IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

Automatic Fruit Sorting Machine Based on Weight

Diksha Waghmare, Alisha Mulani, Prof. S. R. Takale
UG Students, Department of Electronics and Telecommunication Engineering
Assistant Professor, Department of Electronics and Telecommunication Engineering
SKN Sinhgad College of Engineering, Pandharpur
dawaghmre2004@gmail.com, alishamulani222@gmail.com, swapnil.takale@sknscoe.ac.in

Abstract: *Size is a crucial determinant of quality in the visual inspection-based sorting of fruits. While image processing technology is frequently utilized in large-scale fruit and vegetable operations for sorting, smaller vendors cannot afford these systems since they require complex and costly gear for image capture and processing. This study presents an affordable fruit sorting system that is suited for smaller-scale businesses. As fruits travel over conveyor belts to packaging facilities, it uses an automated material handling system to sort them by weight. By removing the monotonous tasks that humans often perform, the system improves accuracy and efficiency.*

A key factor in the design of sorting systems in food processing is weight. For fruit sorting by weight, a layout with load cells is thought to be the most efficient method. Accurate, reliable, and quantitative classification is made possible by this technique. The automated approach lowers the possibility of human error while simultaneously expediting the sorting process. Because it has a direct impact on the end product's quality and customer satisfaction, fruit sorting and grading is an essential step in agriculture and food processing.

Fruit grading is a manual process that has historically been labor-intensive, uneven, and time-consuming. Manual techniques lower overall accuracy and efficiency and raise labor expenses, particularly when dealing with big volumes. Automation provides a dependable and effective way to address these issues.

The creation and deployment of an automated fruit sorting system based on weight is described in this project. Its main component is a load cell, also known as a weight sensor, which precisely measures the fruit's weight. The fruit is categorized into predetermined weight groups by a microcontroller (such an Arduino) that processes the acquired data. After being sorted, the fruit is guided by mechanical elements such as conveyor arms or diverter gates into certain bins or trays.

This method produces outcomes quickly, reliably, and reproducibly while drastically reducing human effort and related errors. It supports the upholding of constant quality standards, which is advantageous to fruit vendors, farmers, and companies that produce food. The system may be used by businesses of all sizes because it is inexpensive, user-friendly, and scalable. In order to increase productivity, improve quality control, and improve post-harvest management, this project advances smart farming and agricultural automation by automating the fruit sorting process.

Keywords: Fruit classification, weight-based sorting, agricultural automation, microcontroller applications, post-harvest handling, embedded technology, quality assurance, productivity improvement, automatic fruit grading

I. INTRODUCTION

Fruit sorting is the process of classifying or grouping fruits according to factors such as size, shape, color, and volume. This organization is essential to maintaining a methodical and effective distribution process, particularly when market standards and customer expectations rise. This effort's main goal is to meet the expanding demands of the fruit processing sector.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

In order to increase their market value, fruits are usually categorized into different classifications. Separating individual fruits from a batch and classifying them according to predetermined standards is known as sorting. Since consumers are becoming more conscious of product standards, it is imperative that this sorting be done when the fruit is still fresh in order to preserve quality. To achieve quality standards, fruits must be carefully sorted when they arrive at processing facilities.

In terms of detecting variations in shape, size, color, and general quality, modern systems now perform exceptionally well. To increase their marketability, fruits must be properly categorized as immature, ripe, and overripe. Fruits of different sizes, from delicate to tough-skinned, can be handled by our sorting machines, which are designed to handle a broad range of fruits. Each fruit kind is accommodated by specially made rollers and cups in these machines, which guarantee efficient and seamless movement along the sorting line.

Furthermore, a large fruit image collection gathered worldwide was used to construct our machine vision program, which allows it to accurately classify and evaluate quality. Since serious flaws and undesired elements are eliminated in the field before the fruits arrive at the processing facilities, effective sorting systems like these not only increase product consistency but also improve food safety

Sorting is essential to the food and agricultural industries' ability to maintain product standards and efficient packing. The manual method of doing this task has historically been tedious, time-consuming, and prone to human error and inconsistency.

The Automatic Fruit Sorting Machine Based on Weight was created to swiftly and precisely sort fruits according to their weight in order to overcome these difficulties. Individual fruits are measured by this technique using load cells or weight sensors, which then classify them into predetermined weight ranges. Increased production rates and packaging homogeneity are the results of this automation.

Fruit grading, which is usually based on characteristics like size, color, shape, and weight, is essential in today's agricultural and processing industries to improve quality, market attractiveness, and consumer satisfaction. Weight is one of the most accurate and most quantifiable of these factors, frequently indicating the nutritional worth and maturity of a fruit.

Manual labor has historically been used for fruit sorting, which offers drawbacks such high prices, weariness, slower operation, and a higher chance of mistakes. There is an increasing need for automated systems that can sort fruits fast, precisely, and with little assistance from humans as agricultural practices change.

The weight-based fruit sorting system provides an intelligent, economical, and effective way to meet this need. The weight of each fruit is measured by weight sensors (also known as load cells) that are mounted on a conveyor or platform. To sort the fruit into small, medium, and large categories, the data is transmitted to a microcontroller (such as an Arduino or PIC), which processes the input and turns on sorting mechanisms like diverters, gates, or flaps.

In addition to increasing productivity and ensuring consistency in grading, this automated approach significantly lessens the need for human labor. It is versatile enough to be used in both large industrial applications and small-scale farming. Additionally, this equipment provides improved quality management, pricing tactics, and packaging efficiency. In conclusion, one important advancement in smart farming is the creation of the Automatic Fruit Sorting Machine Based on Weight. Through the integration of mechanical, automation, and electronic systems, this solution enables farmers, distributors, and industry players to more effectively and consistently deliver premium fruit to the market.

II. LITERATURE SURVEY

Chakraborty (2023)et al. [1]contribute to a comprehensive study that combines technical design (washing, singulation), artificial intelligence (lightweight CNN for sorting), weight grading, and human ergonomic evaluation to create an automated citrus processing system that is suitable for farms. By quantifying the advantages to human health and comfort, concentrating on farm usability, and combining several postharvest procedures into a single system, it improves upon earlier research. For citrus and perhaps other fruits, this work represents a major step toward more accessible postharvest automation, even though there are still issues with scaling, generalizing, managing more comprehensive defect classes, prices, and privacy.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

Chen (2023)etal.[2] shows how to manage a fruit sorting robot's clamping mechanism using eyesight. Fruit is detected and located by the system utilizing machine vision, which then dynamically modifies the clamp's position and perhaps its force to guarantee precise and damage-free grasping. This approach addresses common issues in traditional sorting systems, such as fixed clamping parameters and high fruit damage rates. While the method likely improves adaptability and precision, its performance under varying lighting, fruit types, and real-world conditions may require further validation.

Chougule (2023) et al. [3] contributions by integrating edge and weight characteristics for coin sorting and managing the classification/sorting with a fuzzy controller or fuzzy power converter, allegedly to increase accuracy beyond what can be accomplished with single feature sorting or thresholding alone. Indian coins, which can vary even within a denomination (because to wear, filth, and production tolerances), appear to be their goal, which presents a difficult real-world situation. They point out that previous approaches (based on offline recognition, weight, or picture alone) had trouble achieving high accuracy at high throughput (e.g., 95% accuracy at 1000 coins/minute).

Ahmed (2024) et al.[4]This examines these essential elements as they relate especially to walnuts. It most likely compares the state of end-to-end systems for sorting and grading walnuts, as well as various ML architectures and imaging modalities. The contribution is a summary of previous efforts, what has been successful for walnuts, and what is still lacking.

Allaudin (2023) et al.[5] created a catfish sorting and counting machine that automatically divides fish into three weight groups: small (20–80 grams), medium (80–140 grams), and giant (>140 grams). Servo motors are used for sorting, while load cell sensors are used for precise weight measurement. Fish moving through the system are counted with the help of infrared sensors. The system's average load cell reading accuracy and precision were 99.56% and 98.75%, respectively. Over 15 tests, the overall classification accuracy was 93%, and each test took an average of 3.67 seconds to process.

Wen (2022) et al.[6] proposed a visual feedback control-based autonomous fruit harvesting technology that overcomes these obstacles. The technology makes use of a single motor-powered robotic arm that has a gripper and scissors. A two-dimensional visual sensing method (TVSM) offers depth information for accurate placement, and a YOLOv3-tiny-based deep learning model is used to recognize fruit. Impedance control ensures minimal damage during harvesting by adjusting the gripping force according to the size and firmness of the fruit. According to experimental results, the system could harvest apples with a contact force of 3.6 N and a shear force of 9.9 N, which is much less than the 94 N that calculations using MATLAB and ADAMS projected. This method presents a viable way to automate fruit harvesting while lowering labor costs and enhancing fruit quality.

Zidane (2022) et al. [7] investigated the use of radar measurements that simply assess amplitude for fruit sorting applications. Their research showed that it is possible to use radar signals to categorize apples according to their dielectric characteristics, which are correlated with internal structure and freshness. By analyzing the amplitude of the reflected radar waves, the system can differentiate between various fruit qualities, enabling efficient sorting processes. This strategy fits with the increasing interest in using radar technology to improve sorting throughput and accuracy in agricultural procedures.

Kang (2021) et al. [8] overcome the difficulties in automating the harvesting of camellia fruit by putting forward a multi-link picking machine that is lighter and more kinematically optimized. Utilizing the Kriging surrogate model, the study establishes connections between optimization goals, such as minimizing maximum acceleration and total weight, and design factors, such as crank speed, link size, and rod lengths. By employing the non-dominated sorting genetic algorithm II (NSGA-II), the authors were able to reduce the machine's weight by 27.5% and its maximum acceleration by 31.3%, which improved the machine's efficiency and mobility in camellia orchards.

Andi (2021) et al.[9] developed a fruit sorting machine that automatically sorts fruits according to their ripeness using color sensors. An Arduino microcontroller (ATmega328) processes the sensor data and regulates the sorting mechanism, while a TCS3200 color sensor determines each fruit's color. This method seeks to increase fruit processing facilities' productivity by cutting down on the time and effort required for manual sorting. The machine's design prioritizes affordability and ease of use, making it suitable for small-scale farming.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

Lestari (2022) et al.[10] propose a sweet potato-specific automatic sorting equipment that sorts and classifies the tubers using two sensing modes: weight measurement and moisture content estimation. By eliminating the inconsistencies and inefficiencies that come with manual sorting, where weight and moisture are crucial quality indicators, the goal is to enhance the post-harvest processing of sweet potatoes. Their system includes a moisture sensor to detect the internal moisture content and a weight sensor to calculate the mass of each sweet potato. These sensors are sent into a control logic that determines which class (grade) a sweet potato should be sorted into. The throughput, or speed, at which sorting may be done, the accuracy of classification (the frequency with which the system assigns the proper grade based on weight + moisture), and the dependability of the sensors in field or lab settings are important performance factors.

