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Analysing and Improving Efficiency of Production in Manufacturing Industries Using Artificial Intelligence Methodology with Real Time Implementation

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ABSTRACT: India has been in a race for the past two and a half centuries but unfortunately it has been a race to the bottom. Most people think that the manufacturing industry is like the services or the Agri-industry; each industry having its own relative advantages and features. What is not clear to most is that the manufacturing-led economies are unique in being more egalitarian in their distribution of wealth. Secondly, manufacturing led economies are also much more resilient than economies that are led by other industries. Finally, the more importantly relevant for India, the manufacturing industry in India creates more employment opportunities with its growth than any other sector. Insight our research shows us is that manufacturing led economies are much more resilient and robust. And one of the major criteria to consider is the manufacturing the goods and delivering it at proper lead time. To achieve the tracking of goods production and it's on time delivery is required to be taken care. For that technology needs to be integrated with the manufacturing leading to its tremendous improvement. In this project we propose a system to automatically track and trace each step of manufacturing and the time taken incompletion of each step. If the threshold time limit exceeds for any step in the process then an automatic mail will be sent to the manufacturer to automatically take steps for the process to complete on time. This is achieved by implementing object tracking methodology in industries.

KEYWORDS: Mobile single shot detection algorithm; Regional Convolution Neural Network; SMTP protocol

I. INTRODUCTION

A manufacturing process is the way a business will establish how it will produce its products for its customers. manufacturing process requirements are been completed by operations personnel. requirements of the facilities and processes and associated costs are been identified to enable building production units according to the requirements of volume, time, and safety. manufacturing process is the steps through which raw materials are been transformed into a final product. the manufacturing process begins with the product design, and materials specification from which the product is been manufactured and these materials are then modified through manufacturing processes to become the required part. the manufacturing sector is been closely connected with engineering and industrial design production planning and control is a predetermined process that plans, manages and controls the allocation of human resource, raw material, and machinery to achieve maximum efficiency. a production line is a traditional method, which people associate with manufacturing. the production line is been arranged so that the product is moved sequentially along the line and stops at work centres along the line where an operation is performed. the item may move along some kind of conveyor, or be moved manually by staff. for example, operations along the production line could include assembly, painting, drying, testing, and packaging.

II. RELATED WORK

Multi-Stream Siamese and Faster Region-Based Neural Network for Real-Time Object Tracking, Yi Liu, Liming Zhang , Member, IEEE, Zhuhai Chen, Yan Yan , Member, IEEE, and Hanzi Wang , Senior Member, IEEE [2020, Vol No:1524-9050]Traffic scene perception (TSP) aims to extract accurate real-time on-road environment information, which involves three phases: detection of objects of interest, recognition of detected objects, and tracking of objects in motion. Since recognition and tracking often rely on the results from detection, the ability to detect objects of interest effectively plays a crucial role in TSP. In this paper, we focus on three important classes of objects: traffic signs, cars, and

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cyclists. We propose to detect all the three important objects in a single learning-based detection framework. PlanningVis: A Visual Analytics Approach to Production Planning in Smart Factories, Dong Sun, Renfei Huang, Yuanzhe Chen, Yong Wang, Jia Zeng, Mingxuan Yuan, Ting-Chuen Pong, and Huamin Qu [IEEE 2020] Production planning in the manufacturing industry is crucial for fully utilizing factory resources (e.g., machines, raw materials and workers) and reducing costs. With the advent of industry 4.0, plenty of data recording the status of factory resources have been collected and further involved in production planning, which brings an unprecedented opportunity to understand, evaluate and adjust complex production plans through a data-driven approach. However, developing a systematic analytics approach for production planning is challenging due to the large volume of production data, the complex dependency between products, and unexpected changes in the market and the plant. Previous studies only provide summarized results and fail to show details for comparative analysis of production plans. Besides, the rapid adjustment to the plan in the case of an unanticipated incident is also not supported. In this paper, we propose PlanningVis, a visual analytics system to support the exploration and comparison of production plans Object Detection in High Resolution Remote Sensing Imagery Based on Convolutional Neural Networks With Suitable Object Scale Features, IEEE Peng Tang, Chunyu Wang, Xinggang Wang, Wenyu Liu, Wenjun Zeng, and Jingdong Wang [2019, Vol No: 0196-2892].Object detection in high spatial resolution remote sensing images (HSRIs) is an important part of image information automatic extraction, analysis, and understanding. The region of interest (ROI) scale of object detection and the object feature representation are two vital factors in HSRI object detection. With respect to these two issues, this article presents a novel HSRI object detection method based on convolutional neural networks (CNNs) with suitable object scale features. First, the suitable ROI scale of object detection is obtained by compiling statistics for the scale range of objects in HSRIs. Then, a CNN framework for object detection in HSRIs is designed using a suitable ROI scale of object detection. The object features obtained using a CNN have good universality and robustness. Finally, a CNN framework with a suitable ROI scale of object detection is trained and tested.

