



# Toxic Comment Classification Challenge

## 1. Business Problem

### 1.1 Description

Discussing things you care about can be difficult. The threat of abuse and harassment online means that many people stop expressing themselves and give up on seeking different opinions. Platforms struggle to effectively facilitate conversations, leading many communities to limit or completely shut down user comments.

The Conversation AI team, a research initiative founded by Jigsaw and Google (both a part of Alphabet) are working on tools to help improve online conversation. One area of focus is the study of negative online behaviors, like toxic comments (i.e. comments that are rude, disrespectful or otherwise likely to make someone leave a discussion). So far they've built a range of publicly available models served through the Perspective API, including toxicity. But the current models still make errors, and they don't allow users to select which types of toxicity they're interested in finding (e.g. some platforms may be fine with profanity, but not with other types of toxic content).

In this Case Study, we are challenged to build a multi-headed model that's capable of detecting different types of toxicity like threats, obscenity, insults, and identity-based hate better than Perspective's current models. You'll be using a dataset of comments from Wikipedia's talk page edits. Improvements to the current model will hopefully help online discussion become more productive and respectful.

Source : <https://www.kaggle.com/c/jigsaw-toxic-comment-classification-challenge/overview>

### 1.2 Problem Statement

Detection of different types of toxic comments and classify them in different classes like Toxic, Severe\_Toxic, Obscene, Threat, Insult and Identity\_Hate. But a Single comment can be classified in multiple classes. So it is a Multilabel Classification Problem.

### 1.3 Data Description

We are provided with a large number of Wikipedia comments which have been labeled by human raters for toxic behavior. The types of toxicity are:

A. Toxic; B. Severe\_Toxic; C. Obscene; D. Threat; E. Insult; F. Identity\_Hate.

### 1.4 File Description

train.csv - the training set, contains comments with their binary labels.

test.csv - the test set, you must predict the toxicity probabilities for these comments. To deter hand labeling, the test set contains some comments which are not included in scoring.

sample\_submission.csv - a sample submission file in the correct format.

test\_labels.csv - labels for the test data; value of -1 indicates it was not used for scoring.

### 1.5 Usage

The dataset under CC0, with the underlying comment text being governed by Wikipedia's CC-SA-3.0

### 1.6 Real-world/Business objectives and constraints

1. The cost of a mis-classification can be very high.
2. No strict latency concerns.
3. Determining a comment toxic or not is highly subjective from person to person.

## 2. Exploratory Data Analysis

In [1]:

```
import os
import csv
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import gc
import time
import warnings
from scipy.misc import imread
from scipy import sparse
import scipy.stats as ss
import matplotlib.pyplot as plt
import matplotlib.gridspec as gridspec
import seaborn as sns
from wordcloud import WordCloud, STOPWORDS
from PIL import Image
import string
import re
import nltk
from nltk.corpus import stopwords
import spacy
from nltk import pos_tag
from nltk.stem.wordnet import WordNetLemmatizer
from nltk.tokenize import word_tokenize
from nltk.tokenize import TweetTokenizer
from sklearn.feature_extraction.text import TfidfVectorizer, CountVectorizer, HashingVectorizer
from sklearn.decomposition import TruncatedSVD
from sklearn.base import BaseEstimator, ClassifierMixin
from sklearn.utils.validation import check_X_y, check_is_fitted
from sklearn.linear_model import LogisticRegression
from sklearn import metrics
from sklearn.metrics import log_loss
from sklearn.model_selection import StratifiedKFold
from sklearn.model_selection import train_test_split
from wordcloud import WordCloud, STOPWORDS
import warnings
warnings.filterwarnings("ignore")
```

### Reading data and Basic stats

In [2]:

```
train_df = pd.read_csv('train.csv')
print('Number of data points : ', train_df.shape[0])
print('Number of features : ', train_df.shape[1])
print('Features : ', train_df.columns.values)
train_df.head(10)
```

Number of data points : 159571

Number of features : 8

Features : ['id' 'comment\_text' 'toxic' 'severe\_toxic' 'obscene' 'threat' 'insult' 'identity\_hate']

Out[2]:

	id	comment_text	toxic	severe_toxic	obscene	threat	insult	identity_hate
0	0000997932d777bf	Explanation\nWhy the edits made under my usern...	0	0	0	0	0	0
1	000103f0d9cfb60f	D'aww! He matches this background colour I'm s...	0	0	0	0	0	0
2	000113f07ec002fd	Hey man, I'm really not trying to edit war. It	0	0	0	0	0	0

	id	comment_text	toxic	severe_toxic	obscene	threat	insult	identity_hate
3	0001b41b1c6bb37e	"\nMore\nI can't make any real suggestions on ...	0	0	0	0	0	0
4	0001d958c54c6e35	You, sir, are my hero. Any chance you remember...	0	0	0	0	0	0
5	00025465d4725e87	"\n\nCongratulations from me as well, use the ...	0	0	0	0	0	0
6	0002bcb3da6cb337	COCKSUCKER BEFORE YOU PISS AROUND ON MY WORK	1	1	1	0	1	0
7	00031b1e95af7921	Your vandalism to the Matt Shirvington article...	0	0	0	0	0	0
8	00037261f536c51d	Sorry if the word 'nonsense' was offensive to ...	0	0	0	0	0	0
9	00040093b2687caa	alignment on this subject and which are contra...	0	0	0	0	0	0

In [3]:

```
train_df.shape
```

Out[3]:

```
(159571, 8)
```

In [4]:

```
print("Check for missing values in Train dataset")
missing_values_check = train_df.isnull().sum()
print(missing_values_check)
```

Check for missing values in Train dataset

```
id          0
comment_text 0
toxic        0
severe_toxic 0
obscene      0
threat       0
insult       0
identity_hate 0
dtype: int64
```

In [5]:

```
test_df = pd.read_csv('test.csv')
print('Number of data points : ', test_df.shape[0])
print('Number of features : ', test_df.shape[1])
print('Features : ', test_df.columns.values)
test_df.head(10)
```

```
Number of data points : 153164
Number of features : 2
Features : ['id' 'comment_text']
```

Out[5]:

	id	comment_text
0	00001cee341fdb12	Yo bitch Ja Rule is more succesful then you'll...
1	0000247867823ef7	== From RfC == \n\n The title is fine as it is...
2	00013b17ad220c46	" \n\n == Sources == \n\n * Zawe Ashton on Lap...
3	00017563c3f7919a	:If you have a look back at the source, the in...
4	00017695ad8997eb	I don't anonymously edit articles at all.
5	0001ea8717f6de06	Thank you for understanding. I think very high...
6	00024115d4cbde0f	Please do not add nonsense to Wikipedia. Such ...
7	000247e83dcc1211	:Dear god this site is horrible.
8	00025358d4737918	" \n Only a fool can believe in such numbers. ...
9	00026d1092fe71cc	== Double Redirects == \n\n When fixing double...

In [6]:

```
test_df.shape
```

Out[6]:

```
(153164, 2)
```

In [7]:

```
print("Check for missing values in Train dataset")
missing_values_check = test_df.isnull().sum()
print(missing_values_check)
```

```
Check for missing values in Train dataset
id          0
comment_text 0
dtype: int64
```

In [8]:

```
x = train_df.iloc[:,2:].sum()
rowsums = train_df.iloc[:,2:].sum(axis=1)
clean_comments_count = (rowsums==0).sum(axis=0)
train_df['clean']=(rowsums==0)
train_df['clean'].sum()
print("Total number of Comments = ",len(train_df))
print("Total number of Clean Comments = ",train_df['clean'].sum())
print("Total number of Tags =",x.sum())
print("Total number of Comments with labels =", (len(train_df)-clean_comments_count))
```

```
Total number of Comments = 159571
Total number of Clean Comments = 143346
Total number of Tags = 35098
Total number of Comments with labels = 16225
```

In [9]:

```
comments = train_df['comment_text']
print(comments.head())
comments = comments.as_matrix()
```

```
0    Explanation\nWhy the edits made under my usern...
1    D'aww! He matches this background colour I'm s...
2    Hey man, I'm really not trying to edit war. It...
3    "\nMore\nI can't make any real suggestions on ...
4    You, sir, are my hero. Any chance you remember...
Name: comment_text, dtype: object
```

In [10]:

```
categories = train_df[['toxic', 'severe_toxic', 'obscene', 'threat', 'insult', 'identity_hate']]
print(categories.head(10))
categories = categories.as_matrix()
```

	toxic	severe_toxic	obscene	threat	insult	identity_hate
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	1	1	1	0	1	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0

In [11]:

```
In [11]:
```

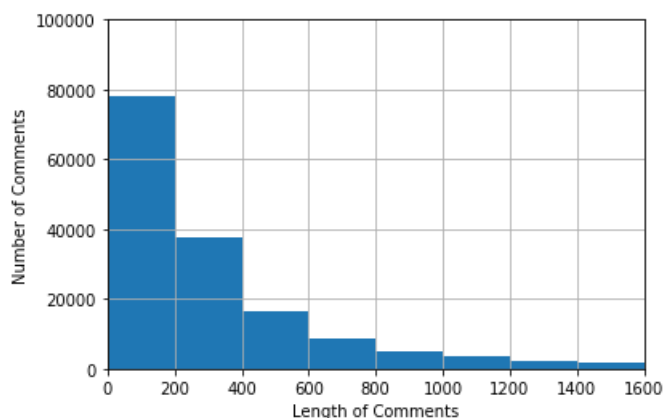
```
count1,count2 = 0,0
for i in range(categories.shape[0]):
    count = np.count_nonzero(categories[i])
    if count :
        count1 = count1+1
    if count > 1 :
        count2 = count2+1
print('Comments having atleast belongs to One Category : ',count1)
print('Comments having atleast belongs to Two or more Categories : ',count2)
```

Comments having atleast belongs to One Category : 16225  
Comments having atleast belongs to Two or more Categories : 9865

```
In [12]:
```

```
x = [len(comments[i]) for i in range(comments.shape[0])]
print('average length of comment: {:.3f}'.format(sum(x)/len(x)) )
bins = [1,200,400,600,800,1000,1200,1400,1600]
plt.hist(x, bins=bins)
plt.xlabel('Length of Comments')
plt.ylabel('Number of Comments')
plt.axis([0, 1600, 0, 100000])
plt.grid(True)
plt.show()
```

average length of comment: 394.073



```
In [13]:
```

```
#Sentence count in each comment: '\n' is split & count number of sentences in each comment
train_df['count_sent'] = train_df["comment_text"].apply(lambda x: len(re.findall("\n",str(x)))+1)

#Word count in each comment:
train_df['count_word'] = train_df["comment_text"].apply(lambda x: len(str(x).split()))

#Unique word count:
train_df['count_unique_word'] = train_df["comment_text"].apply(lambda x: len(set(str(x).split())))
```

```
In [14]:
```

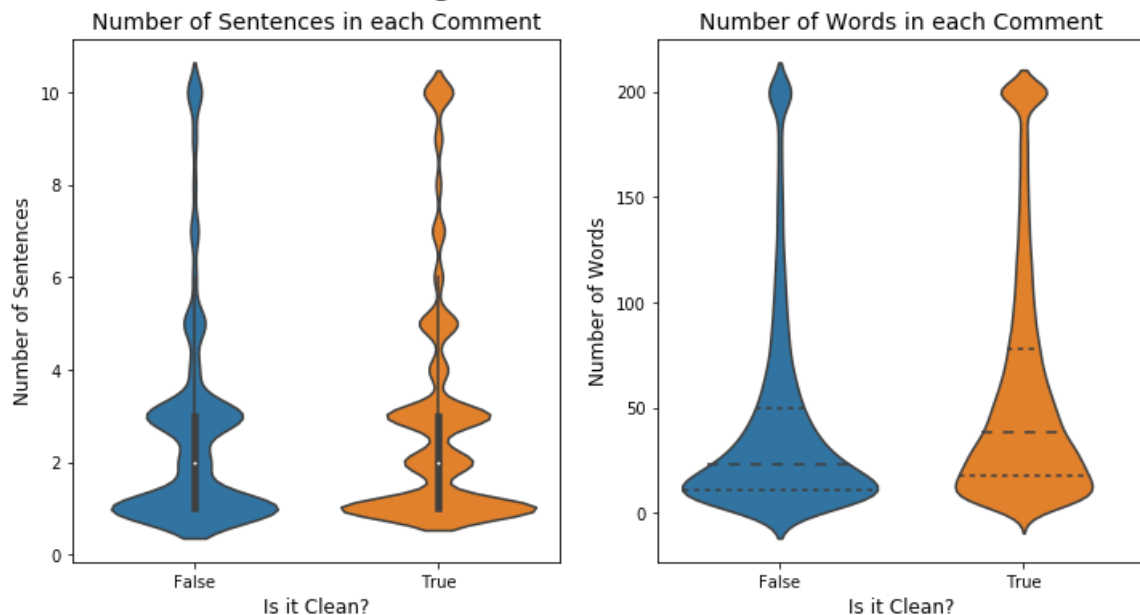
```
#https://www.kaggle.com/jagangupta/stop-the-s-toxic-comments-eda
train_df['count_sent'].loc[train_df['count_sent']>10] = 10
plt.figure(figsize=(12,6))

# Sentences
plt.subplot(121)
plt.suptitle("Are longer comments more toxic?",fontsize=20)
sns.violinplot(y='count_sent',x='clean', data=train_df,split=True)
plt.xlabel('Is it Clean?', fontsize=12)
plt.ylabel('Number of Sentences', fontsize=12)
plt.title("Number of Sentences in each Comment", fontsize=14)

# Words
train_df['count_word'].loc[train_df['count_word']>200] = 200
```

```
plt.subplot(122)
sns.violinplot(y='count_word',x='clean', data=train_df,split=True,inner="quart")
plt.xlabel('Is it Clean?', fontsize=12)
plt.ylabel('Number of Words', fontsize=12)
plt.title("Number of Words in each Comment", fontsize=14)
plt.show()
```

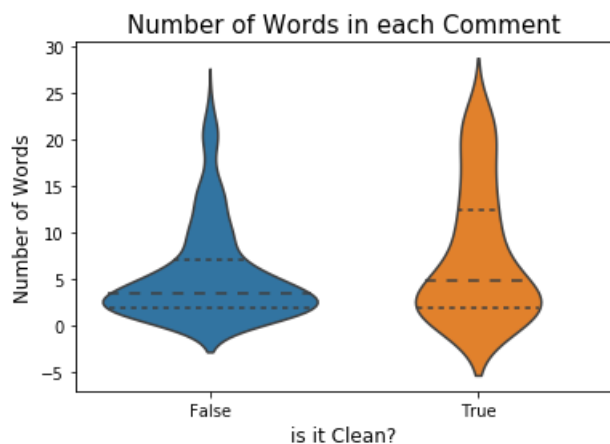
## Are longer comments more toxic?



In [15]:

```
# clac unique word count percent in each comment:
train_df['word_unique_percent'] = train_df['count_unique_word']*100/train_df['count_word']

# lets have a look at some comments with unique word count percentage < 25%...they can be spam/ref
# eral links/marketing
# words
sns.violinplot(y = 'word_unique_percent',x='clean', data = train_df[train_df['word_unique_percent']
< 25],
               split=True,inner="quart")
plt.xlabel('is it Clean?', fontsize=12)
plt.ylabel('Number of Words', fontsize=12)
plt.title("Number of Words in each Comment", fontsize=15)
plt.show()
```

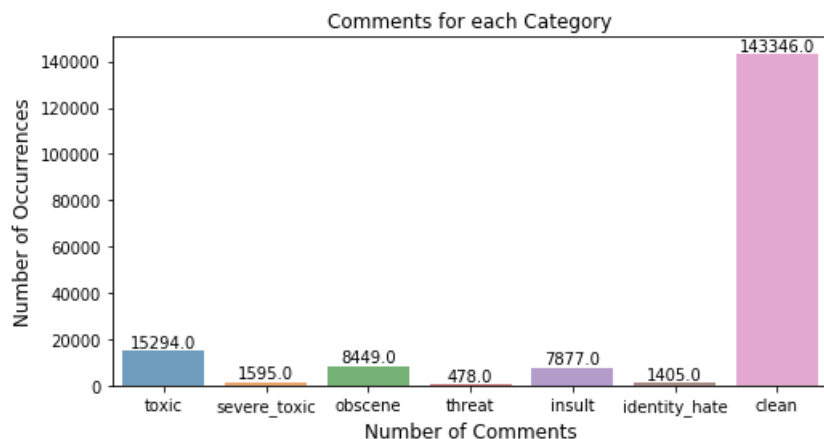


## Barplot

In [26]:

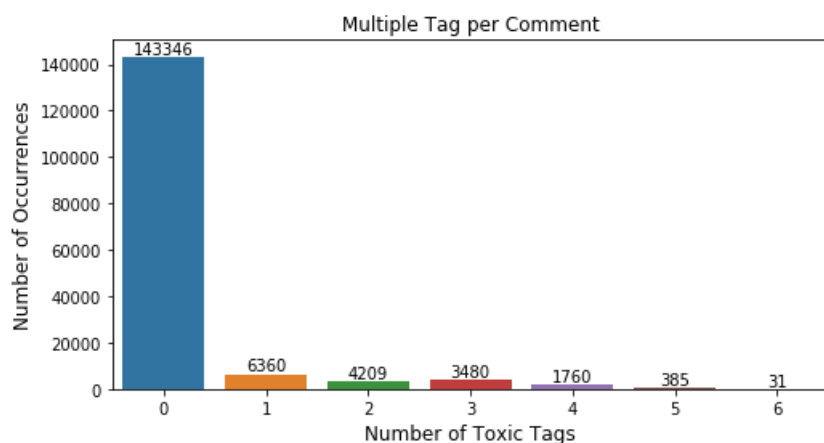
```
label_counts = train_df.iloc[:,2:].sum()
plt.figure(figsize=(8,4))
ax = sns.barplot(label_counts.index, label_counts.values, alpha=0.7)
```

```
plt.title("Comments for each Category")
plt.ylabel('Number of Occurrences', fontsize=12)
plt.xlabel('Number of Comments', fontsize=12)
rects = ax.patches
labels = label_counts.values
for rect, label in zip(rects, labels):
    height = rect.get_height()
    ax.text(rect.get_x() + rect.get_width()/2, height + 10,
            label, ha='center', va='bottom')
plt.show()
```



