

## International Journal of Innovative Research in Science, Engineering and Technology

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# Smart Park: A Method to Save Unwanted Power Wastage Using Machine Learning and Image Processing

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**ABSTRACT:** India being a country that uses 67% of non-renewable energy and only a 33% of renewable energy, it is necessary to not waste any of the energy that is being produced in the country. India has surplus power generation capacity but lacks adequate infrastructure for supplying electricity to all needy people. This paper focuses on controlling the wastage of energy by big IT parks and software companies which will also ensure that a lot of their money is saved which is spent on the unwanted usage of the energy. To build on this idea as a successful model, *Machine learning* algorithm along with *Image processing* is used to identify whether a person is currently present in the working bay. Once it is identified that a person is present only then the lights would turn on instead of the light being on unnecessarily all the while, no matter whether people are present or not, which is the current scenarios of many big Software cooperates.

**KEYWORDS:** Machine Learning, Image Processing, power generation, electricity

### I. INTRODUCTION

The Image Processing technology is being used for military, agriculture, aerial photography, surveillance, remote sensing and many more purposes. In this paper, we propose a system based on image processing where images or videos are processed by Matlab using Digital Image processing Toolbox for monitoring and detecting the events at any place. Operations of the proposed project has two processing units, 1st processing unit is for implementation of real time image processing techniques and 2nd processing unit will handle the rest of monitoring and intimation operations. Video Camera will monitor circular area and it will automatically perform all operation. Object detection algorithms have been tested to find accuracy in detection and to analyze the processing time before implementing in such environment and the results provide optimal accuracy in matching shape in predefined database.

### II. LITERATURE SURVEY

**VivekAshokanet.al**<sup>[1]</sup> The proposed model has a two-stream structure that is composed of the appearance and motion streams. For each stream, a recurrent variational autoencoder can model the probabilistic distribution of the normal data

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in a semi-supervised learning scheme. The appearance and motion features from the two streams can provide complementary information to describe this probabilistic distribution.

**Shiyang Yan et.al**<sup>[2]</sup> This paper presents a vision-based moving objects detection work which attracts much attention in intelligent automobile applications recently. Vision-based objects detection provides object behavior information of objects and is an intuitive detection method similar to human visual perception. Besides, vision-based objects detection methods are much low-cost compared with detection methods such as RADAR (Radio Detection And Ranging), or LiDAR (Light Detection And Ranging). However, current vision-based objects detection methods still suffer from several challenges such as high false alarms and unstable detection rate which limit their value in practical applications. Accordingly, this paper presents a robustness enhancing method for vision-based moving objects detection.

**Ting-Fung Ju et.al**<sup>[3]</sup> This paper presents a vision-based moving objects detection work which attracts much attention in intelligent automobile applications recently. Vision-based objects detection provides object behavior information of objects and is an intuitive detection method similar to human visual perception. Besides, vision-based objects detection methods are much low-cost compared with detection methods such as RADAR (Radio Detection And Ranging), or LiDAR (Light Detection And Ranging). However, current vision-based objects detection methods still suffer from several challenges such as high false alarms and unstable detection rate which limit their value in practical applications. Accordingly, this paper presents a robustness enhancing method for vision-based moving objects detection.

**Muhammet Yan et.al**<sup>[4]</sup> This paper presents a vision-based moving objects detection work which attracts much attention in intelligent automobile applications recently. Vision-based objects detection provides object behavior information of objects and is an intuitive detection method similar to human visual perception. Besides, vision-based objects detection methods are much low-cost compared with detection methods such as RADAR (Radio Detection And Ranging), or LiDAR (Light Detection And Ranging). However, current vision-based objects detection methods still suffer from several challenges such as high false alarms and unstable detection rate which limit their value in practical applications. Accordingly, this paper presents a robustness enhancing method for vision-based moving objects detection.

