Deep learning for site safety: Helmet-Safety-Vest-Detection

Abstract:

Based on the Kingdom's 2030 vision for artificial intelligence applications to enhance safety procedures in factories where wearing safety helmets can effectively protect workers safety on construction sites. However, workers often take off the helmets because of weak security-conscious and discomfort, then hidden dangers will be brought by this behavior. Workers without safety helmets will suffer more injuries in accidents such as falling human body and vertical falling matter. Hence, detecting safety helmet wearing is a vital step of construction sites safety management and a safety helmet detector with high speed and accuracy is urgently needed. However, traditional manual monitor is labor intensive and methods of installing sensors on safety helmet are difficult to popularize. Therefore, this model proposes a deep learning-based method to detect safety helmet wearing at a satisfactory accuracy with high detection speed.

Design

The deep learning project's progress will follow this way. First, the dataset that is used in this project is the Helmet Prediction Dataset. It was downloaded from Kaggle.com. For better exploration, we did some exploratory data analysis (EDA). Then we use a deep learning model called Convolutional neural network (CNN).

Datasets:

The dataset containing images of people wearing helmets and people without helmets. It has over 30, 000 observations and was obtained as an open source from Kaggle, Here.

Algorithm:

After this module, we should be able to do the following:

1. Import Datasets
2. Detect Humans
3. Create a CNN to classify people wearing helmets and people without helmets.
4. Create a CNN to classify people wearing helmets and people without helmets (Transfer Learning)
5. Write the algorithm.
6. Test the algorithm.

Tools:

● Technologies: Python, Jupyter Notebook.

● Libraries: Pandas, NumPy, matplotlib, Seaborn, scikit-learn, Keras, and TensorFlow.

Communication

- The slides will be provided here, Feel free to any pull requests.

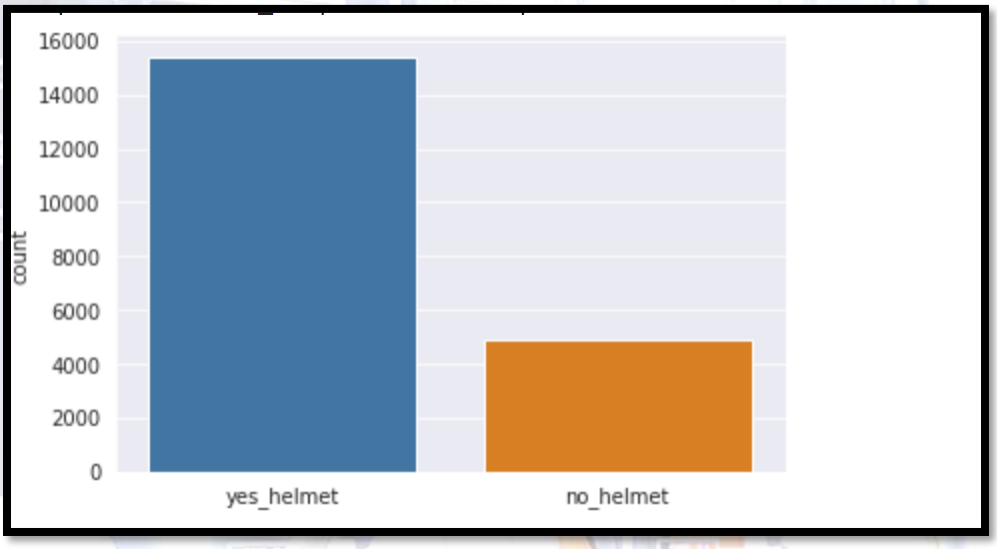

Figure: Shows the No. of people wearing helmets and people without helmets.

