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A MONITORING APPLICATION FOR ANIMAL REPELLING SYSTEM FOR CROP PROTECTION IN SMART AGRICULTURE

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ABSTRACT:

In this project, we focus on a Smart Agriculture application that aims to protect crops from ungulate attacks, and therefore to significantly reduce production losses through the creation of virtual fences that take advantage of computer vision and ultrasound emission. Starting with an innovative device capable of generating ultrasound to drive away ungulates and thus protect crops from their attack. It helps us to monitor a certain area and prevent theft and also provides proof of evidence. In the case of farmlands or agricultural lands surveillance is very important to prevent unauthorized people from gaining access to the area as well as to protect the area from animals. Traditional methods of detecting animals in paddy fields and farms include the use of human eyes to witness animal movements. It is not possible for human beings to monitor animal movements continuously throughout the day. So there is a need for specialized detection of animals particularly which enter the paddy fields and farm land of human beings.

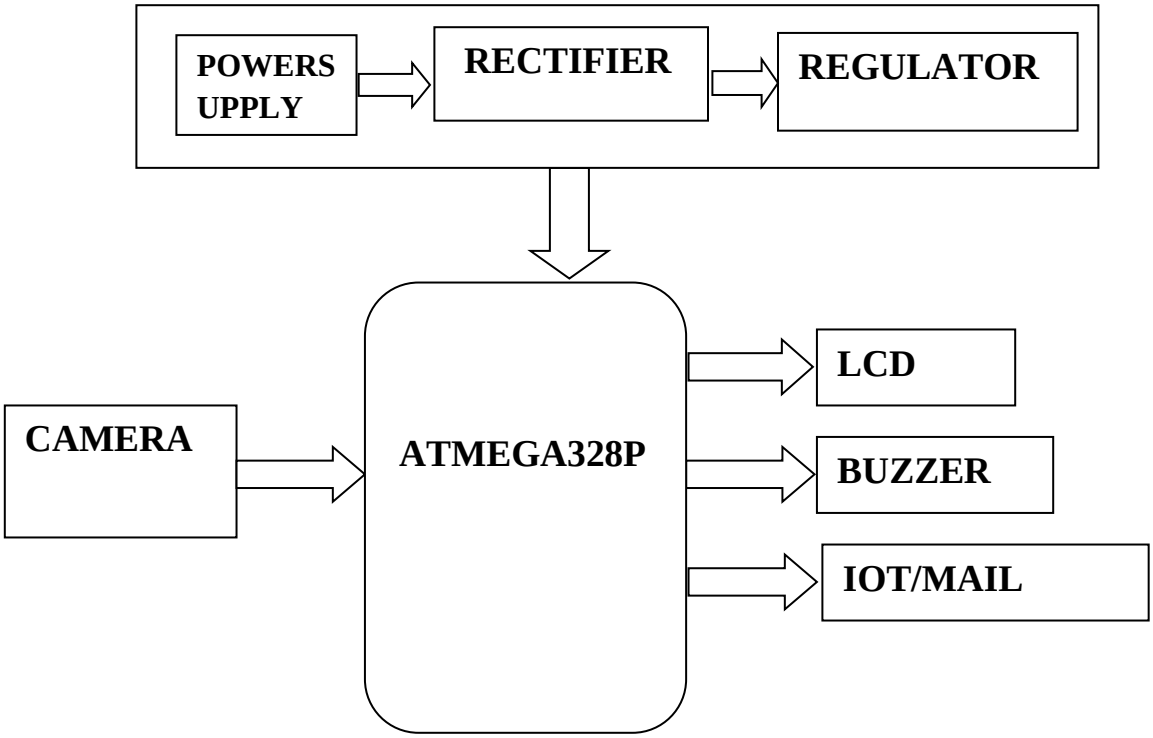
INTRODUCTION:

Agriculture is the main source of livelihood of many people in different parts of the world. Unfortunately farmers are still reliant on traditional techniques that have evolved hundreds of years ago. Due to this the yield of crops are becoming low. Also there are a number of factors that contribute to the low yield of crops animal intrusion is also one among them.

In recent years wild animals are special challenge for the farmers throughout the world, Animals like wild boars, elephant, tiger and monkeys etccause serious damage to crops by animals running over the field and trampling over the crops.

It causes the financial problem to the farmers. Farmers with large area of agricultural lands find it very tedious to irrigate their land manually.

BLOCK DIAGRAM:



COMPONENTS:

POWERSUPPLY:

A power supply is a device that converts one voltage to another more convenient voltage while delivering power. Power supplies are designed from the output back to the input.

