ROAD ACCIDENT DETECTION

- Batch No. : 6

- Team Members:
  - Husna Mehween - 19L51A1209
  - Khadija Maryam - 19L51A1212
  - Saniya Amreen – 19L51A1224
  - Ibtesam Mohammed – 19L51A1234
- Guide : Dr.Harikarthik (Phd)

ABSTRACT

- In today's era, need of efficient accident detection has drawn much attention as number of accidents are increasing day by day. One of the widely employed method is to use accelerometer to detect a crash. In this method, acceleration (g) value measured from the accelerometer is calibrated to detect an accident. This method, however is limited by the accuracy of the accelerometer. To make an efficient accident detection system, convolutional neural network (CNN) methodology can be incorporated in the system. CNN is the state-of-the-art method for image classification. In the recent work, image classification has been used to detect accident. However, CNN takes large time, data and computing power to be trained. To mitigate these issues, transfer learning technique has been innovatively incorporated for the accident detection application, which involves retraining the already trained network. Inception-v3 is an image classifier developed by google, which is incorporated for this purpose. In this work, accident detection system is designed using advanced and efficient Transfer Learning algorithm, which gives 84.5% of accuracy. Also, an effective comparison between this advanced method and the traditional accelerometer based technique have been made.

EXISTING ALGORITHM	PROPOSED ALGORITHM
Convolutional Neural Network (CNN)	Transfer learning

EXISTING SYSTEM

- The intent is to create a system which would detect an accident based on the live feed of video from a CCTV camera installed on a highway.

- The idea is to take each frame of a video and run it through a deep learning convolution neural network model which has been trained to classify frames of a video into accident or non accident.

EXISTING ALGORITHM

Convolutional Neural Network (CNN)

- CNNs have been successful in tasks like image classification, object detection, etc.
- Standard LSTMs can be used directly on sequential data where the input is spatial.
- Thus, to perform tasks which involve sequences of images or videos, CNN-LSTM architecture needs to be used.
- The proposed model is a fusion of CNN and LSTM layers for continuous video classification taken from a camera.

PROPOSED SYSTEM

- Convolutional neural network is the state-of-the-art technique in image classification and recognition. It has a stack of convolutional layers, ReLu layers and pooling layers.
- For example, google's inception-v3 image classifier is trained on the ImageNet dataset of 100000 images to classify among 1000 classes. It has 22 hidden layers and it took weeks to train it.
- Transfer learning technique comes in handy to avoid such limitations.
- Transfer learning refers to using learning from previous training session to a new training session.

PROPOSED ALGORITHM

Transfer Learning

- Picture are continuously captured and fed to the program, where it detects whether accident is occurred or not. Computer vision module can be used for this purpose.

- Inception-v3 is used for our image classification problem.
- If an accident is detected, precise location/spot of the accident vehicle is located in the image and an accuracy of how much percentage the accident/ prediction happen can also find out and display in the image.

- The system implementation is similar to the traditional systems, however in this case a software running on python detects an accident.

SYSTEM ARCHITECTURE

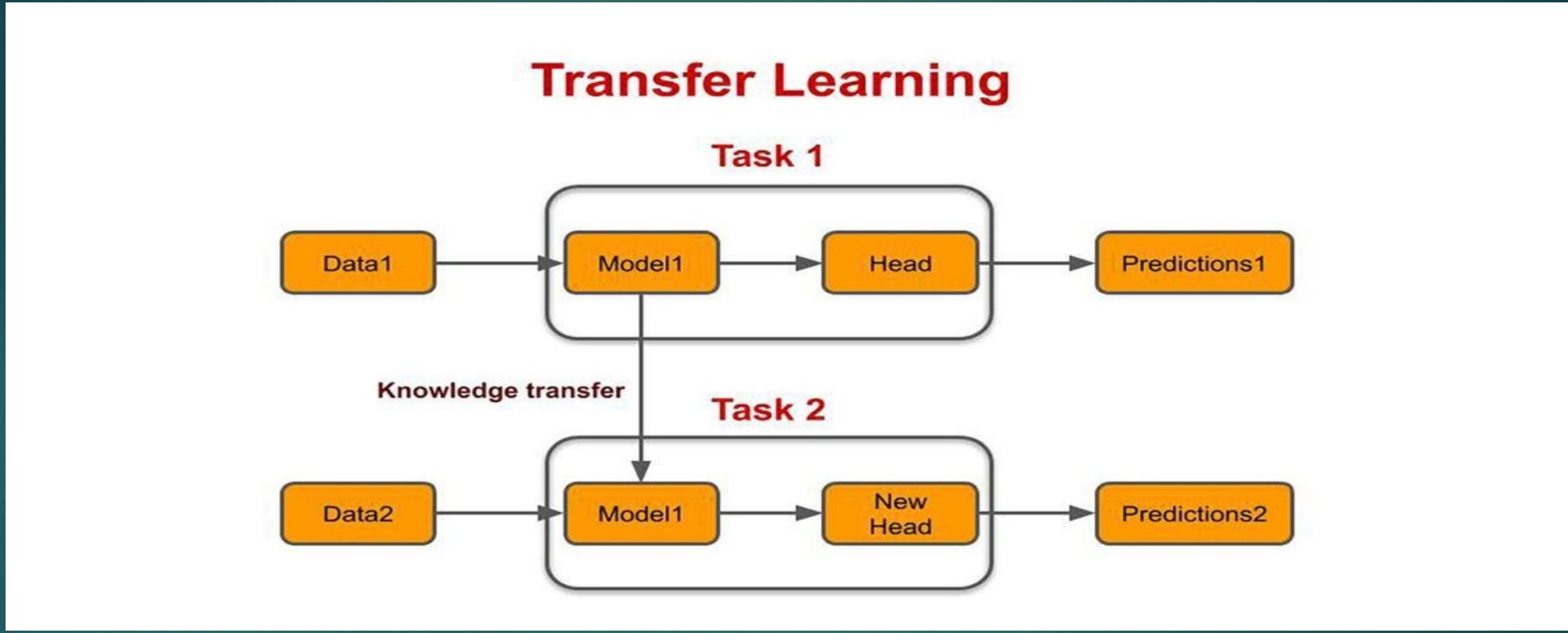

FIG: PROPOSED METHODOLOGY

INPUT IMAGE

OUTPUT IMAGE

DRAWBACKS

- CNN takes large time and data.
- It takes large computing power to be trained.

ADVANTAGES

- It is used especially when we have less images and less computing power available.
- Saving of resources and improved efficiency when training new models.
- It can achieve optimal performance faster than the traditional ML models.

MINIMUM SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- PROCESSOR : Pentium i3 Processor
- RAM : 2GB DD RAM
- HARD DISK : 250 GB

SOFTWARE REQUIREMENTS

- BACK END : PYTHON
- OPERATING SYSTEM : WINDOWS 7
- IDE : Spider3

FUTURE ENHANCEMENT

In the near future, we focus on developing a fully enhanced learning techniques system by applying live cctv camera to detect at the time of accident.

CONCLUSION

- For car crash detection, image classification with convolutional neural network technique is used. Further on, transfer learning is deployed, where only the last layer of the network is trained.

- Selection of images for transfer learning is also important. Image set used for transfer learning should provide variability for better performance.

- The accelerometer technique was easy to implement and use.

- Transfer learning technique gives good accuracy, which in this kind of critical situation might not be acceptable. So, as of now, transfer learning technique needs improvement before deploying it practically and it is advisable to use accelerometer or other sensors related technique currently

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THANK YOU