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AI Visual Examination on Manufacturing Industry to Avoid Accidental Death Work Place

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ABSTRACT : Wearing protective clothing while working in factories is crucial. For factory workers, wearing helmet, gloves and shoes, gloves, and shoes, gloves, and shoes is crucial. Many workers in factories, power plants, and structures do not follow this. They suffer a great deal as a result. We suggest using artificial intelligence to correct this. Additionally, it is widely utilised in image processing techniques. We have the ability to detect the presence of, hand covers, and helmet, gloves and shoes, gloves, and shoes. Utilising methods for artificial intelligence. A person's face can also be recognised by our programme, and it can tell if they are wearing protective gear by looking at their clothing. If he doesn't follow it, you can send him a text message by using facial recognition to identify their face.

I. INTRODUCTION

Construction workers tend to ignore safety helmet, gloves and shoess, gloves, and shoes because of weak safety awareness. At the construction site, workers that wear safety helmet, gloves and shoess, gloves, and shoes improperly are much more likely to be injured. Traditional supervision of the workers wearing safety helmet, gloves and shoess, gloves, and shoes on construction sites often requires manual work. There are problems such as a wide range of operations and difficult management of site workers. These factors make manual supervision difficult and inefficient and it is difficult to track and manage the whole workers at the construction sites accurately in real time. Hence, it is hard to satisfy the modern requirement of construction safety management only relying on the traditional manual supervision.

The automatic monitoring method can contribute to monitoring the construction workers and confirm the safety helmet, gloves and shoess, gloves, and shoes wearing conditions at the construction site. In particular, considering that the traditional manual supervision of the workers is often costly, time-consuming, error-prone, and not sufficient to satisfy the modern requirements of construction safety management, the automatic supervision method can be beneficial to real-time on-site monitoring.

1.1. ARTIFICIAL INTELLIGENCE: In computer science, artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans. Leading AI textbooks define the field as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals.[1] Colloquially, the term "artificial intelligence" is often used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving".[2]

1.2. DEEP LEARNING : Deep learning (also known as deep structured learning or differential programming) is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised or unsupervised.

Deep learning architectures such as deep neural networks, deep belief networks, recurrent neural networks and convolutional neural networks have been applied to fields including computer vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design, medical image analysis, material inspection and board game programs, where they have produced results comparable to and in some cases surpassing human expert performance.

Artificial neural networks (ANNs) were inspired by information processing and distributed communication nodes in biological systems. ANNs have various differences from biological brains.

Specifically, neural networks tend to be static and symbolic, while the biological brain of most living organisms is dynamic (plastic) and analog. In deep learning, each level learns to transform its input data into a slightly

more abstract and composite representation. In an image recognition application, the raw input may be a matrix of pixels; the first representational layer may abstract the pixels and encode edges; the second layer may compose and encode arrangements of edges; the third layer may encode a nose and eyes; and the fourth layer may recognize that the image contains a face. Importantly, a deep learning process can learn which features to optimally place in which level on its own. (Of course, this does not completely eliminate the need for hand-tuning; for example, varying numbers of layers and layer sizes can provide different degrees of abstraction.)

II. LITERATURE SURVEY

2.1 HELMET , GLOVES AND SHOESS, GLOVES, AND SHOES DETECTION USING MACHINE LEARNING TECHNIQUES Devika Sreeram; Subhashini Peneti; P Tejaswi; N Sharath Chandra; R Madhu Yadav - 2021

The continuous mobilization of vehicles has led to a surge in the number of road accidents across the world. To get better of this, government is trying to focus on the safest and preventive measures in traffic. So, our main idea is to introduce a helmet , gloves and shoess, gloves, and shoes detection mechanism as most of the deaths caused are due to the absence of helmet , gloves and shoess, gloves, and shoes. The practice of direct observation is found to be time taking and a lot of human effort is needed. This project attempts to implement a detection process through a few machine learning algorithms by using predefined libraries.