RECTIFIER:

A rectifier is a device that converts an oscillating two-directional alternating current (AC) into a single-directional direct current (DC). Rectifiers can take a wide variety of physical forms, from vacuum tube diodes and crystal radio receivers to modern silicon-based designs.

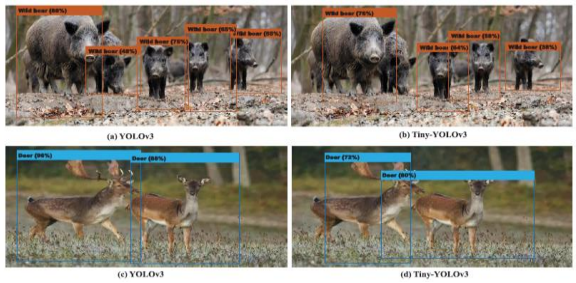
REGULATOR:

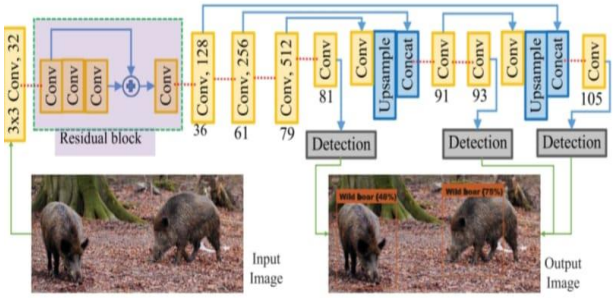
A voltage regulator generates a fixed output voltage of a preset magnitude that remains constant regardless of changes to its input voltage or load conditions. There are two types of voltage regulators: linearandswitching.

CAMERA(Yolo Algorithm):

YOLO is an acronym for “You Only Look Once” and it has that name because this is a real-time object detection algorithm that processes images very fast.Object detection is the task of detecting

instances of objects of a specific class within an image or video. Basically, it locates the existence of objects in an image using a bounding box and assigns the types or classes of the objects found

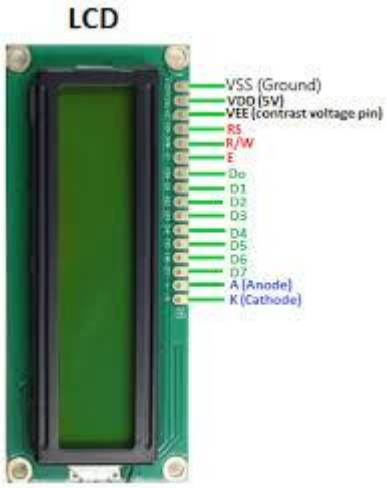




. For instance, it takes an image as input and generates one or more bounding boxes, each with the class label attached. These algorithms are powerful enough to handle multi-class classification and localization and objects with multiple occurrences.

LCD:

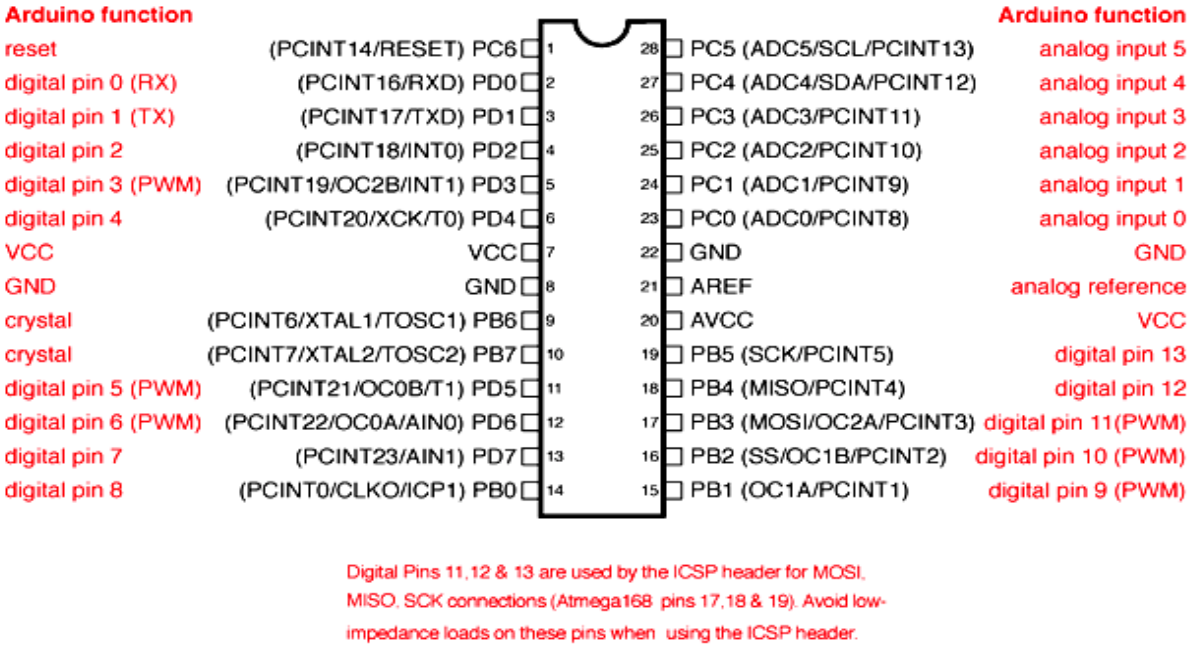
LCD (LiquidCrystalDisplay) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smartphones, televisions, computer monitors andinstrument panels.The liquid crystal display (LCD) panel is designed to project on-screen information of a microcomputer onto a larger screen with the aid of a standard overhead projector, so that large audiences may view on-screen information without having to crowd around the TV monitor. The letter Do, D1 and so on above means data bit 0, data bit 1 etc. Most character displays use eight data bits. The character table contains 255 possible characters.