Table 1: Shows Comparative Review Of Fruit Sorting Machine Based On Weight.

Author(s)	Year	Target Item	Technology Used	Sensors/ Methods	Sorting Criteria	Accuracy / Performance	Notable Feature
Chakraborty et al.	2023	Citrus fruits	AI + Mechanical Automation	CNN (SortNet), CFD, camera, load cell	Visual (defects), Weight	97.6% classification accuracy	Ergonomic design, automated washing & grading
Chen et al.	2023	Generic fruits	Machine Vision + Robotics	Camera, clamping control system	Size & position	Not explicitly stated	Real-time visual control of gripper mechanism
Chougule et al.	2023	Coins	Fuzzy Logic + Power Electronics	Load cell, Fuzzy Controller	Weight, Edge	95% sorting accuracy	Integrates fuzzy logic to improve coin classification
Ahmed et al.	2024	Walnuts	Machine Learning	Review of ML methods	Size, Weight, Surface	Review (not experimental)	System architecture overview; identifies research gaps
Allaudin & Nasuha	2023	Catfish	Automation + Load Cell	Load cell, Servo motors	Weight	99.56% accuracy, 93% success rate	Real-time counting and classification
Wen & Yeh	2022	Apples (and others)	Visual Feedback + Robotics	YOLOv3, camera, force sensors	Ripeness (color, size)	High precision (3.6 N grip, 9.9 N cut force)	Visual-feedback control + deep learning
Zidane et al.	2022	Fruits (general)	Radar Signal Processing	Amplitude-only radar	Size, Material Properties	Experimental validation	Uses only amplitude (no phase) – low-cost radar sorting
Kang et al.	2021	Camellia fruits	Mechanical + Optimization	Kriging Model, NSGA-II	Kinematics & Weight	31.3% less acceleration, 27.5% lighter	Surrogate model-based optimization
Andi et al.	2021	Ripening fruits	Color Sensors + Microcontroller	TCS3200, Arduino	Color (ripeness level)	Low-cost, functional prototype	Compact & budget-friendly ripeness detector
Lestari et al.	2022	Sweet Potatoes	Sensor-based Automation	Weight sensor, Moisture sensor	Weight, Moisture	Not specified	Dual-parameter grading (internal & external)

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

III. PROPOSED MODELLING

Figure 1: Shows That Block Diagram Of Automatic Fruit Sorting Machine Based On Weight

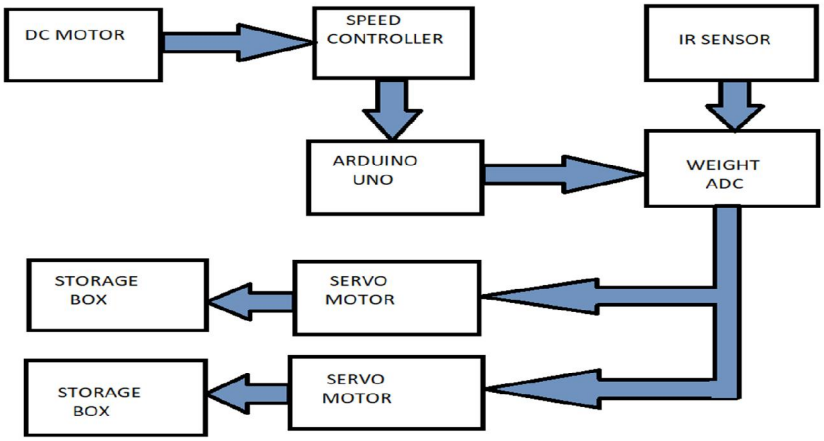

Figure 1 Block Diagram Of Automatic Fruit Sorting Machine Based On Weight

DC Motor:-

A DC motor is a type of electric motor that converts electrical energy into mechanical motion by use of direct current. It operates on the premise that a current-carrying conductor experiences force when it is in a magnetic field. These motors are widely used in automation and robotics because to their ability to deliver variable torque and speed. A DC motor works on the basic principle that mechanical force is produced by a current-carrying wire in a magnetic field. The armature winding, which is situated inside the magnetic field created by field magnets or electromagnetic field windings, is where electric current flows when a direct current (DC) voltage is applied across the motor terminals.

The interaction of the electric current and the magnetic field applies force to the armature conductors, which rotates the armature in accordance with Fleming's Left-Hand Rule. The current is maintained through the windings by the commentator, a copper split ring, and carbon brushes, which produces unidirectional torque and smooth spinning.

Rotation can be reversed by changing the input supply's polarity, and it will continue as long as current is applied. While torque depends on current, the motor's speed can be controlled by adjusting the supply voltage or by using resistors and controls. Due to their straightforward design, ease of speed control, and reliable operation, DC motors are frequently found in robots, fans, electric vehicles, industrial equipment, and battery-operated toys.

Speed Controller:-

A DC motor's speed is controlled by an electrical device known as a speed controller, which adjusts the voltage or current supplied to the motor. The motor's rotational speed can be precisely controlled for applications that need changeable motion.

A speed controller is an electronic device that regulates the speed of an electric motor, usually a brushless DC (BLDC), DC, or servo motor. Pulse Width Modulation (PWM) is a technique that is frequently used to modify the amount of power supplied to the motor. Using this technology, the controller delivers the motor a series of brief on-off pulses. By altering the width of these pulses (the "on" time), the average voltage to the motor is changed, which causes the speed to change. A high PWM duty cycle gives the motor more voltage and causes it to spin faster; a low PWM duty cycle causes the speed to decrease.

To maintain precise speed and make real-time power adjustments, the speed controller in motors with feedback systems, such servo motors, also gets information from sensors or encoders. Usually, the controller is linked to a microcontroller that provides the required speed input, like an Arduino. Smooth acceleration, deceleration, and accurate speed control are made possible by this setup. When motor performance and efficiency are crucial, speed controllers are frequently used in fans, electric vehicles, robotics, drones, and industrial automation applications.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

Arduino Uno:-

A microcontroller development board called the Arduino Uno is built on top of the ATmega328P microcontroller. This open-source electronics platform is a member of the Arduino family, which was developed to make using electronics in multidisciplinary projects easier. "Uno" (which translates to "one" in Italian) is the original Arduino board in a series of USB-based Arduino boards and the reference model for the Arduino platform.

A 16 MHz quartz crystal, six analog inputs, fourteen digital input/output pins (six of which can be used as PWM outputs), a reset button, a USB connector, a power jack, and an ICSP header are all features of the Arduino Uno. The USB cord or an external power source, such as a battery or AC-to-DC adapter, can power it.

The Arduino IDE (Integrated Development Environment) is used for programming, and it uses a simplified form of C/C++. This simplifies things for novices, especially for professionals engaged in fast prototyping, students, and enthusiasts. A vast library and community assistance are also included in the platform, which facilitates the integration of parts like LEDs, motors, displays, sensors, and communication modules.

With compatibility for both serial and I²C/SPI protocols, the Arduino Uno is a flexible tool for a wide range of electronics and automation projects, including robotics, home automation, Internet of Things devices, and more. All things considered, the Arduino Uno is a strong yet approachable board that makes a great starting point for learning embedded systems and hardware programming. The Arduino Uno is a well-liked microcontroller board that is based on the ATmega328P and is used for DIY electronics and robotics projects. The fact that it has both digital and analog input/output pins makes it ideal for reading sensors and controlling motors or other actuators.

LCD Display 16*2:-

The idea behind a liquid crystal display (LCD) is to use liquid crystals to regulate light transmission. In order to provide light, it uses a backlight that is positioned behind the panel. There are multiple layers in the display, including a liquid crystal layer sandwiched between two polarizing filters. The screen seems brilliant because the liquid crystals allow light to flow through them when there is no electricity applied. The alignment of the liquid crystals shifts as voltage is applied, blocking light and giving the appearance of darkness to the pixel. By designating which segments or pixels get voltage, the LCD can show texts, numbers, or images.

A controller chip (such the HD44780) in character-type LCDs, like the 16x2 LCD, receives instructions from a microcontroller and decides which characters to show on the screen. This technology's low power consumption, small size, and excellent visibility make it widely used in digital watches, calculators, measuring devices, and embedded systems.

Because it controls light instead of producing it, the Liquid Crystal Display (LCD) is a power-efficient display technology frequently found in digital devices. It consists of a liquid crystal layer, electrodes, polarizing filters, and a backlight, among other layers. The front and rear polarizing filters ensure that only precisely aligned light passes through, while the backlight provides illumination. Organic molecules, which are the fundamental building blocks of liquid crystals, have the ability to align or twist in response to electrical power.

The liquid crystals' normal state allows light to pass through and gives the impression that the area of the screen is bright since they bend light to line up with the second polarizer. The crystals untwist and block light when a voltage is applied through transparent electrodes, creating a black pixel or segment. By selectively blocking or allowing light to pass through, the display may produce images, numbers, and letters. In traditional alphanumeric LCDs (such 16x2 or 20x4), the display is controlled by a controller integrated circuit (IC) like the HD44780, which receives input from a microcontroller (like an Arduino or Raspberry Pi) and maps it to the relevant screen segment.

The low power consumption, small size, reliability, and excellent viewing under normal lighting conditions make LCDs the favored choice for embedded devices. However, compared to more recent technologies like OLED or TFT, they may have limited viewing angles and require frequent data refreshes.

IR Sensor:-

Infrared light is sent out and received by the IR sensor, which is used to measure distance or detect objects. It is widely used in line-following robotics, obstacle detection, and proximity sensing. A basic infrared photodiode serves as the detector, while a basic infrared LED (light emitting diode) serves as the emitter. Infrared light with the same

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

wavelength as the IR LED can reach the photodiode. When infrared light hits the photodiode, the resistances and output voltages change according to how much of the light is received.

Five basic components make up a conventional infrared detection system: an optical component, a transmission channel, an infrared source, and infrared detectors or receivers.

Infrared sources include infrared lasers and infrared LEDs with specific wavelengths. Vacuum, atmosphere, and optical fibers are the three medium types used in infrared transmission. To limit the spectrum response of infrared light and focus it, optical components are utilized.

Based on their wavelengths, output power, and response time, infrared transmitters come in a variety of kinds. Together, an IR LED and an IR photodiode—also referred to as a photo coupler or coupler—make up an infrared sensor. LEDs that emit infrared radiation are known as infrared transmitters. The radiation that an infrared LED generates is undetectable to the human eye, despite the fact that it looks like any other LED.

An infrared emitter's radiation is detected by infrared receivers or sensors. Photodiodes and phototransistors are the components of infrared receivers. Only infrared energy is detected by infrared photodiodes, which sets them apart from conventional photodiodes. Many types of infrared receivers are distinguished by their wavelength, voltage, packing, and other characteristics. In an infrared transmitter-receiver combination, the wavelengths of the transmitter and receiver must coincide. An IR LED serves as the emitter, while an IR photodiode serves as the detector. The IR light produced by an IR LED is detected by the IR photodiode. How much infrared light is received affects the photodiode's resistance and output voltage.

