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Smart Surveillance and Alert Network using Deep CNNs for Preventing Animal Attacks

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Abstract-Efficient and reliable watching of untamed animals that are about to human home ground and their natural habitats is crucial to require precaution and management selections. Ways for animal detection are useful to understand regarding the moving activity of targeted animal and to forestall animal intrusion that result dangerous things in forest border space. machine-driven police investigation cameras are being a more and more widespread tool for life watching thanks to their effectiveness and responsible in assembling knowledge of life unobtrusively, endlessly and in massive volume. However, process such an outsized volume of pictures and videos captured from camera manually is very high-priced, long and conjointly monotonous. Investing on recent advances in deep learning techniques in laptop vision, we have a tendency to propose during this paper a framework to create machine-driven animal recognition close to the forest space, aiming at an automatic field watching system. Specifically, we have a tendency to use the state-of-the-art deep convolutional neural network architectures, to coach a process system capable of filtering animal pictures and distinguishing species mechanically. Our experimental results achieved an accuracy at ninetieth for the task of police investigation pictures containing animal, and ninety-two for distinguishing the 3 commonest species among the set of pictures of untamed animals taken in Asian country that always intrude in to the human home ground. This, in turn, will helps to forestall animal attacks, loss of life and avoid monetary losses by a straightforward alert network. We have a tendency to implement and take a look at this technique in real time and also the results are extremely encouraging compared to several existing systems.

Keywords:- Deep learning, convolutional neural networks, large scale image classification, animal recognition, wildlife monitoring.

I. INTRODUCTION

Human animal conflict creates heap of negative impact for each human and wild animal. Injury and loss of lifetime of humans and life, injury to human property, crop injury, destruction of environs is a few of the most impact of those conflict. Deforestation is that the reason answerable for the wild animals to maneuverer into the human areas. Large forest areas are the animals prey base and therefore the corridors of their natural movement, they're currently encroached upon by humans that the animals are plunging into human habitats in search of food and water.

So, there's a requirement of developing a system that notice presence of interactions of untamed animal close to the human environs and while not

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inflicting any harmful impact to creature and wild animal. This project covers numerous perspectives of the planning of such systems, together with image process and computer science for animal detection, species classification, style of alarm unit and animal repellent circuit.

II. MATERIALS AND METHODOLOGY

The existing system uses ancient electrical fence has been helpful as a guard of crops. However, that system has some problems love it cannot offer notice the voltage that always drops. Moreover, the householders of the fence got to check the voltage but they'll not comprehend it whereas not going there.

Associate in nursing electrical fence management system we have a tendency to tend to develop uses wireless communication, and it permits the householders to grasp the voltage and conjointly the state of the electrical fence and monitor it from remote locations safely. It describes a demonstrative experiment throughout a mountainous region, Associate in nursing approach to resolve some problems. Associate in nursing electrical fence system victimization wireless network technology has been developed.

The system consists of the many observers and a show, the farmers are able to live voltage at the fence, and have a capability to signify it. The observers transmit the voltage with the direction of the voltage leak to the show.

The show shows the received information and conjointly the householders can grasp the state of the electrical fence. In projected system we have a tendency to tend to don't use electrical fencing or traps that harms or provoke the wild animals instead we have a tendency to tend to started camera 300-500 m among the forest area to capture the pictures of the wild animals that intrudes toward the farm land and human surroundings.

A straightforward alert network victimization semiconductor unit and buzzer unit accustomed alert the oldsters close to this put together distract the wild animals from a lot of invasion. we have a tendency to tend to put together alert the commissioned person through captured image in their itinerant that alter them to grasp what quite animal is approaching intimately. This uses the conception convolutional neural network that train the system the type of animal intrudes. It will even be used as ancient investigating camera. The set mental object of the animal and their photos we have a tendency tore collected and hold on which we regenerate them into TensorFlow models.

In raspberry pi we have a tendency to tend to embrace these models and with a gaggle of code in python, that's fast and economical. We have a tendency to tend to coach the system to capture the image of the wild animals, with accuracy of ninetieth. This accuracy is archived through the deep learning rule that we have a tendency to tend to use among the code. A USB web camera is connected among the raspberry pi that is accustomed discover the animals approaching towards the fixed area.