2.2 DESIGN AND IMPLEMENTATION OF SAFETY HELMET , GLOVES AND SHOESS, GLOVES, AND SHOES DETECTION

In order to reduce safety accidents caused by non-standard wearing of helmet , gloves and shoess, gloves, and shoes, deep learning target detection technology is applied to construction safety detection scenarios, and a helmet , gloves and shoess, gloves, and shoes detection algorithm based on YOLO v5 is proposed, which can realize real-time detection of helmet , gloves and shoess, gloves, and shoes wearing. The deep learning part uses the K-means algorithm to cluster the dimensions of the target frame, and Yolov5s.pt is used for deep learning training. During training, the size of the input image is changed to increase the adaptability of the model, and the hyper parameters and optimizer are adjusted to be the best after improvement.

The detection model has an accuracy rate of 90%, and the detection speed has reached 37.8fps, which meets the requirements of real-time detection of helmet , gloves and shoess, gloves, and shoes. Through the combination of this model and hardware such as cameras, a real-time detection of whether a person wears a helmet , gloves and shoess, gloves, and shoes is designed and implemented. The system realizes the three functions of picture detection, video detection and real-time monitoring.

2.3. SAFETY HELMET , GLOVES AND SHOESS, GLOVES, AND SHOES WEARING DETECTION BASED ON DEEP LEARNING

In many scenarios, such as power station, the detection of whether wearing safety helmet , gloves and shoess, gloves, and shoes or not for perambulator workers is very essential for the safety issue. So far, research in safety helmet , gloves and shoess, gloves, and shoes wearing detection mainly focused on hand-crafted features, such as color or shape. With rising success of deep learning, accurately detecting objects by training the deep convolution neural network (DCNN) becomes a very effective way. This paper presents a deep learning approach for accurate safety helmet , gloves and shoess, gloves, and shoes wearing detection in employing a single shot multi-box detector (SSD).

2.4 AN ADVANCED DEEP LEARNING APPROACH FOR SAFETY HELMET, GLOVES AND SHOESS, GLOVES, AND SHOES WEARING DETECTION

Automatically detect whether workers are wearing safety helmet , gloves and shoess, gloves, and shoes at construction site is significant for safety production. Concerning the problem that the existing safety helmet, gloves and shoess, gloves, and shoes wearing detection method is difficult to detect the partial occlusion, different size and small object, and the detection accuracy is low. In this paper,

we present an advanced deep learning based approach to determine whether workers are wearing safety helmet , gloves and shoess, gloves, and shoes. In our framework, we first use the multi-scale training and the increasing anchors strategies to enhance the robustness of the original RCNN algorithm to detect different scales and small object. Then, the Online Hard Example Mining (OHEM) is to optimize model to prevent the imbalance of positive and negative samples. Finally, the person wearing the helmet , gloves and shoess, gloves, and shoes and its parts (helmet , gloves and shoess, gloves, and shoes and person) are detected by improved RCNN, the multi-part combination method uses the geometric information of the detection objects to determine if a worker is wearing a helmet , gloves and shoess,

gloves, and shoes. Experiments show that compared with the original   RCNN, the detection accuracy is increased by 7%.

III. SYSTEM DESIGN

3.1 EXISTING SYSTEM :

Personal safety is very important for the working workers. In the existing system they have developed a model which is only applicable to the workers working in power and substations. For this they have used YOLOv3 algorithm. And they find only helmet , gloves and shoess, gloves, and shoes in it. In this project they use the data. They use a transfer learning approach to train and then identify who is not wearing a helmet , gloves and shoess, gloves, and shoes in the program.

3.2 EXISTING BLOCK DIAGRAM
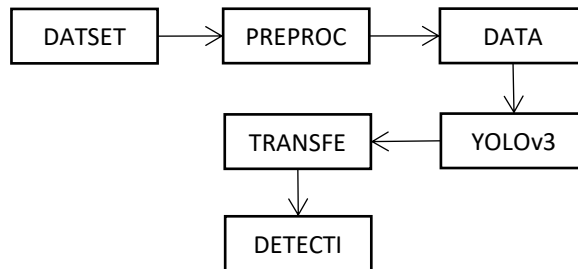
3.3 EXISTING DISADVANTAGES : In Existing system have used transfer learning to train the machine with data. Below are the disadvantages about transfer learning methods

1.   One of the biggest limitations of transfer learning is the problem of negative transfer

2.   Transfer learning only works if the initial and target problems are similar enough for the first round of training to be relevant.

