupaka, S. Rangineni, and A. K. Bhardwaj, "Data Pipeline Engineering in The Insurance Industry: A Critical Analysis Of Etl Frameworks, Integration Strategies, And Scalability," International Journal Of Creative Research Thoughts, vol. 11, no. 6, pp. c530–c539, Jun. 2023.
71. S. Rangineni, A. K. Bhardwaj, and D. Marupaka, "An Overview and Critical Analysis of Recent Advances in Challenges Faced in Building Data Engineering Pipelines for Streaming Media," The Review of Contemporary Scientific and Academic Studies, vol. 3, no. 6, Jun. 2023.
72. Venkatasubramanian, S.. "Optimized Gaming based Multipath Routing Protocol with QoS Support for High-Speed MANET", International Journal of Advanced Research in Science, Communication and Technology. vol. 9, No. 1, ,pp.62-73, September , 2021.
73. Venkatasubramanian.S., "A Chaotic Salp Swarm Feature Selection Algorithm for Apple and Tomato Plant Leaf Disease Detection", International Journal of Advanced Trends in Computer Science and Engineering, 10(5), pp.3037–3045,2021.
74. A. Bodepudi, M. Reddy, S. S. Gutlapalli, and M. Mandapuram, "Voice recognition systems in the Cloud Networks," Asian Journal of Applied Science and Engineering, vol. 8, no. 1, pp. 51–60, 2019.
75. A. Bodepudi, M. Reddy, S. S. Gutlapalli, and M. Mandapuram, "Algorithm policy for the authentication of indirect fingerprints used in cloud computing," American Journal of Trade and Policy, vol. 8, no. 3, pp. 231–238, 2021.
76. S. S. Gutlapalli, M. Mandapuram, M. Reddy, and A. Bodepudi, "Evaluation of Hospital Information Systems (his) in terms of their suitability for tasks," Malaysian Journal of Medical and Biological Research, vol. 6, no. 2, pp. 143–150, 2019.

77. M. Mandapuram, “Applications of Blockchain and Distributed Ledger Technology (DLT) in Commercial Settings”, Asian Accounting and Auditing Advancement (4A Journal), vol. 7, no. 1, pp. 50–57, Dec. 2016.
78. M. Mandapuram, “Application of artificial intelligence in contemporary business: An analysis for content management system optimization,” Asian Business Review, vol. 7, no. 3, pp. 117–122, 2017a.
79. M. Mandapuram, “Security risk analysis of the internet of things,” ABC Research Alert, vol. 5, no. 3, pp. 49–55, 2017b.
80. M. Mandapuram, S. R. Thodupunori, A. Bodepudi, and M. Reddy, “Investigating the prospects of Generative Artificial Intelligence,” Asian Journal of Humanity, Art and Literature, vol. 5, no. 2, pp. 167–174, 2018.
81. M. Mandapuram, S. S. Gutlapalli, M. Reddy, and A. Bodepudi, “Application of artificial intelligence (AI) technologies to accelerate market segmentation,” Global Disclosure of Economics and Business, vol. 9, no. 2, pp. 141–150, 2020.
82. M. Mandapuram and Md. F. Hosen, “The object-oriented database management system versus the Relational Database Management System: A comparison,” Global Disclosure of Economics and Business, vol. 7, no. 2, pp. 89–96, 2018.
83. M. Reddy, A. Bodepudi, M. Mandapuram, and S. S. Gutlapalli, “Face detection and recognition techniques through the Cloud Network: An Exploratory Study,” ABC Journal of Advanced Research, vol. 9, no. 2, pp. 103–114, 2020.
84. G. P. Shukla, P. Chaudhary, P. Ghosh, M. Mandapuram, S. S. Gutlapalli, M Lourens, “Human resource management: a conceptual framework for comprehending the Internet of Things (IoT) and Machine Learning,” Official Journal of the Patent Office (IN), no. 26/2023 (30/06/2023), 2023. Patent number 202321036845 A.
