GTI data set: Grupo de Tratamiento de Imagenes (GTI) is a group of researching on the vision-based vehicle classification task based at Universidad Politecnica De Madrid. In order to evaluate this methods, they have created a new Database of images that they have extracted from their video sequences (acquired with a forward looking camera mounted on a vehicle). The database comprises 3425 **images of vehicle rears** taken from different points of view, and 3900 images extracted from road sequences not containing vehicles. Images are selected to maximize the representativity of the vehicle class, which involves a naturally high variability. One important feature affecting the appearance of the vehicle rear is the position of the vehicle relative to the camera. Therefore, the database separates images in four different regions according to the pose: middle/close range in front of the camera, middle/close range in the left, close/middle range in the right, and far range. In addition, the images are extracted in such a way that they do not perfectly fit the contour of the vehicle in order to make the classifier more robust to offsets in the hypothesis generation stage. Instead, some images contain the vehicle loosely (some background is also included in the image), while others only contain the vehicle partially. Several instances of a same vehicle are included with different bounding hypotheses. The images have 64x64 and are cropped from sequences of 360x256 pixels recorded in highways of Madrid, Brussels and Turin..  
  
The complete set of images is selected so that it covers many different driving conditions, especially relating to weather. In fact, from the 2000 images devoted to each of the image regions (1000 vehicles instances and 1000 non-vehicle images), 20% of them are taken in sunny weather, 20% in cloudy days, 20% in medium conditions (neither very sunny nor cloudy), 20% with poor illumination (down/dusk), 10% with light rain, 5% with bad resolution cameras, and 2,5% in tunnels (with artificial light). This is a binary classification project, with two classes, cars and non-cars, The cars have label of 1.0, whereas the non-cars have a label of 0.0 as shown as figure below.

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Now that we have implemented the model, let’s run an experiment to see how it works. The proposed model is based on the …….. model, which was trained using the GTI dataset. The number of epochs is set to 10 during the training phase. Adam is the optimizer that was used. The epoch accuracy result is shown in “Fig. 12”. The orange line on the graph represents test accuracy, while the blue line represents train accuracy. We can see that the accuracy values are nearly identical, indicating that the model is well trained. The Fig. 11. Resizing and change colour of input image epochs loss value for both train and validation is less than 0.02 as shown in “Fig. 13”, indicating that the loss is significantly small and that the model has a good training phase.

After the train phase has demonstrated a good learning process, the test phase is validate and test on the 733 samples. To demonstrate whether the predicted image is correct, show the true image of the random image of the test sample as shown as figure…….