PROTECTION OF CROPS AND PROPER USAGE OF RAIN WATER USING SATELLITE COMMUNICATION AND WIRELESS SENSOR NETWORK AND WILD ANIMAL DETECTION

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1)Abstract: The Embedded Technology is now in its prime and the wealth of Knowledge available is mind-blowing. Embedded technology plays a major role in integrating the various functions associated with it. This needs to tie up the various sources of the Department in a closed loop system. This proposal greatly reduces the manpower, saves time and operates efficiently without human interference. This project puts forth the first step in achieving the desired target. With the advent in technology, the existing systems are developed to have in built intelligence. Wildlife monitoring and analysis are an active research field since last many decades. In this paper, we focus on wildlife monitoring and analysis through animal detection from natural scenes acquired by camera-trap networks. The image sequences obtained from camera-trap consist of highly cluttered images that hinder the detection of animal resulting in low-detection rates and high false discovery rates. To handle this problem, we have used a camera-trap database that has candidate animal proposals using multilevel graph cut in the spatiotemporal domain. These proposals are used to create a verification phase that identifies whether a given patch is animal or background. We have designed animal detection model using self-learned Deep Convolutional Neural Network (DCNN) features. This efficient feature set is then used for classification using state-of-the-art machine learning algorithms, namely support vector machine, k-nearest neighbor, and ensemble tree. Our intensive results show that our detection model using DCNN features provides accuracy of 91.4% on standard camera-trap dataset.

2)Introduction :Agriculture is the backboneof our country. About 70% of India's revenue comes from agriculture.Agriculture in India is still carried out in conventional way and lags behind in integrating modern technologies. Around 55 percent of India's population has been engaged in agriculture and allied activities which constitute only 15 percent of GDP so it becomes much important for the stakeholders involved to come out of the conventional agricultural practices and modernize the agriculture using technology. The economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth while large number of people continues to work in the agriculture sector. Hence, there is an immediate need to improve the systemwhich can increase the yield and produce healthy organic food.Under such a scenario, the usage of water especially the fresh water resource by agriculture will be enormous and according to the current market surveys it is estimated that agriculture uses 85% of available freshwater resources worldwide, and this percentage will continue to be dominant because of population growth and increased food demand.

3)Literature Survey: According to Dr.N.Suma[1] et.al, IOT based smart agriculture monitoring system the newer scenario of decreasing water tables, drying up of rivers and tanks, unpredictable environment present an urgent need of proper utilization of water. To cope up with this use of temperature and moisture sensor at suitable locations for monitoring of crops is implemented in. An algorithm developed with threshold values of temperature and soil moisture can be programmed into a microcontroller-based gateway to control water quantity.The system can be powered by photovoltaic panels and can have a duplex communication link based on a cellular Internet interface that allows data inspection and irrigation scheduling to be programmed through a web page.A remote sensing and control irrigation system using distributed wireless sensor network aiming for variable rate irrigation, real time in field sensing, controlling of a site specific precision linear move irrigation system to maximize the productivity with minimal use of water was developed by Y. Kim[5] et.al in security framework in RFID multi-domain system. The system described details about the design and instrumentation of variable rate irrigation, wireless sensor network and real time in field sensing and control by using appropriate software. The whole system was developed using five in field sensor stations which collects the data and send it to the base station using global positioning system (GPS) where necessary action was taken for controlling irrigation according to the database available with the system. The system provides a promising low cost wireless solution as well as remote controlling for precision irrigation.

4) BLOCK DIAGRAM:

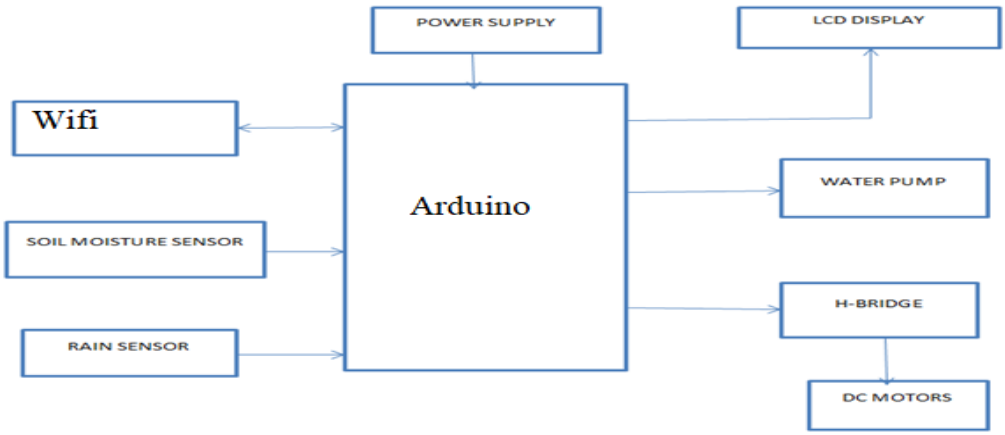
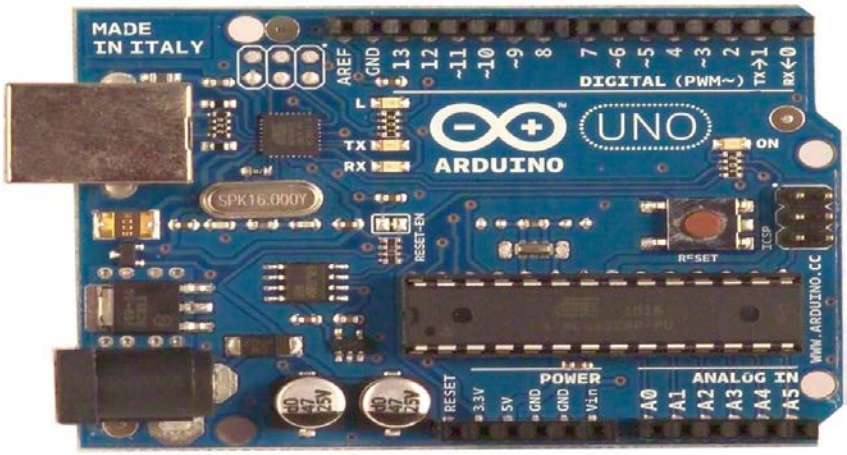


Figure 1: System block diagram of crop protection and rainwater harvesting



5)WORKING PRINCIPLE:

In case of heavy rainfall the farmer will send a signal or a message to start the operations. As soon as the GSM module receives the signal using IC MAX232 the microcontroller is enabled. The first operation of microcontroller is to activate the dc motor in such a way that it starts rotating in clockwise direction to cover the double coated polythene sheet over the crops. Hence the crop is covered by the double coated polythene sheet over the agriculture land & crop is protected. The required protection is fabricated by four adjustable poles which enables the adjustment of height. The microcontroller is used to control this operation using GSM technology which enables the farmer to control the operation from the remote place. Even System works in automated mode i.e. when former doesn't respond to the request from GSM, it checks the moisture content of the soil using moisture sensor and initiates appropriate action required to protect crop.The images that is sent by the camera is received by the PC for classification of animal.Database is created and the set of sample images are stored in it. The program consists of functions such as indexImage, imageSet and retrieveImage. The ImageSet is used to hold a collection of images. indexImage is used to create an image search index. indexImage is used with the retrieveImage function to search for images. The captured image is given as query image to the processing system. The retrieveImage function takes two arguments, a query image and the image stored in the database. The resultant is the indices corresponding to images within image Index that are visually similar to the query image. The image IDs output contains the indices in ranked order, from the most to least similar match. The value match range is from 0-1.If the value is 0, then the image is not matched. If it is 1, then the query image is same as that of the stored image.If the value is found between that of 0-1, then the query image falls under the category of the stored image i.e., the contents in the query image are same as that of the stored image.If the name of the image matches with that of the regular expression of the image then the animal is elephant otherwise it is a leopard. If the score is in the range of 0.1 to 0.9, then the image is matched with that of the stored image. Once the wild animal is identified then the resulting repellent system is applied. If the animal found is an elephant then the Bright light is emitted. If it is found to be a Leopard, then the irritating loud noise is used. Consequently a SMS is sent to the forest officialsand also to the field owner as alert information. If the detected object is not a threat then no SMS is sent. By this way false alarm can be prevented.