3.   You cannot remove layers with confidence to reduce the number of parameters. If you remove the convolutional layers from the first layers, you won't have good learning because of the nature of the architecture which finds low-level features.

4.   Our model struggles with small objects that appear in groups, such as flocks of birds.

5.   Since our model learns to predict bounding boxes from data, it struggles to generalize to objects in new or unusual aspect ratios or configurations.

3.4 PROPOSED SYSTEM : It is very important for workers working in factories to wear helmet , gloves and shoess, gloves, and shoes, gloves and. Because worker safety is very important. Mostly workers working in construction work and factories work without considering their safety. Thus there is a risk of injury to them. To prevent this we use artificial intelligence technology in factory and We can predict whether the workers working in the construction industry are wearing protective equipment. For this we use a deep learning algorithm called convolution neural network. Convolution neural network is a method that is often used in image processing. In our proposed scheme, We keep an eye on the workers to make sure they are using their safety equipment. We could use face recognition to send them a text message if they are not donning helmet , gloves and shoess, gloves, and shoes, gloves, or .

3.5 PROPOSED BLOCK DIAGRAM :

BLOCK DIAGRAM EXPLANATION : A convolutional neural network (CNN) is a type of deep learning neural network that is commonly used in image and video processing tasks.

DATASET : Collecting datasets is very important because it is from this that our machine learning model learns the data, where we collect the data as needed and train the machine.

DATASET PREPROCESSING : need to pre-process all the collected datasets. Because we can't be sure that all the data we collect will be accurate. So we need to check that all the data are correct. Then we need to pre-process all the data in a machine learning way and then train it.

3.5 .1 PROPOSED ARCHITECTURE DIAGRAM

CNN HIDDEN LAYERS : Convolutional layer: This is the first layer in a CNN and is responsible for extracting features from the input image. It applies a set of filters to the input image, which are designed to detect specific features such as edges, shapes, and textures. The output of this layer is called a feature map.

Softmax layer: This layer is used to convert the class scores into probability scores. This is done by applying the softmax function to the class scores, which normalizes them so that they sum to one and can be interpreted as probabilities.

These are the main layers in a CNN, but depending on the task and complexity of the problem there can be more layers, such as Dropout layer, Batch Normalization, etc.

3.5.2 CONVOLUTIONAL NEURAL LAYERS :
The CNN algorithm used in the proposed system for industrial helmet , gloves and shoes , gloves and shoes detection consists of multiple layers, each of which plays a specific role in analyzing the video feed from the cameras and detecting helmet , gloves and shoes , gloves and shoes.

3.5.3 CNN ARCHITECTURE :
Convolutional Layer: The first layer in the CNN algorithm is the convolutional layer. This layer applies a set of filters to the input image to extract relevant features, such as edges and corners. The output of this layer is a set of feature maps that highlight different aspects of the input image.

3.6 PROPOSED ADVANTAGES :
In this program we recognize an employee's face and then determine whether he is wearing protective gear.

1. It is   and more convenient compared to other biometric technologies like fingerprints or retina scans.
2. In Convolution neural network i automatically detects the important features without any human supervision.
3. CNN do not require human supervision for the task of identifying important features.
4. They are very accurate at image recognition and classification.
5. Weight sharing is another major advantage of CNN.
6. Convolution neural networks also minimize computation in comparison with a regular neural network.

IV. PROPOSED METHODOLOGY

A CNN is a neural network with a certain level of complexity, a neural network with more than two layers. Convolutional neural networks use sophisticated mathematical modeling to process data in complex ways.