**Kaiyou Song et.al**<sup>[5]</sup> Object detection remains a challenging task in computer vision due to the tremendous extent of changes in the appearances of objects caused by clustered backgrounds, occlusion, truncation and scale change. Current deep neural network (DNN)-based object detection methods cannot simultaneously achieve a high accuracy and a high efficiency. To overcome this limitation, in this study, we propose a novel multi-scale attention deep neural network (MSA-DNN) for accurate object detection with high efficiency. The proposed MSA-DNN method utilizes a novel multi-scale feature fusion module (MSFFM) to construct high-level semantic features. Subsequently, a novel multi-scale attention module (MSAM) based on the fused layers of the MSFFM is introduced to exploit the global semantic information of image-level labels to guide detection. On the one hand, MSAM can capture global semantic information to further enhance the semantic feature representation of the fused layers constructed by the MSFFM, thereby improving the detection accuracy. On the other hand, the multi-scale attention maps generated by MSAM can be employed to rapidly and coarsely locate objects at different scales. In addition, an attention-based hard negative mining strategy (AHNM) is introduced to filter out negative samples to reduce the search space, dramatically alleviating the severe class imbalance problem. Extensive experimental results on the challenging PASCAL VOC 2007, PASCAL VOC 2012 and MS COCO datasets demonstrate that MSA-DNN achieves a state-of-the-art detection accuracy while maintaining a high efficiency. Furthermore, MSA-DNN significantly improves the small-object detection accuracy.

**Ting-Fung Ju**<sup>[6]</sup> This paper presents a vision-based moving objects detection work which attracts much attention in intelligent automobile applications recently. Vision-based objects detection provides object behavior information of objects and is an intuitive detection method similar to human visual perception. Besides, vision-based objects detection methods are much low-cost compared with detection methods such as RADAR (Radio Detection And Ranging), or LiDAR (Light Detection And Ranging). However, current vision-based objects detection methods still suffer from several challenges such as high false alarms and unstable detection rate which limit their value in practical applications. Accordingly, this paper presents a robustness enhancing method for vision-based moving objects detection.

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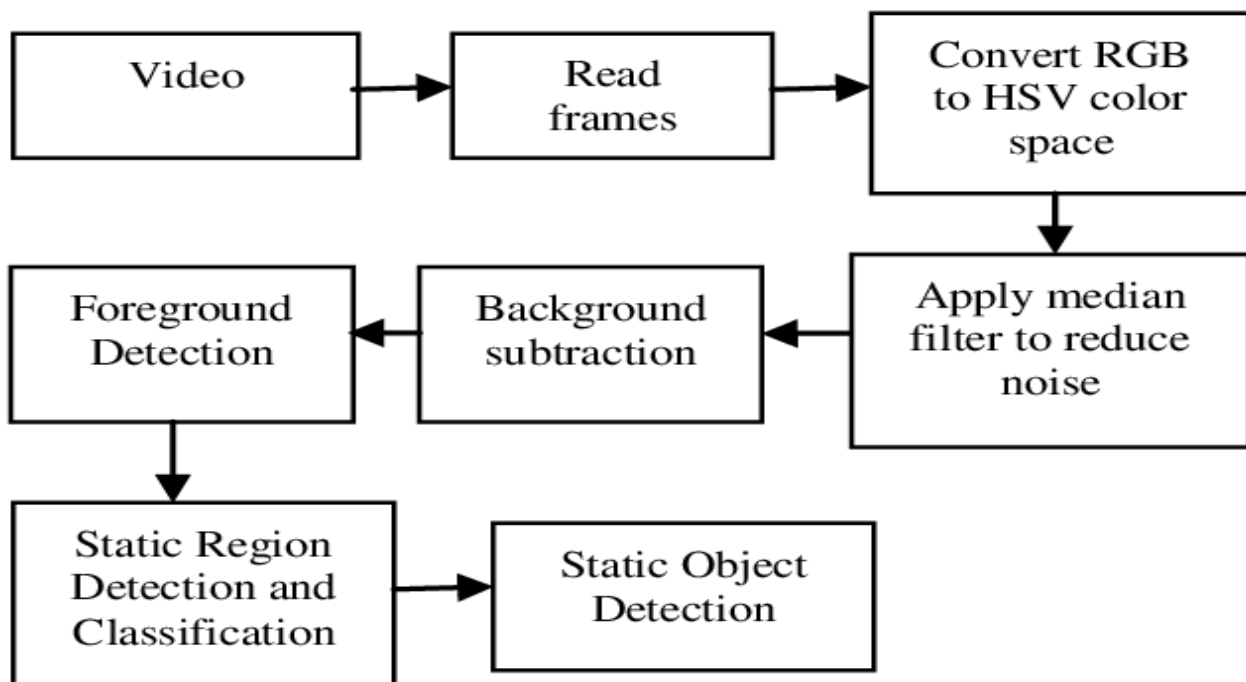
## III. EXISTING SYSTEM