6) Technical Specifications

- Microcontroller ATmega328
- Operating Voltage 5V
- Input Voltage (recommended) 7-12V
- Input Voltage (limits) 6-20V
- Digital I/O Pins 14 (of which 6 provide PWM output)
- Analog Input Pins 6
- DC Current per I/O Pin 40 mA
- DC Current for 3.3V Pin 50 mA
- Flash Memory 32 KB of which 0.5 KB used by boot loader
- SRAM 2 KB
- EEPROM 1 KB

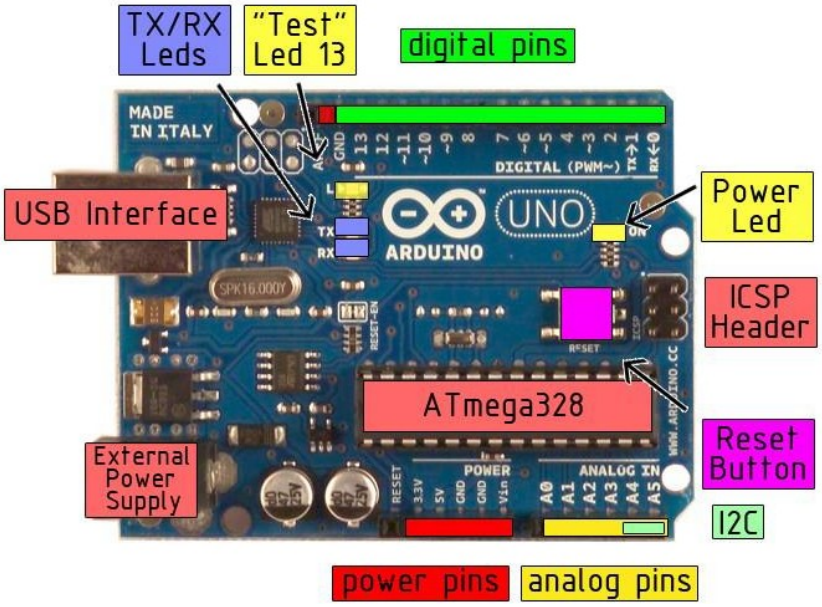


Fig 2: Arduino Specifications

7) INNOVATIVENESS AND USEFULLNESS:

The problem of wild animal attacks on crop fields i.e. crop vandalization is becoming a very common phenomenon in the state of Himachal Pradesh, Punjab, Haryana and many other states. Wild animals like monkeys, estray animals especially cows and buffaloes, wild dogs, nilgais, bisons, elephants deer, wild pigs and even birds like parakeets cause a lot of damage to crops either by running over them or eating them and vandalizing them completely. This leads to poor yield of crops. These animals attack on fruit orchards and destroy the flowerings and fruits. In both cases, this leads to significant financial loss to the farmers and orchard owners. The problem is so pronounced that sometimes farmers decide to leave the area barren due to these animal attacks.

The problem of monkeys is especially more pronounced in the hill state of Himachal Pradesh. Groups of wild monkeys attack fields in the Una District mainly in the border areas of Himachal Pradesh and Punjab and cause a lot of financial loss to farmers. The scenario is same in District Shimla, which is famous for its apple orchards. Monkeys cause a lot of havoc in the apple orchards and ultimately lead to financial losses to owners. In District Kangra and Hamirpur, the problem of estray cows, buffaloes and wild pigs is more pronounced. Herds of cows attack the fields, destroy the crops and almost render the fields useless for the rest of the season.

The state of Kerala faces similar problems where animals like Asian elephants, wild pigs, Indian crested porcupine, Indian giant squirrel, Indian peafowl and other birds vandalize the crops causing great financial losses. It has been estimated that at minimum conservative average damage per household of ₹ 6,000, 15 million families could suffer a cumulative loss of ₹ 9,000 crore every year. This is a very huge amount to loose in a country like India.

8) ACKNOWLEDGEMENT:

We would like to extend our sincere thanks to principle and HOD OF EEE RYMEC institution, we woulike express our deepest appreciation for our guide DR hanumanth rao sir for encouraging our project proposal for paper publishing ,we would also like to extend our deepest gratitutude to friends and family members for useful discussions .

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papers gives information about Iot based smart greenhouse.

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