Convolutional neural networks as networks that have an input layer, an output layer and at least one hidden layer in between. Each layer performs specific types of sorting and ordering in a process that some refer to as "feature hierarchy." One of the key uses of these sophisticated neural networks is dealing with unlabeled or unstructured data. The phrase "deep learning" is also used to describe these Convolutional neural networks, as deep learning represents a specific form of machine learning where technologies using aspects of artificial intelligence seek to classify and order information in ways that go beyond simple input/output protocols. The CNN finds the correct mathematical manipulation to turn the input into the output, whether it be as linear relationship or a non-linear relationship.

MODULE DESCRIPTION : 4.1 DATASET COLLECTION : Dataset collection refers to the process of gathering and compiling a set of data for a specific research or analysis project. This can include collecting data from various sources such as surveys, interviews, experiments, or existing databases. The collected data is then organized and cleaned to ensure accuracy and consistency, before being used for further analysis or modelling. The goal of dataset collection is to gather a comprehensive and representative sample of data that can be used to make informed decisions or predictions.

4.2 IMAGE PREPROCESSING : Image pre-processing refers to the process of preparing digital images for further analysis or processing. This can include a variety of tasks such as:

Resizing: Changing the size of the image to fit specific requirements.

Cropping: Removing unwanted parts of the image.

Rotating: Adjusting the angle of the image.

Normalization: Scaling the pixel values of the image to a specific range.

Denoising: Removing noise or unwanted variations in the image.

Histogram equalization: Adjusting the contrast of the image to make it more visible.

Filtering: Applying a specific filter to the image to enhance certain features.

The goal of image pre-processing is to make the image easier to analyse, and to extract useful information from it. Image pre-processing is a crucial step in computer vision and image processing applications such as facial recognition, object detection, and medical imaging.

4.3 IMPORTING MODULES : Importing modules refers to the process of bringing external code or libraries into a Python script or program. This allows the use of pre-written functions, classes, and methods that can save time and effort, and make the code more efficient.
To import a module in Python, the import keyword is used, followed by the name of the module. For example: Import tensor flow Import keras Import numpy

4.4 TRAINING THE DATASET : We train data in machine learning to build a model that can make predictions or take decisions based on new, unseen data. The process of training a model involves using a set of labeled data, known as the training data, to teach the model how to make accurate predictions or decisions.
During the training process, the model is presented with the input data, and it uses this data to adjust its internal parameters and weights. This process is repeated multiple times, with the model adjusting its parameters each time in an attempt to minimize the error or difference between its predictions and the actual output.

4.5 CAMERA INTERFACING : Camera interfacing with Python can be done using various libraries such as OpenCV, PiCamera, and Pygame.
OpenCV: OpenCV is a popular library for computer vision and image processing. It has built-in support for a wide range of cameras, and can be used to capture and process video and images from a camera.

TEST THE OUTPUT : Testing a machine learning model involves evaluating its performance on a separate set of data known as the test data. This test data should be representative of the data that the model will encounter in real-world scenarios and should not be used during the training process.

V. SOFTWARE DESCRIPTION

- **PYTHON 3.6.5   KERAS   TENSORFLOW   NUMPY   FACE RECOGNITION TWILIO**

5.1 PYTHON : Python is a wonderful and powerful programming language that's easy to use (easy to read **and** write) and with Raspberry Pi lets you connect your project to the real world.Python syntax is very clean, with an emphasis on readability and uses Standard English keywords. Start by opening IDLE from the desktop. **5.2 IDLE:**The easiest introduction to Python is through IDLE, a Python development environment. Open IDLE from the Desktop or applications menu:

IDLE also has syntax highlighting built in and some support for autocompletion. You can look back on the history of the commands you've entered in the REPL with Alt + P (previous) and Alt + N (next).