We are going to investigating the planet endure the computer/laptop victimization VNC viewer or through monitor via HDMI cable in raspberry pi. Once the animal is detected and matches with the model, we've hold thereon activates the buzzer and semiconductor unit connected through a relay module in raspberry pi, which alerts the oldsters close to put together distract the animals from a lot of intrusion.

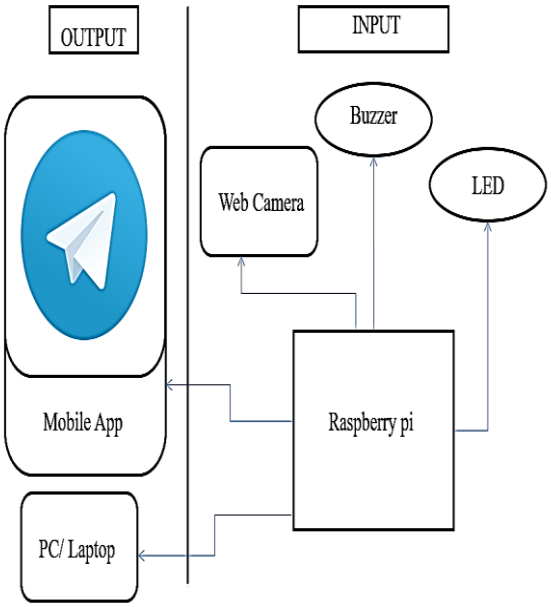

Fig 1. Block Diagram.

This helps to avoid the conflicts whereas not harming the wild animals. In addition, we have created a bot that is interfaced with the telegram mobile

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application. With the API token created for the telegram bot we fetched to the python code. We can obtain the image of the animal that intrudes to the human territory with an alert message. This helps to analyze the problem in detail.

III. RESULTS AND DISCUSSIONS

The animal identification results have shown a decent performance in distinguishing the foremost common species of three animals.

Whereas this performance might not however be sufficient to create a completely automatic recognition, it still adds a colossal worth in up the system by mechanically providing initial animal labels for human annotators. We tend to anticipate that with additional information collected over time and with a fast growing capability of deep learning techniques in pc vision, this performance can be improved considerably in close to future.

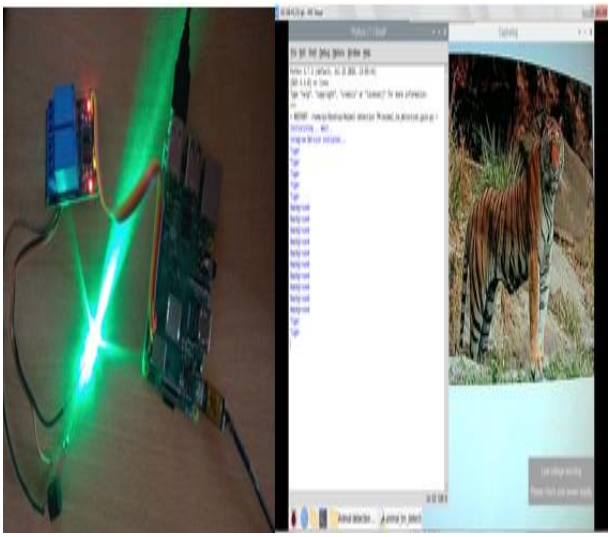

Fig 2. Output of the model.

IV. CONCLUSION AND FUTURE WORKS

This paper presented the design of smart and efficient real time surveillance system that helps preventing animal attacks. We proposed and demonstrated the feasibility of a deep learning approach towards constructing scalable automated wildlife monitoring system.

Our models achieved more than 90% in recognizing images with animals and close to 93% in identifying three most common animals that is used to avoid the invasion of wild animal to the farmland and the human habitat near the forest region without harming them. Here the web camera used with Raspberry pi is used to detect the presence of wild animal and alert through the buzzer and led also alert message and image of the animal in the telegram mobile application.

V. FUTURE WORKS

We are working on alternative ways to improve the system's performance by enhancing the dataset, applying deeper CNN models and exploiting specific properties of camera images. Towards a fully automated wild animal recognition system, we would investigate transfer learning to deal with problem of highly imbalanced data.In near future we can enhance the to a wide range area also with additional effective sensors.

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