In [11]:

```
x = rowsums.value_counts()
plt.figure(figsize=(8,4))
ax = sns.barplot(x.index, x.values)
plt.title("Multiple Tag per Comment")
plt.ylabel('Number of Occurrences', fontsize=12)
plt.xlabel('Number of Toxic Tags', fontsize=12)
rects = ax.patches
labels = x.values
for rect, label in zip(rects, labels):
    height = rect.get_height()
    ax.text(rect.get_x() + rect.get_width()/2, height + 5, label, ha='center', va='bottom')
plt.show()
```



### Pie-Chart

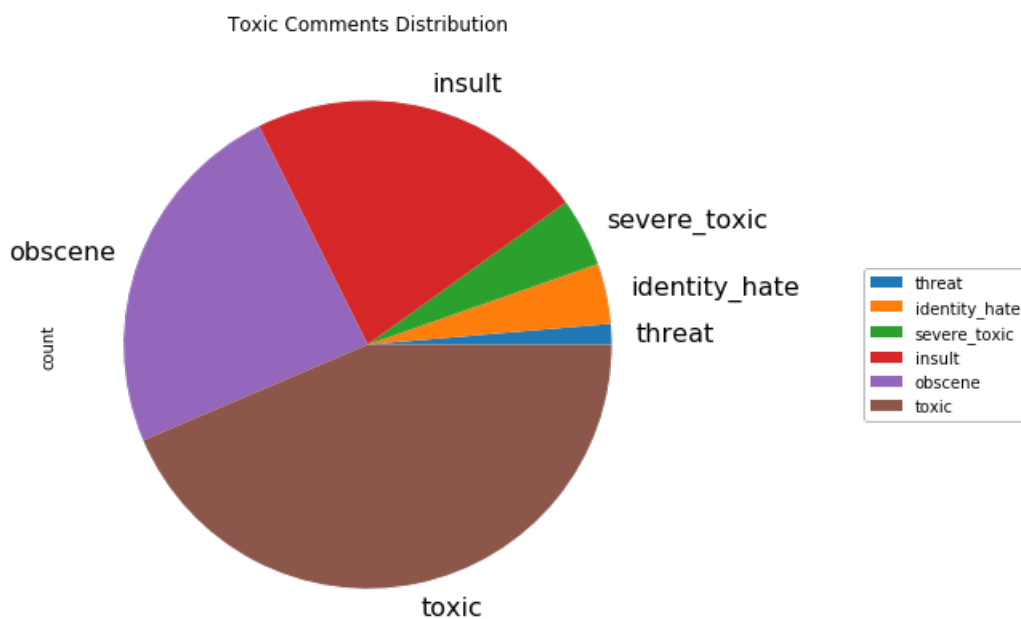
In [12]:

[illegible]

```
CO_anchor=(1.5, 0.5))
```

Out[12]:

<matplotlib.legend.Legend at 0x1ce1ff3cf60>



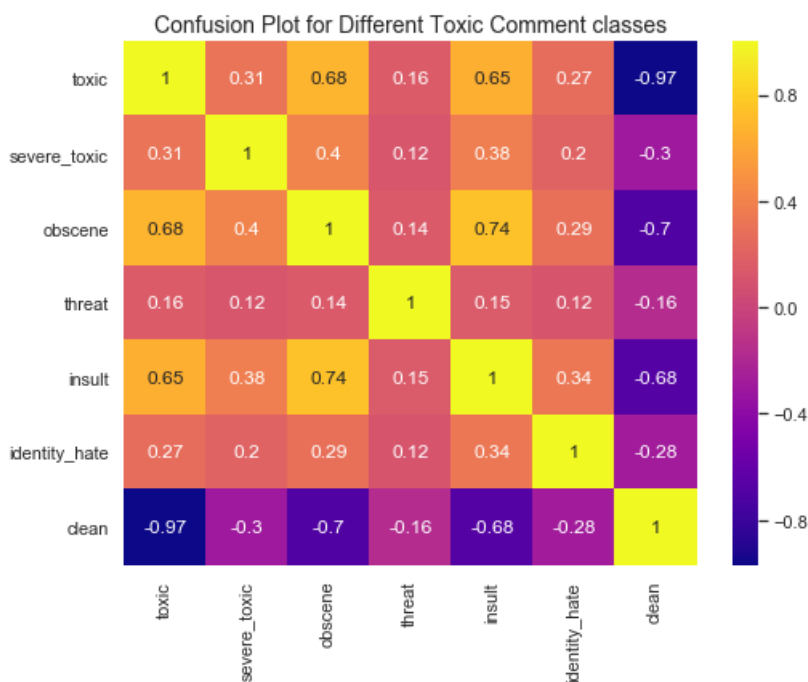
## Confusion Matrix

In [80]:

```
colormap = plt.cm.plasma
temp_df=train_df[categories]
corr=temp_df.corr()
plt.figure(figsize=(8,6))
plt.title('Confusion Plot for Different Toxic Comment classes',fontsize = 14)
sns.heatmap(corr[categories],cmap=colormap, linecolor='white',annot=True)
```

Out[80]:

<matplotlib.axes.\_subplots.AxesSubplot at 0x1e45c97bf98>





### Example of Toxic Comments

In [174]:

```
print(train_df[train_df.toxic==1].iloc[7,1])
```

Stupid peace of shit stop deleting my stuff asshole go die and fall in a hole go to hell!

### Word Cloud for Toxic Comments

```
In [103]:
```

```
from wordcloud import WordCloud, STOPWORDS
plt.figure(figsize=(8,6))
subset = train_df[train_df.toxic==1]
text = subset.comment_text.values
cloud_toxic = WordCloud(stopwords=STOPWORDS, background_color='white', collocations=False,
width=1920, height=1080).generate(" ".join(text))
plt.axis('off')
plt.title("Toxic", fontsize=20)
plt.imshow(cloud_toxic)
```

Out[103]:

```
<matplotlib.image.AxesImage at 0x1aac2185358>
```



### Example of Severe Toxic Comments

In [175]:

```
print(train_df[train_df.severe_toxic==1].iloc[4,1])
```

What a motherfucking piece of crap those fuckheads for blocking us!

### Word Cloud for Severe Toxic Comments

In [110]:

```
from wordcloud import WordCloud, STOPWORDS
plt.figure(figsize=(8,6))
subset = train_df[train_df.severe_toxic==1]
text = subset.comment_text.values
cloud_severe_toxic = WordCloud(stopwords=STOPWORDS, background_color='white', collocations=False,
width=1920, height=1080

).generate(" ".join(text))
plt.axis('off')
plt.title("Severe Toxic", fontsize=20)
plt.imshow(cloud_severe_toxic)
```

Out [110] :

```
<matplotlib.image.AxesImage at 0x1aac1179438>
```



### Example of Obscene Comments

In [176]:

```
print(train_df[train_df.obscene==1].iloc[3,1])
```

GET FUCKED UP. GET FUCEEEED UP. GOT A DRINK THAT YOU CANT PUT DOWN???

GET FUCK UP GET FUCKED UP. I'M FUCKED UP RIGHT NOW!

### Word Cloud for Obscene Comments

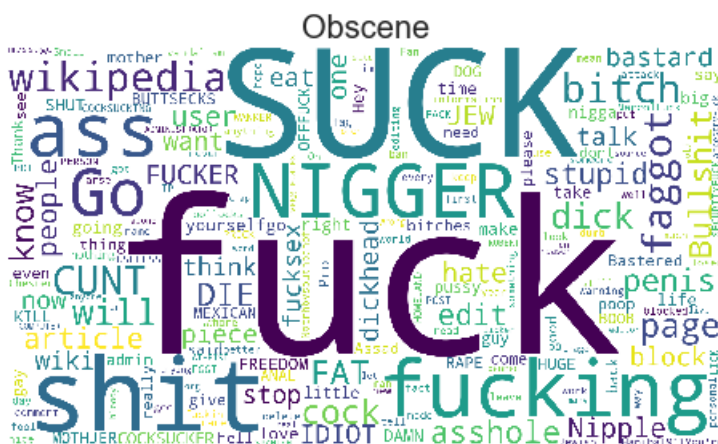
In [146]:

```
from wordcloud import WordCloud, STOPWORDS
plt.figure(figsize=(8,6))
subset = train_df[train_df.obscene==1]
text = subset.comment_text.values
cloud_obscene = WordCloud(stopwords=STOPWORDS, background_color='white', collocations=False, width
=1920, height=1080

).generate(" ".join(text))
plt.axis('off')
plt.title("Obscene", fontsize=20)
plt.imshow(cloud_obscene)
```

Out[146]:

```
<matplotlib.image.AxesImage at 0x1aac485a0f0>
```



### Example of Threat Comments

In [177]:

```
print(train_df[train_df.threat==1].iloc[5,1])
```

Whoever put a notices on my page. I will kill u

### Word Cloud for Threat Comments

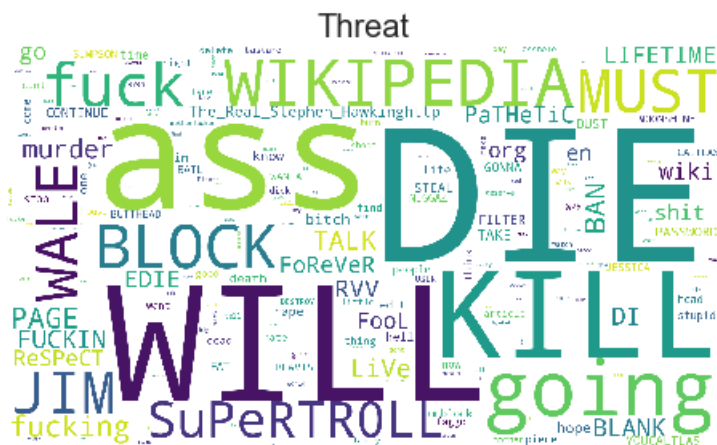
In [147]:

```
from wordcloud import WordCloud, STOPWORDS
plt.figure(figsize=(8,6))
subset = train_df[train_df.threat==1]
text = subset.comment_text.values
cloud_threat = WordCloud(stopwords=STOPWORDS, background_color='white', collocations=False, width=
1920, height=1080

).generate(" ".join(text))
plt.axis('off')
plt.title("Threat", fontsize=20)
plt.imshow(cloud_threat)
```

Out [147]:

```
<matplotlib.image.AxesImage at 0x1aac23e50b8>
```



### Example of Insult Comments

In [178]:

```
print(train_df[train_df.insult==1].iloc[9,1])
```

I think that your a Fagget get a oife and burn in Hell I hate you 'm sorry we cant have any more s  
ex i'm running out of conndoms

### Word Cloud for Insult Comments

In [148]:

```
from wordcloud import WordCloud, STOPWORDS
plt.figure(figsize=(8,6))
subset = train_df[train_df.insult==1]
text = subset.comment_text.values
cloud_insult = WordCloud(stopwords=STOPWORDS, background_color='white', collocations=False, width=
1920, height=1080

).generate(" ".join(text))
plt.axis('off')
```

```
<matplotlib.image.AxesImage at 0x1aac21fe4e0>
```



## In [179]:

```
print(train_df[train_df.identity_hate==1].iloc[24,1])
```

You fascit Nazi! You socialist bastard! You filthy Hippy!

You dare touch my edits again and I'll go to where you live and kick your ass in person. It shouldn't be hard to find. Communes smell worse than slaughter houses. I make edits. I don't vandalize. Get off your high horse.

## In [149]:

```
from wordcloud import WordCloud, STOPWORDS
plt.figure(figsize=(8,6))
subset = train_df[train_df.identity_hate==1]
text = subset.comment_text.values
cloud_identity_hate = WordCloud(stopwords=STOPWORDS, background_color='white', collocations=False,
width=1920, height=1080).generate(" ".join(text))
plt.axis('off')
plt.title("Identity Hate", fontsize=20)
plt.imshow(cloud_identity_hate)
plt.show()
```



# Data Pre-Processing

In [13]:

```
import nltk
from nltk.corpus import stopwords
from nltk.stem.snowball import SnowballStemmer
import re
import sys
import warnings
if not sys.warnoptions:
    warnings.simplefilter("ignore")
```

In [14]:

```
def cleanHtml(sentence):
    cleanr = re.compile('<.*?>')
    cleantext = re.sub(cleanr, ' ', str(sentence))
    return cleantext

def cleanPunc(sentence): #function to clean the word of any punctuation or special characters
    cleaned = re.sub(r'[?|!|\'|\"|#]', r'', sentence)
    cleaned = re.sub(r'[.,|)|(|\\|/]', r'', cleaned)
    cleaned = cleaned.strip()
    cleaned = cleaned.replace("\n", " ")
    return cleaned

def keepAlpha(sentence):
    alpha_sent = ""
    for word in sentence.split():
        alpha_word = re.sub('^[^a-zA-Z]+', '', word)
        alpha_sent += alpha_word
        alpha_sent += " "
    alpha_sent = alpha_sent.strip()
    return alpha_sent
```

In [15]:

```
train_df['comment_text'] = train_df['comment_text'].str.lower()
train_df['comment_text'] = train_df['comment_text'].apply(cleanHtml)
train_df['comment_text'] = train_df['comment_text'].apply(cleanPunc)
train_df['comment_text'] = train_df['comment_text'].apply(keepAlpha)
train_df.head()
```

Out[15]:

	id	comment_text	toxic	severe_toxic	obscene	threat	insult	identity_hate	clean
0	0000997932d777bf	explanation why the edits made under my userna...	0	0	0	0	0	0	True
1	000103f0d9c9b60f	daww he matches this background colour im seem...	0	0	0	0	0	0	True
2	000113f07ec002fd	hey man im really not trying to edit war its j...	0	0	0	0	0	0	True
3	0001b41b1c6bb37e	more i cant make any real suggestions on impro...	0	0	0	0	0	0	True
4	0001d958c54c6e35	you sir are my hero any chance you remember wh...	0	0	0	0	0	0	True

In [16]:

```
stop_words = set(stopwords.words('english'))
stop_words.update(['zero', 'one', 'two', 'three', 'four', 'five', 'six', 'seven', 'eight', 'nine', 'ten', 'may', 'also', 'across', 'among', 'beside', 'however', 'yet', 'within'])
re_stop_words = re.compile(r"\b(" + "|".join(stop_words) + ")\W", re.I)
def removeStopWords(sentence):
    global re_stop_words
    return re_stop_words.sub(" ", sentence)

train_df['comment_text'] = train_df['comment_text'].apply(removeStopWords)
train_df.head()
```

Out[16]:

	id	comment_text	toxic	severe_toxic	obscene	threat	insult	identity_hate	clean
0	0000997932d777bf	explanation edits made username hardcore m...	0	0	0	0	0	0	True
1	000103f0d9cfb60f	daww matches background colour im seemingly ...	0	0	0	0	0	0	True
2	000113f07ec002fd	hey man im really trying edit war guy c...	0	0	0	0	0	0	True
3	0001b41b1c6bb37e	cant make real suggestions improvement ...	0	0	0	0	0	0	True
4	0001d958c54c6e35	sir hero chance remember page thats on	0	0	0	0	0	0	True

In [17]:

```
stemmer = SnowballStemmer("english")
def stemming(sentence):
    stemSentence = ""
    for word in sentence.split():
        stem = stemmer.stem(word)
        stemSentence += stem
        stemSentence += " "
    stemSentence = stemSentence.strip()
    return stemSentence

train_df['comment_text'] = train_df['comment_text'].apply(stemming)
train_df.head(10)
```

Out[17]:

	id	comment_text	toxic	severe_toxic	obscene	threat	insult	identity_hate	clean
0	0000997932d777bf	explan edit made usernam hardcor metallica fan...	0	0	0	0	0	0	True
1	000103f0d9cfb60f	daww match background colour im seem stuck tha...	0	0	0	0	0	0	True
2	000113f07ec002fd	hey man im realli tri edit war guy constant re...	0	0	0	0	0	0	True
3	0001b41b1c6bb37e	cant make real suggest improv wonder section s...	0	0	0	0	0	0	True
4	0001d958c54c6e35	sir hero chanc rememb page that on	0	0	0	0	0	0	True
5	00025465d4725e87	congratul well use tool well talk	0	0	0	0	0	0	True
6	0002bcb3da6cb337	cocksuck piss around work	1	1	1	0	1	0	False
7	00031b1e95af7921	vandal matt shirvington articl revert pleas do...	0	0	0	0	0	0	True
8	00037261f536c51d	sorri word nonsens offends anyway im intend wri...	0	0	0	0	0	0	True
9	00040093b2687caa	align subject contrari dulithgow	0	0	0	0	0	0	True

In [18]:

```
stopwords= set(['br', 'the', 'i', 'me', 'my', 'myself', 'we', 'our', 'ours', 'ourselves', 'you', "y
ou're", "you've",\
    "you'll", "you'd", 'your', 'yours', 'yourself', 'yourselves', 'he', 'him', 'his',
'himself', \
    'she', "she's", 'her', 'hers', 'herself', 'it', "it's", 'its', 'itself', 'they', 'them',
'their',\
    'theirs', 'themselves', 'what', 'which', 'who', 'whom', 'this', 'that', "that'll",
'these', 'those', \
    'am', 'is', 'are', 'was', 'were', 'be', 'been', 'being', 'have', 'has', 'had', 'having',
'do', 'does', \
    'did', 'doing', 'a', 'an', 'the', 'and', 'but', 'if', 'or', 'because', 'as', 'until', '
while', 'of', \
    'at', 'by', 'for', 'with', 'about', 'against', 'between', 'into', 'through', 'during',
'before', 'after',\
    'above', 'below', 'to', 'from', 'up', 'down', 'in', 'out', 'on', 'off', 'over', 'under'
, 'again', 'further',\
    'then', 'once', 'here', 'there', 'when', 'where', 'why', 'how', 'all', 'any', 'both', 'e
ach', 'few', 'more',\
    'most', 'other', 'some', 'such', 'only', 'own', 'same', 'so', 'than', 'too', 'very', \
    's', 't', 'can', 'will', 'just', 'don', "don't", 'should', "should've", 'now', 'd', 'll'
, 'm', 'o', 're', \
    've', 'y', 'ain', 'aren', "aren't", 'couldn', "couldn't", 'didn', "didn't", 'doesn', "do
esn't", 'hadn',\
    "hadn't", 'hasn', "hasn't", 'haven', "haven't", 'isn', "isn't", 'ma', 'mightn',
```