Weight ADC (Analog-to-Digital Converter):-

The Weight Analog-to-Digital Converter, or Weight ADC, is a crucial component when using analog weight sensors, like load cells. Load cells produce analog voltage signals based on weight, which the ADC converts into a digital value that may be calculated by an Arduino or other microcontroller. In addition to accurately measuring weight, this allows the system to do tasks like inventory management and automatic sorting.

The mechanical application of force to strain. Mechanical deformation happens to the load cell when weight is applied. Structural components known as strain gauges are attached to the load cell.

Under load, these strain gauges flex a little, changing the electrical resistance. Signal creation in analog (strain to voltage). In a Wheatstone bridge configuration, the strain gauges are connected. The bridge becomes imbalanced as resistance varies, producing a tiny analog voltage (mill volts). The applied weight and the voltage are exactly proportional. Voltage to Data Conversion from Analog to Digital. It feeds the weak analog voltage into an ADC (like the HX711). Before turning this signal to a high-resolution digital number (typically 24-bit), the ADC amplifies it. This digital output shows how much weight was applied.

Data to Weight Microcontroller Processing. An Arduino or other microcontroller reads the digital signal. To convert the digital result to actual weight, a calibration factor based on known weight is used. If more processing is required, the weight is then shown.

HX-711:-

The 24-bit precision analog-to-digital converter (ADC) HX711 was created especially for force measurement devices that use load cells and weighing scales. Electrical signals are converted from weight or force by sensors known as load cells. These weak analog impulses are amplified and transformed into powerful digital signals by the HX711, which an Arduino or other microcontroller can read.

Servo Motors:-

Acceleration, speed, and angular position may all be precisely controlled by servo motors thanks to their integrated feedback and control circuitry. Applications that require precise movements, such as robotic arms and automated systems, commonly use them.

An actuator that can precisely control linear or angular position, acceleration, and velocity is called a servomotor. It is composed of a motor coupled to a position-feedback sensor. It also requires a fairly sophisticated controller, which is typically a separate module designed specifically for servomotors. A servo is a type of feedback control that senses errors and is used to enhance a system's performance. It also requires a fairly sophisticated controller, which is typically a separate module designed specifically for servomotors.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

A servo is a type of feedback control that senses errors and is used to enhance a system's performance. Moreover, it requires a sophisticated controller, usually a distinct module designed especially for servomotors. Servo motors are direct current motors that allow for precise angular position control.

These are DC motors, and the gears gradually lower their speeds. Servo motors usually feature a 90° to 180° revolution cut-off. The revolution cutoff of some servo motors is 360° or more. Servo motors, however, do not spin continuously. They can only rotate within the predetermined angles.

Storage Boxes:-

Last but not least, storage boxes are real containers that are employed in automated systems to organize and store resources etc. Depending on sensor input or preprogrammed instructions from a microcontroller such as the Arduino, these boxes can be controlled by actuators or servo motors to sort, move, or distribute items. To create intelligent, responsive automation systems, each of these components is necessary.

Figure 2 Shows That Circuit Diagram of Fruit Sorting Machine Based on Weight

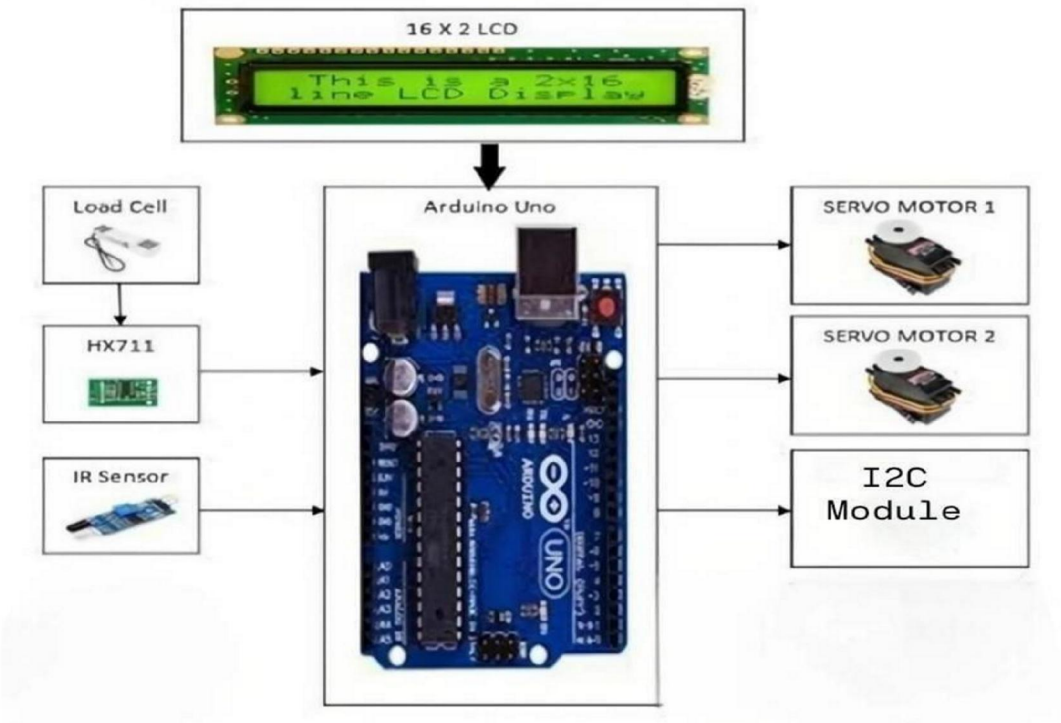

Figure 2:Circuit Diagram of Fruit Sorting Machine Based On Weight

The fruit sorting machine in the block diagram below works based on the weight of the object. A microcontroller called the Arduino Uno is the brains behind the entire system. An IR sensor, a 16x2 LCD display (with an I2C module), two servo motors, and a load cell with a HX711 amplifier module make up the system. The process begins when a fruit or other thing is placed on the weighing platform. The object's presence is detected by an infrared sensor close to the platform. When the sensor detects the presence of an object, it signals the Arduino Uno.

The following block diagram illustrates a fruit sorting machine that functions based on the weight of the item. The brain of this system is the Arduino Uno microcontroller. A load cell with a HX711 amplifier module, two servo motors, an IR sensor, and a 16x2 LCD display (with an I2C module) make up the system. The process begins when an object, such as a fruit, is placed on the weighing platform. Near the platform, an infrared sensor detects the object's presence. When it detects an object, the sensor signals the Arduino Uno.

The load cell's analog signal is amplified by the HX711 module before being sent as a digital signal to the Arduino Uno. Using this signal as input, the Arduino determines the actual weight of the object. After that, the weight

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

measurement is shown on a 16x2 LCD screen connected to the Arduino by an I2C module. The efficiency of setup is increased since the I2C module reduces the number of connections between the Arduino and LCD.

Following weight determination, the Arduino compares the weight to preset threshold values entered into the code. If an object's weight is below a specific threshold, it is deemed light. If it above the threshold, it is deemed heavy. Lighter objects are pushed into a single bin or container by Servo Motor 1. When it detects that the thing is heavy, Servo Motor 2 pushes it into a different bin. It does this automatically each time a new item is uploaded to the platform.

The entire procedure is carried out in real time, and the findings are displayed on the LCD screen immediately. The process works well for sorting products like fruits and is accurate and dependable for the food or agricultural industries. The elimination of the need for manual sorting saves time and labor.

IV. RESULT AND DISCUSSION

For testing, a variety of fruits weighing between less than 100 grams and more than 200 grams were used. Fruits were categorized by weight using the system: light (less than 100g), medium (between 100 and 200g), and heavy (more than 200g). The majority of fruits were correctly sorted by the machine into the proper groups during testing. Seven of the eight fruit samples were correctly sorted, with an overall accuracy of 87.5%. The machine accurately recognized and categorized mangoes, oranges, and apples according to their weight. A fruit that was not positioned correctly on the weighing platform, however, resulted in a misreading and improper sorting. This emphasizes how crucial it is to maintain steady and reliable fruit positioning when in use.

The servo mechanism guided the fruit to the proper bin, and the load cell precisely measured the fruit weight, demonstrating the system's overall dependable performance. The sorting procedure was efficient enough for small to medium-sized farming or packaging businesses, taking about 1.5 seconds per fruit. Notwithstanding its strong performance, the system has drawbacks. Because it uses weight as the only sorting criterion, it is unable to differentiate

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

between fruits of comparable weights. Furthermore, if not positioned properly, uneven or lopsided fruits could compromise the precision of the weight reading. Consistent precision also requires regular calibration of the load cell.

A crucial constraint was discovered by the one instance of improper sorting, though: for an accurate readout, the fruit had to be positioned centrally and steadily on the load cell. The apple was positioned slightly angled and off-center in this case, which resulted in an unstable reading and consequent misdiagnosis. In order to guarantee consistency throughout the weighing procedure, this problem highlights the necessity for a more safe and regulated fruit placing device, like a funnel or cradle.

Furthermore, the system only sorts fruits solely on weight at this time, failing to take into consideration other crucial elements such fruit kind, size, shape, maturity, or external damage. Despite the fact that they could need different treatment or packing in practical applications, two fruits (such as an orange and an apple) that weigh the same would be categorized under the same heading.

The equipment showed a clear potential to automate one of the most labor-intensive post-harvest handling procedures, despite these drawbacks. It lowers human error, increases fruit classification uniformity, and may boost the effectiveness of subsequent procedures including packing, storage, and shipping. Improvements like multi-sensor fusion (including infrared or optical sensors) or the incorporation of computer vision systems could enable the machine to carry out more thorough sorting based on extra fruit attributes for commercial scalability. Furthermore, predictive sorting features in later iterations of the system might be made possible by analyzing fruit quality using artificial intelligence or machine learning algorithms based on historical data.

V. CONCLUSION

The weight-based fruit sorting machine is a practical and affordable way to automate agricultural post-harvest procedures. Conveyors, load cells, and microcontrollers are some of the components that enable the system to accurately weigh each fruit and classify it. In addition to lowering the possibility of human error and manual labor, this method increases the harvested items' market value, productivity, and consistency. The project demonstrates how simple electrical parts and automation techniques can result in meaningful improvements in the agriculture sector, especially for small and medium-sized farmers. Such machinery can be integrated with vision systems for more complex sorting capabilities or customized to classify different kinds of fruits with further improvements.

This technology also makes it possible to sort fruits more quickly, which means that more fruits may be processed in less time. It facilitates the maintenance of consistent quality grading, which is essential for packaging and fulfilling export requirements. Additionally, the machine is versatile, making it suitable for both small-scale businesses and local marketplaces. Real-time monitoring and data analysis may be made easier by its ability to interface with IoT or data logging systems. This type of technology has the potential to empower farmers and transform conventional grading methods with increased awareness and investment. All things considered, this project links automation with agriculture, contributing to the development of smart farming.