5.3 BASIC PYTHON USAGE : Hello world in Python: print("Hello world") Simple as that!

5.4 INDENTATION : Some languages use curly braces { and } to wrap around lines of code which belong together, and leave it to the writer to indent these lines to appear visually nested. However, Python does not use curly braces but instead requires indentation for nesting. For example a for loop in Python:

TensorFlow — Convolutional Neural Networks : After understanding machine-learning concepts, we can now shift our focus to deep learning concepts. Deep learning is a division of machine learning and is considered as a crucial step taken by researchers in recent decades. The examples of deep learning implementation include applications like image recognition and speech recognition.
Following are the two important types of deep neural networks:
- Convolutional Neural Networks
- Recurrent Neural Networks In this chapter, we will focus on the CNN, Convolutional Neural Networks

Convolutional Neural Networks : Convolutional Neural networks are designed to process data through multiple layers of arrays. This type of neural networks is used in applications like image recognition or face recognition. The

primary difference between CNN and any other ordinary neural network is that CNN takes input as a two-dimensional array and operates directly on the images rather than focusing on feature extraction which other neural networks focus on. The dominant approach of CNN includes solutions for problems of recognition. Top companies like Google and Facebook have invested in research and development towards recognition projects to get activities done with greater speed.

A convolutional neural network uses three basic ideas:

• Local respective fields   , • Convolution , • Pooling , Let us understand these ideas in detail.

CNN utilizes spatial correlations that exist within the input data. Each concurrent layer of a neural network connects some input neurons. This specific region is called local receptive field. Local receptive field focusses on the hidden neurons. The hidden neurons process the input data inside the mentioned field not realizing the changes outside the specific boundary.

KERAS

INTRODUCTION: Deep learning is one of the major subfield of machine learning framework. Machine learning is the study of design of algorithms, inspired from the model of human brain. Deep learning is becoming more popular in data science fields like robotics, artificial intelligence(AI), audio & video recognition and image recognition. Artificial neural network is the core of deep learning methodologies. Deep learning is supported by various libraries such as Theano, TensorFlow, Caffe, Mxnet

OVERVIEW OF KERAS : Keras runs on top of open source machine libraries like TensorFlow, Theano or Cognitive Toolkit (CNTK). Theano is a python library used for fast numerical computation tasks. TensorFlow is the most famous symbolic math library used for creating neural networks and deep learning models. TensorFlow is very flexible and the primary benefit is distributed computing. CNTK is deep learning framework developed by Microsoft. It uses libraries such as Python, C#, C++ or standalone machine learning toolkits.

Keras leverages various optimization techniques to make high level neural network API easier and more performant. It supports the following features:

• Consistent, simple and extensible API.   • Minimal structure - easy to achieve the result without any frills.

• It supports multiple platforms and backends.   • It is user friendly framework which runs on both CPU and GPU.   • Highly scalability of computation.

BENEFITS : Keras is highly powerful and dynamic framework and comes up with the following advantages:

• Larger community support.   • Easy to test.   • Keras neural networks are written in Python which makes things simpler.   combine into many ways.

KERAS — OVERVIEW OF DEEP LEARNING:

Deep learning is an evolving subfield of machine learning. Deep learning involves analyzing the input in layer by layer manner, where each layer progressively extracts higher level information about the input. Let us take a simple scenario of analyzing an image. Let us assume that your input image is divided up into a rectangular grid of pixels. Now, the first layer abstracts the pixels. The second layer understands the edges in the image. The Next layer constructs nodes from the edges. Then, the next would find branches from the nodes. Finally,

Artificial Neural Networks : The most popular and primary approach of deep learning is using "Artificial neural network" (ANN). They are inspired from the model of human brain, which is the most complex organ of our body. The human brain is made up of more than 90 billion tiny cells called "Neurons". Neurons are inter-connected through nerve fiber called "axons" and "Dendrites". The main role of axon is to transmit information from one neuron to another to which it is connected.

Similarly, the main role of dendrites is to receive the information being transmitted by the axons of another neuron to which it is connected. Each neuron processes a small information and then passes the result to another neuron and this process continues.

• Multiple input along with weight represents dendrites.

• Sum of input along with activation function represents neurons. Sum actually means computed value of all inputs and activation function represent a function, which modify the Sum value into 0, 1 or 0 to 1.

• Actual output represent axon and the output will be received by neuron in next layer.

Let us understand different types of artificial neural networks in this section.

Multi-Layer Perceptron

Multi-Layer perceptron is the simplest form of ANN. It consists of a single input layer, one or more hidden layer and finally an output layer. A layer consists of a collection of perceptron. Input layer is basically one or more features of the input data.