In [22]:

```
count_vect = CountVectorizer() #in scikit-learn
count_vect.fit(preprocessed_comments)
print("some feature names ", count_vect.get_feature_names()[:10])
print('='*50)
final_counts = count_vect.transform(preprocessed_comments)
print("the type of count vectorizer ",type(final_counts))
print("the shape of out text BOW vectorizer ",final_counts.get_shape())
print("the number of unique words ", final_counts.get_shape()[1])
```

```
some feature names  ['aa', 'aab', 'aaba', 'aabov', 'aaboyz', 'aac', 'aacargo', 'aacd', 'aacfo', 'a
achen']
```

```
=====
the type of count vectorizer  <class 'scipy.sparse.csr.csr_matrix'>
the shape of out text BOW vectorizer  (159571, 135483)
the number of unique words  135483
```

In [23]:

```
count_vect = CountVectorizer(ngram_range=(1,2), min_df=10, max_features=5000)
final_bigram_counts = count_vect.fit_transform(preprocessed_comments)
print("the type of count vectorizer ",type(final_bigram_counts))
print("the shape of out text BOW vectorizer ",final_bigram_counts.get_shape())
print("the number of unique words including both unigrams and bigrams ", final_bigram_counts.get_s
hape()[1])
```

```
the type of count vectorizer  <class 'scipy.sparse.csr.csr_matrix'>
the shape of out text BOW vectorizer  (159571, 5000)
the number of unique words including both unigrams and bigrams  5000
```

## TF-IDF

In [24]:

```
tf_idf_vect = TfidfVectorizer(ngram_range=(1,2), min_df=10)
tf_idf_vect.fit(preprocessed_comments)
print("some sample features(unique words in the corpus)",tf_idf_vect.get_feature_names()[0:10])
print('='*50)
final_tf_idf = tf_idf_vect.transform(preprocessed_comments)
print("the type of count vectorizer ",type(final_tf_idf))
print("the shape of out text TFIDF vectorizer ",final_tf_idf.get_shape())
print("the number of unique words including both unigrams and bigrams ", final_tf_idf.get_shape()[
1])
```

```
some sample features(unique words in the corpus) ['aa', 'aah', 'aap', 'aardvark', 'aaron', 'ab', '
aba', 'abandon', 'abba', 'abbey']
```

```
=====
the type of count vectorizer  <class 'scipy.sparse.csr.csr_matrix'>
the shape of out text TFIDF vectorizer  (159571, 67565)
the number of unique words including both unigrams and bigrams  67565
```

In [25]:

```
text_col = ['comment_text']
```

In [26]:

```
drop_col = ['id', 'clean', 'count_sent', 'count_word', 'count_unique_word', 'word_unique_percent']
label_col = [col for col in train_df.columns if col not in text_col + drop_col]
label_col
```

Out[26]:

```
['toxic', 'severe_toxic', 'obscene', 'threat', 'insult', 'identity_hate']
```

In [27]:

```
final_tf_idf = tf_idf_vect.transform(preprocessed_comments)
```



In [28]:

```
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.model_selection import train_test_split
import scipy

features = text_col

X_test = test_df[features].copy()

X_train, X_val, y_train, y_val = train_test_split(train_df[features], train_df[label_col], test_size=0.2, random_state=2019)

X_train = tf_idf_vect.transform(X_train['comment_text'])
X_val = tf_idf_vect.transform(X_val['comment_text'])
X_test = tf_idf_vect.transform(X_test['comment_text'])
feature_names = tf_idf_vect.get_feature_names()

print('Text Data dimensions after transformations:', X_train.shape, y_train.shape, X_val.shape, y_val.shape)
```

Text Data dimensions after transformations: (127656, 67565) (127656, 6) (31915, 67565) (31915, 6)

## ML Models

### Multinomial Naive Bayes

In [41]:

```
sub_df_mnb = pd.read_csv('sample_submission.csv')
```

In [42]:

```
%%time

from sklearn.naive_bayes import MultinomialNB
from sklearn.metrics import log_loss, roc_auc_score
model = MultinomialNB(alpha = 0.1)

train_rocs = []
valid_rocs = []

preds_train = np.zeros(y_train.shape)
preds_valid = np.zeros(y_val.shape)
preds_test = np.zeros((len(test_df), len(label_col)))

for i, label_name in enumerate(label_col):
    print('\nClass:= '+label_name)
    # fit
    model.fit(X_train, y_train[label_name])

    # train
    preds_train[:, i] = model.predict_proba(X_train)[:, 1]
    train_roc_class = roc_auc_score(y_train[label_name], preds_train[:, i])
    print('Train ROC AUC:', train_roc_class)
    train_rocs.append(train_roc_class)

    # valid
    preds_valid[:, i] = model.predict_proba(X_val)[:, 1]
    valid_roc_class = roc_auc_score(y_val[label_name], preds_valid[:, i])
    print('Valid ROC AUC:', valid_roc_class)
    valid_rocs.append(valid_roc_class)

    # test predictions
    preds_test[:, i] = model.predict_proba(X_test)[:, 1]

print('\nmean column-wise ROC AUC on Train data: ', np.mean(train_rocs))
print('mean column-wise ROC AUC on Val data: ', np.mean(valid_rocs))
```

```
sub_df_mnb.iloc[:,1:] = preds_test
```

```
Class:= toxic
Train ROC AUC: 0.9837999890058676
Valid ROC AUC: 0.95258538123471
```

```
Class:= severe_toxic
Train ROC AUC: 0.9929256721203312
Valid ROC AUC: 0.9727484488685235
```

```
Class:= obscene
Train ROC AUC: 0.9891218852821394
Valid ROC AUC: 0.9583701330934271
```

```
Class:= threat
Train ROC AUC: 0.9941090939418463
Valid ROC AUC: 0.9143511878613547
```

```
Class:= insult
Train ROC AUC: 0.9880679814614697
Valid ROC AUC: 0.9570413288477672
```

```
Class:= identity_hate
Train ROC AUC: 0.9896728307754585
Valid ROC AUC: 0.9400402792733558
```

```
mean column-wise ROC AUC on Train data: 0.9896162420978522
mean column-wise ROC AUC on Val data: 0.9491894598631898
Wall time: 1.36 s
```

In [43]:

```
sub_df_mnb.to_csv('submission_mnb.csv')
sub_df_mnb.head()
```

Out[43]:

	id	toxic	severe_toxic	obscene	threat	insult	identity_hate
0	00001cee341fdb12	0.994549	0.100258	0.988490	0.003142	0.966735	0.133749
1	0000247867823ef7	0.019381	0.000291	0.002617	0.000048	0.004957	0.000265
2	00013b17ad220c46	0.095342	0.009902	0.052453	0.003008	0.048991	0.008523
3	00017563c3f7919a	0.049306	0.000462	0.006277	0.000058	0.008894	0.000252
4	00017695ad8997eb	0.067329	0.001883	0.031952	0.000311	0.028648	0.001335

## Logistic Regression

In [44]:

```
sub_df_lr = pd.read_csv('sample_submission.csv')
```

In [45]:

```
%%time

from sklearn.linear_model import LogisticRegression
from sklearn.metrics import log_loss, roc_auc_score
model = LogisticRegression(C=10)

train_rocs = []
valid_rocs = []

preds_train = np.zeros(y_train.shape)
preds_valid = np.zeros(y_val.shape)
preds_test = np.zeros((len(test_df), len(label_col)))

for i, label_name in enumerate(label_col):
    print('\nClass:= ' + label_name)
```

```

# fit
model.fit(X_train,y_train[label_name])

# train
preds_train[:,i] = model.predict_proba(X_train)[:,1]
train_roc_class = roc_auc_score(y_train[label_name],preds_train[:,i])
print('Train ROC AUC:', train_roc_class)
train_rocs.append(train_roc_class)

# valid
preds_valid[:,i] = model.predict_proba(X_val)[:,1]
valid_roc_class = roc_auc_score(y_val[label_name],preds_valid[:,i])
print('Valid ROC AUC:', valid_roc_class)
valid_rocs.append(valid_roc_class)

# test predictions
preds_test[:,i] = model.predict_proba(X_test)[:,1]

print('\nmean column-wise ROC AUC on Train data: ', np.mean(train_rocs))
print('mean column-wise ROC AUC on Val data:', np.mean(valid_rocs))

sub_df_lr.iloc[:,1:] = preds_test

```

```

Class:= toxic
Train ROC AUC: 0.9977809251176465
Valid ROC AUC: 0.9684383390198846

```

```

Class:= severe_toxic
Train ROC AUC: 0.998277113281685
Valid ROC AUC: 0.9789279611536071

```

```

Class:= obscene
Train ROC AUC: 0.998537544674464
Valid ROC AUC: 0.979806780597173

```

```

Class:= threat
Train ROC AUC: 0.9998691491778762
Valid ROC AUC: 0.9724741857210581

```

```

Class:= insult
Train ROC AUC: 0.9973256324532058
Valid ROC AUC: 0.9690903080218426

```

```

Class:= identity_hate
Train ROC AUC: 0.9990102862922791
Valid ROC AUC: 0.9659096241166882

```

```

mean column-wise ROC AUC on Train data: 0.9984667751661928
mean column-wise ROC AUC on Val data: 0.9724411997717088
Wall time: 26.7 s

```

In [46]:

```

sub_df_lr.to_csv('submission_lr.csv')
sub_df_lr.head()

```

Out[46]:

	id	toxic	severe_toxic	obscene	threat	insult	identity_hate
0	00001cee341fdb12	0.999866	0.181122	0.999894	0.054551	0.980881	0.145335
1	0000247867823ef7	0.001631	0.001426	0.000558	0.000264	0.004205	0.000699
2	00013b17ad220c46	0.025656	0.002647	0.006197	0.000660	0.008454	0.001558
3	00017563c3f7919a	0.004388	0.003204	0.001093	0.002055	0.000706	0.000119
4	00017695ad8997eb	0.012976	0.000310	0.002016	0.000917	0.007645	0.000806

## Binary Relevance with Multinomial Naive Bayes

In [47]:

```

%%time
#https://github.com/nupurbagh/Capstone_Project_ML/blob/Final_Report%20.ipynb

from sklearn.naive_bayes import MultinomialNB
from sklearn.metrics import log_loss, roc_auc_score
from skmultilearn.problem_transform import BinaryRelevance
model = BinaryRelevance(MultinomialNB(alpha=1.0, class_prior=None, fit_prior=True), require_dense=[False, True])

train_rocs = []
valid_rocs = []

preds_train = np.zeros(y_train.shape)
preds_valid = np.zeros(y_val.shape)
preds_test = np.zeros((len(test_df), len(label_col)))

for i, label_name in enumerate(label_col):
    print('\nClass:= '+label_name)
    # fit
    model.fit(X_train, y_train[label_name].values.reshape(-2, 1))

    # train
    preds_train = model.predict_proba(X_train)
    train_roc_class = roc_auc_score(y_train, preds_train.toarray())
    print('Train ROC AUC:', train_roc_class)
    train_rocs.append(train_roc_class)

    # valid
    preds_valid = model.predict_proba(X_val)
    valid_roc_class = roc_auc_score(y_val, preds_valid.toarray())
    print('Valid ROC AUC:', valid_roc_class)
    valid_rocs.append(valid_roc_class)

    # test predictions
    preds_test = model.predict_proba(X_test)

print('\nmean column-wise ROC AUC on Train data: ', np.mean(train_rocs))
print('mean column-wise ROC AUC on Val data:', np.mean(valid_rocs))

```

```

Class:= toxic
Train ROC AUC: 0.960425412664241
Valid ROC AUC: 0.9404946645708768

```

```

Class:= severe_toxic
Train ROC AUC: 0.7846311359543073
Valid ROC AUC: 0.7811337461032022

```

```

Class:= obscene
Train ROC AUC: 0.9051243474759546
Valid ROC AUC: 0.8982622676790445

```

```

Class:= threat
Train ROC AUC: 0.7122536627872063
Valid ROC AUC: 0.7083068534798642

```

```

Class:= insult
Train ROC AUC: 0.9048001628608581
Valid ROC AUC: 0.896974997591123

```

```

Class:= identity_hate
Train ROC AUC: 0.7705800989974918
Valid ROC AUC: 0.7668313221990275

```

```

mean column-wise ROC AUC on Train data: 0.8396358034566765
mean column-wise ROC AUC on Val data: 0.8320006419371896
Wall time: 7.81 s

```

## Label Powerset with Logistic Regression

In [48]:

```

%%time

from sklearn.naive_bayes import MultinomialNB

```

```

from sklearn.metrics import log_loss, roc_auc_score
from skmultilearn.problem_transform import LabelPowerset
model = LabelPowerset(LogisticRegression(), require_dense = [False, True])

train_rocs = []
valid_rocs = []

preds_train = np.zeros(y_train.shape)
preds_valid = np.zeros(y_val.shape)
preds_test = np.zeros((len(test_df), len(label_col)))

for i, label_name in enumerate(label_col):
    print('\nClass:= '+label_name)
    # fit
    model.fit(X_train, y_train[label_name].values.reshape(-2,1))

    # train
    preds_train = model.predict_proba(X_train)
    train_roc_class = roc_auc_score(y_train, preds_train.toarray())
    print('Train ROC AUC:', train_roc_class)
    train_rocs.append(train_roc_class)

    # valid
    preds_valid = model.predict_proba(X_val)
    valid_roc_class = roc_auc_score(y_val, preds_valid.toarray())
    print('Valid ROC AUC:', valid_roc_class)
    valid_rocs.append(valid_roc_class)

    # test predictions
    preds_test = model.predict_proba(X_test)

print('\nmean column-wise ROC AUC on Train data: ', np.mean(train_rocs))
print('mean column-wise ROC AUC on Val data:', np.mean(valid_rocs))

```

```

Class:= toxic
Train ROC AUC: 0.9862615004090854
Valid ROC AUC: 0.9715009826349993

```

```

Class:= severe_toxic
Train ROC AUC: 0.9214803064641623
Valid ROC AUC: 0.9196554981072854

```

```

Class:= obscene
Train ROC AUC: 0.9622877111236889
Valid ROC AUC: 0.9601705858629211

```

```

Class:= threat
Train ROC AUC: 0.8748557429207433
Valid ROC AUC: 0.878239561510531

```

```

Class:= insult
Train ROC AUC: 0.9640443256127639
Valid ROC AUC: 0.9609240995092653

```

```

Class:= identity_hate
Train ROC AUC: 0.9152143674222334
Valid ROC AUC: 0.9159583611699873

```

```

mean column-wise ROC AUC on Train data: 0.9373573256587796
mean column-wise ROC AUC on Val data: 0.9344081814658315
Wall time: 45.9 s

```

## Classifier chain with Multinomial Naive Bayes

In [40]:

```

%%time

from sklearn.naive_bayes import MultinomialNB
from sklearn.metrics import log_loss, roc_auc_score
from skmultilearn.problem_transform import ClassifierChain
model = ClassifierChain(MultinomialNB(), require_dense = [False, True])

train_rocs = []

```

```

valid_rocs = []

preds_train = np.zeros(y_train.shape)
preds_valid = np.zeros(y_val.shape)
preds_test = np.zeros((len(test_df), len(label_col)))

for i, label_name in enumerate(label_col):
    print('\nClass:= '+label_name)
    # fit
    model.fit(X_train,y_train[label_name].values.reshape(-2,1))

    # train
    preds_train = model.predict_proba(X_train)
    train_roc_class = roc_auc_score(y_train,preds_train.toarray())
    print('Train ROC AUC:', train_roc_class)
    train_rocs.append(train_roc_class)

    # valid
    preds_valid = model.predict_proba(X_val)
    valid_roc_class = roc_auc_score(y_val,preds_valid.toarray())
    print('Valid ROC AUC:', valid_roc_class)
    valid_rocs.append(valid_roc_class)

    # test predictions
    preds_test = model.predict_proba(X_test)

print('\nmean column-wise ROC AUC on Train data: ', np.mean(train_rocs))
print('mean column-wise ROC AUC on Val data:', np.mean(valid_rocs))

```

```

Class:= toxic
Train ROC AUC: 0.9604254123085129
Valid ROC AUC: 0.9404946645708768

```

```

Class:= severe_toxic
Train ROC AUC: 0.7846311359543073
Valid ROC AUC: 0.7811337461032022

```

```

Class:= obscene
Train ROC AUC: 0.9051243474759546
Valid ROC AUC: 0.8982622676790445

```

```

Class:= threat
Train ROC AUC: 0.7122536620757501
Valid ROC AUC: 0.7083068534798642

```

```

Class:= insult
Train ROC AUC: 0.9048001635723143
Valid ROC AUC: 0.896974997591123

```

```

Class:= identity_hate
Train ROC AUC: 0.7705800997089478
Valid ROC AUC: 0.7668313221990275

```

```

mean column-wise ROC AUC on Train data: 0.8396358035159645
mean column-wise ROC AUC on Val data: 0.8320006419371896
Wall time: 11.1 s

```

## Binary Relevance with SVM

In [67]:

```

%%time

from sklearn.metrics import log_loss, roc_auc_score
from skmultilearn.problem_transform import BinaryRelevance
from sklearn.svm import SVC

model = BinaryRelevance(SVC(C=1.0, probability=True), require_dense = [False, True])

train_rocs = []
valid_rocs = []

preds_train = np.zeros(y_train.shape)
preds_valid = np.zeros(y_val.shape)

```

```

preds_test = np.zeros((len(test_df), len(label_col)))

for i, label_name in enumerate(label_col):
    print('\nClass:= '+label_name)
    # fit
    model.fit(X_train,y_train[label_name].values.reshape(-2,1))

    # train
    preds_train = model.predict_proba(X_train)
    train_roc_class = roc_auc_score(y_train,preds_train.toarray())
    print('Train ROC AUC:', train_roc_class)
    train_rocs.append(train_roc_class)

    # valid
    preds_valid = model.predict_proba(X_val)
    valid_roc_class = roc_auc_score(y_val,preds_valid.toarray())
    print('Valid ROC AUC:', valid_roc_class)
    valid_rocs.append(valid_roc_class)

    # test predictions
    preds_test = model.predict_proba(X_test)

print('\nmean column-wise ROC AUC on Train data: ', np.mean(train_rocs))
print('mean column-wise ROC AUC on Val data:', np.mean(valid_rocs))

```

```

Class:= toxic
Train ROC AUC: 0.9703391526216056
Valid ROC AUC: 0.9597104247301768

```

```

Class:= severe_toxic
Train ROC AUC: 0.683217638640853
Valid ROC AUC: 0.6752887393917103

```

```

Class:= obscene
Train ROC AUC: 0.9124197365814268
Valid ROC AUC: 0.9110755140027601

```

```

Class:= threat
Train ROC AUC: 0.6132490842571761
Valid ROC AUC: 0.6202771774491384