REFERENCES

[1] Chakraborty, S.K., Subeesh, A., Potdar, R., Chandel, N.S., Jat, D., Dubey, K., & Shelake, P.S. (2023). AI-enabled farm-friendly automatic machine for washing, image-based sorting, and weight grading of citrus fruits: Design optimization, performance evaluation, and ergonomic assessment. *Journal of Field Robotics, 40,* 1581 - 1602.

[2] Chen, D., Zhou, H., Lv, S., Yu, Z., & Chen, Z. (2023). Control Method of Clamping Mechanism of Fruit Sorting Robot Based on Machine Vision. *2023 International Conference on Mechatronics, IoT andIndustrial Informatics (ICMIII)*, 315-319.

[3] A.Chougule, A., Awati, J.S., & Kumbhar, M.S. (2023). Fuzzy Power, Converter for Coin Sorting System Based on Weight, Edge. *Journal of Remote Sensing GIS & Technology*.

[4] Ahmed, K., Kajal, Dubey, M.K., & Pandey, D.K. (2024). Machine Learning Enabled System Architecture for Automatic Grading and Sorting of Walnut Fruits: A Review. *2024 International Conference on Electrical Electronics and Computing Technologies (ICEECT), 1*, 1-6.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

[5] Allaudin, A.N., & Nasuha, A. (2023). Automatic Catfish Sorter and Counter Based on Weight Classification. *Journal of Robotics, Automation, and Electronics Engineering*.

[6] Wen, B., & Yeh, C. (2022). Automatic Fruit Harvesting Device Based on Visual Feedback Control. *Agriculture.*

[7] Zidane, F., Lantéri, J., Brochier, L., Marot, J., & Migliaccio, C. (2022). Fruit Sorting with Amplitude-only Measurements. *202118th European Radar Conference (EuRAD)*, 373-376.

[8] Kang, D., Chen, Z., Fan, Y., Li, C., Mi, C., & Tang, Y. (2021). Optimization on kinematic characteristics and lightweight of a camellia fruit picking machine based on the Kriging surrogate model. *Mechanics & Industry.*

[9] Andi, A.F., Nuha, H.H., & Abdurohman, M. (2021). Fruit Ripeness Sorting Machine using Color Sensors. *2021 International Conference on Intelligent Cybernetics Technology & Applications (ICICyTA),* 149-152.

[10] Lestari, N., Badri, D.A., Khadafi, A., Munastha, K.A., Sarief, I., & Wijaya, W. (2022). An Automatic Sorting Machine Using Weight Sensor and Moisture Content Measurement for Sweet Potatoes. *2022 16th International Conference on Telecommunication Systems, Services, and Applications (TSSA),* 1-5.

[11] AbdullahAhmad, & Adamu Shah, Development of an Automatic Tomato Sorting Machine Based on Color Sensor, International Journal of Recent Engineering Research and Development (IJRERD) ISSN: 2455-8761, Volume 03 – Issue 11, November 2018, PP. 01-07.

[12] P.Preetha, R. Pandiselvam, J. Deep and N. Varadharaju, Development and performance evaluation of rotary drum grader for tomato, International Journal of Agriculture, Environment and Biotechnology, Citation: IJAEB: 9(1): 137- 144 February2016, pp.137-144.

[13] Dr. S. Usha, Dr. M. Karthik& R. Jenifer, Automated Sorting and Grading of Vegetables Using Image Processing, International Journal of Engineering Research and General ScienceVolume5, Issue6, November-December, 2017, pp.53-61.

[14] Archana Kumari &Vivek Chawla, Automated Inspection and Grading of Vegetables Using Multi sorting System Based on Embedded Plat form, international Journal of Science and Research (IJSR), Volume 4 Issue 6, June2015, pp.1021-1026.

[15] Mukesh Kumar Tripathi & Dr. Dhananjay D. Maktedar, A role of computer vision in fruits and vegetables among various horticulture products of agriculture fields: A survey, Information Processing In Agriculture, 24 July 2019, pp.1-21.

[16] Gholap, A.V., & Shinde, R.S. (2020). "Design and Development of Automatic Fruit Sorting System Based on Weight." International Journal of Engineering Research and Technology (IJERT), Vol. 9, Issue 5. [2].

[17] Kumar, R., & Verma, P. (2019). "Automation in Agriculture: Fruit Sorting System Using Arduino." International Journal of Scientific & Engineering Research (IJSER), Vol. 10, Issue 4.

[18] Patil, A., & Deshmukh, P. (2021). "Embedded System Based Fruit Sorting Machine." International Research Journal of Engineering and Technology (IRJET), Vol. 8, Issue 6.

[19] Yadav, D., & Gupta, S. (2018). "Smart Farming Applications Using Automation." International Journal of Computer Applications (IJCA), Vol. 182, No. 24.

[20] Godase, M. V., Mulani, A., Ghodak, M. R., Birajadar, M. G., Takale, M. S., & Kolte, M. A MapReduce and Kalman Filter based Secure IIoT Environment in Hadoop. Sanshodhak, Volume 19, June 2024.

[21] Mulani, A. O., & Mane, P. B. (2017). Watermarking and cryptography based image authentication on reconfigurable platform. Bulletin of Electrical Engineering and Informatics, 6(2), 181-187.

[22] Gadade, B., Mulani, A. O., & Harale, A. D. IoT Based Smart School Bus and Student Tracking System. Sanshodhak, Volume 19, June 2024.

[23] Dhanawadel, A., Mulani, A. O., & Pise, A. C. IOT based Smart farming using Agri BOT. Sanshodhak, Volume 20, June 2024.

[24] Mulani, A., & Mane, P. B. (2016). DWT based robust invisible watermarking. Scholars' Press.

[25] R. G. Ghodke, G. B. Birajdar, A.O. Mulani, G.N. Shinde, R.B. Pawar, Design and Development of an Efficient and Cost-Effective surveillance Quadcopter using Arduino, Sanshodhak, Volume 20, June 2024.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

[26] R. G. Ghodke, G. B. Birajdar, A.O. Mulani, G.N. Shinde, R.B. Pawar, Design and Development of Wireless Controlled ROBOT using Bluetooth Technology, Sanshodhak, Volume 20, June 2024.

[27] Swami, S. S., & Mulani, A. O. (2017, August). An efficient FPGA implementation of discrete wavelet transform for image compression. In 2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS) (pp. 3385-3389). IEEE.

[28] Mane, P. B., & Mulani, A. O. (2018). High speed area efficient FPGA implementation of AES algorithm. International Journal of Reconfigurable and Embedded Systems, 7(3), 157-165.

[29] Mulani, A. O., & Mane, P. B. (2016). Area efficient high speed FPGA based invisible watermarking for image authentication. Indian journal of Science and Technology, 9(39), 1-6.

[30] Kashid, M. M., Karande, K. J., & Mulani, A. O. (2022, November). IoT-based environmental parameter monitoring using machine learning approach. In Proceedings of the International Conference on Cognitive and Intelligent Computing: ICCIC 2021, Volume 1 (pp. 43-51). Singapore: Springer Nature Singapore.

[31] Nagane, U. P., & Mulani, A. O. (2021). Moving object detection and tracking using Matlab. Journal of Science and Technology, 6(1), 2456-5660.

[32] Kulkarni, P. R., Mulani, A. O., & Mane, P. B. (2016). Robust invisible watermarking for image authentication. In Emerging Trends in Electrical, Communications and Information Technologies: Proceedings of ICECIT-2015 (pp. 193-200). Singapore: Springer Singapore.

[33] Ghodake, M. R. G., & Mulani, M. A. (2016). Sensor based automatic drip irrigation system. Journal for Research, 2(02).

[34] Mandwale, A. J., & Mulani, A. O. (2015, January). Different Approaches For Implementation of Viterbi decoder on reconfigurable platform. In 2015 International Conference on Pervasive Computing (ICPC) (pp. 1-4). IEEE.

[35] Jadhav, M. M., Chavan, G. H., & Mulani, A. O. (2021). Machine learning based autonomous fire combat turret. Turkish Journal of Computer and Mathematics Education, 12(2), 2372-2381.

[36] Shinde, G., & Mulani, A. (2019). A robust digital image watermarking using DWT-PCA. International Journal of Innovations in Engineering Research and Technology, 6(4), 1-7.

[37] Mane, D. P., & Mulani, A. O. (2019). High throughput and area efficient FPGA implementation of AES algorithm. International Journal of Engineering and Advanced Technology, 8(4).

[38] Mulani, A. O., & Mane, D. P. (2017). An Efficient implementation of DWT for image compression on reconfigurable platform. International Journal of Control Theory and Applications, 10(15), 1-7.

[39] Deshpande, H. S., Karande, K. J., & Mulani, A. O. (2015, April). Area optimized implementation of AES algorithm on FPGA. In 2015 International Conference on Communications and Signal Processing (ICCSP) (pp. 0010-0014). IEEE.

[40] Deshpande, H. S., Karande, K. J., & Mulani, A. O. (2014, April). Efficient implementation of AES algorithm on FPGA. In 2014 International Conference on Communication and Signal Processing (pp. 1895-1899). IEEE.

[41] Kulkarni, P., & Mulani, A. O. (2015). Robust invisible digital image mamarking using discrete wavelet transform. International Journal of Engineering Research & Technology (IJERT), 4(01), 139-141.

[42] Mulani, A. O., Jadhav, M. M., & Seth, M. (2022). Painless Non-invasive blood glucose concentration level estimation using PCA and machine learning. The CRC Book entitled Artificial Intelligence, Internet of Things (IoT) and Smart Materials for Energy Applications.

[43] Mulani, A. O., & Shinde, G. N. (2021). An approach for robust digital image watermarking using DWT-PCA. Journal of Science and Technology, 6(1).

[44] Mulani, A. O., & Mane, P. B. (2014, October). Area optimization of cryptographic algorithm on less dense reconfigurable platform. In 2014 International Conference on Smart Structures and Systems (ICSSS) (pp. 86-89). IEEE.

[45] Jadhav, H. M., Mulani, A., & Jadhav, M. M. (2022). Design and development of chatbot based on reinforcement learning. Machine Learning Algorithms for Signal and Image Processing, 219-229.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

[46] Mulani, A. O., & Mane, P. (2018). Secure and area efficient implementation of digital image watermarking on reconfigurable platform. International Journal of Innovative Technology and Exploring Engineering, 8(2), 56-61.

[47] Kalyankar, P. A., Mulani, A. O., Thigale, S. P., Chavhan, P. G., & Jadhav, M. M. (2022). Scalable face image retrieval using AESC technique. Journal Of Algebraic Statistics, 13(3), 173-176.

[48] Takale, S., & Mulani, A. (2022). DWT-PCA based video watermarking. Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM) ISSN, 2799-1156.

[49] Kamble, A., & Mulani, A. O. (2022). Google assistant based device control. Int. J. of Aquatic Science, 13(1), 550-555.

[50] Kondekar, R. P., & Mulani, A. O. (2017). Raspberry Pi based voice operated Robot. International Journal of Recent Engineering Research and Development, 2(12), 69-76.