85. B. Nemade and D. Shah, “An IoT based efficient Air pollution prediction system using DLMNN classifier,” Phys. Chem. Earth (2002), vol. 128, no. 103242, p. 103242, 2022.
86. B. Nemade and D. Shah, “An efficient IoT based prediction system for classification of water using novel adaptive incremental learning framework,” J. King Saud Univ. - Comput. Inf. Sci., vol. 34, no. 8, pp. 5121–5131, 2022.
87. B. Nemade, “Automatic traffic surveillance using video tracking,” Procedia Comput. Sci., vol. 79, pp. 402–409, 2016.
88. A. R. Kunduru, "Security Concerns and Solutions for Enterprise Cloud Computing Applications," Asian Journal of Research in Computer Science, vol. 15, no. 4, pp. 24-33, 2023.
89. A. R. Kunduru, "Industry Best Practices on Implementing Oracle Cloud ERP Security," International Journal of Computer Trends and Technology, vol. 71, no. 6, pp. 1-8, 2023.
90. A. R. Kunduru, "Cloud Appian BPM (Business Process Management) Usage In health care Industry," IJARCCE International Journal of Advanced Research in Computer and Communication Engineering, vol. 12, no. 6, pp. 339-343, 2023.
91. A. R. Kunduru, "Effective Usage of Artificial Intelligence in Enterprise Resource Planning Applications," International Journal of Computer Trends and Technology, vol. 71, no. 4, pp. 73-80, 2023.

92. A. R. Kunduru, "Recommendations to Advance the Cloud Data Analytics and Chatbots by Using Machine Learning Technology," International Journal of Engineering and Scientific Research, vol. 11, no. 3, pp. 8-20, 2023.
93. A. R. Kunduru and R. Kandepu, "Data Archival Methodology in Enterprise Resource Planning Applications (Oracle ERP, Peoplesoft)," Journal of Advances in Mathematics and Computer Science, vol. 38, no. 9, pp. 115-127, 2023.
94. A. R. Kunduru, "Artificial Intelligence Usage in Cloud Application Performance Improvement," Central Asian Journal of Mathematical Theory and Computer Sciences, vol. 4, no. 8, pp. 42-47, 2023.
95. A. R. Kunduru, "Artificial Intelligence Advantages in Cloud Fintech Application Security," Central Asian Journal of Mathematical Theory and Computer Sciences, vol. 4, no. 8, pp. 48-53, 2023.
96. A. R. Kunduru, "Cloud BPM Application (Appian) Robotic Process Automation Capabilities," Asian Journal of Research in Computer Science, vol. 16, no. 3, pp. 267-280, Aug. 2023.
97. A. R. Kunduru, "Machine Learning in Drug Discovery: A Comprehensive Analysis of Applications, Challenges, and Future Directions", IJOT, vol. 5, no. 8, pp. 29-37, Aug. 2023.
98. L. Mohanty, S. K. Panigrahi, and M. Patnaik, "Assessment of water quality of Mahanadi basin using statistical and wavelet techniques," Materials Today: Proceedings, vol. 62, pp. 6371–6378, 2022.
99. J. Pradhan, S. Panda, R. K. Mandal, and S. K. Panigrahi, "Influence of GGBFS-based blended precursor on fresh properties of self-compacting geopolymer concrete under ambient temperature," Materials Today: Proceedings, p. S221478532303732X, Jul. 2023.
100. R. Das, S. Panda, A. S. Sahoo, and S. K. Panigrahi, "Effect of superplasticizer types and dosage on the flow characteristics of GGBFS based self-compacting geopolymer concrete," Materials Today: Proceedings, p. S2214785323037331, Jul. 2023.
101. S. K. Parhi and S. K. Panigrahi, "Alkali–silica reaction expansion prediction in concrete using hybrid metaheuristic optimized machine learning algorithms," Asian Journal of Civil Engineering, pp. 1–23, 2023.
102. S. K. Parhi, S. Dwibedy, S. Panda, and S. K. Panigrahi, "A comprehensive study on Controlled Low Strength Material," Journal of Building Engineering, p. 107086, 2023.