Every hidden layer consists of one or more neurons and process certain aspect of the feature and send the processed information into the next hidden layer. The output layer process receives the data from last hidden layer and finally output the result.

Convolutional Neural Network (CNN)

Convolutional neural network is one of the most popular ANN. It is widely used in the fields of image and video recognition. It is based on the concept of convolution, a mathematical concept. It is almost similar to multi-layer perceptron except it contains series of convolution layer and pooling layer before the fully connected hidden neuron layer.

It has three important layers:

• Convolution layer: It is the primary building block and perform computational tasks based on convolution function.

• Pooling layer: It is arranged next to convolution layer and is used to reduce the size of inputs by removing unnecessary information so computation can be performed .

• Fully connected layer: It is arranged to next to series of convolution and pooling layer and classify input into various categories.

A simple CNN can be represented as below:
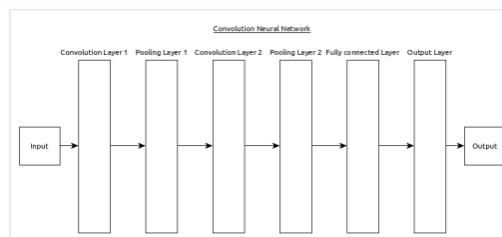
Here,

• 2 series of Convolution and pooling layer is used and it receives and process the input (e.g. image).

• A single fully connected layer is used and it is used to output the data (e.g. classification of image)

PYTHON NUMPY

Our Python NumPy Tutorial provides the basic and advanced concepts of the NumPy. Our NumPy tutorial is designed for beginners and professionals.

NumPy stands for numeric python which is a python package for the computation and processing of the multidimensional and single dimensional array elements.

What is NumPy : NumPy stands for numeric python which is a python package for the computation and processing of the multidimensional and single dimensional array elements.Travis Oliphant created NumPy package in 2005 by injecting the features of the ancestor module Numeric into another module Numarray. It is an extension module of Python which is mostly written in C. It provides various functions which are capable of performing the numeric computations with a high speed.NumPy provides various powerful data structures, implementing multi-dimensional arrays and matrices. These data structures are used for the optimal computations regarding arrays and matrices. In this tutorial, we will go through the numeric python library NumPy.**The need of NumPy   :** With the revolution of data science, data analysis libraries like NumPy, SciPy, Pandas, etc. have seen a lot of growth. With a much easier syntax than other programming languages, python is the first choice language for the data scientist.NumPy provides a convenient and efficient way to handle the vast amount of data. NumPy is also very convenient with Matrix multiplication and data reshaping.

PYTHON PILLOW ─ OVERVIEW In today's digital world, we come across lots of digital images. In case, we are working with Python programming language, it provides lot of image processing libraries to add image processing capabilities to digital images. Some of the most common image processing libraries are: OpenCV, Python Imaging Library (PIL), Scikit-image, Pillow. However, in this tutorial, we are only focusing on Pillow module and will try to explore various capabilities of this module. Pillow is built on top of PIL (Python Image Library). PIL is one of the important modules for image processing in Python. However, the PIL module is not supported since 2011 and doesn't

support python 3. Pillow module gives more functionalities, runs on all major operating system and support for python 3. It supports wide variety of images such as "jpeg", "png", "bmp", "gif", "ppm", "tiff". You can do almost anything on digital images using pillow module. Apart from basic image processing functionality, including point operations, filtering images using built-in convolution kernels, and color space conversions.

IMAGE ARCHIVES : The Python Imaging Library is best suited for image archival and batch processing applications. Python pillow package can be used for creating thumbnails, converting from one format to another and print images, etc.

IMAGE DISPLAY : You can display images using Tk PhotoImage, BitmapImage and Windows DIB interface, which can be used with PythonWin and other Windows-based toolkits and many other Graphical User Interface (GUI) toolkits. For debugging purposes, there is a show () method to save the image to disk which calls the external display utility.