Hardware startup Zenatix has developed the device called WattMan — designed for retail chains and banking/financial institutions — and counts institutions including Mother Dairy, State Bank of India, Aditya Birla's More retail chain, Fabindia, NIIT and GlaxoSmithKline among its clients. The WattMan hardware consists essentially of three main units: sensors, — which include energy meters and power and temperature sensors — to monitor the infrastructure; relays and switches to control the equipment; and a main controller unit that collects, analyses and relays data to be collected to the cloud and also activates the relays and switches based on requirement. The device monitors various parameters including power consumption, UPS power, fuel levels in the diesel generator etc via its connected sensors and controls the functioning of the monitored equipment remotely, in real-time.

## IV. PROPOSED SYSTEM

Our basic idea is to monitor the energy that are being wasted by the IT companies, to ensure that the wastage is minimized with our new method, and to address the lack of adequate electricity supply to all the people in the country, for which our idea will be a cost cutting technique. Object detection remains a challenging task in computer vision due to the tremendous extent of changes in the appearances of objects caused by clustered backgrounds, occlusion, truncation and scale change. Current Deep Neural Network (DNN)-based object detection methods cannot simultaneously achieve a high accuracy and a high efficiency. To overcome this limitation, we propose a novel multi-scale attention deep neural network for accurate object detection with high efficiency. We propose a new and novel system for predicting and detecting the activities using Machine learning techniques based on image processing. In our proposed system working principle is based on computer vision, artificial intelligence and control system where video camera interfaced with Matlab (for image processing), which analysis each frame in the real time video to monitor, detect and indicate.

## V. ARCHITECTURE DIAGRAM



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## Frame conversion:

The video is converted into frames and the required frame is taken for processing.

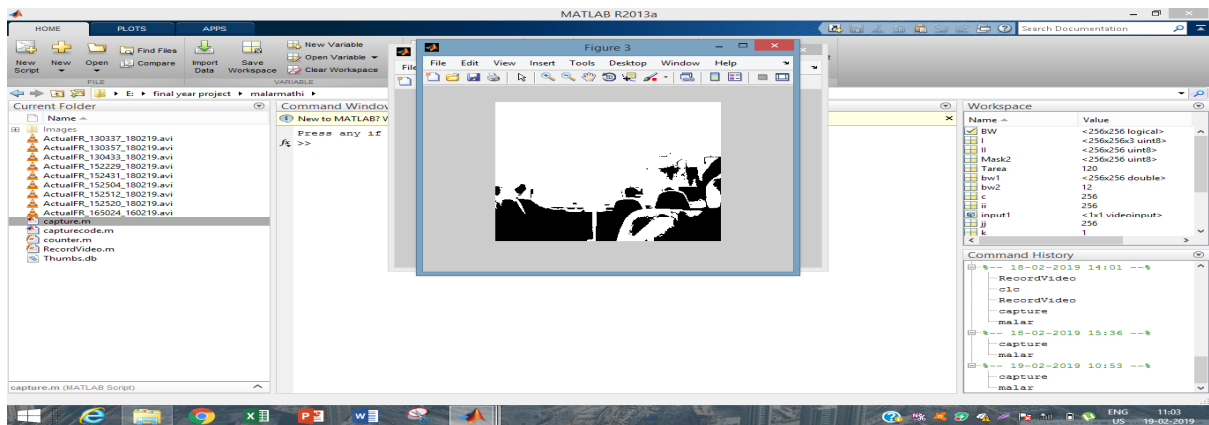


Figure 3.1: Frame conversion

## Pre- processing:

In this module the pre-processing is done with the given input image. The grey scale conversion takes place then the noise is removed using the median filter. Then binary conversion takes place. This is the first phase and here the image is given as an input for pre-processing. During the pre-processing phase grey scale conversion takes place then noise is removed. Then binary conversion takes place before the segmentation process.