103. S. K. Panigrahi and A. K. Sahoo, "Possible use of T-section columns in RC frame," Indian concrete journal, vol. 77, no. 12, pp. 1518–1522, 2003.
104. S. K. Panigrahi, A. Deb, and S. K. Bhattacharyya, "Effect of laminate stiffness on failure mode in FRP wrapped T beams," IJRET, vol. 4, no. 13, pp. 510–520, 2015.
105. K. Gaurav, A. S. Ray, and A. Pradhan, "Investment Behavior of Corporate Professionals Towards Mutual Funds in India," International Journal of Accounting & Finance Review, vol. 14, no. 1, pp. 30–39, 2023.
106. M. Rajanikanth and K. Gaurav, "Influence of Reference Group on Tractor Purchasing Decision of Farmers In Telangana," Academy of Marketing Studies Journal, vol. 27, no. 5, pp. 1–12, 2023.
107. K. Gaurav, A. S. Ray, and N. K. Sahu, "Factors Determining the Role of Brand in Purchase Decision of Sportswear," PalArch's Journal of Archaeology of Egypt / Egyptology, vol. 17, no. 7, pp. 2168–2186, 2020.
108. K. Gaurav and V. Raju, "Factors influencing Highway Retailer Satisfaction in FMCG industry,"

Mukt Shabd Journal, vol. 9, no. 4, pp. 1297–1316, 2020.
109. K. Gaurav and A. Suraj Ray, “Impact of Social Media Advertising on Consumer Buying Behavior in Indian E-commerce Industry,” Sumedha Journal of Management, vol. 9, no. 1, pp. 41–51, Jun. 2020.
110. K. Gaurav, “Factors Influencing Destination Choice of Indian Tourists Visiting Abroad–An Analytical Study,” Pramana Research Journal, vol. 9, no. 6, pp. 203–217, 2019.
111. Mishra, S., & Kumar Samal, S. (2023). Mitigation of transmission line jamming by price intrusion technique in competitive electricity market. International Journal of Ambient Energy, 44(1), 171-176.
112. B. Subudhi, S. K. Sarnal and S. Ghosh, "A new low-frequency oscillatory modes estimation using TLS-ESPRIT and least mean squares sign-data (LMSSD) adaptive filtering," TENCON 2017 - 2017 IEEE Region 10 Conference, Penang, Malaysia, 2017, pp. 751-756.
113. P. K. Sahu, S. Maity, R. K. Mahakhuda and S. K. Samal, "A fixed switching frequency sliding mode control for single-phase voltage source inverter," 2014 International Conference on Circuits, Power and Computing Technologies [ICCPCT-2014], Nagercoil, India, 2014, pp. 1006-1010.
114. Mishra, S., & Samal, S. K. (2023). Impact of electrical power congestion and diverse transmission congestion issues in the electricity sector. Energy Systems, 1-13.
115. Sahoo, A. K., & Samal, S. K. (2023). Online fault detection and classification of 3-phase long transmission line using machine learning model. Multiscale and Multidisciplinary Modeling, Experiments and Design, 6(1), 135-146.
116. A. Patel, S. Samal, S. Ghosh and B. Subudhi, "A study on wide-area controller design for inter-area oscillation damping," 2016 2nd International Conference on Control, Instrumentation, Energy & Communication (CIEC), Kolkata, India, 2016, pp. 245-249.
117. K. Gaurav and P. Kumari, “Celebrity Endorsement & Consumer Buying Intention–A Dyadic Exploration in Indian Context,” International journal of basic and applied research, vol. 9, no. 7, pp. 184–203, 2019.
118. K. Gaurav and A. Harika, “Factors influencing Learner’s Preference Towards E-learning Websites: A Quantitative Exploration,” SuGyaan, vol. 9, no. 1, pp. 47–56, 2019.
119. A, V. V. ., T, S. ., S, S. N. ., & Rajest, D. S. S. . (2022). IoT-Based Automated Oxygen Pumping System for Acute Asthma Patients. European Journal of Life Safety and Stability (2660-9630), 19 (7), 8-34.