```

```

Class:= insult
Train ROC AUC: 0.928534268960824
Valid ROC AUC: 0.922003763987168

```

```

Class:= identity_hate
Train ROC AUC: 0.6866009098308008
Valid ROC AUC: 0.7002575674550078

```

```

mean column-wise ROC AUC on Train data: 0.7990601318154477
mean column-wise ROC AUC on Val data: 0.7981021978359936
Wall time: 5h 25min 27s

```

## Random Forest

In [144]:

```
sub_df_rf = pd.read_csv('sample_submission.csv')
```

In [145]:

```

%%time

from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import log_loss, roc_auc_score
model = RandomForestClassifier()

train_rocs = []
valid_rocs = []

preds_train = np.zeros(y_train.shape)
preds_valid = np.zeros(y_val.shape)
preds_test = np.zeros((len(test_df), len(label_col)))

```

```

for i, label_name in enumerate(label_col):
    print('\nClass:= '+label_name)
    # fit
    model.fit(X_train,y_train[label_name])

    # train
    preds_train[:,i] = model.predict_proba(X_train)[:,1]
    train_roc_class = roc_auc_score(y_train[label_name],preds_train[:,i])
    print('Train ROC AUC:', train_roc_class)
    train_rocs.append(train_roc_class)

    # valid
    preds_valid[:,i] = model.predict_proba(X_val)[:,1]
    valid_roc_class = roc_auc_score(y_val[label_name],preds_valid[:,i])
    print('Valid ROC AUC:', valid_roc_class)
    valid_rocs.append(valid_roc_class)

    # test predictions
    preds_test[:,i] = model.predict_proba(X_test)[:,1]

print('\nmean column-wise ROC AUC on Train data: ', np.mean(train_rocs))
print('mean column-wise ROC AUC on Val data:', np.mean(valid_rocs))

sub_df_rf.iloc[:,1:] = preds_test

```

```

Class:= toxic
Train ROC AUC: 0.999828145980009
Valid ROC AUC: 0.9343391718463083

```

```

Class:= severe_toxic
Train ROC AUC: 0.9998759885860425
Valid ROC AUC: 0.8699751796006696

```

```

Class:= obscene
Train ROC AUC: 0.9998329041206785
Valid ROC AUC: 0.962135850699813

```

```

Class:= threat
Train ROC AUC: 0.9999807151055744
Valid ROC AUC: 0.7234346781564696

```

```

Class:= insult
Train ROC AUC: 0.9997422114089747
Valid ROC AUC: 0.9414319640445241

```

```

Class:= identity_hate
Train ROC AUC: 0.9998977604342888
Valid ROC AUC: 0.8319748504627235

```

```

mean column-wise ROC AUC on Train data: 0.9998596209392613
mean column-wise ROC AUC on Val data: 0.877215282468418
Wall time: 3min 44s

```

In [148]:

```

sub_df_rf.to_csv('submission_rf.csv')
sub_df_rf.head()

```

Out[148]:

	id	toxic	severe_toxic	obscene	threat	insult	identity_hate
0	00001cee341fdb12	0.800000	0.100000	0.400000	0.0	0.80000	0.000000
1	0000247867823ef7	0.000000	0.000000	0.000000	0.0	0.00000	0.000000
2	00013b17ad220c46	0.138864	0.020619	0.091817	0.0	0.06184	0.021748
3	00017563c3f7919a	0.000000	0.000000	0.000000	0.0	0.00000	0.000000
4	00017695ad8997eb	0.000000	0.000000	0.000000	0.0	0.00000	0.000000

In [80]:



```
final_submission_combined_updated = pd.read_csv('sample_submission.csv')
```

In [81]:

```
for label in label_col:
    final_submission_combined_updated[label] = 0.5*(sub_df_mnb[label]+sub_df_lr[label])
```

In [82]:

```
final_submission_combined_updated.head()
```

Out[82]:

	id	toxic	severe_toxic	obscene	threat	insult	identity_hate
0	00001cee341fdb12	0.997208	0.140690	0.994192	0.028846	0.973808	0.139542
1	0000247867823ef7	0.010506	0.000859	0.001587	0.000156	0.004581	0.000482
2	00013b17ad220c46	0.060499	0.006274	0.029325	0.001834	0.028723	0.005040
3	00017563c3f7919a	0.026847	0.001833	0.003685	0.001057	0.004800	0.000185
4	00017695ad8997eb	0.040152	0.001096	0.016984	0.000614	0.018147	0.001070

In [83]:

```
final_submission_combined_updated.to_csv('final_submission_combined_updated.csv', index=False)
```

In [29]:

```
from keras.models import Sequential
from keras.layers import Dense, Activation, Dropout
```

Using TensorFlow backend.

In [31]:

```
model = Sequential()
model.add(Dense(4, activation='relu', input_dim = X_train.shape[1]))
model.add(Dropout(0.3))
model.add(Dense(6, activation='softmax'))
model.summary()
```

Layer (type)	Output Shape	Param #
dense_3 (Dense)	(None, 4)	270264
dropout_2 (Dropout)	(None, 4)	0
dense_4 (Dense)	(None, 6)	30

=====  
Total params: 270,294  
Trainable params: 270,294  
Non-trainable params: 0  
=====

In [33]:

```
model.compile(optimizer='rmsprop', loss='categorical_crossentropy', metrics=['accuracy'])
```

In [32]:

```
model.fit(X_train, y_train, epochs=10, batch_size=32)
```

W0909 11:10:55.445366 10152 deprecation.py:323] From C:\Users\SOURAV\Anaconda3\lib\site-packages\tensorflow\python\ops\math\_grad.py:1250: add\_dispatch\_support.<locals>.wrapper (from tensorflow.python.ops.array\_ops) is deprecated and will be removed in a future version.

Instructions for updating:  
Use tf.where in 2.0, which has the same broadcast rule as np.where

Epoch 1/10

21568/127656 [====>.....] - ETA: 12:06 - loss: 0.6165 - acc: 0.15 - ETA: 3:16  
- loss: 0.4584 - acc: 0.2250 - ETA: 2:34 - loss: 0.4399 - acc: 0.351 - ETA: 2:15 - loss: 0.4007 -  
acc: 0.397 - ETA: 1:59 - loss: 0.3899 - acc: 0.387 - ETA: 1:47 - loss: 0.4070 - acc: 0.396 - ETA:  
1:44 - loss: 0.4242 - acc: 0.414 - ETA: 1:41 - loss: 0.4420 - acc: 0.422 - ETA: 1:39 - loss: 0.434  
1 - acc: 0.409 - ETA: 1:34 - loss: 0.4212 - acc: 0.416 - ETA: 1:33 - loss: 0.4258 - acc: 0.427 - E  
TA: 1:32 - loss: 0.4356 - acc: 0.443 - ETA: 1:31 - loss: 0.4491 - acc: 0.467 - ETA: 1:30 - loss: 0  
.4249 - acc: 0.502 - ETA: 1:27 - loss: 0.4158 - acc: 0.541 - ETA: 1:27 - loss: 0.4064 - acc: 0.567  
- ETA: 1:27 - loss: 0.4060 - acc: 0.589 - ETA: 1:25 - loss: 0.4019 - acc: 0.611 - ETA: 1:25 - loss  
: 0.3963 - acc: 0.630 - ETA: 1:25 - loss: 0.3966 - acc: 0.647 - ETA: 1:25 - loss: 0.3925 - acc: 0.  
663 - ETA: 1:24 - loss: 0.3949 - acc: 0.677 - ETA: 1:24 - loss: 0.3950 - acc: 0.690 - ETA: 1:22 -  
loss: 0.3871 - acc: 0.705 - ETA: 1:22 - loss: 0.3861 - acc: 0.716 - ETA: 1:22 - loss: 0.3856 - acc  
: 0.726 - ETA: 1:22 - loss: 0.3904 - acc: 0.735 - ETA: 1:21 - loss: 0.3873 - acc: 0.746 - ETA: 1:2  
1 - loss: 0.3938 - acc: 0.754 - ETA: 1:21 - loss: 0.3914 - acc: 0.762 - ETA: 1:21 - loss: 0.3892 -  
acc: 0.769 - ETA: 1:20 - loss: 0.3870 - acc: 0.778 - ETA: 1:20 - loss: 0.3876 - acc: 0.784 - ETA:  
1:20 - loss: 0.3837 - acc: 0.790 - ETA: 1:20 - loss: 0.3762 - acc: 0.796 - ETA: 1:20 - loss: 0.379  
3 - acc: 0.802 - ETA: 1:19 - loss: 0.3812 - acc: 0.809 - ETA: 1:19 - loss: 0.3795 - acc: 0.815 - E  
TA: 1:19 - loss: 0.3796 - acc: 0.819 - ETA: 1:19 - loss: 0.3811 - acc: 0.823 - ETA: 1:19 - loss: 0  
.3771 - acc: 0.827 - ETA: 1:18 - loss: 0.3730 - acc: 0.832 - ETA: 1:18 - loss: 0.3703 - acc: 0.836  
- ETA: 1:18 - loss: 0.3791 - acc: 0.841 - ETA: 1:18 - loss: 0.3780 - acc: 0.845 - ETA: 1:18 - loss  
: 0.3768 - acc: 0.849 - ETA: 1:17 - loss: 0.3733 - acc: 0.852 - ETA: 1:17 - loss: 0.3703 - acc: 0.  
855 - ETA: 1:17 - loss: 0.3667 - acc: 0.858 - ETA: 1:17 - loss: 0.3692 - acc: 0.860 - ETA: 1:17 -  
loss: 0.3669 - acc: 0.863 - ETA: 1:17 - loss: 0.3671 - acc: 0.865 - ETA: 1:16 - loss: 0.3657 - acc  
: 0.868 - ETA: 1:16 - loss: 0.3689 - acc: 0.870 - ETA: 1:16 - loss: 0.3704 - acc: 0.872 - ETA: 1:1  
6 - loss: 0.3718 - acc: 0.874 - ETA: 1:16 - loss: 0.3703 - acc: 0.876 - ETA: 1:16 - loss: 0.3711 -  
acc: 0.878 - ETA: 1:16 - loss: 0.3702 - acc: 0.880 - ETA: 1:16 - loss: 0.3699 - acc: 0.882 - ETA:  
1:16 - loss: 0.3714 - acc: 0.884 - ETA: 1:16 - loss: 0.3704 - acc: 0.885 - ETA: 1:16 - loss: 0.365  
7 - acc: 0.887 - ETA: 1:16 - loss: 0.3626 - acc: 0.888 - ETA: 1:16 - loss: 0.3630 - acc: 0.890 - E  
TA: 1:16 - loss: 0.3635 - acc: 0.891 - ETA: 1:16 - loss: 0.3640 - acc: 0.893 - ETA: 1:16 - loss: 0  
.3647 - acc: 0.894 - ETA: 1:16 - loss: 0.3669 - acc: 0.895 - ETA: 1:16 - loss: 0.3640 - acc: 0.896  
- ETA: 1:16 - loss: 0.3633 - acc: 0.898 - ETA: 1:15 - loss: 0.3618 - acc: 0.899 - ETA: 1:15 - loss  
: 0.3632 - acc: 0.901 - ETA: 1:15 - loss: 0.3628 - acc: 0.902 - ETA: 1:15 - loss: 0.3635 - acc: 0.  
904 - ETA: 1:15 - loss: 0.3652 - acc: 0.905 - ETA: 1:15 - loss: 0.3635 - acc: 0.906 - ETA: 1:15 -  
loss: 0.3633 - acc: 0.907 - ETA: 1:15 - loss: 0.3629 - acc: 0.908 - ETA: 1:15 - loss: 0.3624 - acc  
: 0.909 - ETA: 1:15 - loss: 0.3647 - acc: 0.910 - ETA: 1:15 - loss: 0.3643 - acc: 0.911 - ETA: 1:1  
5 - loss: 0.3663 - acc: 0.912 - ETA: 1:15 - loss: 0.3672 - acc: 0.913 - ETA: 1:15 - loss: 0.3666 -  
acc: 0.913 - ETA: 1:14 - loss: 0.3679 - acc: 0.914 - ETA: 1:14 - loss: 0.3684 - acc: 0.915 - ETA:  
1:14 - loss: 0.3679 - acc: 0.916 - ETA: 1:14 - loss: 0.3691 - acc: 0.917 - ETA: 1:14 - loss: 0.368  
6 - acc: 0.918 - ETA: 1:14 - loss: 0.3667 - acc: 0.918 - ETA: 1:14 - loss: 0.3667 - acc: 0.919 - E  
TA: 1:14 - loss: 0.3652 - acc: 0.920 - ETA: 1:14 - loss: 0.3671 - acc: 0.921 - ETA: 1:14 - loss: 0  
.3660 - acc: 0.921 - ETA: 1:14 - loss: 0.3659 - acc: 0.922 - ETA: 1:14 - loss: 0.3658 - acc: 0.923  
- ETA: 1:14 - loss: 0.3647 - acc: 0.923 - ETA: 1:13 - loss: 0.3634 - acc: 0.924 - ETA: 1:13 - loss  
: 0.3614 - acc: 0.925 - ETA: 1:13 - loss: 0.3611 - acc: 0.926 - ETA: 1:13 - loss: 0.3615 - acc: 0.  
927 - ETA: 1:13 - loss: 0.3606 - acc: 0.928 - ETA: 1:13 - loss: 0.3595 - acc: 0.928 - ETA: 1:13 -  
loss: 0.3583 - acc: 0.929 - ETA: 1:13 - loss: 0.3579 - acc: 0.929 - ETA: 1:13 - loss: 0.3565 - acc  
: 0.930 - ETA: 1:13 - loss: 0.3566 - acc: 0.930 - ETA: 1:13 - loss: 0.3563 - acc: 0.931 - ETA: 1:1  
3 - loss: 0.3561 - acc: 0.931 - ETA: 1:13 - loss: 0.3576 - acc: 0.932 - ETA: 1:12 - loss: 0.3573 -  
acc: 0.932 - ETA: 1:12 - loss: 0.3558 - acc: 0.933 - ETA: 1:12 - loss: 0.3552 - acc: 0.933 - ETA:  
1:12 - loss: 0.3548 - acc: 0.934 - ETA: 1:12 - loss: 0.3545 - acc: 0.935 - ETA: 1:12 - loss: 0.355  
3 - acc: 0.935 - ETA: 1:12 - loss: 0.3556 - acc: 0.936 - ETA: 1:12 - loss: 0.3544 - acc: 0.936 - E  
TA: 1:12 - loss: 0.3523 - acc: 0.937 - ETA: 1:12 - loss: 0.3514 - acc: 0.937 - ETA: 1:12 - loss: 0  
.3512 - acc: 0.938 - ETA: 1:12 - loss: 0.3511 - acc: 0.939 - ETA: 1:11 - loss: 0.3511 - acc: 0.939  
- ETA: 1:11 - loss: 0.3505 - acc: 0.940 - ETA: 1:11 - loss: 0.3523 - acc: 0.940 - ETA: 1:11 - loss  
: 0.3510 - acc: 0.940 - ETA: 1:11 - loss: 0.3507 - acc: 0.941 - ETA: 1:11 - loss: 0.3512 - acc: 0.  
941 - ETA: 1:11 - loss: 0.3502 - acc: 0.942 - ETA: 1:11 - loss: 0.3499 - acc: 0.942 - ETA: 1:11 -  
loss: 0.3489 - acc: 0.942 - ETA: 1:11 - loss: 0.3480 - acc: 0.943 - ETA: 1:11 - loss: 0.3485 - acc  
: 0.943 - ETA: 1:11 - loss: 0.3484 - acc: 0.943 - ETA: 1:11 - loss: 0.3467 - acc: 0.944 - ETA: 1:1  
1 - loss: 0.3460 - acc: 0.944 - ETA: 1:11 - loss: 0.3460 - acc: 0.944 - ETA: 1:10 - loss: 0.3459 -  
acc: 0.945 - ETA: 1:10 - loss: 0.3463 - acc: 0.945 - ETA: 1:10 - loss: 0.3462 - acc: 0.946 - ETA:  
1:10 - loss: 0.3456 - acc: 0.946 - ETA: 1:10 - loss: 0.3445 - acc: 0.946 - ETA: 1:10 - loss: 0.345  
9 - acc: 0.947 - ETA: 1:10 - loss: 0.3456 - acc: 0.947 - ETA: 1:10 - loss: 0.3448 - acc: 0.947 - E  
TA: 1:10 - loss: 0.3435 - acc: 0.948 - ETA: 1:10 - loss: 0.3425 - acc: 0.948 - ETA: 1:10 - loss: 0  
.3427 - acc: 0.948 - ETA: 1:10 - loss: 0.3436 - acc: 0.948 - ETA: 1:10 - loss: 0.3437 - acc: 0.949  
- ETA: 1:10 - loss: 0.3438 - acc: 0.949 - ETA: 1:10 - loss: 0.3427 - acc: 0.949 - ETA: 1:10 - loss  
: 0.3426 - acc: 0.950 - ETA: 1:10 - loss: 0.3437 - acc: 0.950 - ETA: 1:10 - loss: 0.3440 - acc: 0.  
950 - ETA: 1:10 - loss: 0.3436 - acc: 0.951 - ETA: 1:10 - loss: 0.3423 - acc: 0.951 - ETA: 1:09 -  
loss: 0.3413 - acc: 0.951 - ETA: 1:09 - loss: 0.3404 - acc: 0.951 - ETA: 1:09 - loss: 0.3411 - acc  
: 0.952 - ETA: 1:09 - loss: 0.3409 - acc: 0.952 - ETA: 1:09 - loss: 0.3423 - acc: 0.952 - ETA: 1:0  
9 - loss: 0.3432 - acc: 0.953 - ETA: 1:09 - loss: 0.3425 - acc: 0.953 - ETA: 1:09 - loss: 0.3433 -  
acc: 0.953 - ETA: 1:09 - loss: 0.3432 - acc: 0.954 - ETA: 1:09 - loss: 0.3431 - acc: 0.954 - ETA:  
1:09 - loss: 0.3429 - acc: 0.954 - ETA: 1:08 - loss: 0.3435 - acc: 0.954 - ETA: 1:08 - loss: 0.343  
5 - acc: 0.955 - ETA: 1:08 - loss: 0.3436 - acc: 0.955 - ETA: 1:08 - loss: 0.3433 - acc: 0.955 - E  
TA: 1:08 - loss: 0.3438 - acc: 0.955 - ETA: 1:08 - loss: 0.3437 - acc: 0.955 - ETA: 1:08 - loss: 0