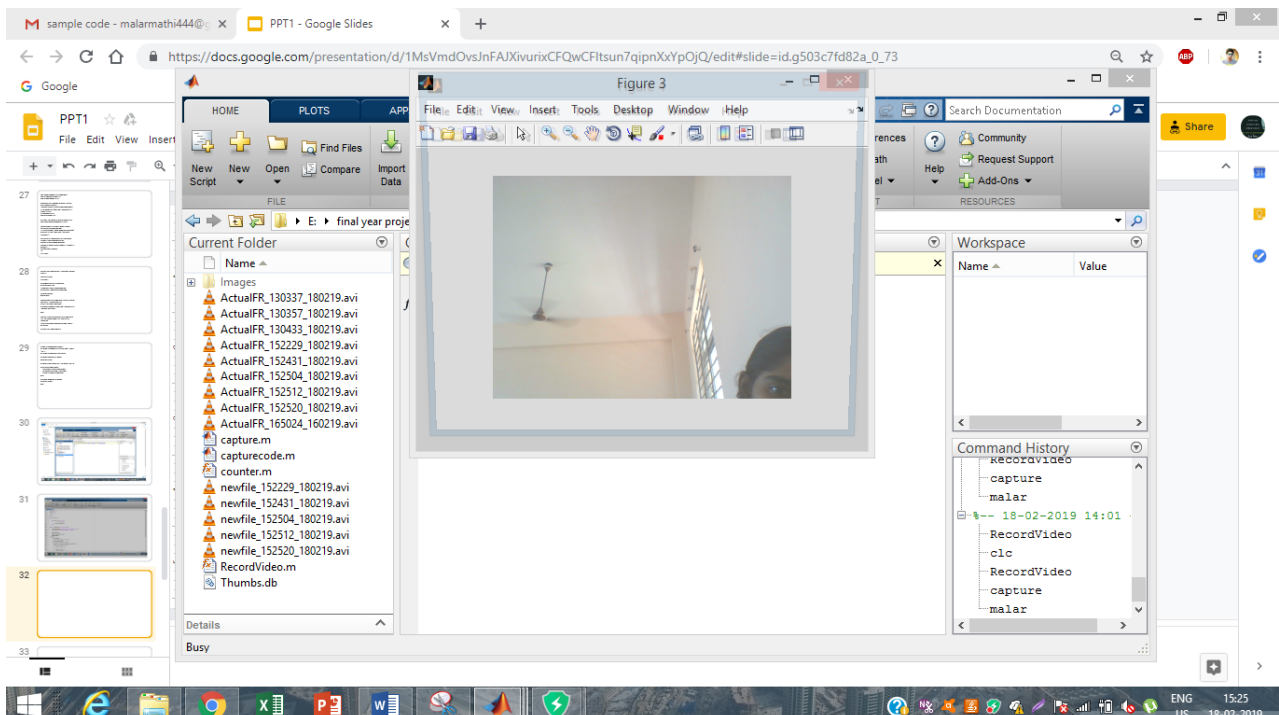


Figure 3.2: Preprocessing

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### Segmentation:

The pre-processed image will have multiple patterns. In segmentation the required patterns will be identified. We use pattern recognition algorithm to detect the required pattern then it is subjected to feature extraction. The required pattern is segmented from the segmentation.