120. Regin, D. R., Rajest, D. S. S., T, S., G, J. A. C., & R, S. (2022). An Automated Conversation System Using Natural Language Processing (NLP) Chatbot in Python. Central Asian Journal Of Medical And Natural Sciences, 3(4), 314-336.
121. Rajest, S. S. ., Regin, R. ., T, S. ., G, J. A. C. ., & R, S. . (2022). Production of Blockchains as Well as their Implementation. Vital Annex : International Journal of Novel Research in Advanced Sciences, 1(2), 21–44.
122. T, S., Rajest, S. S., Regin, R., Christabel G, J. A., & R, S. (2022). Automation And Control Of Industrial Operations Using Android Mobile Devices Based On The Internet Of Things. Central Asian Journal of Mathematical Theory and Computer Sciences, 3(9), 1-33.
123. Jerusha Angelene Christabel G, Shynu T, S. Suman Rajest, R. Regin, & Steffi. R. (2022). The use

of Internet of Things (Iot) Technology in the Context of "Smart Gardens" is Becoming Increasingly Popular. International Journal of Biological Engineering and Agriculture, 1(2), 1–13.

124. R. Steffi, G. Jerusha Angelene Christabel, T. Shynu, S. Suman Rajest, R. Regin (2022), " A Method for the Administration of the Work Performed by Employees", Journal of Advanced Research in Dynamical and Control Systems, Vol.14, no.1, pp. 7-23.
125. R. Regin, Steffi. R, Jerusha Angelene Christabel G, Shynu T, S. Suman Rajest (2022), "Internet of Things (IoT) System Using Interrelated Computing Devices in Billing System", Journal of Advanced Research in Dynamical and Control Systems, Vol.14, no.1, pp. 24-40.
126. S. S. Rajest, R. Regin, S. T, J. A. C. G, and S. R, "Improving Infrastructure and Transportation Systems Using Internet of Things Based Smart City", CAJOTAS, vol. 3, no. 9, pp. 125-141, Sep. 2022.
127. Regin, R., Rajest , S. S., T , S., G, J. A. C., & R , S. (2022). An Organization's Strategy that is Backed by the Values and Visions of its Employees' Families. Central Asian Journal of Innovations on Tourism Management and Finance, 3(9), 81-96.
128. K. Gaurav and S. Dheer, "Social media usage at workplace-An empirical investigation," SUMEDHA Journal of Management, vol. 7, no. 1, pp. 144–158, 2018.
129. K. Gaurav and V. Jhansi, "Consumers' Perception towards Online Shopping: An Exploratory Study," Inspira-Journal of Modern Management & Entrepreneurship, vol. 8, no. 4, pp. 252–260, 2018.
130. K. Gaurav and K. C. Sahu, "Demographical Influence on Consumer Buying: An Empirical Investigation," Inspira-Journal of Modern Management & Entrepreneurship, vol. 7, no. 4, pp. 160–164, 2017.
131. K. Gaurav, "AUTOSERV: Development of a Scale for Measuring Automobile Service Quality," UDAAN: The International Journal of Management Research, vol. 3, no. 2, pp. 3–20, 2015.
132. K. Gaurav, "Trust in Electronic Marketing," Indian Journal of Marketing, vol. 40, no. 1, pp. 49–52, 2010.
133. K. Gaurav, "International Advertising Strategy: Standardization or Adaptation?," Indian Journal of Marketing, vol. 38, no. 7, pp. 8–13, 2008.
134. Chakrabarti P., Satpathy B., Bane S., Chakrabarti T., Chaudhuri N.S. , Siano P., "Business forecasting in the light of statistical approaches and machine learning classifiers", Communications in Computer and Information Science , 1045, pp.13-21, 2019.
135. Shah K., Laxkar P. , Chakrabarti P., "A hypothesis on ideal Artificial Intelligence and associated wrong implications", Advances in Intelligent Systems and Computing, 989, pp.283-294, 2020.