[51] Ghodake, R. G., & Mulani, A. O. (2018). Microcontroller based automatic drip irrigation system. In Techno-Societal 2016: Proceedings of the International Conference on Advanced Technologies for Societal Applications (pp. 109-115). Springer International Publishing.

[52] Mulani, A. O., Birajadar, G., Ivković, N., Salah, B., & Darlis, A. R. (2023). Deep learning based detection of dermatological diseases using convolutional neural networks and decision trees. Traitement du Signal, 40(6), 2819.

[53] Boxey, A., Jadhav, A., Gade, P., Ghanti, P., & Mulani, A. O. (2022). Face Recognition using Raspberry Pi. Journal of Image Processing and Intelligent Remote Sensing (JIPIRS) ISSN, 2815-0953.

[54] Patale, J. P., Jagadale, A. B., Mulani, A. O., & Pise, A. (2023). A Systematic survey on Estimation of Electrical Vehicle. Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM) ISSN, 2799-1156.

[55] Gadade, B., & Mulani, A. (2022). Automatic System for Car Health Monitoring. International Journal of Innovations in Engineering Research and Technology, 57-62.

[56] Shinde, M. R. S., & Mulani, A. O. (2015). Analysisof Biomedical Image Using Wavelet Transform. International Journal of Innovations in Engineering Research and Technology, 2(7), 1-7.

[57] Mandwale, A., & Mulani, A. O. (2014, December). Implementation of convolutional encoder & different approaches for viterbi decoder. In IEEE International Conference on Communications, Signal Processing Computing and Information technologies.

[58] Mulani, A. O., Jadhav, M. M., & Seth, M. (2022). Painless machine learning approach to estimate blood glucose level with non-invasive devices. In Artificial intelligence, internet of things (IoT) and smart materials for energy applications (pp. 83-100). CRC Press.

[59] Maske, Y., Jagadale, A. B., Mulani, A. O., & Pise, A. C. (2023). Development of BIOBOT system to assist COVID patient and caretakers. European Journal of Molecular & Clinical Medicine, 10(01), 2023.

[60] Utpat, V. B., Karande, D. K., & Mulani, D. A. Grading of Pomegranate Using Quality Analysis‖. International Journal for Research in Applied Science & Engineering Technology (IJRASET), 10.

[61] Takale, S., & Mulani, D. A. (2022). Video Watermarking System. International Journal for Research in Applied Science & Engineering Technology (IJRASET), 10.

[62] Mandwale, A., & Mulani, A. O. (2015, January). Different approaches for implementation of Viterbi decoder. In IEEE international conference on pervasive computing (ICPC).

[63] Maske, Y., Jagadale, M. A., Mulani, A. O., & Pise, A. (2021). Implementation of BIOBOT System for COVID Patient and Caretakers Assistant Using IOT. International Journal of Information Technology and, 30-43.

[64] Mulani, A. O., & Mane, D. P. (2016). Fast and Efficient VLSI Implementation of DWT for Image Compression. International Journal for Research in Applied Science & Engineering Technology, 5, 1397-1402.

[65] Kambale, A. (2023). Home automation using google assistant. UGC care approved journal, 32(1), 1071-1077.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

[66] Pathan, A. N., Shejal, S. A., Salgar, S. A., Harale, A. D., & Mulani, A. O. (2022). Hand gesture controlled robotic system. Int. J. of Aquatic Science, 13(1), 487-493.
[67] Korake, D. M., & Mulani, A. O. (2016). Design of Computer/Laptop Independent Data transfer system from one USB flash drive to another using ARM11 processor. International Journal of Science, Engineering and Technology Research.
[68] Mandwale, A., & Mulani, A. O. (2016). Implementation of High Speed Viterbi Decoder using FPGA. International Journal of Engineering Research & Technology, IJERT.
[69] Kolekar, S. D., Walekar, V. B., Patil, P. S., Mulani, A. O., & Harale, A. D. (2022). Password Based Door Lock System. Int. J. of Aquatic Science, 13(1), 494-501.
[70] Shinde, R., & Mulani, A. O. (2015). Analysis of Biomedical Image‖. International Journal on Recent & Innovative trend in technology (IJRITT).
[71] Sawant, R. A., & Mulani, A. O. (2022). Automatic PCB Track Design Machine. International Journal of Innovative Science and Research Technology, 7(9).
[72] ABHANGRAO, M. R., JADHAV, M. S., GHODKE, M. P., & MULANI, A. (2017). Design And Implementation Of 8-bit Vedic Multiplier. International Journal of Research Publications in Engineering and Technology (ISSN No: 2454-7875).
[73] Gadade, B., Mulani, A. O., & Harale, A. D. (2024). Iot based smart school bus and student monitoring system. Naturalista Campano, 28(1), 730-737.
[74] Mulani, D. A. O. (2024). A Comprehensive Survey on Semi-Automatic Solar-Powered Pesticide Sprayers for Farming. Journal of Energy Engineering and Thermodynamics (JEET) ISSN, 2815-0945.
[75] Salunkhe, D. S. S., & Mulani, D. A. O. (2024). Solar Mount Design Using High-Density Polyethylene. NATURALISTA CAMPANO, 28(1).
[76] Seth, M. (2022). Painless Machine learning approach to estimate blood glucose level of Non-Invasive device. Artificial Intelligence, Internet of Things (IoT) and Smart Materials for Energy Applications.
[77] Kolhe, V. A., Pawar, S. Y., Gohery, S., Mulani, A. O., Sundari, M. S., Kiradoo, G., ... & Sunil, J. (2024). Computational and experimental analyses of pressure drop in curved tube structural sections of Coriolis mass flow metre for laminar flow region. Ships and Offshore Structures, 19(11), 1974-1983.
[78] Basawaraj Birajadar, G., Osman Mulani, A., Ibrahim Khalaf, O., Farhah, N., G Gawande, P., Kinage, K., & Abdullah Hamad, A. (2024). Epilepsy identification using hybrid CoPrO-DCNN classifier. International Journal of Computing and Digital Systems, 16(1), 783-796.
[79] Kedar, M. S., & Mulani, A. (2021). IoT Based Soil, Water and Air Quality Monitoring System for Pomegranate Farming. Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM) ISSN, 2799-1156.
[80] Godse, A. P. A.O. Mulani (2009). Embedded Systems (First Edition).
[81] Pol, R. S., Bhalerao, M. V., & Mulani, A. O. A real time IoT based System Prediction and Monitoring of Landslides. International Journal of Food and Nutritional Sciences, Volume 11, Issue 7, 2022.
[82] Mulani, A. O., Sardey, M. P., Kinage, K., Salunkhe, S. S., Fegade, T., & Fegade, P. G. (2025). ML-powered Internet of Medical Things (MLIOMT) structure for heart disease prediction. Journal of Pharmacology and Pharmacotherapeutics, 16(1), 38-45.
[83] Aiwale, S., Kolte, M. T., Harpale, V., Bendre, V., Khurge, D., Bhandari, S., ... & Mulani, A. O. (2024). Non-invasive Anemia Detection and Prediagnosis. Journal of Pharmacology and Pharmacotherapeutics, 15(4), 408-416.
[84] Mulani, A. O., Bang, A. V., Birajadar, G. B., Deshmukh, A. B., Jadhav, H. M., & Liyakat, K. K. S. (2024). IoT Based Air, Water, and Soil Monitoring System for Pomegranate Farming. Annals of Agri-Bio Research, 29(2), 71-86.
[85] Kulkarni, T. M., & Mulani, A. O. (2024). Face Mask Detection on Real Time Images and Videos using Deep Learning. International Journal of Electrical Machine Analysis and Design (IJEMAD), 2(1).

[86] Thigale, S. P., Jadhav, H. M., Mulani, A. O., Birajadar, G. B., Nagrale, M., & Sardey, M. P. (2024). Internet of things and robotics in transforming healthcare services. Afr J Biol Sci (S Afr), 6(6), 1567-1575.
[87] Pol, D. R. S. (2021). Cloud Based Memory Efficient Biometric Attendance System Using Face Recognition. Stochastic Modeling & Applications, 25(2).
[88] Nagtilak, M. A. G., Ulegaddi, M. S. N., Adat, M. A. S., & Mulani, A. O. (2021). Breast Cancer Prediction using Machine Learning.
[89] Rahul, G. G., & Mulani, A. O. (2016). Microcontroller Based Drip Irrigation System.
[90] Kulkarni, T. M., & Mulani, A. O. Deep Learning Based Face-Mask Detection: An Approach to Reduce Pandemic Spreads in Human Healthcare. African Journal of Biological Sciences, 6(6), 2024.
[91] Mulani, A., & Mane, P. B. (2016). DWT based robust invisible watermarking. Scholars' Press.
[92] Dr. Vaishali Satish Jadhav, Dr. Shweta Sadanand Salunkhe, Dr. Geeta Salunkhe, Pranali Rajesh Yawle, Dr. Rahul S. Pol, Dr. Altaf Osman Mulani, Dr. Manish Rana, Iot Based Health Monitoring System for Human, Afr. J. Biomed. Res. Vol. 27 (September 2024).
[93] Dr. Vaishali Satish Jadhav, Geeta D. Salunke, Kalyani Ramesh Chaudhari, Dr. Altaf Osman Mulani, Dr. Sampada Padmakar Thigale, Dr. Rahul S. Pol, Dr. Manish Rana, Deep Learning-Based Face Mask Recognition in Real-Time Photos and Videos, Afr. J. Biomed. Res. Vol. 27 (September 2024).
[94] Altaf Osman Mulani, Electric Vehicle Parameters Estimation Using Web Portal, Recent Trends in Electronics & Communication Systems, Volume 10, Issue 3, 2023.
[95] Aryan Ganesh Nagtilak, Sneha Nitin Ulegaddi, Mahesh Mane, Altaf O. Mulani, Automatic Solar Powered Pesticide Sprayer for Farming, International Journal of Microwave Engineering and Technology, Volume 9 No. 2, 2023.
[96] Annasaheb S. Dandage, Vitthal R. Rupnar, Tejas A Pise, and A. O. Mulani, Real-Time Language Translation Application Using Tkinter. International Journal of Digital Communication and Analog Signals. 2025; 11(01): -p.
[97] AnnaSaheb S Dandage, Vitthal R. Rupnar, Tejas A Pise, and A. O. Mulani, IoT-Powered Weather Monitoring and Irrigation Automation: Transforming Modern Farming Practices. . 2025; 11(01): -p.
[98] Mulani, A.O., Kulkarni, T.M. (2025). Face Mask Detection System Using Deep Learning: A Comprehensive Survey. In: Singh, S., Arya, K.V., Rodriguez, C.R., Mulani, A.O. (eds) Emerging Trends in Artificial Intelligence, Data Science and Signal Processing. AIDSP 2023. Communications in Computer and Information Science, vol 2439. Springer, Cham. https://doi.org/10.1007/978-3-031-88759-8_3.
[99] Karve, S., Gangonda, S., Birajadar, G., Godase, V., Ghodake, R., Mulani, A.O. (2025). Optimized Neural Network for Prediction of Neurological Disorders. In: Singh, S., Arya, K.V., Rodriguez, C.R., Mulani, A.O. (eds) Emerging Trends in Artificial Intelligence, Data Science and Signal Processing. AIDSP 2023. Communications in Computer and Information Science, vol 2440. Springer, Cham. https://doi.org/10.1007/978-3-031-88762-8_18.
[100] Saurabh Singh, Karm Veer Arya, Ciro Rodriguez Rodriguez, and Altaf Osman Mulani, Emerging Trends in Artificial Intelligence, Data Science and Signal Processing, Communications in Computer and Information Science (CCIS), volume 2440.
[101] Saurabh Singh, Karm Veer Arya, Ciro Rodriguez Rodriguez, and Altaf Osman Mulani, Emerging Trends in Artificial Intelligence, Data Science and Signal Processing, Communications in Computer and Information Science (CCIS), volume 2439.
[102] Godase, V., Mulani, A., Pawar, A., & Sahani, K. (2025). A Comprehensive Review on PIR Sensor-Based Light Automation Systems. International Journal of Image Processing and Smart Sensors, 1(1), 22-29.
[103] Godase, V., Mulani, A., Takale, S., & Ghodake, R. (2025). Comprehensive Review on Automated Field Irrigation using Soil Image Analysis and IoT. Journal of Advance Electrical Engineering and Devices, 3(1), 46-55.
[104] Altaf Osman Mulani, Deshmukh M., Jadhav V., Chaudhari K., Mathew A.A., Shweta Salunkhe. Transforming Drug Therapy with Deep Learning: The Future of Personalized Medicine. Drug Research. 2025 Aug 29.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

