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Smart Military Helmet Using CNN

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ABSTRACT: A long way from home and friends and family, these saints forfeit their own lives so the whole country can rest in peace. Military Helmet and Surveillance System (MHSS) can get a sensational effect on troopers making the country more secured. This framework is joins a few propelled highlights that could spare the lives of fighters in mission basic situations. MHSS is intended to incorporate data obtaining and preparing to upgrade summon and control of a military unit. Advances in this model incorporate a land data framework, Multi sensor information combination framework, figuring gadgets and IoT-based correspondence framework for troopers. Once completely created and demonstrated, MHSS will be basic components of the Army's system driven fighting project and will connect infantry level troops on the front line to the summon base camp. It will likewise arrange ground troops with the different Army order central command and incorporate all components in a fight gathering, giving constant strategic situations. MHSS will have the capacity to get and transmit information, for example sensor information including air conditions, wellbeing status and messages enabling the officers to get to the ongoing data at the same time

KEYWORDS: Convolutional neural network, Arduino, ADXL sensor, Smart helmet, Python Programming,

I. INTRODUCTION

Military Helmet and Surveillance System is a concept model of an IOT based wearable device for military purposes. This idea can fulfill several use cases in the military. MHSS is likewise an upgraded adaptation of Battlefield Management System – BMS (a framework intended to incorporate data securing and preparing to improve order and control of a military unit). This framework additionally underpins the popular movement (Integrated Knowledge based Command and Control), a framework intended to incorporate data securing and preparing to upgrade order and control of a military unit. MHSS makes it easy for the soldiers to know several parameters such as their fighting direction, surrounding conditions, sending messages to base station, etc. it provides a simple to use interface .they can get assistance from the base through the wearable helmet device and at the same time a log is created about those parameters which is the main function of Military soldiers and Surveillance System.

II. RELATED WORK

Title :Arduino based Real Time Drowsiness and Fatigue Detection for Bikers using Helmet

Author:M.Oviyaa, P.Renvitha, Ms. R. Swathika, Dr. I. Joe Louis Paul, Dr. S. Sasirekha**,**. The proposed system has EEG-sensors which are implemented within the helmet to detect the drowsy state of the driver. The biomedical signal from the driver's brain is sensed by a Brain-wave sensor. This system provides real-time drowsiness and fatigue detection for the bikers by making a helmet to play a vital part with warning platform as a miniaturized sensor and to provide mind machine interface (MMI) to address the challenges like drowsiness and fatigue. When the biker is detected to be in drowse state the system alerts the biker by an alarm and motor gets slow down and stopped

Title: Helmet Detection under the Power Construction Scene Based on Image Analysis

Author: Yang Bo, Qin Huan, Xie Huan, Zhu Rong, Li Hongbin, Mu Kebin, Zhang Weizhong, Zhao Lei,In this paper, an intelligent safety surveillance system is designed for the electric power construction system to detect whether workers wear helmets correctly. The YOLOv3 objective detection algorithm is used for fine-tuning the datasets for the electric power construction scene which is made by ourselves. The main targets for detection are the helmet and the head. The helmet and the head are tested to detect whether the worker wears a helmet.

Title: Raphael—The Smart Helmet

Author: Lokeshwaran M., Nikhit Mathew S.P., and JoshuvaAThe helmet is developed based on IoT technology. This helmet provides welfare and security to the driver. The helmet system consists of microcontroller, heart rate sensor, Force sensing resistor, RF transmitter and power supply.

III. PROPOSED ALGORITHM

A. *Design Considerations:*

- Command can monitor the battlefield and can send the instruction to the soldiers. The instruction displayed on the oled display of the soldier's helmet. Soldiers can ask for help from the nearby soldiers if in danger. The soldier's activities and movement is monitored by the smart helmet and send the information to the control room.
- The progression of the cutting edge Internet of Things (IoT) makes the probability of interfacing PC automated control structures for remote watching and brisk reaction to occasions requiring continuous taking care of. Previously, an offices supervisor needed to physically take care of a control framework regularly making a postponement in real life prompting harms.
- An easy to use interface for sending messages to the base station
- Our idea is to create a wearable device to provide assistance to military soldiers and also to enable .information acquisition from his context. For a wearable device, the main component is display.

Advantages:

- Smart vision to the soldiers
- Updated technologies
- Improve safety of the soldiers

Algorithm:
- Convolutional Neural Network (CNN) were used to achieve some breakthrough results and win well-known contests. The application of convolutional layers consists in convolving a signal or an image with kernels to obtain feature maps.
- **Initialization:**
    1. It is important to achieve convergence. We use the Xavier initialization.
    2. With this, the activations and the gradients are maintained in controlled levels, otherwise back-propagated gradients could vanish or explode.

- **Activation Function:**
    It is responsible for non-linearly transforming the data. Rectifier linear units (ReLU), defined as $f(x)= max(0, x)$,
- **Pooling**:
    It combines spatially nearby features in the feature maps. This combination of possibly redundant features makes the representation more compact and invariant to small image changes, such as insignificant details; it also decreases the computational load of the next stages. To join features it is more common to use max-pooling or average-pooling.
- **Regularization:**
    It is used to reduce overfitting. We use Dropout in the FC layers. In each training step, it removes nodes from the network with probability.
- **Data Augmentation:**
    It can be used to increase the size of training sets and reduce overfitting. Since the class of the patch is obtained by the central voxel, we restricted the data augmentation to rotating operations.