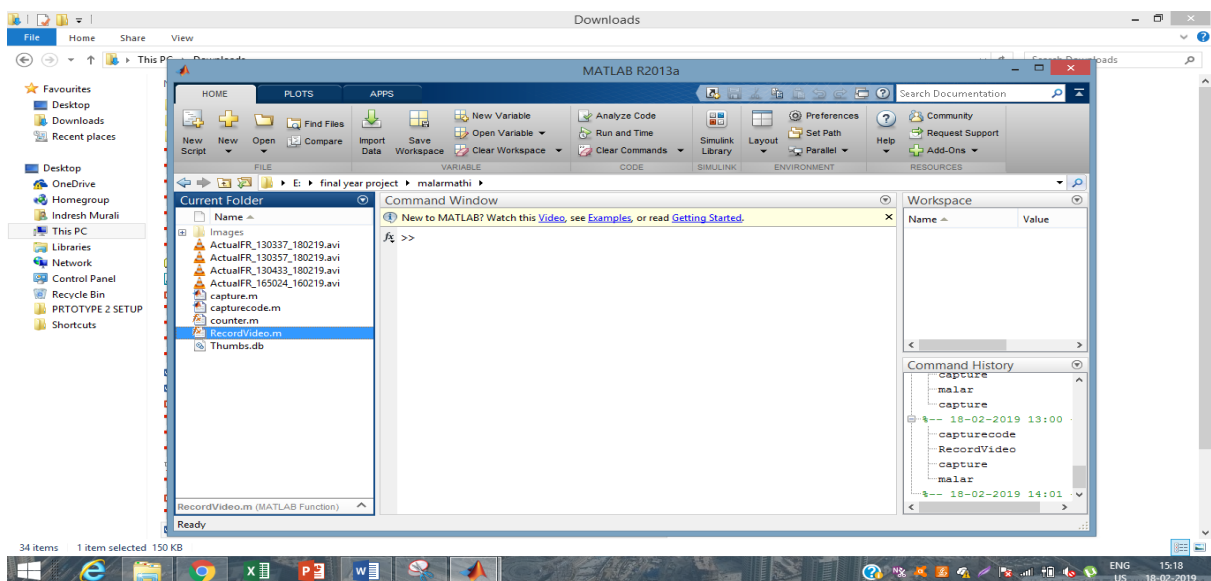


Figure 3.3: Segmentation

### Feature extraction:

In this module we implement independent component analysis to detect the hue saturation value. In this module we find the state of the animal. Feature extraction involves reducing the amount of resources required to describe a large set of data. The features extracted will be then classified.

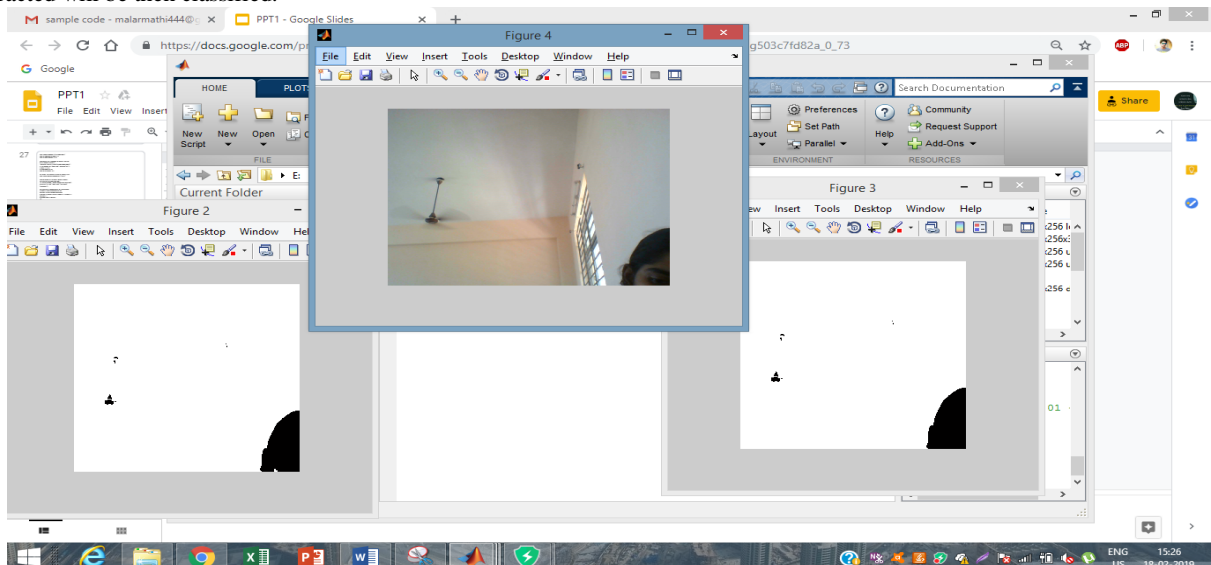


Figure 3.4: Feature extraction

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## Alert system:

When the camera captures the appearance of any person image to be intimidated and creates a particular light blink intimidation.

## VI. CONCLUSION

Based on image processing where images or videos are processed by Matlab using Digital Image processing Toolbox for monitoring and detecting the events at any place. With the help of this system we can be able to monitor if there is any person or not. Like this we can be able to save mass electric energy that is being wasted every year.

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