ATMEGA328P:

ATmega-328 has 2KB Static Random Access Memory (SRAM). ATmega328/328P is a 28-Pin AVR Microcontroller, manufactured by Microchip, follows RISC Architecture and has a flash-type program memory of 32KB. ATMEGA328/328P.ATmega-328/328P is an AVR Microcontroller having twenty-eight (28) pins in total.

ATMega328P and Arduino Uno Pin Mapping



Digital Pins 11,12 & 13 are used by the ICSP header for MOSI, MISO, SCK connections (Atmega168 pins 17,18 & 19). Avoid low-impedance loads on these pins when using the ICSP header.

ATmega328 is commonly used in many projects and autonomous systems where a simple, low-powered, low-cost micro-controller is needed. Perhaps the most common implementation of this chip is on the popular Arduinodevelopment platform, namely the Arduino Uno, Arduino Pro Mini and Arduino Nano models

BUZZER:

A buzzer is understood as a device that creates an audible tone under the influence of an applied external voltage. This output may either be in the form of a buzzing or a beeping sound.Also known as a sounder, audio alarm or audio indicator, a buzzer is a basic audio device that generates a sound from an incoming electrical signal. Buzzers come in two primary forms — piezo buzzers and magnetic buzzers.The buzzer is a sounding device that can convert audio signals into sound signals. It is usually powered by DC voltage. It is widely used in alarms, computers, printers and other electronic products as sound devices.Piezoelectric and magnetic buzzers are most commonly used in electronic applications. The buzzers are designed to be used as a transducer or indicator in any circuit. Buzzers/Beepers are designed to operate as either transducer or indicator in electronic circuits.

An active buzzer sensor module has a built-in oscillation circuit, thus the sound frequency is fixed. It is able to generate the sound itself. So, you can simply turn it on and off with an Arduino pin, just like the way of turning on and off a Led which is connected to Arduino board.

IOT/MAIL:

IOT hosts email services in Exchange Online. This is a cloud-based service hosted in the Microsoft Government cloud. Hosting email in Exchange Online improves security as well as reduces infrastructure costs. IoT — Internet of Things is an extremely fascinating concept. It's the interconnectivity of digital devices that provide brands the opportunity to listen and respond to customers at the perfect time, on their preferred device and with the right message.

WORKING PRINCIPLE:

The object matched with predefined object of YOLO algorithm, camera will capture a picture and upload it to the server. After capturing the image of intruding animals, the image in the server will get deleted.Intelligence surveillance system that detects the animal through YOLO framework algorithm and sends notification through Message and Mail.

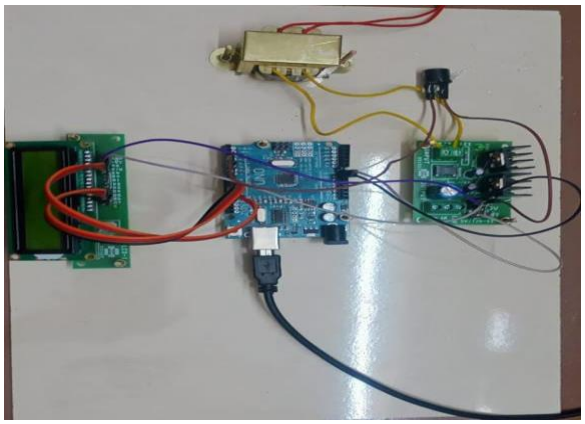


Fig:final implementation

It also turns ON buzzer automatically and also farmer can control. In this project we using YOLO file for animal detection and recognition we will find animal in real time using AI ,OPENCV After acquisition of image it has to be pre-processed and compressed. Images are used to train the model. It is trained by performing feature extraction on the image to obtain the required pattern in the image.Followed by feature fusion and dimension reduction to compress the image for reliable and real time performance.Finally the animal is identified.