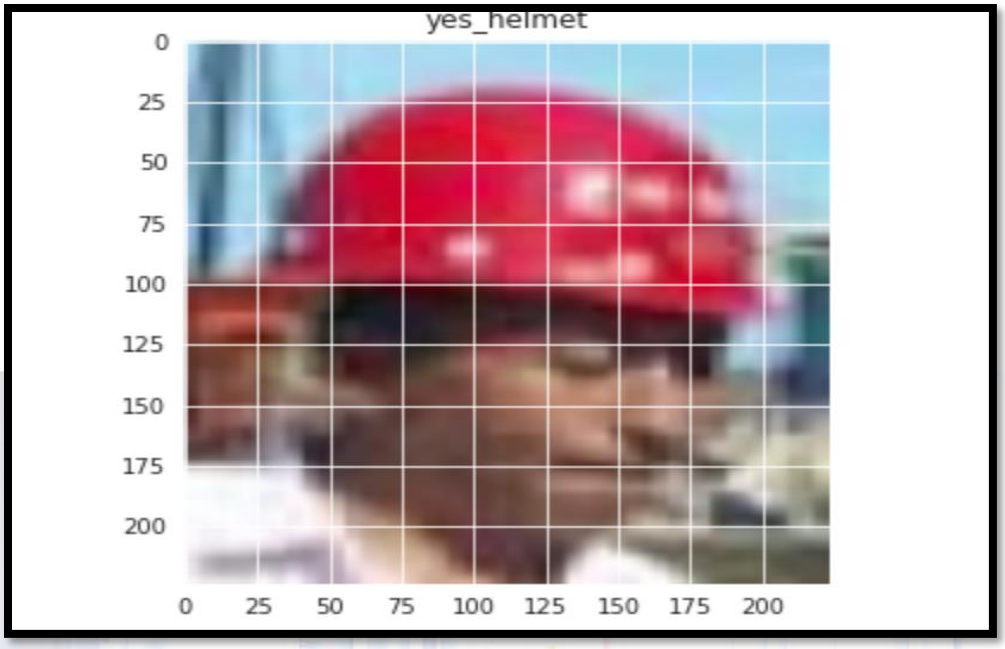

Figure: Detect the helmet person

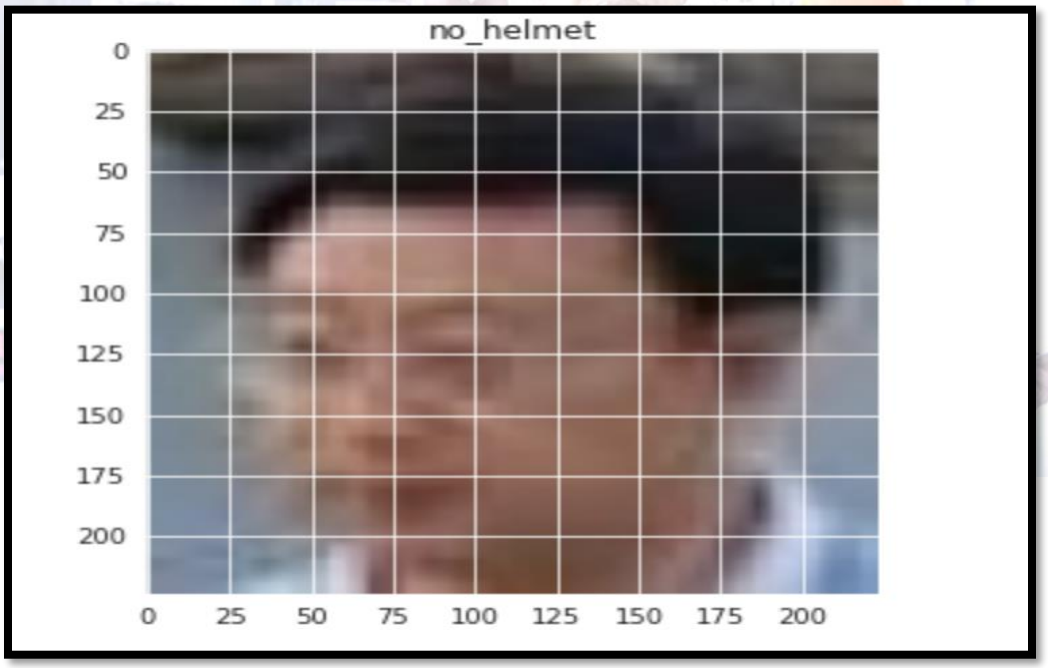

Figure: Detect the person without helmet