IV. PSEUDO CODE

```
#.........................Automatic Webcam/rspb to capture image.........................#
import os
import time
import cv2

cap = cv2.VideoCapture(0)
i=0
while(True):
   ret, frame = cap.read()
   cv2.imshow("imshow",frame)
i+=1
time.sleep(4)
   cv2.imwrite('Test/a.jpg', frame)
   f=open('readdata.txt','w')
f.write('read')
f.close()
   face = "capture image"
print("camera is start:",face )

   if cv2.waitKey(30) & 0xFF == ord('q'):
     break

cap.release()
cv2.destroyAllWindows()
```

V. SIMULATION RESULTS

1. MILITARY HELMET

Military Helmet provides protection to the soldiers. Smart helmet makes it easy for the soldiers to know several parameters such as their fighting direction, surrounding conditions, sending messages to base station . They can get assistance from the base through the wearable helmet device and also Our main aim here is to provide a modified and smart vision to the soldiers.
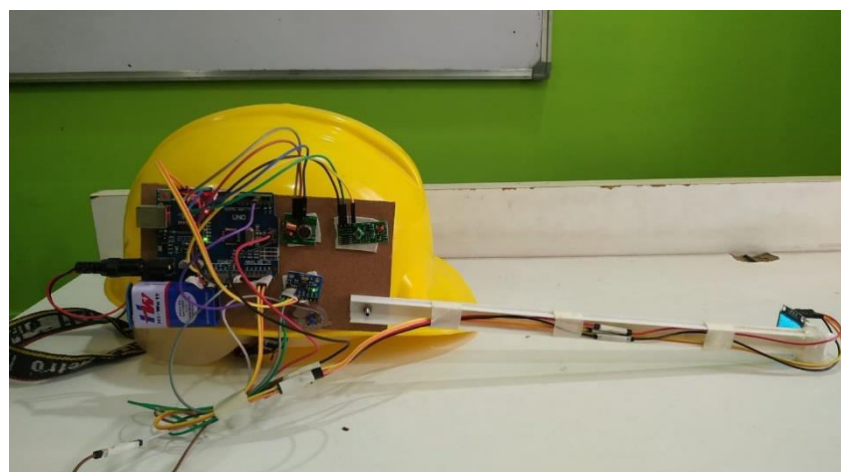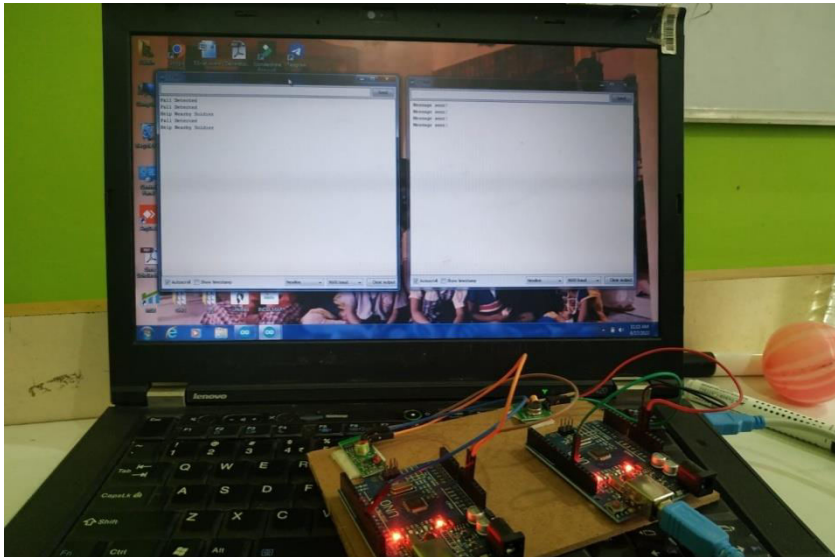
2. SERVER

It controls the soldier movements. Server rooms are enclosed spaces that provide a central point for organizations to manage their network server resources. A control room or operations room is a central space where a large physical facility or physically dispersed service can be monitored and controlled. It is often part of a larger command center.

VI. CONCLUSION AND FUTURE WORK

THIS PROTOTYPE PROJECT COMBINES ALL POSSIBLE FEATURES INTO ONE SINGLE UNIT AND HANDLES MULTIPLE DEVICES SIMULTANEOUSLY. ALSO, THE HELMET IS COST EFFECTIVE AND ACCURATE ENOUGH TO SPOT THE SUSPECT AND HELP MAKING RESPECTIVE COMBAT PLANS, WHILE BEING UPDATED ABOUT THE LIVE DATA FEEDBACK. IN THIS PAPER IOT BASED MILITARY HELMET AND SURVEILLANCE SYSTEM ON WEARABLE IS PRESENTED. THIS SYSTEM IS IMPLEMENTED TO FIND AN EFFECTIVE SOLUTION FOR THE PROBLEMS FACED BY SOLDIERS SYSTEM MHSS IS A WEARABLE SPECIALLY DESIGNED FOR SOLDIERS WHICH HELPS THEM ON THE BATTLEFIELD ONCE FULLY DEVELOPED AND PROVED; SYSTEM MHSS WILL BE CRITICAL ELEMENTS OF THE ARMY'S NETWORK-CENTRIC WARFARE PROGRAM AND WILL LINK INFANTRY LEVEL TROOPS ON THE BATTLEFIELD TO THE COMMAND HEADQUARTERS. IT WILL ALSO NETWORK GROUND TROOPS WITH THE VARIOUS ARMY COMMAND HEADQUARTERS AND INTEGRATE ALL ELEMENTS IN A BATTLE GROUP, PROVIDING REAL TIME TACTICAL SCENARIOS. SYSTEM MHSS WILL BE ABLE TO RECEIVE AND TRANSMIT DATA, SENSOR DATA INCLUDING ATMOSPHERIC CONDITIONS AND MESSAGES ALLOWING THE SOLDIERS TO ACCESS THE REAL TIME INFORMATION SIMULTANEOUSLY WITH THE COMMAND HEADQUARTERS

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