136. Kothi N., Laxkar P. Jain A. , Chakrabarti P., "Ledger based sorting algorithm", Advances in Intelligent Systems and Computing, 989, pp. 37-46, 2020.
137. Chakrabarti P. ,Chakrabarti T., Sharma M . , Atre D, Pai K.B., "Quantification of Thought Analysis of Alcohol-addicted persons and memory loss of patients suffering from stage-4 liver cancer", Advances in Intelligent Systems and Computing, 1053, pp.1099-1105, 2020.
138. Chakrabarti P., Bane S.,Satpathy B.,Goh M, Datta B N , Chakrabarti T., "Compound Poisson Process and its Applications in Business", Lecture Notes in Electrical Engineering, 601, pp.678-685,2020.

139. Chakrabarti P., Chakrabarti T., Satpathy B., SenGupta I . Ware J A., “Analysis of strategic market management in the light of stochastic processes, recurrence relation, Abelian group and expectation”, Advances in Artificial Intelligence and Data Engineering, 1133 , pp.701-710, 2020.
140. Priyadarshi N., Bhoi A.K., Sharma A.K., Mallick P.K. , Chakrabarti P., “An efficient fuzzy logic control-based soft computing technique for grid-tied photovoltaic system”, Advances in Intelligent Systems and Computing, 1040,pp.131-140,2020.
141. Batool, Kiran; Zhao, Zhen-Yu; Irfan, Muhammad; Żywiołek, Justyna (2023): Assessing the role of sustainable strategies in alleviating energy poverty: an environmental sustainability paradigm. w: Environ Sci Pollut Res, s. 1–22.
142. Khan, Muhammad Asghar; Kumar, Neeraj; Mohsan, Syed Agha Hassnain; Khan, Wali Ullah; Nasralla, Moustafa M.; Alsharif, Mohammed H. i wsp. (2023): Swarm of UAVs for Network Management in 6G: A Technical Review. w: IEEE Trans. Netw. Serv. Manage. 20 (1), s. 741–761.
143. Mohsan, Syed Agha Hassnain; Othman, Nawaf Qasem Hamood; Khan, Muhammad Asghar; Amjad, Hussain; Żywiołek, Justyna (2022): A Comprehensive Review of Micro UAV Charging Techniques. w: Micromachines 13 (6).
144. Tucmeanu, Elena Roxana; Tucmeanu, Alin Iulian; Iliescu, Madalina Gabriela; Żywiołek, Justyna; Yousaf, Zahid (2022): Successful Management of IT Projects in Healthcare Institutions after COVID-19: Role of Digital Orientation and Innovation Adaption. w: Healthcare (Basel, Switzerland) 10 (10).
145. Żywiołek, Justyna; Tucmeanu, Elena Roxana; Tucmeanu, Alin Iulian; Isac, Nicoleta; Yousaf, Zahid (2022): Nexus of Transformational Leadership, Employee Adaptiveness, Knowledge Sharing, and Employee Creativity. w: Sustainability 14 (18), s. 11607.
146. Priyadarshi N., Bhoi A.K., Sahana S.K., Mallick P.K. , Chakrabarti P., Performance enhancement using novel soft computing AFLC approach for PV power system”, Advances in Intelligent Systems and Computing, 1040, pp.439-448,2020.
147. Magare A., Lamin M., Chakrabarti P., “Inherent Mapping Analysis of Agile Development Methodology through Design Thinking”, Lecture Notes on Data Engineering and Communications Engineering, 52, pp.527-534,2020.
148. Ali Y., Shreemali J., Chakrabarti T., Chakrabarti P. , Poddar S., “Prediction of Reaction Parameters on Reaction Kinetics for Treatment of Industrial Wastewater: A Machine Learning Perspective”, Materials Today :Proceedings,2020.
149. Chakrabarti P., Satpathy B., Bane S., Chakrabarti T., Poddar S., “Business gain forecasting in Materials Industry - A linear dependency, exponential growth, moving average, neuro-associator and compound Poisson process perspective”, Materials Today: Proceedings, 2020.