[105] Altaf O. Mulani, Vaibhav V. Godase, Swapnil R. Takale, Rahul G. Ghodake (2025), Image Authentication Using Cryptography and Watermarking, International Journal of Image Processing and Smart Sensors, Vol. 1, Issue 2, pp 27-34.

[106] Altaf O. Mulani, Vaibhav V. Godase, Swapnil R. Takale, Rahul G. Ghodake (2025), Advancements in Artificial Intelligence: Transforming Industries and Society, International Journal of Artificial Intelligence of Things (AIoT) in Communication Industry, Vol. 1, Issue 2, pp 1-5.

[107] Altaf O. Mulani, Vaibhav V. Godase, Swapnil R. Takale, Rahul G. Ghodake (2025), AI-Powered Predictive Analytics in Healthcare: Revolutionizing Disease Diagnosis and Treatment, Journal of Advance Electrical Engineering and Devices, Vol. 3, Issue 2, pp 27-34.

[108] Godase, V., Mulani, A., Takale, S., & Ghodake, R. (2025). A Holistic Review of Automatic Drip Irrigation Systems: Foundations and Emerging Trends. Available at SSRN 5247778.

[109] V. Godase, R. Ghodake, S. Takale, and A. Mulani, ―Design and Optimization of Reconfigurable Microwave Filters Using AI Techniques, International Journal of RF and Microwave Communication Technologies, vol. 2, no. 2, pp.26–41, Aug. 2025.

[110] V. Godase, A. Mulani, R. Ghodake, S. Takale, "Automated Water Distribution Management and Leakage Mitigation Using PLC Systems," Journal of Control and Instrumentation Engineering, vol.11, no. 3, pp. 1-8, Aug. 2025.

[111] V. Godase, A. Mulani, R. Ghodake, S. Takale, "PLC-Assisted Smart Water Distribution with Rapid Leakage Detection and Isolation," Journal of Control Systems and Converters, vol. 1, no. 3, pp. 1-13, Aug. 2025.

[112] V. V. Godase, S. R. Takale, R. G. Ghodake, and A. Mulani, "Attention Mechanisms in Semantic Segmentation of Remote Sensing Images," Journal of Advancement in Electronics Signal Processing, vol. 2, no. 2, pp. 45–58, Aug. 2025.

[113] D. Waghmare, A. Mulani, S. R. Takale, V. Godase, and A. Mulani, "A Comprehensive Review on Automatic Fruit Sorting and Grading Techniques with Emphasis on Weight-based Classification," Research & Review: Electronics and Communication Engineering, vol. 2, no. 3, pp. 1-10, Oct. 2025.

[114] Karande, K. J., & Talbar, S. N. (2014). Independent component analysis of edge information for face recognition. Springer India.

[115] Karande, K. J., & Talbar, S. N. (2008). Face recognition under variation of pose and illumination using independent component analysis. ICGST-GVIP, ISSN.

[116] Kawathekar, P. P., & Karande, K. J. (2014, July). Severity analysis of Osteoarthritis of knee joint from X-ray images: A Literature review. In 2014 International Conference on Signal propagation and computer technology (ICSPCT 2014) (pp. 648-652). IEEE.

[117] Daithankar, M. V., Karande, K. J., & Harale, A. D. (2014, April). Analysis of skin color models for face detection. In 2014 International Conference on Communication and Signal Processing (pp. 533-537). IEEE.

[118] Karande, J. K., Talbar, N. S., & Inamdar, S. S. (2012, May). Face recognition using oriented Laplacian of Gaussian (OLOG) and independent component analysis (ICA). In 2012 Second International Conference on Digital Information and Communication Technology and it's Applications (DICTAP) (pp. 99-103). IEEE.

[119] Asabe, H., Asabe, R., Lengare, O., & Godase, S. (2025). IOT- BASED STORAGE SYSTEM FOR MANAGING VOLATILE MEDICAL RESOURCES IN HEALTHCARE FACILITIES. INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS), 05(03), 2427–2433. https://www.ijprems.com

[120] Karche, S. N., Mulani, A. O., Department of Electronics, SKN Sinhgad College of Engineering, Korti, & University of Solapur, Maharashtra, India. (2018). AESC Technique for Scalable Face Image Retrieval. International Journal of Innovative Research in Computer and Communication Engineering, 6(4), 3404–3405.

[121] https://doi.org/10.15680/IJIRCCE.2018.0604036

[122] Bankar, A. S., Harale, A. D., & Karande, K. J. (2021). Gestures Controlled Home Automation using Deep Learning: A Review. International Journal of Current Engineering and Technology, 11(06), 617–621. https://doi.org/10.14741/ijcet/v.11.6.4

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

[123] Mali, A. S., Ghadge, S. K., Adat, A. S., & Karande, S. V. (2024). Intelligent Medication Management System. IJSRD - International Journal for Scientific Research & Development, Vol. 12(Issue 3).

[124] Water Level Control, Monitoring and Altering System by using GSM in Irrigation Based on Season. (2019). In International Research Journal of Engineering and Technology (IRJET) (Vol. 06, Issue 04, p. 1035) [Journal-article]. https://www.irjet.net

[125] Modi, S., Misal, V., Kulkarni, S., & Mali A.S. (2025). Hydroponic Farming Monitoring System - Automated system to monitor and control nutrient and pH levels. In Journal of Microcontroller Engineering and Applications (Vol. 12, Issue 3, pp. 11–16). https://doi.org/10.37591/JoMEA

[126] Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "VGHN: variations aware geometric moments and histogram features normalization for robust uncontrolled face recognition", International Journal of Information Technology, https://doi.org/10.1007/s41870-021-00703-0.

[127] Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition using MFCC & DTW Features", International Journal of Engineering Research And Applications (IJERA) pp. 118-122, ISSN: 2248-9622.

[128] Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "Recognition of Marathi Numerals Using MFCC and DTW Features", Book Title: Recent Trends on Image Processing and Pattern Recognition, RTIP2R 2018, CCIS 1037, pp. 1–11, © Springer Nature Singapore Pte Ltd. 2019 https://doi.org/10.1007/978-981-13-9187-3_17.

[129] Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "Analysis of Face Recognition Algorithms for Uncontrolled Environments", Book Title: Computing, Communication and Signal Processing, pp. 919–926, © Springer Nature Singapore Pte Ltd. 2018.

[130] Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "Recognition of Marathi Numerals using MFCC and DTW Features", 2nd International Conference on Recent Trends in Image Processing and Pattern Recognition (RTIP2R 2018), 21th -22th Dec., 2018, organized by Solapur University, Solapur in collaboration with University of South Dakota (USA) and Universidade de Evora (Portugal), India.

[131] Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "A Comprehensive Survey of Face Databases for Constrained and Unconstrained Environments", 2nd IEEE Global Conference on Wireless Computing & Networking (GCWCN-2018), 23th-24th Nov., 2018, organized by STES's Sinhgad Institute of Technology, Lonavala, India.

[132] Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "An Extensive Survey of Prominent Researches in Face Recognition under different Conditions", 4th International Conference on Computing, Communication, Control And Automation (ICCUBEA-2018), 16th to 18th Aug. 2018 organized by Pimpri Chinchwad College of Engineering (PCCOE), Pune, India.

[133] Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "Analysis of Face Recognition Algorithms for Uncontrolled Environments", 3rd International Conference on Computing, Communication and Signal Processing (ICCASP 2018), 26th-27th Jan.2018, organized by Dr. BATU, Lonere, India.

[134] Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition", International Conference on Recent Trends, Feb 2012, IOK COE, Pune.

[135] S. S. Gangonda, "Bidirectional Visitor Counter with automatic Door Lock System", National Conference on Computer, Communication and Information Technology (NCCCIT-2018), 30th and 31st March 2018 organized by Department of Electronics and Telecommunication Engineering, SKN SCOE, Korti, Pandharpur.

[136] Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition using MFCC & DTW Features", ePGCON 2012, 23rd and 24th April 2012 organized by Commins COE for Woman, Pune.