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



[illegible]

```
- ETA: 3s - loss: 0.3060 - acc: 0.988 - ETA: 3s - loss: 0.3061 - acc: 0.988 - ETA: 2s - loss: 0.3061 - acc: 0.988 - ETA: 2s - loss: 0.3060 - acc: 0.988 - ETA: 2s - loss: 0.3060 - acc: 0.988 - ETA: 2s - loss: 0.3059 - acc: 0.988 - ETA: 2s - loss: 0.3059 - acc: 0.988 - ETA: 2s - loss: 0.3058 - acc: 0.988 - ETA: 2s - loss: 0.3056 - acc: 0.988 - ETA: 2s - loss: 0.3057 - acc: 0.988 - ETA: 2s - loss: 0.3056 - acc: 0.988 - ETA: 2s - loss: 0.3057 - acc: 0.988 - ETA: 2s - loss: 0.988 - ETA: 2s - loss: 0.3058 - acc: 0.988 - ETA: 2s - loss: 0.3057 - acc: 0.988 - ETA: 2s - loss : 0.3059 - acc: 0.988 - ETA: 2s - loss: 0.3059 - acc: 0.988 - ETA: 2s - loss: 0.3059 - acc: 0.988 - ETA: 2s - loss: 0.3059 - acc: 0.988 - ETA: 2s - loss: 0.3059 - acc: 0.988 - ETA: 2s - loss: 0.3059 - acc: 0.988 - ETA: 2s - loss: 0.3059 - acc: 0.988 - ETA: 1s - loss: 0.3060 - acc: 0.988 - ETA: 1s - loss: 0.3059 - acc: 0.988 - ETA: 1s - loss: 0.3060 - acc: 0.988 - ETA: 1s - loss: 0.3059 - acc: 0.988 - ETA: 1s - loss: 0.3060 - acc: 0.988 - ETA: 1s - loss: 0.3058 - acc: 0.988 - ETA: 1s - loss : 0.3058 - acc: 0.988 - ETA: 1s - loss: 0.3058 - acc: 0.988 - ETA: 1s - loss: 0.3058 - acc: 0.988 - ETA: 1s - loss: 0.3057 - acc: 0.988 - ETA: 1s - loss: 0.3058 - acc: 0.988 - ETA: 1s - loss: 0.3059 - acc: 0.988 - ETA: 1s - loss: 0.3060 - acc: 0.988 - ETA: 1s - loss: 0.3060 - acc: 0.988 - ETA: 0s - loss: 0.3060 - acc: 0.988 - ETA: 0s - loss: 0.3060 - acc: 0.988 - ETA: 0s - loss: 0.3061 - acc: 0.988 - ETA: 0s - loss: 0.3061 - acc: 0.988 - ETA: 0s - loss: 0.3063 - acc: 0.988 - ETA: 0s - loss: 0.3064 - acc: 0.988 - ETA: 0s - loss: 0.3063 - acc: 0.988 - ETA: 0s - loss: 0.3064 - acc: 0.988 - ETA: 0s - loss: 0.3065 - acc: 0.988 - ETA: 0s - loss : 0.3064 - acc: 0.988 - ETA: 0s - loss: 0.3064 - acc: 0.988 - ETA: 0s - loss: 0.3065 - acc: 0.988 - ETA: 0s - loss: 0.3066 - acc: 0.988 - ETA: 0s - loss: 0.3067 - acc: 0.988 - ETA: 0s - loss: 0.3067 - acc: 0.988 - ETA: 0s - loss: 0.3068 - acc: 0.988 - ETA: 0s - loss: 0.3068 - acc: 0.988 - 115s 898us/step - loss: 0.3068 - acc: 0.9886
```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

```
ETA: 1s - loss: 0.2943 - acc: 0.994 - ETA: 1s - loss: 0.2944 - acc: 0.994 - ETA: 1s - loss: 0.2944
- acc: 0.994 - ETA: 1s - loss: 0.2943 - acc: 0.994 - ETA: 1s - loss: 0.2945 - acc: 0.994 - ETA: 0s
- loss: 0.2945 - acc: 0.994 - ETA: 0s - loss: 0.2945 - acc: 0.994 - ETA: 0s - loss: 0.2946 - acc:
0.994 - ETA: 0s - loss: 0.2946 - acc: 0.994 - ETA: 0s - loss: 0.2945 - acc: 0.9942127656/127656 [=
=====] - ETA: 0s - loss: 0.2945 - acc: 0.994 - ETA: 0s - loss: 0.2947 - ac
c: 0.994 - ETA: 0s - loss: 0.2946 - acc: 0.994 - ETA: 0s - loss: 0.2946 - acc: 0.994 - ETA: 0s - l
oss: 0.2946 - acc: 0.994 - ETA: 0s - loss: 0.2945 - acc: 0.994 - ETA: 0s - loss: 0.2945 - acc: 0.9
94 - ETA: 0s - loss: 0.2945 - acc: 0.994 - ETA: 0s - loss: 0.2945 - acc: 0.994 - ETA: 0s - loss: 0
.2944 - acc: 0.994 - ETA: 0s - loss: 0.2945 - acc: 0.994 - ETA: 0s - loss: 0.2944 - acc: 0.994 - E
TA: 0s - loss: 0.2944 - acc: 0.994 - ETA: 0s - loss: 0.2946 - acc: 0.994 - ETA: 0s - loss: 0.2945
- acc: 0.994 - 120s 937us/step - loss: 0.2945 - acc: 0.9942
```

```
10976/127656 [=>.....] - ETA: 3:22 - loss: 0.7880 - acc: 0.968 - ETA: 3:00
- loss: 0.4678 - acc: 0.989 - ETA: 2:57 - loss: 0.3765 - acc: 0.987 - ETA: 2:53 - loss: 0.3053 - a
cc: 0.991 - ETA: 2:53 - loss: 0.3804 - acc: 0.993 - ETA: 2:52 - loss: 0.4351 - acc: 0.994 - ETA: 2
:54 - loss: 0.4013 - acc: 0.988 - ETA: 2:56 - loss: 0.3825 - acc: 0.988 - ETA: 2:57 - loss: 0.3920
- acc: 0.986 - ETA: 2:58 - loss: 0.3843 - acc: 0.987 - ETA: 2:58 - loss: 0.3584 - acc: 0.988 - ETA
: 2:58 - loss: 0.3325 - acc: 0.988 - ETA: 2:57 - loss: 0.3500 - acc: 0.987 - ETA: 2:57 - loss: 0.3
680 - acc: 0.987 - ETA: 2:58 - loss: 0.3506 - acc: 0.987 - ETA: 2:58 - loss: 0.3593 - acc: 0.988 -
ETA: 2:58 - loss: 0.3521 - acc: 0.988 - ETA: 2:59 - loss: 0.3411 - acc: 0.989 - ETA: 2:58 - loss:
0.3364 - acc: 0.988 - ETA: 2:57 - loss: 0.3470 - acc: 0.988 - ETA: 2:56 - loss: 0.3386 - acc: 0.98
9 - ETA: 2:56 - loss: 0.3405 - acc: 0.988 - ETA: 2:56 - loss: 0.3354 - acc: 0.988 - ETA: 2:56 - lo
ss: 0.3302 - acc: 0.988 - ETA: 2:57 - loss: 0.3245 - acc: 0.988 - ETA: 2:57 - loss: 0.3132 - acc:
0.989 - ETA: 2:56 - loss: 0.3172 - acc: 0.989 - ETA: 2:56 - loss: 0.3090 - acc: 0.990 - ETA: 2:56
- loss: 0.2975 - acc: 0.990 - ETA: 2:57 - loss: 0.2959 - acc: 0.990 - ETA: 2:58 - loss: 0.2905 - a
cc: 0.990 - ETA: 2:57 - loss: 0.2995 - acc: 0.990 - ETA: 2:58 - loss: 0.3060 - acc: 0.989 - ETA: 2
:57 - loss: 0.3036 - acc: 0.989 - ETA: 2:57 - loss: 0.3060 - acc: 0.989 - ETA: 2:57 - loss: 0.3103
- acc: 0.989 - ETA: 2:56 - loss: 0.3089 - acc: 0.989 - ETA: 2:56 - loss: 0.3077 - acc: 0.989 - ETA
: 2:56 - loss: 0.3081 - acc: 0.989 - ETA: 2:57 - loss: 0.3107 - acc: 0.990 - ETA: 2:57 - loss: 0.3
063 - acc: 0.990 - ETA: 2:56 - loss: 0.3058 - acc: 0.990 - ETA: 2:56 - loss: 0.3110 - acc: 0.990 -
ETA: 2:56 - loss: 0.3111 - acc: 0.990 - ETA: 2:56 - loss: 0.3101 - acc: 0.990 - ETA: 2:56 - loss:
0.3109 - acc: 0.990 - ETA: 2:57 - loss: 0.3078 - acc: 0.990 - ETA: 2:56 - loss: 0.3073 - acc: 0.99
0 - ETA: 2:56 - loss: 0.3056 - acc: 0.990 - ETA: 2:56 - loss: 0.3029 - acc: 0.990 - ETA: 2:56 - lo
ss: 0.3035 - acc: 0.990 - ETA: 2:56 - loss: 0.2995 - acc: 0.990 - ETA: 2:56 - loss: 0.3029 - acc:
0.990 - ETA: 2:55 - loss: 0.3031 - acc: 0.990 - ETA: 2:55 - loss: 0.3052 - acc: 0.991 - ETA: 2:55
- loss: 0.3049 - acc: 0.991 - ETA: 2:56 - loss: 0.3047 - acc: 0.991 - ETA: 2:55 - loss: 0.3026 - a
cc: 0.991 - ETA: 2:55 - loss: 0.3058 - acc: 0.991 - ETA: 2:55 - loss: 0.3065 - acc: 0.991 - ETA: 2
:55 - loss: 0.3074 - acc: 0.991 - ETA: 2:54 - loss: 0.3106 - acc: 0.991 - ETA: 2:54 - loss: 0.3106
- acc: 0.991 - ETA: 2:54 - loss: 0.3132 - acc: 0.991 - ETA: 2:54 - loss: 0.3097 - acc: 0.991 - ETA
: 2:54 - loss: 0.3087 - acc: 0.991 - ETA: 2:54 - loss: 0.3108 - acc: 0.991 - ETA: 2:53 - loss: 0.3
079 - acc: 0.991 - ETA: 2:53 - loss: 0.3055 - acc: 0.991 - ETA: 2:53 - loss: 0.3067 - acc: 0.991 -
ETA: 2:53 - loss: 0.3095 - acc: 0.991 - ETA: 2:52 - loss: 0.3098 - acc: 0.991 - ETA: 2:52 - loss:
0.3071 - acc: 0.991 - ETA: 2:53 - loss: 0.3075 - acc: 0.991 - ETA: 2:53 - loss: 0.3062 - acc: 0.99
1 - ETA: 2:53 - loss: 0.3053 - acc: 0.992 - ETA: 2:53 - loss: 0.3049 - acc: 0.992 - ETA: 2:53 - lo
ss: 0.3025 - acc: 0.992 - ETA: 2:54 - loss: 0.3008 - acc: 0.992 - ETA: 2:53 - loss: 0.2987 - acc:
0.992 - ETA: 2:53 - loss: 0.2999 - acc: 0.992 - ETA: 2:53 - loss: 0.3016 - acc: 0.992 - ETA: 2:53
- loss: 0.3046 - acc: 0.992 - ETA: 2:53 - loss: 0.3073 - acc: 0.992 - ETA: 2:53 - loss: 0.3076 - a
cc: 0.992 - ETA: 2:52 - loss: 0.3050 - acc: 0.992 - ETA: 2:52 - loss: 0.3038 - acc: 0.992 - ETA: 2
:52 - loss: 0.3024 - acc: 0.992 - ETA: 2:52 - loss: 0.3021 - acc: 0.992 - ETA: 2:52 - loss: 0.2998
- acc: 0.992 - ETA: 2:52 - loss: 0.2996 - acc: 0.992 - ETA: 2:52 - loss: 0.2980 - acc: 0.992 - ETA
: 2:52 - loss: 0.2966 - acc: 0.992 - ETA: 2:52 - loss: 0.2986 - acc: 0.992 - ETA: 2:52 - loss: 0.2
982 - acc: 0.992 - ETA: 2:52 - loss: 0.2970 - acc: 0.992 - ETA: 2:53 - loss: 0.2969 - acc: 0.992 -
ETA: 2:53 - loss: 0.2983 - acc: 0.992 - ETA: 2:53 - loss: 0.2972 - acc: 0.992 - ETA: 2:54 - loss:
0.2958 - acc: 0.992 - ETA: 2:54 - loss: 0.2958 - acc: 0.992 - ETA: 2:54 - loss: 0.2953 - acc: 0.99
2 - ETA: 2:54 - loss: 0.2948 - acc: 0.992 - ETA: 2:54 - loss: 0.2946 - acc: 0.991 - ETA: 2:55 - lo
ss: 0.2940 - acc: 0.992 - ETA: 2:55 - loss: 0.2924 - acc: 0.992 - ETA: 2:55 - loss: 0.2930 - acc:
0.991 - ETA: 2:55 - loss: 0.2925 - acc: 0.991 - ETA: 2:55 - loss: 0.2951 - acc: 0.992 - ETA: 2:55
- loss: 0.2940 - acc: 0.991 - ETA: 2:54 - loss: 0.2929 - acc: 0.992 - ETA: 2:55 - loss: 0.2925 - a
cc: 0.992 - ETA: 2:54 - loss: 0.2907 - acc: 0.992 - ETA: 2:54 - loss: 0.2897 - acc: 0.991 - ETA: 2
:54 - loss: 0.2922 - acc: 0.991 - ETA: 2:54 - loss: 0.2922 - acc: 0.991 - ETA: 2:54 - loss: 0.2911
- acc: 0.991 - ETA: 2:54 - loss: 0.2919 - acc: 0.992 - ETA: 2:54 - loss: 0.2921 - acc: 0.992 - ETA
: 2:54 - loss: 0.2915 - acc: 0.991 - ETA: 2:54 - loss: 0.2910 - acc: 0.991 - ETA: 2:54 - loss: 0.2
927 - acc: 0.991 - ETA: 2:53 - loss: 0.2929 - acc: 0.991 - ETA: 2:54 - loss: 0.2938 - acc: 0.991 -
ETA: 2:53 - loss: 0.2932 - acc: 0.991 - ETA: 2:53 - loss: 0.2960 - acc: 0.991 - ETA: 2:53 - loss:
0.2947 - acc: 0.991 - ETA: 2:53 - loss: 0.2952 - acc: 0.991 - ETA: 2:54 - loss: 0.2946 - acc: 0.99
1 - ETA: 2:54 - loss: 0.2953 - acc: 0.991 - ETA: 2:54 - loss: 0.2958 - acc: 0.991 - ETA: 2:54 - lo
ss: 0.2950 - acc: 0.991 - ETA: 2:54 - loss: 0.2950 - acc: 0.991 - ETA: 2:55 - loss: 0.2943 - acc:
0.991 - ETA: 2:55 - loss: 0.2946 - acc: 0.991 - ETA: 2:55 - loss: 0.2945 - acc: 0.991 - ETA: 2:55
- loss: 0.2937 - acc: 0.991 - ETA: 2:55 - loss: 0.2948 - acc: 0.991 - ETA: 2:55 - loss: 0.2945 - a
cc: 0.991 - ETA: 2:55 - loss: 0.2938 - acc: 0.991 - ETA: 2:55 - loss: 0.2923 - acc: 0.991 - ETA: 2
:55 - loss: 0.2916 - acc: 0.991 - ETA: 2:55 - loss: 0.2910 - acc: 0.991 - ETA: 2:54 - loss: 0.2928
- acc: 0.991 - ETA: 2:54 - loss: 0.2922 - acc: 0.991 - ETA: 2:54 - loss: 0.2927 - acc: 0.991 - ETA
: 2:54 - loss: 0.2939 - acc: 0.991 - ETA: 2:54 - loss: 0.2950 - acc: 0.991 - ETA: 2:54 - loss: 0.2
955
```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

```
- ETA: 3s - loss: 0.2920 - acc: 0.994 - ETA: 2s - loss: 0.2919 - acc: 0.994 - ETA: 2s - loss: 0.2919 - acc: 0.994 - ETA: 2s - loss: 0.2920 - acc: 0.994 - ETA: 2s - loss: 0.2920 - acc: 0.994 - ETA: 2s - loss: 0.2923 - acc: 0.994 - ETA: 2s - loss: 0.2923 - acc: 0.994 - ETA: 2s - loss: 0.2924 - acc: 0.994 - ETA: 2s - loss: 0.2923 - acc: 0.994 - ETA: 2s - loss: 0.2924 - acc: 0.994 - ETA: 2s - loss: 0.2925 - acc: 0.994 - ETA: 2s - loss: 0.2925 - acc: 0.994 - ETA: 2s - loss: 0.2925 - acc: 0.994 - ETA: 2s - loss: 0.2925 - acc: 0.994 - ETA: 2s - loss: 0.2925 - acc: 0.994 - ETA: 2s - loss: 0.2924 - acc: 0.994 - ETA: 2s - loss: 0.2924 - acc: 0.994 - ETA: 2s - loss: 0.2925 - acc: 0.994 - ETA: 1s - loss: 0.2928 - acc: 0.994 - ETA: 1s - loss: 0.2927 - acc: 0.994 - ETA: 1s - loss: 0.2929 - acc: 0.994 - ETA: 1s - loss: 0.2930 - acc: 0.994 - ETA: 1s - loss: 0.2930 - acc: 0.994 - ETA: 1s - loss: 0.2929 - acc: 0.994 - ETA: 1s - loss: 0.2929 - acc: 0.994 - ETA: 1s - loss: 0.2929 - acc: 0.994 - ETA: 1s - loss: 0.2929 - acc: 0.994 - ETA: 1s - loss: 0.2929 - acc: 0.994 - ETA: 1s - loss: 0.2929 - acc: 0.994 - ETA: 1s - loss: 0.2930 - acc: 0.994 - ETA: 1s - loss: 0.2931 - acc: 0.994 - ETA: 1s - loss: 0.2931 - acc: 0.994 - ETA: 1s - loss: 0.2930 - acc: 0.994 - ETA: 0s - loss: 0.2929 - acc: 0.994 - ETA: 0s - loss: 0.2929 - acc: 0.994 - ETA: 0s - loss: 0.2930 - acc: 0.994 - ETA: 0s - loss: 0.2930 - acc: 0.994 - ETA: 0s - loss: 0.2929 - acc: 0.994 - ETA: 0s - loss: 0.2929 - acc: 0.994 - ETA: 0s - loss: 0.2929 - acc: 0.994 - ETA: 0s - loss: 0.2928 - acc: 0.994 - ETA: 0s - loss: 0.2928 - acc: 0.994 - ETA: 0s - loss: 0.2927 - acc: 0.994 - ETA: 0s - loss: 0.2927 - acc: 0.994 - ETA: 0s - loss: 0.2928 - acc: 0.994 - ETA: 0s - loss: 0.2929 - acc: 0.994 - ETA: 0s - loss: 0.2929 - acc: 0.994 - ETA: 0s - loss: 0.2930 - acc: 0.994 - ETA: 0s - loss: 0.2931 - acc: 0.994 - 124s 969us/step - loss: 0.2932 - acc: 0.9942
```

```
19040/127656 [==>.....] - ETA: 3:07 - loss: 0.1266 - acc: 0.968 - ETA: 2:58
- loss: 0.2912 - acc: 0.989 - ETA: 2:56 - loss: 0.2114 - acc: 0.993 - ETA: 2:54 - loss: 0.2882 - a
cc: 0.991 - ETA: 2:51 - loss: 0.3060 - acc: 0.989 - ETA: 2:48 - loss: 0.2992 - acc: 0.985 - ETA: 2
:46 - loss: 0.2840 - acc: 0.985 - ETA: 2:46 - loss: 0.2945 - acc: 0.987 - ETA: 2:48 - loss: 0.3004
- acc: 0.988 - ETA: 2:49 - loss: 0.3218 - acc: 0.989 - ETA: 2:48 - loss: 0.3023 - acc: 0.990 - ETA
: 2:48 - loss: 0.2971 - acc: 0.991 - ETA: 2:49 - loss: 0.3212 - acc: 0.992 - ETA: 2:49 - loss: 0.3
377 - acc: 0.991 - ETA: 2:49 - loss: 0.3719 - acc: 0.992 - ETA: 2:48 - loss: 0.3626 - acc: 0.991 -
ETA: 2:47 - loss: 0.3632 - acc: 0.992 - ETA: 2:47 - loss: 0.3681 - acc: 0.991 - ETA: 2:46 - loss:
0.3659 - acc: 0.991 - ETA: 2:45 - loss: 0.3604 - acc: 0.991 - ETA: 2:44 - loss: 0.3672 - acc: 0.99
1 - ETA: 2:44 - loss: 0.3645 - acc: 0.991 - ETA: 2:43 - loss: 0.3648 - acc: 0.991 - ETA: 2:43 - lo
ss: 0.3590 - acc: 0.991 - ETA: 2:43 - loss: 0.3625 - acc: 0.991 - ETA: 2:43 - loss: 0.3610 - acc:
0.991 - ETA: 2:42 - loss: 0.3557 - acc: 0.991 - ETA: 2:42 - loss: 0.3546 - acc: 0.991 - ETA: 2:41
- loss: 0.3479 - acc: 0.992 - ETA: 2:41 - loss: 0.3438 - acc: 0.991 - ETA: 2:40 - loss: 0.3381 - a
cc: 0.991 - ETA: 2:40 - loss: 0.3319 - acc: 0.991 - ETA: 2:40 - loss: 0.3256 - acc: 0.991 - ETA: 2
:38 - loss: 0.3272 - acc: 0.992 - ETA: 2:35 - loss: 0.3245 - acc: 0.992 - ETA: 2:32 - loss: 0.3230
- acc: 0.992 - ETA: 2:29 - loss: 0.3229 - acc: 0.992 - ETA: 2:26 - loss: 0.3233 - acc: 0.993 - ETA
: 2:24 - loss: 0.3240 - acc: 0.993 - ETA: 2:21 - loss: 0.3160 - acc: 0.993 - ETA: 2:19 - loss: 0.3
086 - acc: 0.993 - ETA: 2:17 - loss: 0.3070 - acc: 0.993 - ETA: 2:13 - loss: 0.3125 - acc: 0.993 -
ETA: 2:12 - loss: 0.3084 - acc: 0.993 - ETA: 2:10 - loss: 0.3088 - acc: 0.993 - ETA: 2:09 - loss:
0.3030 - acc: 0.993 - ETA: 2:08 - loss: 0.2993 - acc: 0.993 - ETA: 2:06 - loss: 0.2948 - acc: 0.99
3 - ETA: 2:05 - loss: 0.2966 - acc: 0.993 - ETA: 2:04 - loss: 0.2962 - acc: 0.994 - ETA: 2:03 - lo
ss: 0.3001 - acc: 0.994 - ETA: 2:01 - loss: 0.2965 - acc: 0.994 - ETA: 2:00 - loss: 0.2988 - acc:
0.993 - ETA: 1:59 - loss: 0.2937 - acc: 0.993 - ETA: 1:58 - loss: 0.2944 - acc: 0.994 - ETA: 1:57
- loss: 0.2941 - acc: 0.994 - ETA: 1:56 - loss: 0.2918 - acc: 0.994 - ETA: 1:55 - loss: 0.2966 - a
cc: 0.994 - ETA: 1:54 - loss: 0.2952 - acc: 0.994 - ETA: 1:53 - loss: 0.2976 - acc: 0.994 - ETA: 1
:52 - loss: 0.2964 - acc: 0.994 - ETA: 1:51 - loss: 0.2944 - acc: 0.993 - ETA: 1:50 - loss: 0.2927
- acc: 0.993 - ETA: 1:49 - loss: 0.2958 - acc: 0.993 - ETA: 1:48 - loss: 0.2980 - acc: 0.993 - ETA
: 1:48 - loss: 0.2968 - acc: 0.993 - ETA: 1:47 - loss: 0.2986 - acc: 0.993 - ETA: 1:46 - loss: 0.2
962 - acc: 0.993 - ETA: 1:46 - loss: 0.2943 - acc: 0.993 - ETA: 1:44 - loss: 0.2945 - acc: 0.993 -
ETA: 1:44 - loss: 0.2947 - acc: 0.993 - ETA: 1:43 - loss: 0.2941 - acc: 0.993 - ETA: 1:43 - loss:
0.2982 - acc: 0.993 - ETA: 1:42 - loss: 0.2941 - acc: 0.993 - ETA: 1:41 - loss: 0.2946 - acc: 0.99
3 - ETA: 1:41 - loss: 0.2943 - acc: 0.993 - ETA: 1:41 - loss: 0.2928 - acc: 0.993 - ETA: 1:40 - lo
ss: 0.2925 - acc: 0.993 - ETA: 1:40 - loss: 0.2947 - acc: 0.993 - ETA: 1:40 - loss: 0.2932 - acc:
0.993 - ETA: 1:39 - loss: 0.2917 - acc: 0.993 - ETA: 1:39 - loss: 0.2926 - acc: 0.994 - ETA: 1:39
- loss: 0.2944 - acc: 0.994 - ETA: 1:38 - loss: 0.2939 - acc: 0.994 - ETA: 1:38 - loss: 0.2940 - a
cc: 0.993 - ETA: 1:37 - loss: 0.2942 - acc: 0.993 - ETA: 1:37 - loss: 0.2925 - acc: 0.993 - ETA: 1
:37 - loss: 0.2953 - acc: 0.993 - ETA: 1:37 - loss: 0.2946 - acc: 0.993 - ETA: 1:36 - loss: 0.2967
- acc: 0.993 - ETA: 1:36 - loss: 0.2975 - acc: 0.993 - ETA: 1:36 - loss: 0.2978 - acc: 0.993 - ETA
: 1:36 - loss: 0.2991 - acc: 0.993 - ETA: 1:35 - loss: 0.2991 - acc: 0.993 - ETA: 1:35 - loss: 0.3
014 - acc: 0.993 - ETA: 1:35 - loss: 0.3011 - acc: 0.993 - ETA: 1:34 - loss: 0.3003 - acc: 0.993 -
ETA: 1:34 - loss: 0.2986 - acc: 0.993 - ETA: 1:34 - loss: 0.2993 - acc: 0.993 - ETA: 1:33 - loss:
0.3003 - acc: 0.993 - ETA: 1:33 - loss: 0.3007 - acc: 0.993 - ETA: 1:33 - loss: 0.3007 - acc: 0.99
3 - ETA: 1:32 - loss: 0.2990 - acc: 0.993 - ETA: 1:32 - loss: 0.2987 - acc: 0.993 - ETA: 1:32 - lo
ss: 0.2973 - acc: 0.993 - ETA: 1:32 - loss: 0.2967 - acc: 0.993 - ETA: 1:31 - loss: 0.2985 - acc:
0.993 - ETA: 1:31 - loss: 0.2990 - acc: 0.994 - ETA: 1:31 - loss: 0.3002 - acc: 0.994 - ETA: 1:31
- loss: 0.3034 - acc: 0.993 - ETA: 1:30 - loss: 0.3040 - acc: 0.993 - ETA: 1:30 - loss: 0.3044 - a
cc: 0.993 - ETA: 1:30 - loss: 0.3051 - acc: 0.993 - ETA: 1:30 - loss: 0.3050 - acc: 0.993 - ETA: 1
:29 - loss: 0.3045 - acc: 0.993 - ETA: 1:29 - loss: 0.3033 - acc: 0.993 - ETA: 1:29 - loss: 0.3025
- acc: 0.993 - ETA: 1:29 - loss: 0.3017 - acc: 0.993 - ETA: 1:28 - loss: 0.3008 - acc: 0.993 - ETA
: 1:28 - loss: 0.3014 - acc: 0.993 - ETA: 1:28 - loss: 0.3032 - acc: 0.993 - ETA: 1:28 - loss: 0.3
037 - acc: 0.994 - ETA: 1:28 - loss: 0.3022 - acc: 0.994 - ETA: 1:27 - loss: 0.3013 - acc: 0.993 -
ETA: 1:27 - loss: 0.3013 - acc: 0.994 - ETA: 1:27 - loss: 0.3031 - acc: 0.994 - ETA: 1:27 - loss:
0.3014 - acc: 0.994 - ETA: 1:26 - loss: 0.3027 - acc: 0.994 - ETA: 1:26 - loss: 0.3030 - acc: 0.99
4 - ETA: 1:26 - loss: 0.3029 - acc: 0.994 - ETA: 1:26 - loss: 0.3040 - acc: 0.994 - ETA: 1:25 - lo
ss: 0.3038 - acc: 0.993 - ETA: 1:25 - loss: 0.3022 - acc: 0.993 - ETA: 1:25 - loss: 0.3009 - acc:
```