Image Processing : The Pillow library contains all the basic image processing functionality. You can do image resizing, rotation and transformation.
Pillow module allows you to pull some statistics data out of image using histogram method, which later can be used for statistical analysis and automatic contrast enhancement.

VI. FACE RECOGNITION

Face recognition is a technology that uses computer algorithms to identify and verify a person's identity based on their face. It involves analyzing and comparing facial features, such as the distance between the eyes, nose, and mouth, to those stored in a database of known faces.Face recognition systems can be used in a variety of applications, such as security and surveillance, biometrics, and image tagging. For example, in security and surveillance, a face recognition system can be used to grant access to a building or restricted area by comparing the person's face to a database of authorized personnel. In biometrics, face recognition can be used for passport verification or other forms of identification. In image tagging, it can be used to automatically tag people in photos or videos.**There are two main approaches to face recognition:**Feature-based approach: This approach uses mathematical algorithms to extract unique facial features and compare them to a database of known faces.Appearance-based approach: This approach uses machine learning algorithms to analyze the overall appearance of a face and compare it to a database of known faces.Overall, face recognition technology is a powerful tool that can be used to improve security, streamline identification processes, and enhance personalization in various applications.

6.1 ADVANTAGES & APPLICATION :
Helmet , gloves and shoess, gloves, and shoes detection is a computer vision and image processing application that uses machine learning algorithms to identify and detect whether a person is wearing a helmet , gloves and shoess, gloves, and shoes or not.

Industrial Safety: In industrial settings such as construction sites, mines, and factories, helmet , gloves and shoess, gloves, and shoes detection can be used to ensure that workers are wearing the appropriate protective gear, and to alert supervisors if someone is not wearing a helmet , gloves and shoess, gloves, and shoes.

Transportation Safety: Helmet , gloves and shoess, gloves, and shoes detection can be used to ensure that motorcyclists are wearing helmet , gloves and shoess, gloves, and shoes, and to enforce helmet , gloves and shoess, gloves, and shoes laws. It can also be used to detect whether cyclists are wearing helmet , gloves and shoess, gloves, and shoes, and to promote safe cycling practices.

Surveillance: Helmet , gloves and shoess, gloves, and shoes detection can be used in security and surveillance systems to detect individuals who are not wearing helmet , gloves and shoess, gloves, and shoes in restricted areas such as airports, train stations, and government buildings.

Autonomous Vehicles: Helmet , gloves and shoess, gloves, and shoes detection can also be used in autonomous vehicles and drones to ensure the safety of the passengers and other individuals.

VII. RESULTS AND DISCUSSION

In this project we sought to solve the common problems faced by a person working in the factory, automotive or construction industry in their daily life. In that way we propose an artificial intelligence program to fix accidents at their workplaces as a problem they face every day. We monitor workers to see if they are wearing their protective gear. Maybe if they are not wearing helmet , gloves and shoess, gloves, and shoes, gloves or , we track their face through

face tracking and send them a text message. Sometimes there are some employees who don't wear their safety equipment properly. In this we ensure that our model performs optimally.

RESULTS :

Figure 1 : Hand Gloves

Figure 2. Wearing Helmet

Figure 3.Without Gloves

Figure 4. Without Helmet

VIII. CONCLUSION

Helmet, gloves and shoess, gloves, and shoes, glove, and shoe detection are computer vision and image processing applications that use machine learning algorithms to identify and detect whether a person is wearing the appropriate safety gear. These technologies have the potential to improve safety and reduce accidents in a variety of settings, such as industrial sites, transportation, and sports.

However, helmet, gloves and shoess, gloves, and shoes, glove, and shoe detection technology is still in its early stages of development, and there are several challenges that need to be addressed. These include improving the accuracy of the algorithms, dealing with variations in lighting and camera angles, and handling variations in the appearance of the helmet , gloves and shoess, gloves, and shoes, gloves, and .

Overall, helmet , gloves and shoess, gloves, and shoes, glove, and shoe detection technology has the potential to improve safety and reduce accidents in a variety of settings, and it can also be integrated into other systems and applications. More research and development is needed to improve the accuracy and robustness of the technology, and to find new and innovative ways to use it.

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