CONCLUSION:

The project has been successfully designed and tested. It has been developed by integrating features of all the processor and software used and tested. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit.The problem of crop

vandalization by wild animals has become a major social problem in the current time. It requires urgent attention and an effective solution. Thus this project carries a great social relevance as it aims to address this problem. Smart embedded farmland protection and surveillance based system which is low cost, and also consumes less energy.

Final Output:

Fig:LCD Output

Fig:Prediction Result

REFERENCES:

1. M. De Clercq, A. Vats, and A. Biel, ‘‘Agriculture 4.0: The future of farming technology,’’ in Proc. World Government Summit, Dubai, UAE, 2018, pp. 11–13.
2. Y. Liu, X. Ma, L. Shu, G. P. Hancke, and A. M. Abu-Mahfouz, ‘‘From industry 4.0 to agriculture 4.0:Current status, enabling technologies, and research challenges,’’ IEEE Trans. Ind. Informat., vol. 17, no. 6,pp. 4322–4334, Jun. 2021.
3. M. S. Farooq, S. Riaz, A. Abid, K. Abid, and M. A.Naeem, ‘‘A survey on the role of IoT in agriculture for the implementation of smart farming,’’ IEEE Access,vol. 7, pp. 156237–156271, 2019.
4. K.Kirkpatrick,‘‘Technologizing agriculture,’’Commun. ACM, vol. 62, no. 2, pp. 14–16, Jan. 2019.
5. A. Farooq, J. Hu, and X. Jia, ‘‘Analysis of spectralbands and spatial resolutions for weed classification via deep convolutional neural net work,’’ IEEE Geosci.Remote Sens. Lett., vol. 16, no. 2, pp. 183–187, Feb.2018.
6. M. Apollonio, S. Ciuti, L. Pedrotti, and P. Banti,‘‘Ungulates and their management in Italy,’’ in European Ungulates and Their Management in the 21th Century. Cambridge, U.K.: Cambridge Univ. Press, 2010, pp. 475–505.
7. A. Amici, F. Serrani, C. M. Rossi, and R. Primi,‘‘Increase in crop damage caused by wild boar (Susscrofa L.): The ‘refuge effect,’’’Agronomy Sustain.Develop., vol. 32, no. 3, pp. 683–692, Jul. 2012.
8. S. Giordano, I. Seitanidis, M. Ojo, D. Adami, and F.Vignoli, ‘‘IoT solu tions for crop protection against wild animal attacks,’’ in Proc. IEEE Int. Conf. Environ. Eng. (EE), Mar. 2018, pp. 1–5.
9. M. O. Ojo, D. Adami, and S. Giordano, ‘‘Network performance evaluation of a LoRa-based IoT system for crop protection against ungulates,’’ in Proc. IEEE 25th Int. Workshop Comput. Aided Modeling Design Commun. Links Netw. (CAMAD), Sep. 2020, pp. 1–6.
10. S. Ren, K. He, R. Girshick, and J. Sun, ‘‘Faster R-CNN:Towards real-time object detection with region proposal

networks,'' 2015, arXiv:1506.01497. [Online]Available: http://arxiv.org/abs/1506.01497

11. H. E. Heffner and R. S. Heffner, ''Hearing ranges of laboratory ani mals,'' J. Amer. Assoc. Lab. Animal Sci.,vol. 46, no. 1, pp. 20–22, 2007.
12. R. Shi, T. Li, and Y. Yamaguchi, ''An attribution-based pruning method for real-time mango detection with YOLO network,'' Comput. Electron. Agricult., vol. 169,Feb. 2020, Art. no. 105214.
13. N. P. Ramaiah, E. P. Ijjina, and C. K. Mohan,''Illumination invariant face recognition using convolutional neural networks,'' in Proc. IEEE Int.Conf. Signal Process., Informat., Commun. Energy Syst.(SPICES), Feb. 2015, pp. 1–4.
14. R. Singh and H. Om, ''Newborn face recognition using deep convolutional neural network,'' Multimedia Tools Appl., vol. 76, no. 18, pp. 19005–19015, 2017.
15. E. Li, L. Zeng, Z. Zhou, and X. Chen, ''Edge AI: On-demand accelerating deep neural network inference via edge computing,'' IEEE Trans. Wireless Commun., vol.19, no. 1, pp. 447–457, Jan. 2020.