III. PROPOSED ALGORITHM

Design Considerations:
India has been in a race for the past two and a half centuries but unfortunately it has been a race to the bottom. Most people think that the manufacturing industry is like the services or the agricultural industry; each industry having its own relative advantages and features. What is not clear to most is that the manufacturing-led economies are unique in being more egalitarian in their distribution of wealth. Secondly, manufacturing led economies are also much more resilient than economies that are led by other industries. Finally, the more importantly relevant for India, the manufacturing industry in India creates more employment opportunities with its growth than any other sector. Insight our research shows us is that manufacturing led economies are much more resilient and robust. And one of the major criteria to consider is the manufacturing the goods and delivering it at proper lead time. To achieve the tracking of goods production and it's on time delivery is required to be taken care. For that technology needs to be integrated with the manufacturing leading to its tremendous improvement. In this project I propose a system to automatically track and trace each step of manufacturing and thetime taken incompletion of each step. If the threshold time limit exceeds for any step in the process then an automatic mail will be sent to the manufacturer automatically take steps for the process to complete on time. This is achieved by implementing object tracking methodology in industries

IV. ARCHITECTURE DIAGRAM

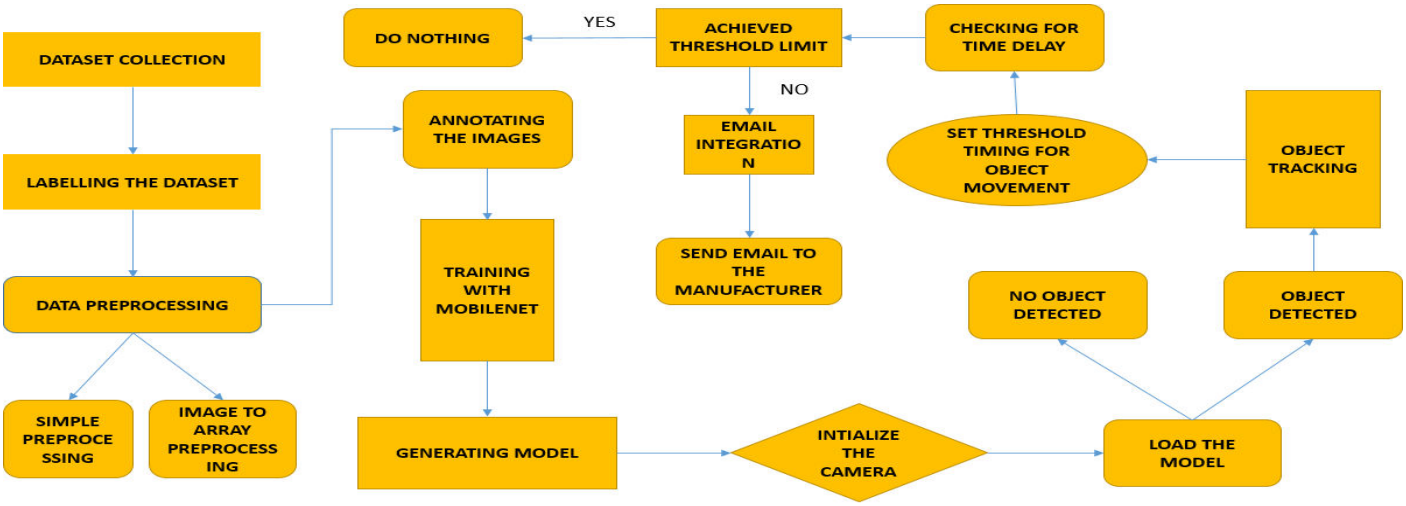

Fig.1. architecture diagram

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The working of the total model from the above diagram can be explained as follows. The dataset that is been required for the project training is been collected from various sources which is then trained by a deep learning model. In the training process, MobileNet algorithm is been implemented to increase the accuracy of prediction and come up with a perfect object detection. If necessary network surgery will also be performed where the combination of algorithms takes place to increase the accuracy. A camera will be implemented for the intelligence of monitoring the production unit. The camera is initialized and the trained model is loaded. The object detection is now live. After the script is detecting the object, an object tracking algorithm has been implemented for pixel-wise object tracking. The threshold value with time monitoring has been set. It will be keep on monitoring the objects movement. The object which is moved late to the next work station will be intimated using an email integration. By this project the work state at the manufacturing industry is effectively monitored, reducing the burden on the management.