[illegible]

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

```

12768/127656 [=]>.....] - ETA: 3:42 - loss: 0.4243 - acc: 1.000 - ETA: 3:12
- loss: 0.3667 - acc: 0.989 - ETA: 3:05 - loss: 0.3570 - acc: 0.993 - ETA: 3:00 - loss: 0.3802 - a
cc: 0.995 - ETA: 2:59 - loss: 0.3357 - acc: 0.993 - ETA: 2:58 - loss: 0.3122 - acc: 0.994 - ETA: 2
:57 - loss: 0.3297 - acc: 0.995 - ETA: 2:55 - loss: 0.2989 - acc: 0.995 - ETA: 2:54 - loss: 0.2998
- acc: 0.994 - ETA: 2:53 - loss: 0.2875 - acc: 0.995 - ETA: 2:52 - loss: 0.3110 - acc: 0.994 - ETA
: 2:51 - loss: 0.3047 - acc: 0.994 - ETA: 2:50 - loss: 0.3207 - acc: 0.993 - ETA: 2:50 - loss: 0.3
326 - acc: 0.994 - ETA: 2:49 - loss: 0.3551 - acc: 0.991 - ETA: 2:48 - loss: 0.3482 - acc: 0.991 -
ETA: 2:47 - loss: 0.3430 - acc: 0.992 - ETA: 2:47 - loss: 0.3459 - acc: 0.992 - ETA: 2:47 - loss:
0.3351 - acc: 0.993 - ETA: 2:46 - loss: 0.3225 - acc: 0.993 - ETA: 2:46 - loss: 0.3286 - acc: 0.99
3 - ETA: 2:45 - loss: 0.3274 - acc: 0.994 - ETA: 2:45 - loss: 0.3275 - acc: 0.993 - ETA: 2:45 - lo
ss: 0.3269 - acc: 0.994 - ETA: 2:45 - loss: 0.3210 - acc: 0.993 - ETA: 2:45 - loss: 0.3110 - acc:
0.993 - ETA: 2:44 - loss: 0.3105 - acc: 0.994 - ETA: 2:44 - loss: 0.3128 - acc: 0.993 - ETA: 2:44
- loss: 0.3063 - acc: 0.994 - ETA: 2:44 - loss: 0.3090 - acc: 0.993 - ETA: 2:44 - loss: 0.3174 - a
cc: 0.993 - ETA: 2:44 - loss: 0.3138 - acc: 0.993 - ETA: 2:44 - loss: 0.3266 - acc: 0.993 - ETA: 2
:43 - loss: 0.3239 - acc: 0.993 - ETA: 2:43 - loss: 0.3195 - acc: 0.993 - ETA: 2:43 - loss: 0.3147
- acc: 0.993 - ETA: 2:44 - loss: 0.3142 - acc: 0.993 - ETA: 2:44 - loss: 0.3140 - acc: 0.992 - ETA
: 2:45 - loss: 0.3126 - acc: 0.992 - ETA: 2:45 - loss: 0.3136 - acc: 0.993 - ETA: 2:45 - loss: 0.3
139 - acc: 0.993 - ETA: 2:46 - loss: 0.3127 - acc: 0.993 - ETA: 2:46 - loss: 0.3161 - acc: 0.993 -
ETA: 2:45 - loss: 0.3156 - acc: 0.993 - ETA: 2:45 - loss: 0.3151 - acc: 0.993 - ETA: 2:45 - loss:
0.3118 - acc: 0.993 - ETA: 2:45 - loss: 0.3074 - acc: 0.994 - ETA: 2:44 - loss: 0.3059 - acc: 0.99
4 - ETA: 2:44 - loss: 0.3064 - acc: 0.993 - ETA: 2:45 - loss: 0.3087 - acc: 0.993 - ETA: 2:45 - lo
ss: 0.3063 - acc: 0.993 - ETA: 2:44 - loss: 0.3089 - acc: 0.993 - ETA: 2:44 - loss: 0.3136 - acc:
0.993 - ETA: 2:44 - loss: 0.3170 - acc: 0.993 - ETA: 2:44 - loss: 0.3174 - acc: 0.993 - ETA: 2:44
- loss: 0.3146 - acc: 0.993 - ETA: 2:43 - loss: 0.3116 - acc: 0.993 - ETA: 2:43 - loss: 0.3116 - a
cc: 0.993 - ETA: 2:43 - loss: 0.3149 - acc: 0.993 - ETA: 2:43 - loss: 0.3144 - acc: 0.993 - ETA: 2
:43 - loss: 0.3153 - acc: 0.993 - ETA: 2:43 - loss: 0.3147 - acc: 0.993 - ETA: 2:43 - loss: 0.3133
- acc: 0.993 - ETA: 2:42 - loss: 0.3127 - acc: 0.993 - ETA: 2:42 - loss: 0.3113 - acc: 0.993 - ETA
: 2:42 - loss: 0.3110 - acc: 0.993 - ETA: 2:42 - loss: 0.3105 - acc: 0.993 - ETA: 2:42 - loss: 0.3
090 - acc: 0.993 - ETA: 2:42 - loss: 0.3070 - acc: 0.993 - ETA: 2:42 - loss: 0.3079 - acc: 0.993 -
ETA: 2:42 - loss: 0.3091 - acc: 0.993 - ETA: 2:42 - loss: 0.3093 - acc: 0.993 - ETA: 2:42 - loss:
0.3056 - acc: 0.993 - ETA: 2:42 - loss: 0.3068 - acc: 0.993 - ETA: 2:41 - loss: 0.3049 - acc: 0.99
3 - ETA: 2:41 - loss: 0.3044 - acc: 0.993 - ETA: 2:41 - loss: 0.3034 - acc: 0.993 - ETA: 2:41 - lo
ss: 0.3015 - acc: 0.993 - ETA: 2:41 - loss: 0.3064 - acc: 0.993 - ETA: 2:41 - loss: 0.3031 - acc:
0.993 - ETA: 2:41 - loss: 0.3037 - acc: 0.993 - ETA: 2:41 - loss: 0.3009 - acc: 0.993 - ETA: 2:41
- loss: 0.2993 - acc: 0.993 - ETA: 2:41 - loss: 0.2994 - acc: 0.993 - ETA: 2:40 - loss: 0.3023 - a
cc: 0.993 - ETA: 2:40 - loss: 0.3042 - acc: 0.993 - ETA: 2:40 - loss: 0.3070 - acc: 0.993 - ETA: 2
:40 - loss: 0.3081 - acc: 0.993 - ETA: 2:40 - loss: 0.3059 - acc: 0.993 - ETA: 2:40 - loss: 0.3042
- acc: 0.993 - ETA: 2:40 - loss: 0.3066 - acc: 0.993 - ETA: 2:40 - loss: 0.3064 - acc: 0.993 - ETA
: 2:40 - loss: 0.3068 - acc: 0.993 - ETA: 2:39 - loss: 0.3090 - acc: 0.993 - ETA: 2:39 - loss: 0.3
074 - acc: 0.993 - ETA: 2:39 - loss: 0.3077 - acc: 0.993 - ETA: 2:39 - loss: 0.3087 - acc: 0.993 -
ETA: 2:39 - loss: 0.3095 - acc: 0.993 - ETA: 2:39 - loss: 0.3090 - acc: 0.993 - ETA: 2:39 - loss:
0.3124 - acc: 0.993 - ETA: 2:39 - loss: 0.3118 - acc: 0.993 - ETA: 2:38 - loss: 0.3127 - acc: 0.99
3 - ETA: 2:38 - loss: 0.3122 - acc: 0.993 - ETA: 2:38 - loss: 0.3120 - acc: 0.993 - ETA: 2:38 - lo
ss: 0.3109 - acc: 0.993 - ETA: 2:38 - loss: 0.3107 - acc: 0.993 - ETA: 2:38 - loss: 0.3122 - acc:

```

[illegible]