[137] Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition", National Conference on Emerging Trends in Engineering and Technology (VNCET'12), 30th March 2012 organized by Vidyavardhini's College of Engineering and Technology, Vasai Road, Thane.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

[138] Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition", ePGCON 2011, 26th April 2011 organized by MAEER's MIT, Kothrud, Pune-38.
[139] Siddheshwar Gangonda, "Medical Image Processing", Aavishkar-2K7, 17th and 18th March 2007 organized by Department of Electronics and Telecommunication Engineering, SVERI's COE, Pandharpur.
[140] Siddheshwar Gangonda, "Image enhancement & Denoising", VISION 2k7, 28th Feb-2nd March 2007 organized by M.T.E. Society's Walchand College of Engineering, Sangli.
[141] Siddheshwar Gangonda, "Electromagnetic interference & compatibility" KSHITIJ 2k6, 23rd and 24th Sept. 2006 organized by Department of Mechanical Engineering, SVERI's COE, Pandharpur.
[142] A. Pise and K. Karande, "A genetic Algorithm-Driven Energy-Efficient routing strategy for optimizing performance in VANETs," Engineering Technology and Applied Science Research, vol. 15, no. 5, 2025, [Online]. Available: https://etasr.com/index.php/ETASR/article/view/12744
[143] A. C. Pise, K. J. Karande, "Investigating Energy-Efficient Optimal Routing Protocols for VANETs: A Comprehensive Study", ICT for Intelligent Systems, Lecture Notes in Networks and Systems 1109, Proceedings of ICTIS 2024 Volume 3, Lecture Notes in Networks and Systems, Springer, Singapore, ISSN 2367-3370, PP 407-417, 29 October 2024 https://doi.org/10.1007/978-981-97-6675-8_33.
[144] A. C. Pise, et. al., "Smart Vehicle: A Systematic Review", International Journal - The Ciência & Engenharia - Science & Engineering Journal ISSN: 0103-944XVolume 11 Issue 1, 2023pp: 992–998, 2023.
[145] A. C. Pise, et. al., "Smart Vehicle: A Systematic Review", International Journal of Research Publication and Reviews, ISSN 2582-7421, Vol 4, no 10, pp 2728-2731 October 2023.
[146] A. C. Pise, et. al., "Development of BIOBOT System to Assist COVID Patient and Caretakers", European Journal of Molecular and Clinical Medicine ; 10(1):3472-3480, 2023.
[147] A. C. Pise, et. al., "IoT Based Landmine Detection Robot", International Journal of Research in Science & EngineeringISSN: 2394-8299Vol: 03, No. 04, June-July 2023.
[148] A. C. Pise, et. al., "A Systematic survey on Estimation of Electrical Vehicle", Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM) ISSN: 2799-1156, Volume 3, Issue 01, Pages 1-6, December 2023.
[149] A. C. Pise, et. al., "Python Algorithm to Estimate Range of Electrical Vehicle", Web of Science, Vol 21, No 1 (2022) December 2022
[150] A. C. Pise, et. al., "Implementation of BIOBOT System for COVID Patient and Caretakers Assistant using IOT", International Journal of Information technology and Computer Engineering. 30-43. 10.55529/ijitc.21.30.43, (2022).
[151] A. C. Pise, et. al., "An IoT Based Real Time Monitoring of Agricultural and Micro irrigation system", International journal of scientific research in Engineering and management (IJSREM), VOLUME: 06 ISSUE: 04 | APRIL – 2022, ISSN:2582-3930.
[152] A. C. Pise, Dr. K. J. Karande, "An Exploratory study of Cluster Based Routing Protocol in VANET: A Review", International Journal of Advanced Research in Engineering and Technology(IJARET), 12,10, 2021, 17-30, Manuscript ID :00000-94375 Source ID : 00000006, Journal_uploads/ IJARET/VOLUME_12_ISSUE_10/IJARET_12_10_002.pdf
[153] A. C. Pise, et. al., "Android based Portable Health Support System," A Peer Referred & Indexed International Journal ofResearch,Vol.8,issue.4 , April 2019.
[154] A. C. Pise, et. al., "Facial Expression Recognition Using Image Processing," International Journal ofVLSI Design, Microelectronics and Embedded System,Vol.3,issue.2 , July 2018.
[155] A. C. Pise, et. al., "Detection of Cast Iron Composition by Cooling Curve Analysis using Thermocouple Temperature Sensor," UGC Approved International Journal of Academic Science (IJRECE),Vol.6, Issue.3 , July-September 2018.
[156] A. C. Pise, et. al., "Android Based Portable Health Support", System International Journal of Engineering Sciences & Research Technology (IJESRT 2017) Vol.6, Issue 8, pp 85-88 5th Aug 2017

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

[157] A. C. Pise, et. al., "Adaptive Noise Cancellation in Speech Signal", International Journal of Innovative Engg and Technology, 2017
[158] A. C. Pise, et. al., "Lung Cancer Detection System by using Baysian Classifier", ISSN 2454-7875, IJRPET, published online in conference special issue VESCOMM-2016, February 2016
[159] A. C. Pise, et. al.,"Review on Agricultural Plant Diseases Detection by Image Processing", ISSN 2278-62IX, IJLTET, Vol 7, Issue 1 May 2016
[160] A. C. Pise, et. al. "Segmentation of Retinal Images for Glaucoma Detection", International Journal of Engineering Research and Technology (06, June-2015).
[161] A. C. Pise, et. al. "Color Local Texture Features Based Face Recognition", International Journal of Innovations in Engineering and Technology(IJIET) , Dec. 2014
[162] A. C. Pise, et. al. "Single Chip Solution For Multimode Robotic Control", International Journal of Engineering Research and Technology (IJERT-2014), Vol. 3, Issue 12, Dec. 2014.
[163] Anjali C. Pise et. al., "Remote monitoring of Greenhouse parameters using zigbee Wireless Sensor Network", International Journal of Engineering Research & Technology ISSN 2278-0181 (online) Vol. 3, Issue 2, and pp: (2412-2414), Feb. 2014.
[164] A. C. Pise, K. J. Karande, "Cluster Head Selection Based on ACO In Vehicular Ad-hoc Networks", Machine Learning for Environmental Monitoring in Wireless Sensor Networks
[165] A. C. Pise, K. J. Karande, "Architecture, Characteristics, Applications and Challenges in Vehicular Ad Hoc Networks" Presented in 27th IEEE International Symposium on Wireless Personal Multimedia Communications (WPMC 2024) "Secure 6G – AI Nexus: Where Technology Meets Humanity" Accepted for book chapter to be published in international Scopus index book by River publisher.
[166] A. C. Pise, Dr. K. J. Karande, "K-mean Energy Efficient Optimal Cluster Based Routing Protocol in Vehicular Ad Hoc Networks", International Conference on Innovations in Artificial Intelligence and Machine Learning (ICAIML-2022), August 20th and 21st 2022 Springer database Conference.
[167] A. C. Pise, Mr. D. Nale, "Web-Based Application for Result Analysis", ", International Conference on Innovations in Artificial Intelligence and Machine Learning (ICAIML-2022), August 20th and 21st 2022 Springer database Conference.
[168] A. C. Pise, et. al., "Detection of Cast Iron Composition by Cooling Curve Analysis using Thermocouple Temperature Sensor," 2nd International Conference on Engineering Technology, Science and Management Innovation (ICETSMI – 2018), 2nd September 2018.
[169] A. C. Pise, et. al., "Facial Expression Recognition Using Facial Features," IEEE International Conference on Communication and Electronics Systems (ICCES 2018), October 2018.
[170] A. C. Pise, et. al., "Estimating Parameters of Cast Iron Composition using Cooling Curve Analysis," IEEE International Conference on Communication and Electronics Systems (ICCES 2018), Coimbatore, October 2018.
[171] A. C. Pise, et. al., "Android based portable Health Support System," International Conference on Innovations in Engineering and Technology (CIET 2016), SKN Sinhgad College of Engineering, 30-31 Dec 2016.
[172] A. C. Pise, et. al., "Baysian Classifier & FCM Segmentation for Lung Cancer Detection in early stage," International Conference on Innovations in Engineering and Technology (CIET 2016), SKN Sinhgad College of Engineering, 30-31 Dec 2016.
[173] A. C. Pise, et. al., "Cast Iron Composition Measurement by Coding Curve Analysis," International Conference on Innovations in Engineering and Technology (CIET 2016), SKN Sinhgad College of Engineering, 30-31 Dec 2016.
[174] A. C. Pise, et. al., "War field Intelligence Defence Flaging Vehicle," International Conference on Innovations in Engineering and Technology (CIET 2016), SKN Sinhgad College of Engineering, 30-31 Dec 2016.
[175] A. C. Pise, et. al. "Disease Detection of Pomegranate Plant", IEEE sponsored International Conference on Computation of Power, Energy, Information and Communication, 22- 23 Apr. 2015.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

[176] A. C. Pise, P. Bankar. "Face Recognition by using GABOR and LBP", IEEE International Conference on Communication and Signal Processing, ICCSP, 2-4 Apr. 2015
[177] A. C. Pise, et. al. "Single Chip Solution For Multimode Robotic Control", Ist IEEE International Conferene on Computing Communication and Automation, 26-27 Feb2015.
[178] Anjali C. Pise, Vaishali S. Katti, "Efficient Design for Monitoring of Greenhouse Parameters using Zigbee Wireless Sensor Network", fifth SARC international conference IRF,IEEE forum ISBN 978-93-84209-21-6,pp 24-26, 25th May 2014
[179] A. C. Pise, P. Bankar, "Face Recognition using Color Local Texture Features", International Conference on Electronics and Telecommunication, Electrical and Computer Engineering, Apr.2014.
[180] A. C. Pise, et.al. "Monitoring parameters of Greenhouse using Zigbee Wireless Sensor Network", 1st International Conference on Electronics and Telecommunication, Electrical and Computer Engineering, 5-6 Apr.2014.
[181] A. C. Pise, et. al. "Compensation schemes and performance Analysis of IQ Imbalances in Direct Conversion Receivers", International Conference at GHPCOE, Gujarat, (Online Proceeding is Available), 2009.
[182] A. C. Pise, K. J. Karande, "Energy-Efficient Optimal Routing Protocols in VANETs", 66th Annual IETE Convention, AIC -2023 September16-17, 2023, under the Theme: The Role of 5G In Enabling Digital Transformation for Rural Upliftment.
[183] A. C. Pise, et. al. "Automatic Bottle Filling Machine using Raspberry Pi", National Conference on computer ;Communication& information Technology (NCCIT-2018) dated 30th & 31st March 2018.
[184] A. C. Pise, et. al. "Design & Implementation of ALU using VHDL", National Conference on computer ;Communication& information Technology (NCCIT-2018) dated 30th & 31st March 2018.
[185] A. C. Pise, et. al. "Mechanism and Control of Autonomus four rotor Quad copter", National Conference on Computer, Electrical and Electronics Engineering, 23- 24 Apr. 2016.
[186] A. C. Pise, et. al. "Segmentation of Optic Disk and Optic Cup from retinal Images", ICEECMPE – Chennai, June 2015
[187] A. C. Pise, et. al. "Diseases Detection of Pomegranate Plant", IEEE Sponsored International conference on Computation of Power, Energy , April 2015.
[188] A. C. Pise, et. al. "Compensation Techniques for I/Q Imbalance in Direct-Conversion Receivers", Conference at SCOE, Pune 2010.
[189] A. C. Pise, et. al. "I/Q Imbalance compensation Techniques in Direct Conversion Receiver ", Advancing Trends in Engineering and Management Technologies, ATEMT-2009, Conference at Shri Ramdeobaba Kamla Nehru Engineering College, Nagpur, 20-21 November 2009
[190] A. C. Pise, et. al. "Compensation Techniques for I/Q Imbalance in Direct Conversion Receiver", Conference at PICT, Pune 2008.
[191] A. C. Pise, et. al. "I/Q Imbalance compensation Techniques in Direct Conversion Receiver ", Conference at DYCOE, Pune 2008.
[192] A. C. Pise, et. al. "DUCHA: A New Dual channel MAC protocol for Multihop Ad-Hoc Networks", Conference at SVCP, Pune 2007.
[193] Godase, V., Pawar, P., Nagane, S., & Kumbhar, S. (2024). Automatic railway horn system using node MCU. Journal of Control & Instrumentation, 15(1).
[194] Godase, V., & Godase, J. (2024). Diet prediction and feature importance of gut microbiome using machine learning. Evolution in Electrical and Electronic Engineering, 5(2), 214-219.
[195] Jamadade, V. K., Ghodke, M. G., Katakdhond, S. S., & Godase, V. A Comprehensive Review on Scalable Arduino Radar Platform for Real-time Object Detection and Mapping.
[196] Godase, V. (2025). A comprehensive study of revolutionizing EV charging with solar-powered wireless solutions. Advance Research in Power Electronics and Devices e-ISSN, 3048-7145.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