1. Dataset Collection Module
2. Training the Model With Algorithm
3. Object detection
4. Object tracking
5. Email integration

A data set is a collection of data. Deep Learning has become the go-to method for solving many challenging real-world problems. It's definitely by far the best performing method for computer vision tasks. The image above showcases the power of deep learning for computer vision. With enough training, a deep network can segment and identify the "key points" of every person in the image. These deep learning machines that have been working so well need fuel lots of fuel; that fuel is data. The more labelled data available, the better our model performs. The idea of more data leading to better performance has even been explored at a large-scale by Google with a dataset of 300 Million images! When deploying a Deep Learning model in a real-world application**,** data must be constantly fed to continue improving its performance. And, in the deep learning era, data is very well arguably the most valuable resource.

V. APPLICATIONS

- Applicable in Big manufacturing companies.
- Saves the time of the production period.
- Decrease in production cost.
- Speed delivery of goods in production unit.

Steps for Sending Email using Raspberry Pi

Step 1:- Setting up the raspberry pi module- connect the power cable and LAN cable to raspberry pi then create WIFI hotspot and connect with it.
Step 2:- After then open the terminal window on Pi. Then, open the putty software and paste the host name or ip address.
Step 3:- We need to update the Raspberry Pi. So, install the latest packages by using the below command.
Step4:- Then use the following command – echo "hello" | mail –s "test" xyz@gmail.com
This command specifies the content, subject of the mail, as well as the mail id to which the mail will be delivered.
Step 5:- Then we need to create a new file in the python and this can be done by using the following command- nano newmailing.py
Alternate way to do the same step
Open the Python IDE 2.7 or above 3.2, create a new file and save itas newmailing.py by pressing Ctrl + x. Here, newmailing.py is the name given by the user while saving the file.
Step 6:- Allowing Gmail SMTP Access for Accounts with Standard Authentication To allow access to Gmail's SMTP server from your app
Step 7:- Login to the Gmail account and check the mail, if everything works correctly then a mail will be delivered to the mentioned mail id.

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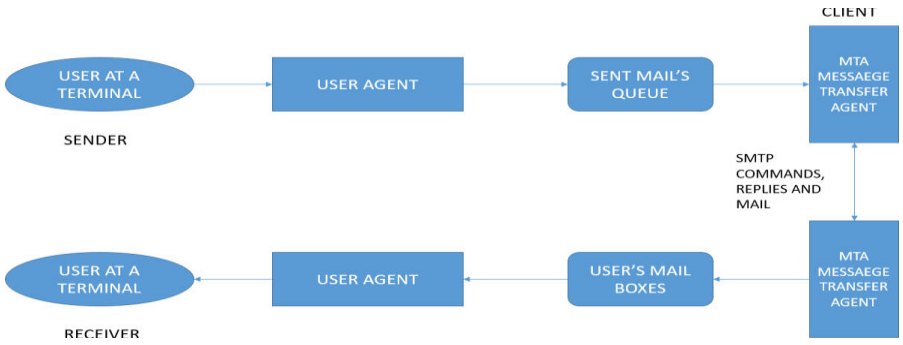

Fig.2.message sending to the higher official

VI. RESULT AND DISCUSSION

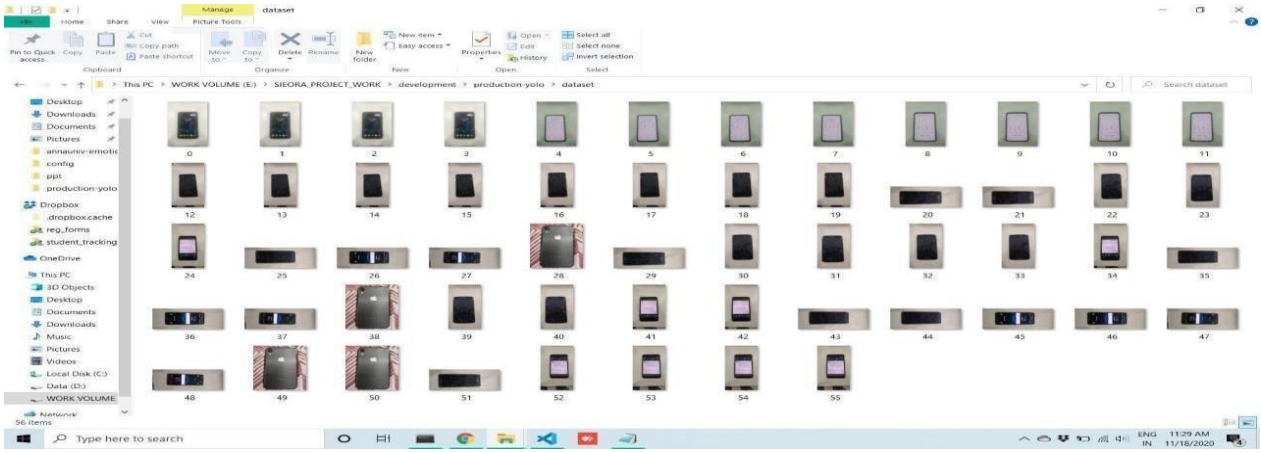

Fig.3. data set collection

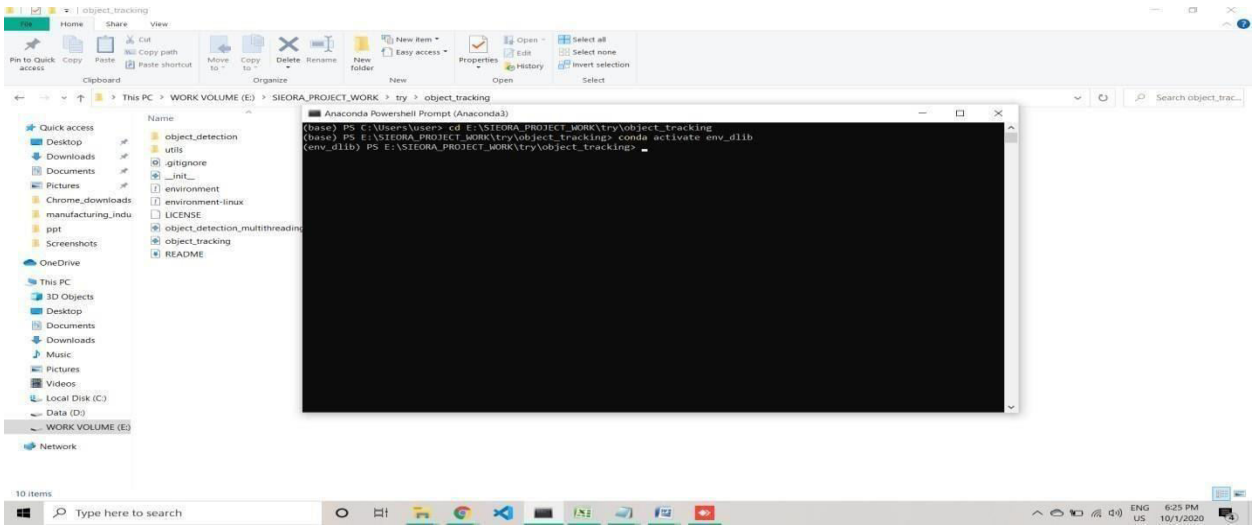

fig.4. pre -processing code

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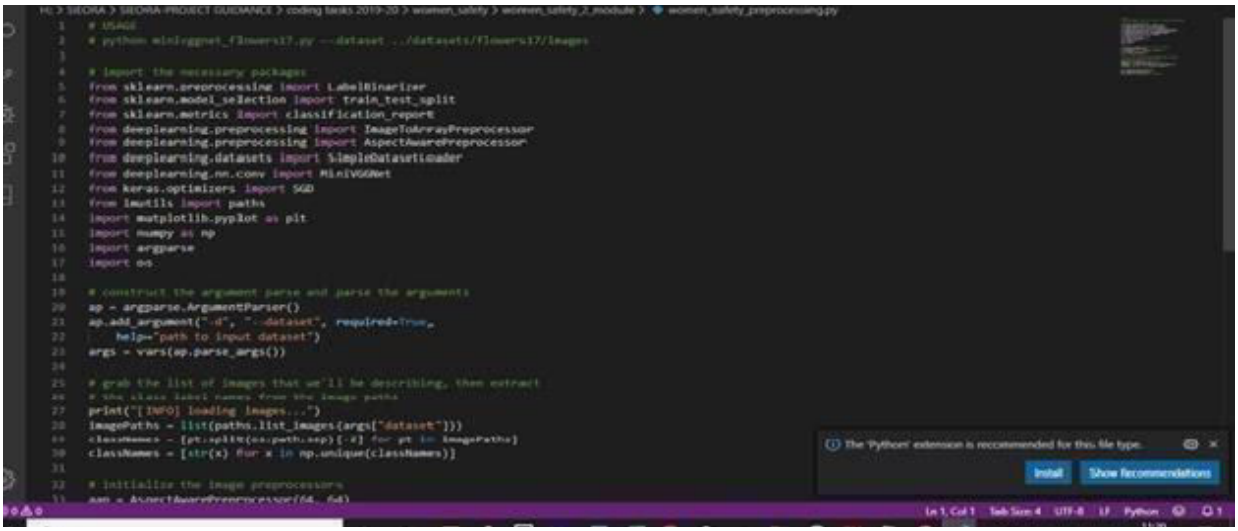

Fig.5. object identification

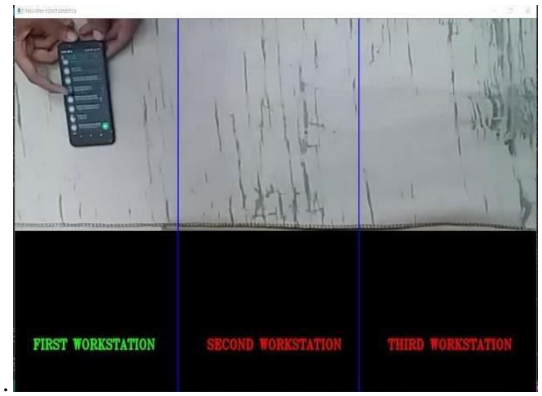

Fig.6. object detection in first workstation

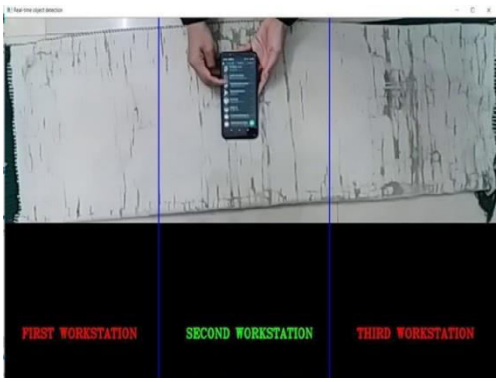

Fig.7. object detection in second worstation

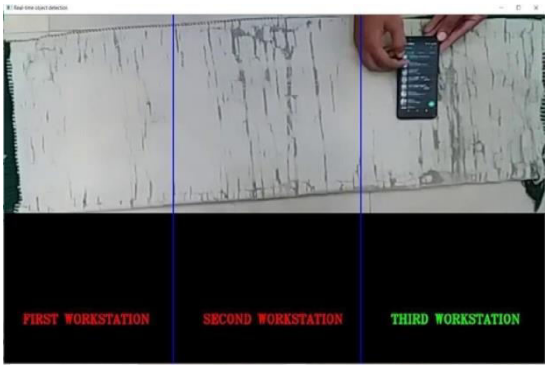

Fig.8. object detection in third worstation

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FACTORS	EXISTING SYSTEM	PROPOSED SYSTEM
ALGORITHM	Deeply-Supervised Attention Network (DSAN)	Mobilenet SSD
ACCURACY	Very low compared to other state-of-art methods	Has very high accuracy
OBJECT DETECTION & TRACKING	The method makes use of primitive algorithms	The method makes use of Mobilenet SSD for OBJECT DETECTION & TRACKING
COST	The system is very expensive.	The system is cheap and effective.
APPLICATION	The method is applicable only for multiple object tracking.	The method is applicable in industrial and production spaces.

VII. Conclusion and Future Work

This project is successfully implemented for effective monitoring of work states in the manufacturing sector using the artificial intelligence approach . This project is very helpful in reducing the burden on the management of constant monitoring and also any possibility in human error is removed.

FUTURE WORK

In the coming future, we review the application of the production technology inmanufacturing field and it can promote for advance the manufacturing technology with more accuracy. In this field, there are more chance to develop or convert this project in many ways. Thus, this project has an efficient scope in coming future where this idea can be converted to computerized production in a cheap way.

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