[197] Godase, V. (2025, April). Advanced Neural Network Models for Optimal Energy Management in Microgrids with Integrated Electric Vehicles. In Proceedings of the International Conference on Trends in Material Science and Inventive Materials (ICTMIM-2025) DVD Part Number: CFP250J1-DVD.
[198] Dange, R., Attar, E., Ghodake, P., & Godase, V. (2023). Smart agriculture automation using ESP8266 NodeMCU. J. Electron. Comput. Netw. Appl. Math, (35), 1-9.
[199] Godase, V. (2025). Optimized Algorithm for Face Recognition using Deepface and Multi-task Cascaded Convolutional Network (MTCNN). Optimum Science Journal.
[200] Mane, V. G. A. L. K., & Gangonda, K. D. S. Pipeline Survey Robot.
[201] Godase, V. (2025). Navigating the digital battlefield: An in-depth analysis of cyber-attacks and cybercrime. International Journal of Data Science, Bioinformatics and Cyber Security, 1(1), 16-27.
[202] Godase, V., & Jagadale, A. (2019). Three element control using PLC, PID & SCADA interface. International Journal for Scientific Research & Development, 7(2), 1105-1109.
[203] Godase, V. (2025). Edge AI for Smart Surveillance: Real-time Human Activity Recognition on Low-power Devices. International Journal of AI and Machine Learning Innovations in Electronics and Communication Technology, 1(1), 29-46.
[204] Godase, V., Modi, S., Misal, V., & Kulkarni, S. (2025). LoRaEdge-ESP32 synergy: Revolutionizing farm weather data collection with low-power, long-range IoT. Advance Research in Analog and Digital Communications, 2(2), 1-11.
[205] Godase, V. (2025). Comparative study of ladder logic and structured text programming for PLC. Available at SSRN 5383802.
[206] Godase, V., Modi, S., Misal, V., & Kulkarni, S. Real-time object detection for autonomous drone navigation using YOLOv8,‖. Advance Research in Communication Engineering and its Innovations, 2(2), 17-27.
[207] Godase, V. (2025). Smart energy management in manufacturing plants using PLC and SCADA. Advance Research in Power Electronics and Devices, 2(2), 14-24.
[208] Godase, V. (2025). IoT-MCU Integrated Framework for Field Pond Surveillance and Water Resource Optimization. International Journal of Emerging IoT Technologies in Smart Electronics and Communication, 1(1), 9-19.
[209] Godase, V. (2025). Graphene-Based Nano-Antennas for Terahertz Communication. International Journal of Digital Electronics and Microprocessor Technology, 1(2), 1-14.
[210] Godase, V., Khiste, R., & Palimkar, V. (2025). AI-Optimized Reconfigurable Antennas for 6G Communication Systems. Journal of RF and Microwave Communication Technologies, 2(3), 1-12.
[211] Bhaganagare, S., Chavan, S., Gavali, S., & Godase, V. V. (2025). Voice-Controlled Home Automation with ESP32: A Systematic Review of IoT-Based Solutions. Journal of Microprocessor and Microcontroller Research, 2(3), 1-13.
[212] Jamadade, V. K., Ghodke, M. G., Katakdhond, S. S., & Godase, V. A Comprehensive Review on Scalable Arduino Radar Platform for Real-time Object Detection and Mapping.
[213] Godase, V. (2025). Cross-Domain Comparative Analysis of Microwave Imaging Systems for Medical Diagnostics and Industrial Testing. Journal of Microwave Engineering & Technologies, 12(2), 39-48p.
[214] V. K. Jamadade, M. G. Ghodke, S. S. Katakdhond, and V. Godase, ―A Review on Real-time Substation Feeder Power Line Monitoring and Auditing Systems," International Journal of Emerging IoT Technologies in Smart Electronics and Communication, vol. 1, no. 2, pp. 1-16, Sep. 2025.
[215] V. V. Godase, "VLSI-Integrated Energy Harvesting Architectures for Battery-Free IoT Edge Systems,"Journal of Electronics Design and Technology, vol. 2, no. 3, pp. 1-12, Sep. 2025.
[216] A. Salunkhe et al., "A Review on Real-Time RFID-Based Smart Attendance Systems for Efficient Record Management," Advance Research in Analog and Digital Communications, vol. 2, no. 2, pp.32-46, Aug. 2025.
[217] Vaibhav, V. G. (2025). A Neuromorphic-Inspired, Low-Power VLSI Architecture for Edge AI in IoT Sensor Nodes. Journal of Microelectronics and Solid State Devices, 12(2), 41-47p.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

[218] Nagane, M.S., Pawar, M.P., & Godase, P.V. (2022). Cinematica Sentiment Analysis. Journal of Image Processing and Intelligent Remote Sensing.
[219] Godase, V.V. (2025). Tools of Research. SSRN Electronic Journal.
[220] Godase, V. (n.d.). EDUCATION AS EMPOWERMENT: THE KEY TO WOMEN'S SOCIO ECONOMIC DEVELOPMENT. Women Empowerment and Development, 174–179.
[221] Godase, V. (n.d.). COMPREHENSIVE REVIEW ON EXPLAINABLE AI TO ADDRESSES THE BLACK BOX CHALLENGE AND ITS ROLE IN TRUSTWORTHY SYSTEMS. In Sinhgad College of Engineering, Artificial Intelligence Education and Innovation (pp. 127–132).
[222] Godase, V. (n.d.-b). REVOLUTIONIZING HEALTHCARE DELIVERY WITH AI-POWERED DIAGNOSTICS: A COMPREHENSIVE REVIEW. In SKN Sinhgad College of Engineering, SKN Sinhgad College of Engineering (pp. 58–61).
[223] Dhope, V. (2024). SMART PLANT MONITORING SYSTEM. In International Journal of Creative Research Thoughts (IJCRT). https://www.ijcrt.org
[224] M. M. Zade,SushantD.Kambale,Shweta A.Mane,Prathamesh M. Jadhav.(2025) "IOT Based early fire detection in Jungles". RIGJA&AR Volume 2 Issue 1,ISSN:2998-4459. DOI:https://doi.org/10.5281/zendo.15056435
[225] M. M. Zade, Bramhadev B. Rupanar, Vrushal S. Shilawant , Akansha R. Pawar(2025) "IOT Flood Monitoring & Alerting System using Rasberry Pi-Pico "International Journal of Research Publication &Reviews , Volume 6 ,Issue3,ISSN:2582-7421.DOI:https://ijrpr.com/uploads/V6ISSUE3/IJRPR40251.pdf
[226] M.M.Zade(2022) "Touchless Fingerprint Recognition System"(Paper-ID 907)(2022) International Conference on "Advanced Technologies for Societal Applications: Techno-Societal 2022 https://link.springer.com/book/10.1007/978-3-031-34644-6?page=6
[227] Mr.M.M.Zade published the paper on "Automation of Color Object Sorting Conveyor Belt", in International Journal of Scientific Research in Engineering & Management (IJSREM),ISSN:2582-3930 Volume 06 ,Issue 11th November 2022.
[228] Mr.M.M.Zade published the paper on "Cloud Based Patient Health Record Tracking web Developement",in International Journal of Advanced Research in Science, Communication &Technology(IJARSCT),ISSN NO:2581-9429 Volume 02 ,Issue03,DOI 1048175/IJARSCT-3705,IF 6.252, May 2022.
[229] Mr. Mahesh M Zade, "Performance analysis of PSNR Vs. Impulse Noise for the enhancement of Image using SMF", Journal of Applied Science & Computations (JASC UGC Approved), Volume VI, Issue II, Feb.2019
[230] Mr. Mahesh M Zade, "Classification of Power Quality Disturbances Using SVM & their Efficiency Comparison", Journal of Applied Science & Computations (JASC UGC Approved), Volume VI, Issue II, Feb.2019
[231] Mr. Mahesh M Zade, "Dynamic Clustering of Wireless Sensor Network Using Modified AODV", Journal of Applied Science & Computations (JASC UGC Approved), Volume VI, Issue II, Feb.2019
[232] Mr. Mahesh M Zade, "Performance analysis of PSNR Vs. Impulse Noise for the enhancement of Image using SMF", National Conference on Mathematical Modeling and Computational Intelligence 2K19 (MMCI-2k19), in association with JASC, at S. B. Patil College of Engineering, Indapur, Feb.2019
[233] Mr. Mahesh M Zade, "Classification of Power Quality Disturbances Using SVM & their Efficiency Comparison", National Conference on Mathematical Modeling and Computational Intelligence 2K19 (MMCI-2k19), in association with JASC, at S. B. Patil College of Engineering, Indapur Feb.2019
[234] Mr. Mahesh M Zade, "Dynamic Clustering of Wireless Sensor Network Using Modified AODV", National Conference on Mathematical Modeling and Computational Intelligence 2K19 (MMCI-2k19), in association with JASC, at S. B. Patil College of Engineering, Indapur Feb.2019
[235] Mr. Mahesh M Zade & Mr.S.M.Karve,"Performance Analysis of Median Filter for Enhancement of Highly Corrupted Images", National Conference on Advanced Trends in Engineering, Association with IRJMS, Karmyogi Engineering College, Shelave, Pandharpur, March 2016.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

[236] Mr. Mahesh M Zade & Mr.S.M.Karve,"Implementation of Reed Solomen Encoder & Decoder Using FPGA",National Conference on Advanced Trends in Engineering, Association with IRJMS, Karmyogi Engineering College, Shelave, Pandharpur, March 2016.

[237] Mr. Mahesh M Zade & Dr.S.M.Mukane,"Performance of Switching Median Filter for Enhancement of Image", National Conference on Mechatronics at Sinhgad Institute of Technology and Science, Narhe, Pune, Feb. 2016.

[238] Mr. Mahesh M Zade & Dr.S.M.Mukane,"Enhancement of Image with the help of Switching Median Filter", National Conference on Emerging Trends in Electronics & Telecommunication Engineering, SVERI's College of Engineering Pandharpur, NCET 2013.

[239] Mr.Mahesh M Zade & Dr.S.M.Mukane,"Enhancement of Image with the help of Switching Median Filter", International Journal of Computer Application (IJCA) SVERI's College of Engineering, Pandharpur, Dec.2013.