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

```
0.993 - ETA: 2s - loss: 0.2898 - acc: 0.993 - ETA: 2s - loss: 0.2898 - acc: 0.993 - ETA: 2s - loss:
: 0.2898 - acc: 0.993 - ETA: 2s - loss: 0.2897 - acc: 0.993 - ETA: 2s - loss: 0.2898 - acc: 0.993
- ETA: 2s - loss: 0.2898 - acc: 0.993 - ETA: 2s - loss: 0.2899 - acc: 0.993 - ETA: 2s - loss:
0.2899 - acc: 0.993 - ETA: 2s - loss: 0.2898 - acc: 0.993 - ETA: 2s - loss: 0.2898 - acc: 0.993 -
ETA: 2s - loss: 0.2899 - acc: 0.993 - ETA: 2s - loss: 0.2898 - acc: 0.993 - ETA: 2s - loss: 0.2899
- acc: 0.993 - ETA: 2s - loss: 0.2900 - acc: 0.993 - ETA: 2s - loss: 0.2899 - acc: 0.993 - ETA: 1s
- loss: 0.2900 - acc: 0.993 - ETA: 1s - loss: 0.2900 - acc: 0.993 - ETA: 1s - loss: 0.2900 - acc:
0.993 - ETA: 1s - loss: 0.2900 - acc: 0.993 - ETA: 1s - loss: 0.2899 - acc: 0.993 - ETA: 1s - loss
: 0.2900 - acc: 0.993 - ETA: 1s - loss: 0.2899 - acc: 0.993 - ETA: 1s - loss: 0.2900 - acc: 0.993
- ETA: 1s - loss: 0.2900 - acc: 0.993 - ETA: 1s - loss: 0.2900 - acc: 0.9939127656/127656
[=====] - ETA: 1s - loss: 0.2900 - acc: 0.993 - ETA: 1s - loss: 0.2900 -
acc: 0.993 - ETA: 1s - loss: 0.2900 - acc: 0.993 - ETA: 1s - loss: 0.2903 - acc: 0.993 - ETA: 1s -
loss: 0.2903 - acc: 0.993 - ETA: 1s - loss: 0.2904 - acc: 0.993 - ETA: 0s - loss: 0.2904 - acc: 0.
993 - ETA: 0s - loss: 0.2904 - acc: 0.993 - ETA: 0s - loss: 0.2904 - acc: 0.993 - ETA: 0s - loss:
0.2905 - acc: 0.993 - ETA: 0s - loss: 0.2906 - acc: 0.993 - ETA: 0s - loss: 0.2905 - acc: 0.993 -
ETA: 0s - loss: 0.2905 - acc: 0.993 - ETA: 0s - loss: 0.2905 - acc: 0.993 - ETA: 0s - loss: 0.2904
- acc: 0.993 - ETA: 0s - loss: 0.2905 - acc: 0.993 - ETA: 0s - loss: 0.2904 - acc: 0.993 - ETA: 0s
- loss: 0.2905 - acc: 0.993 - ETA: 0s - loss: 0.2905 - acc: 0.993 - ETA: 0s - loss: 0.2904 - acc:
0.993 - ETA: 0s - loss: 0.2904 - acc: 0.993 - ETA: 0s - loss: 0.2904 - acc: 0.993 - ETA: 0s - loss
: 0.2903 - acc: 0.993 - 122s 957us/step - loss: 0.2904 - acc: 0.9939
```

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

[illegible]



[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```
18112/127656 [==>.....] - ETA: 1:33 - loss: 0.4038 - acc: 1.000 - ETA: 1:23
- loss: 0.2957 - acc: 0.992 - ETA: 1:20 - loss: 0.2246 - acc: 0.995 - ETA: 1:20 - loss: 0.3223 - a
cc: 0.987 - ETA: 1:21 - loss: 0.2613 - acc: 0.988 - ETA: 1:20 - loss: 0.2527 - acc: 0.986 - ETA: 1
:20 - loss: 0.3099 - acc: 0.988 - ETA: 1:19 - loss: 0.2827 - acc: 0.983 - ETA: 1:19 - loss: 0.2722
- acc: 0.982 - ETA: 1:19 - loss: 0.2711 - acc: 0.984 - ETA: 1:19 - loss: 0.2764 - acc: 0.984 - ETA
: 1:19 - loss: 0.2814 - acc: 0.983 - ETA: 1:19 - loss: 0.2731 - acc: 0.983 - ETA: 1:19 - loss: 0.2
749 - acc: 0.983 - ETA: 1:19 - loss: 0.2801 - acc: 0.983 - ETA: 1:19 - loss: 0.2973 - acc: 0.983 -
ETA: 1:19 - loss: 0.2990 - acc: 0.982 - ETA: 1:19 - loss: 0.2929 - acc: 0.983 - ETA: 1:19 - loss:
0.2995 - acc: 0.981 - ETA: 1:19 - loss: 0.2918 - acc: 0.981 - ETA: 1:19 - loss: 0.2893 - acc: 0.98
2 - ETA: 1:19 - loss: 0.2950 - acc: 0.981 - ETA: 1:19 - loss: 0.2948 - acc: 0.981 - ETA: 1:19 - lo
ss: 0.2961 - acc: 0.982 - ETA: 1:19 - loss: 0.2945 - acc: 0.982 - ETA: 1:18 - loss: 0.2925 - acc:
0.982 - ETA: 1:18 - loss: 0.2861 - acc: 0.983 - ETA: 1:18 - loss: 0.2843 - acc: 0.982 - ETA: 1:18
- loss: 0.2841 - acc: 0.983 - ETA: 1:18 - loss: 0.2768 - acc: 0.983 - ETA: 1:18 - loss: 0.2719 - a
cc: 0.983 - ETA: 1:18 - loss: 0.2711 - acc: 0.983 - ETA: 1:18 - loss: 0.2701 - acc: 0.983 - ETA: 1
:18 - loss: 0.2674 - acc: 0.984 - ETA: 1:18 - loss: 0.2614 - acc: 0.983 - ETA: 1:18 - loss: 0.2618
- acc: 0.983 - ETA: 1:17 - loss: 0.2630 - acc: 0.982 - ETA: 1:18 - loss: 0.2629 - acc: 0.982 - ETA
: 1:18 - loss: 0.2648 - acc: 0.981 - ETA: 1:17 - loss: 0.2641 - acc: 0.982 - ETA: 1:17 - loss: 0.2
592 - acc: 0.982 - ETA: 1:17 - loss: 0.2602 - acc: 0.982 - ETA: 1:17 - loss: 0.2629 - acc: 0.982 -
ETA: 1:17 - loss: 0.2707 - acc: 0.981 - ETA: 1:17 - loss: 0.2706 - acc: 0.981 - ETA: 1:17 - loss:
0.2750 - acc: 0.981 - ETA: 1:17 - loss: 0.2764 - acc: 0.981 - ETA: 1:17 - loss: 0.2747 - acc: 0.98
1 - ETA: 1:17 - loss: 0.2785 - acc: 0.981 - ETA: 1:17 - loss: 0.2783 - acc: 0.981 - ETA: 1:17 - lo
ss: 0.2775 - acc: 0.981 - ETA: 1:17 - loss: 0.2747 - acc: 0.981 - ETA: 1:17 - loss: 0.2754 - acc:
```

[illegible]





[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```
0.2904 - acc: 0.980 - ETA: 3s - loss: 0.2903 - acc: 0.980 - ETA: 3s - loss: 0.2903 - acc: 0.980 -
ETA: 3s - loss: 0.2903 - acc: 0.980 - ETA: 3s - loss: 0.2903 - acc: 0.980 - ETA: 3s - loss: 0.2905
- acc: 0.980 - ETA: 3s - loss: 0.2904 - acc: 0.980 - ETA: 3s - loss: 0.2903 - acc: 0.980 - ETA: 3s
- loss: 0.2903 - acc: 0.980 - ETA: 3s - loss: 0.2904 - acc: 0.980 - ETA: 3s - loss: 0.2903 - acc:
0.980 - ETA: 2s - loss: 0.2903 - acc: 0.980 - ETA: 2s - loss: 0.2904 - acc: 0.980 - ETA: 2s - loss
: 0.2902 - acc: 0.980 - ETA: 2s - loss: 0.2902 - acc: 0.980 - ETA: 2s - loss: 0.2902 - acc: 0.980
- ETA: 2s - loss: 0.2902 - acc: 0.980 - ETA: 2s - loss: 0.2902 - acc: 0.980 - ETA: 2s - loss:
0.2902 - acc: 0.980 - ETA: 2s - loss: 0.2903 - acc: 0.980 - ETA: 2s - loss: 0.2902 - acc: 0.980 -
ETA: 2s - loss: 0.2901 - acc: 0.980 - ETA: 1s - loss: 0.2901 - acc: 0.980 - ETA: 1s - loss: 0.2902
- acc: 0.980 - ETA: 1s - loss: 0.2900 - acc: 0.980 - ETA: 1s - loss: 0.2899 - acc: 0.980 - ETA: 1s
- loss: 0.2900 - acc: 0.980 - ETA: 1s - loss: 0.2900 - acc: 0.980 - ETA: 1s - loss: 0.2899 - acc:
0.980 - ETA: 1s - loss: 0.2899 - acc: 0.980 - ETA: 1s - loss: 0.2899 - acc: 0.980 - ETA: 1s - loss
: 0.2899 - acc: 0.980 - ETA: 1s - loss: 0.2900 - acc: 0.980 - ETA: 0s - loss: 0.2899 - acc: 0.980
- ETA: 0s - loss: 0.2900 - acc: 0.980 - ETA: 0s - loss: 0.2900 - acc: 0.980 - ETA: 0s - loss:
0.2901 - acc: 0.980 - ETA: 0s - loss: 0.2902 - acc: 0.980 - ETA: 0s - loss: 0.2903 - acc: 0.980 -
ETA: 0s - loss: 0.2903 - acc: 0.980 - ETA: 0s - loss: 0.2903 - acc: 0.980 - ETA: 0s - loss: 0.2903
- acc: 0.980 - ETA: 0s - loss: 0.2904 - acc: 0.980 - ETA: 0s - loss: 0.2904 - acc: 0.980 - ETA: 0s
- loss: 0.2902 - acc: 0.980 - 116s 908us/step - loss: 0.2903 - acc: 0.9805
```

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```
: 0.2916 - acc: 0.982 - ETA: 9s - loss: 0.2915 - acc: 0.982 - ETA: 9s - loss: 0.2915 - acc: 0.982 -
- ETA: 9s - loss: 0.2914 - acc: 0.982 - ETA: 9s - loss: 0.2914 - acc: 0.982 - ETA: 9s - loss:
0.2913 - acc: 0.982 - ETA: 9s - loss: 0.2912 - acc: 0.982 - ETA: 9s - loss: 0.2911 - acc: 0.982 -
ETA: 9s - loss: 0.2911 - acc: 0.982 - ETA: 9s - loss: 0.2911 - acc: 0.982 - ETA: 9s - loss: 0.2912
- acc: 0.982 - ETA: 9s - loss: 0.2911 - acc: 0.982 - ETA: 8s - loss: 0.2912 - acc: 0.982 - ETA: 8s
- loss: 0.2913 - acc: 0.982 - ETA: 8s - loss: 0.2912 - acc: 0.982 - ETA: 8s - loss: 0.2912 - acc:
0.982 - ETA: 8s - loss: 0.2912 - acc: 0.982 - ETA: 8s - loss: 0.2911 - acc: 0.982 - ETA: 8s - loss
: 0.2911 - acc: 0.982 - ETA: 8s - loss: 0.2910 - acc: 0.982 - ETA: 8s - loss: 0.2911 - acc: 0.982
- ETA: 8s - loss: 0.2911 - acc: 0.982 - ETA: 8s - loss: 0.2912 - acc: 0.982 - ETA: 8s - loss:
0.2912 - acc: 0.982 - ETA: 8s - loss: 0.2912 - acc: 0.982 - ETA: 8s - loss: 0.2911 - acc: 0.982 -
ETA: 8s - loss: 0.2911 - acc: 0.982 - ETA: 8s - loss: 0.2911 - acc: 0.982 - ETA: 8s - loss: 0.2911
- acc: 0.982 - ETA: 8s - loss: 0.2911 - acc: 0.982 - ETA: 7s - loss: 0.2912 - acc: 0.982 - ETA: 7s
- loss: 0.2912 - acc: 0.982 - ETA: 7s - loss: 0.2911 - acc: 0.982 - ETA: 7s - loss: 0.2910 - acc:
0.982 - ETA: 7s - loss: 0.2910 - acc: 0.982 - ETA: 7s - loss: 0.2910 - acc: 0.982 - ETA: 7s - loss
: 0.2909 - acc: 0.982 - ETA: 7s - loss: 0.2910 - acc: 0.982 - ETA: 7s - loss: 0.2909 - acc: 0.982
- ETA: 7s - loss: 0.2908 - acc: 0.982 - ETA: 7s - loss: 0.2910 - acc: 0.982 - ETA: 7s - loss:
0.2909 - acc: 0.982 - ETA: 7s - loss: 0.2909 - acc: 0.982 - ETA: 7s - loss: 0.2908 - acc: 0.982 -
ETA: 6s - loss: 0.2910 - acc: 0.982 - ETA: 6s - loss: 0.2911 - acc: 0.982 - ETA: 6s - loss: 0.2911
- acc: 0.982 - ETA: 6s - loss: 0.2910 - acc: 0.982 - ETA: 6s - loss: 0.2911 - acc: 0.982 - ETA: 6s
- loss: 0.2910 - acc: 0.982 - ETA: 6s - loss: 0.2911 - acc: 0.982 - ETA: 6s - loss: 0.2909 - acc:
0.982 - ETA: 6s - loss: 0.2909 - acc: 0.982 - ETA: 6s - loss: 0.2910 - acc: 0.982 - ETA: 5s - loss
: 0.2910 - acc: 0.982 - ETA: 5s - loss: 0.2910 - acc: 0.982 - ETA: 5s - loss: 0.2910 - acc: 0.982
- ETA: 5s - loss: 0.2909 - acc: 0.982 - ETA: 5s - loss: 0.2909 - acc: 0.982 - ETA: 5s - loss:
0.2909 - acc: 0.982 - ETA: 5s - loss: 0.2911 - acc: 0.982 - ETA: 5s - loss: 0.2912 - acc: 0.982 -
ETA: 5s - loss: 0.2910 - acc: 0.982 - ETA: 5s - loss: 0.2909 - acc: 0.982 - ETA: 5s - loss: 0.2909
- acc: 0.982 - ETA: 4s - loss: 0.2912 - acc: 0.982 - ETA: 4s - loss: 0.2911 - acc: 0.982 - ETA: 4s
- loss: 0.2911 - acc: 0.982 - ETA: 4s - loss: 0.2912 - acc: 0.982 - ETA: 4s - loss: 0.2911 - acc:
0.982 - ETA: 4s - loss: 0.2913 - acc: 0.982 - ETA: 4s - loss: 0.2911 - acc: 0.982 - ETA: 4s - loss
: 0.2913 - acc: 0.982 - ETA: 4s - loss: 0.2913 - acc: 0.982 - ETA: 4s - loss: 0.2913 - acc: 0.982
- ETA: 4s - loss: 0.2913 - acc: 0.982 - ETA: 3s - loss: 0.2913 - acc: 0.982 - ETA: 3s - loss:
0.2913 - acc: 0.982 - ETA: 3s - loss: 0.2913 - acc: 0.982 - ETA: 3s - loss: 0.2913 - acc: 0.982 -
ETA: 3s - loss: 0.2913 - acc: 0.982 - ETA: 3s - loss: 0.2912 - acc: 0.982 - ETA: 3s - loss: 0.2912
- acc: 0.982 - ETA: 3s - loss: 0.2914 - acc: 0.982 - ETA: 3s - loss: 0.2913 - acc: 0.982 - ETA: 3s
- loss: 0.2914 - acc: 0.982 - ETA: 3s - loss: 0.2915 - acc: 0.982 - ETA: 2s - loss: 0.2913 - acc:
0.982 - ETA: 2s - loss: 0.2913 - acc: 0.982 - ETA: 2s - loss: 0.2912 - acc: 0.982 - ETA: 2s - loss
: 0.2911 - acc: 0.982 - ETA: 2s - loss: 0.2910 - acc: 0.982 - ETA: 2s - loss: 0.2911 - acc: 0.982
- ETA: 2s - loss: 0.2910 - acc: 0.982 - ETA: 2s - loss: 0.2912 - acc: 0.982 - ETA: 2s - loss:
0.2912 - acc: 0.982 - ETA: 2s - loss: 0.2910 - acc: 0.982 - ETA: 2s - loss: 0.2910 - acc: 0.982 -
ETA: 1s - loss: 0.2910 - acc: 0.982 - ETA: 1s - loss: 0.2910 - acc: 0.982 - ETA: 1s - loss: 0.2910
- acc: 0.982 - ETA: 1s - loss: 0.2911 - acc: 0.982 - ETA: 1s - loss: 0.2911 - acc: 0.982 - ETA: 1s
- loss: 0.2911 - acc: 0.982 - ETA: 1s - loss: 0.2910 - acc: 0.982 - ETA: 1s - loss: 0.2911 - acc:
0.982 - ETA: 1s - loss: 0.2910 - acc: 0.982 - ETA: 1s - loss: 0.2910 - acc: 0.982 - ETA: 1s - loss
: 0.2910 - acc: 0.982 - ETA: 1s - loss: 0.2911 - acc: 0.982 - ETA: 0s - loss: 0.2912 - acc: 0.982
- ETA: 0s - loss: 0.2912 - acc: 0.982 - ETA: 0s - loss: 0.2912 - acc: 0.982 - ETA: 0s - loss:
0.2913 - acc: 0.982 - ETA: 0s - loss: 0.2912 - acc: 0.982 - ETA: 0s - loss: 0.2912 - acc: 0.982 -
ETA: 0s - loss: 0.2912 - acc: 0.982 - ETA: 0s - loss: 0.2911 - acc: 0.982 - ETA: 0s - loss: 0.2910
- acc: 0.982 - ETA: 0s - loss: 0.2910 - acc: 0.982 - ETA: 0s - loss: 0.2910 - acc: 0.982 - ETA: 0s
- loss: 0.2911 - acc: 0.982 - 113s 885us/step - loss: 0.2911 - acc: 0.9821
```

Out[32]:

<keras.callbacks.History at 0x1b2856010b8>

In [68]:

```
sub_df_bp_m11 = pd.read_csv('sample_submission.csv')
```

In [34]:

```
predict = model.predict(X_test)
print(predict[0])
```

```
[0.34538394 0.08078484 0.27567172 0.01371274 0.24195077 0.04249604]
```

In [70]:

```
sub_df_bp_m11.iloc[:,1:] = predict
```

In [71]:

```
sub_df_bp_m11.to_csv('submission_bp_m11.csv')
sub_df_bp_m11.head()
```

Out[71]:

	id	toxic	severe_toxic	obscene	threat	insult	identity_hate
0	00001cee341fdb12	0.345384	0.080785	0.275672	0.013713	0.241951	0.042496
1	0000247867823ef7	0.388515	0.051859	0.243147	0.015175	0.247718	0.053587
2	00013b17ad220c46	0.344162	0.083562	0.273558	0.014807	0.240133	0.043777
3	00017563c3f7919a	0.639915	0.000682	0.142977	0.000803	0.193120	0.022503
4	00017695ad8997eb	0.419798	0.009723	0.293124	0.000704	0.263211	0.013440

In [84]:

```
final_submission_combined_updated_3 = pd.read_csv('sample_submission.csv')
```

In [85]:

```
for label in label_col:
    final_submission_combined_updated_3[label] = (sub_df_mnb[label]+sub_df_lr[label]+sub_df_lr[label]+sub_df_bp_mll[label])
```

In [86]:

```
final_submission_combined_updated_3.head()
```

Out[86]:

	id	toxic	severe_toxic	obscene	threat	insult	identity_hate
0	00001cee341fdb12	3.339665	0.543288	3.263950	0.125956	3.170447	0.466915
1	0000247867823ef7	0.411157	0.055003	0.246880	0.015751	0.261084	0.055249
2	00013b17ad220c46	0.490817	0.098758	0.338406	0.019136	0.306033	0.055415
3	00017563c3f7919a	0.697997	0.007553	0.151440	0.004971	0.203426	0.022993
4	00017695ad8997eb	0.513078	0.012226	0.329108	0.002850	0.307150	0.016386

In [87]:

```
final_submission_combined_updated_3.to_csv('final_submission_combined_updated_3.csv', index=False)
```

In [31]:

```
import os
from keras.layers import Dense, Input, LSTM, Bidirectional, Activation, Conv1D, GRU
from keras.callbacks import Callback
from keras.layers import Dropout, Embedding, GlobalMaxPooling1D, MaxPooling1D, Add, Flatten
from keras.preprocessing import text, sequence
from keras.layers import GlobalAveragePooling1D, GlobalMaxPooling1D, concatenate, SpatialDropout1D
from keras import initializers, regularizers, constraints, optimizers, layers, callbacks
from keras.callbacks import EarlyStopping, ModelCheckpoint
from keras.models import Model
from keras.optimizers import Adam
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from sklearn.metrics import roc_auc_score
```

Using TensorFlow backend.

In [36]:

```
max_features=100000
maxlen=150
embed_size=300
```



In [32]:

```
EMBEDDING_FILE = 'glove840b300dtxt/glove.840B.300d.txt'
train = pd.read_csv('train.csv')
test = pd.read_csv('test.csv')
```

In [33]:

```
train["comment_text"].fillna("fillna")
test["comment_text"].fillna("fillna")
X_train = train["comment_text"].str.lower()
y_train = train[["toxic", "severe_toxic", "obscene", "threat", "insult", "identity_hate"]].values
X_test = test["comment_text"].str.lower()
```

In [34]:

```
class RocAucEvaluation(Callback):
    def __init__(self, validation_data=(), interval=1):
        super(Callback, self).__init__()

        self.interval = interval
        self.X_val, self.y_val = validation_data

    def on_epoch_end(self, epoch, logs={}):
        if epoch % self.interval == 0:
            y_pred = self.model.predict(self.X_val, verbose=0)
            score = roc_auc_score(self.y_val, y_pred)
            print("\n ROC-AUC - epoch: {:d} - score: {:.6f}".format(epoch+1, score))
```

In [37]:

```
tok=text.Tokenizer(num_words=max_features,lower=True)
tok.fit_on_texts(list(X_train)+list(X_test))
X_train=tok.texts_to_sequences(X_train)
X_test=tok.texts_to_sequences(X_test)
x_train=sequence.pad_sequences(X_train,maxlen=maxlen)
x_test=sequence.pad_sequences(X_test,maxlen=maxlen)
```

In [37]:

```
embeddings_index = {}
with open(EMBEDDING_FILE,encoding='utf8') as f:
    for line in f:
        values = line.rstrip().rsplit(' ')
        word = values[0]
        coefs = np.asarray(values[1:], dtype='float32')
        embeddings_index[word] = coefs
```

In [40]:

```
word_index = tok.word_index
#prepare embedding matrix
num_words = min(max_features, len(word_index) + 1)
embedding_matrix = np.zeros((num_words, embed_size))
for word, i in word_index.items():
    if i >= max_features:
        continue
    embedding_vector = embeddings_index.get(word)
    if embedding_vector is not None:
        # words not found in embedding index will be all-zeros.
        embedding_matrix[i] = embedding_vector
```

In [43]:

```
# https://www.kaggle.com/eashish/bidirection-gru-convolution
sequence_input = Input(shape=(maxlen, ))
x = Embedding(max_features, embed_size, weights=[embedding_matrix],trainable = False)(sequence_input)
x = SpatialDropout1D(0.2)(x)
x = Bidirectional(GRU(128, return_sequences=True,dropout=0.1,recurrent_dropout=0.1))(x)
x = Conv1D(64, kernel_size = 3, padding = "valid", kernel_initializer = "glorot_uniform")(x)
avg_pool = GlobalAveragePooling1D()(x)
```

```

avg_pool = GlobalAveragePooling1D()(x)
max_pool = GlobalMaxPooling1D()(x)
x = concatenate([avg_pool, max_pool])
preds = Dense(6, activation="sigmoid")(x)
model = Model(sequence_input, preds)
model.compile(loss='binary_crossentropy', optimizer=Adam(lr=1e-3), metrics=['accuracy'])

```

In [44]:

```

batch_size = 128
epochs = 4
X_tra, X_val, y_tra, y_val = train_test_split(x_train, y_train, train_size=0.9, random_state=42)

```

In [45]:

```

filepath="weights_base.best.hdf5"
checkpoint = ModelCheckpoint(filepath, monitor='val_acc', verbose=1, save_best_only=True, mode='max')
early = EarlyStopping(monitor="val_acc", mode="max", patience=5)
ra_val = RocAucEvaluation(validation_data=(X_val, y_val), interval = 1)
callbacks_list = [ra_val, checkpoint, early]

```

In [47]:

```

model.fit(X_tra, y_tra, batch_size=batch_size, epochs=epochs, validation_data=(X_val, y_val), callbacks=callbacks_list, verbose=1)
model.load_weights(filepath)
print('Predicting....')
y_pred = model.predict(x_test, batch_size=64, verbose=1)

```

Train on 143613 samples, validate on 15958 samples

Epoch 1/4

```

24960/143613 [====>.....] - ETA: 51:59 - loss: 0.3529 - acc: 0.96 - ETA: 51:59 - loss: 0.3181 - acc: 0.96 - ETA: 51:14 - loss: 0.2841 - acc: 0.96 - ETA: 49:40 - loss: 0.2531 - acc: 0.96 - ETA: 49:10 - loss: 0.2261 - acc: 0.96 - ETA: 49:34 - loss: 0.2422 - acc: 0.96 - ETA: 51:06 - loss: 0.2388 - acc: 0.96 - ETA: 51:52 - loss: 0.2307 - acc: 0.96 - ETA: 51:39 - loss: 0.2179 - acc: 0.96 - ETA: 52:58 - loss: 0.2034 - acc: 0.96 - ETA: 54:01 - loss: 0.1979 - acc: 0.96 - ETA: 54:39 - loss: 0.1927 - acc: 0.96 - ETA: 55:20 - loss: 0.1935 - acc: 0.96 - ETA: 55:28 - loss: 0.1855 - acc: 0.96 - ETA: 55:53 - loss: 0.1840 - acc: 0.96 - ETA: 56:18 - loss: 0.1814 - acc: 0.96 - ETA: 56:42 - loss: 0.1785 - acc: 0.96 - ETA: 57:09 - loss: 0.1765 - acc: 0.96 - ETA: 56:38 - loss: 0.1732 - acc: 0.96 - ETA: 56:48 - loss: 0.1711 - acc: 0.96 - ETA: 56:59 - loss: 0.1704 - acc: 0.96 - ETA: 56:47 - loss: 0.1707 - acc: 0.96 - ETA: 57:06 - loss: 0.1702 - acc: 0.96 - ETA: 57:15 - loss: 0.1667 - acc: 0.96 - ETA: 57:30 - loss: 0.1651 - acc: 0.96 - ETA: 57:51 - loss: 0.1649 - acc: 0.96 - ETA: 58:15 - loss: 0.1647 - acc: 0.96 - ETA: 58:32 - loss: 0.1632 - acc: 0.96 - ETA: 58:52 - loss: 0.1631 - acc: 0.96 - ETA: 58:58 - loss: 0.1629 - acc: 0.96 - ETA: 59:17 - loss: 0.1632 - acc: 0.96 - ETA: 59:33 - loss: 0.1633 - acc: 0.96 - ETA: 59:44 - loss: 0.1621 - acc: 0.96 - ETA: 59:45 - loss: 0.1621 - acc: 0.96 - ETA: 1:00:01 - loss: 0.1633 - acc: 0.96 - ETA: 59:30 - loss: 0.1646 - acc: 0.9630 - ETA: 59:35 - loss: 0.1648 - acc: 0.96 - ETA: 59:48 - loss: 0.1629 - acc: 0.96 - ETA: 1:00:06 - loss: 0.1631 - acc: 0.96 - ETA: 1:00:16 - loss: 0.1619 - acc: 0.96 - ETA: 1:00:24 - loss: 0.1618 - acc: 0.96 - ETA: 1:00:43 - loss: 0.1615 - acc: 0.96 - ETA: 1:00:57 - loss: 0.1625 - acc: 0.96 - ETA: 1:01:13 - loss: 0.1618 - acc: 0.96 - ETA: 1:01:24 - loss: 0.1613 - acc: 0.96 - ETA: 1:01:47 - loss: 0.1610 - acc: 0.96 - ETA: 1:01:51 - loss: 0.1606 - acc: 0.96 - ETA: 1:01:59 - loss: 0.1601 - acc: 0.96 - ETA: 1:02:08 - loss: 0.1600 - acc: 0.96 - ETA: 1:02:41 - loss: 0.1583 - acc: 0.96 - ETA: 1:02:52 - loss: 0.1574 - acc: 0.96 - ETA: 1:03:09 - loss: 0.1574 - acc: 0.96 - ETA: 1:03:37 - loss: 0.1587 - acc: 0.96 - ETA: 1:03:56 - loss: 0.1583 - acc: 0.96 - ETA: 1:04:04 - loss: 0.1574 - acc: 0.96 - ETA: 1:03:49 - loss: 0.1563 - acc: 0.96 - ETA: 1:03:53 - loss: 0.1570 - acc: 0.96 - ETA: 1:03:58 - loss: 0.1561 - acc: 0.96 - ETA: 1:03:55 - loss: 0.1558 - acc: 0.96 - ETA: 1:03:52 - loss: 0.1565 - acc: 0.96 - ETA: 1:03:46 - loss: 0.1560 - acc: 0.96 - ETA: 1:03:47 - loss: 0.1555 - acc: 0.96 - ETA: 1:03:48 - loss: 0.1553 - acc: 0.96 - ETA: 1:03:49 - loss: 0.1546 - acc: 0.96 - ETA: 1:04:07 - loss: 0.1543 - acc: 0.96 - ETA: 1:04:10 - loss: 0.1557 - acc: 0.96 - ETA: 1:04:15 - loss: 0.1550 - acc: 0.96 - ETA: 1:04:14 - loss: 0.1552 - acc: 0.96 - ETA: 1:04:15 - loss: 0.1548 - acc: 0.96 - ETA: 1:04:15 - loss: 0.1546 - acc: 0.96 - ETA: 1:04:15 - loss: 0.1544 - acc: 0.96 - ETA: 1:04:18 - loss: 0.1538 - acc: 0.96 - ETA: 1:04:21 - loss: 0.1534 - acc: 0.96 - ETA: 1:04:23 - loss: 0.1528 - acc: 0.96 - ETA: 1:04:27 - loss: 0.1516 - acc: 0.96 - ETA: 1:04:33 - loss: 0.1517 - acc: 0.96 - ETA: 1:04:33 - loss: 0.1517 - acc: 0.96 - ETA: 1:04:34 - loss: 0.1525 - acc: 0.96 - ETA: 1:04:33 - loss: 0.1523 - acc: 0.96 - ETA: 1:04:30 - loss: 0.1516 - acc: 0.96 - ETA: 1:04:27 - loss: 0.1516 - acc: 0.96 - ETA: 1:04:25 - loss: 0.1507 - acc: 0.96 - ETA: 1:04:36 - loss: 0.1511 - acc: 0.96 - ETA: 1:04:40 - loss: 0.1507 - acc: 0.96 - ETA: 1:04:41 - loss: 0.1510 - acc: 0.96 - ETA: 1:04:39 - loss: 0.1506 - acc: 0.96 - ETA: 1:04:40 - loss: 0.1507 - acc: 0.96 - ETA: 1:04:39 - loss: 0.1511 - acc: 0.96 - ETA: 1:04:39 - loss: 0.1509 - acc: 0.96 - ETA: 1:04:42 - loss: 0.1510 - acc: 0.96 - ETA: 1:04:54 - loss: 0.1508 - acc: 0.96 - ETA: 1:04:56 - loss: 0.1514 - acc: 0.96 - ETA: 1:04:57 - loss: 0.1509 - acc: 0.96 - ETA: 1:05:13 - loss: 0.1507 - acc: 0.96 - ETA: 1:05:29 - loss: 0.1506 - acc: 0.96 - ETA: 1:05:44 - loss: 0.1505 - acc: 0.96 - ETA: 1:05:46 - loss: 0.1505 - acc: 0.96 - ETA: 1:05:48 - loss: 0.1509 - acc: 0.96 - ETA: 1:05:57 - loss: 0.1511 -

```

A: 0.96 - ETA: 1:06:01 - loss: 0.1510 - acc: 0.96 - ETA: 1:06:03 - loss: 0.1511 - acc: 0.96 - ET  
A: 1:06:02 - loss: 0.1507 - acc: 0.96 - ETA: 1:06:02 - loss: 0.1503 - acc: 0.96 - ETA: 1:06:02 - l  
oss: 0.1499 - acc: 0.96 - ETA: 1:06:03 - loss: 0.1502 - acc: 0.96 - ETA: 1:06:09 - loss: 0.1503 -  
acc: 0.96 - ETA: 1:06:12 - loss: 0.1501 - acc: 0.96 - ETA: 1:06:01 - loss: 0.1498 - acc: 0.96 - ET  
A: 1:06:02 - loss: 0.1496 - acc: 0.96 - ETA: 1:06:02 - loss: 0.1494 - acc: 0.96 - ETA: 1:06:03 - l  
oss: 0.1495 - acc: 0.96 - ETA: 1:06:08 - loss: 0.1495 - acc: 0.96 - ETA: 1:06:12 - loss: 0.1499 -  
acc: 0.96 - ETA: 1:06:15 - loss: 0.1497 - acc: 0.96 - ETA: 1:06:14 - loss: 0.1500 - acc: 0.96 - ET  
A: 1:06:17 - loss: 0.1503 - acc: 0.96 - ETA: 1:06:18 - loss: 0.1500 - acc: 0.96 - ETA: 1:06:33 - l  
oss: 0.1508 - acc: 0.96 - ETA: 1:06:46 - loss: 0.1506 - acc: 0.96 - ETA: 1:06:53 - loss: 0.1507 -  
acc: 0.96 - ETA: 1:07:02 - loss: 0.1509 - acc: 0.96 - ETA: 1:07:10 - loss: 0.1508 - acc: 0.96 - ET  
A: 1:07:19 - loss: 0.1511 - acc: 0.96 - ETA: 1:07:17 - loss: 0.1511 - acc: 0.96 - ETA: 1:07:13 - l  
oss: 0.1516 - acc: 0.96 - ETA: 1:07:11 - loss: 0.1518 - acc: 0.96 - ETA: 1:07:10 - loss: 0.1520 -  
acc: 0.96 - ETA: 1:07:09 - loss: 0.1517 - acc: 0.96 - ETA: 1:06:56 - loss: 0.1519 - acc: 0.96 - ET  
A: 1:06:43 - loss: 0.1519 - acc: 0.96 - ETA: 1:06:32 - loss: 0.1515 - acc: 0.96 - ETA: 1:06:29 - l  
oss: 0.1519 - acc: 0.96 - ETA: 1:06:20 - loss: 0.1518 - acc: 0.96 - ETA: 1:06:15 - loss: 0.1515 -  
acc: 0.96 - ETA: 1:06:10 - loss: 0.1519 - acc: 0.96 - ETA: 1:06:05 - loss: 0.1517 - acc: 0.96 - ET  
A: 1:06:00 - loss: 0.1520 - acc: 0.96 - ETA: 1:05:54 - loss: 0.1518 - acc: 0.96 - ETA: 1:05:47 - l  
oss: 0.1516 - acc: 0.96 - ETA: 1:05:37 - loss: 0.1517 - acc: 0.96 - ETA: 1:05:26 - loss: 0.1516 -  
acc: 0.96 - ETA: 1:05:24 - loss: 0.1514 - acc: 0.96 - ETA: 1:05:25 - loss: 0.1512 - acc: 0.96 - ET  
A: 1:05:21 - loss: 0.1507 - acc: 0.96 - ETA: 1:05:27 - loss: 0.1502 - acc: 0.96 - ETA: 1:05:23 - l  
oss: 0.1500 - acc: 0.96 - ETA: 1:05:19 - loss: 0.1499 - acc: 0.96 - ETA: 1:05:12 - loss: 0.1497 -  
acc: 0.96 - ETA: 1:04:59 - loss: 0.1494 - acc: 0.96 - ETA: 1:04:49 - loss: 0.1490 - acc: 0.96 - ET  
A: 1:04:42 - loss: 0.1489 - acc: 0.96 - ETA: 1:04:39 - loss: 0.1493 - acc: 0.96 - ETA: 1:04:33 - l  
oss: 0.1490 - acc: 0.96 - ETA: 1:04:36 - loss: 0.1489 - acc: 0.96 - ETA: 1:04:35 - loss: 0.1491 -  
acc: 0.96 - ETA: 1:04:41 - loss: 0.1490 - acc: 0.96 - ETA: 1:04:42 - loss: 0.1490 - acc: 0.96 - ET  
A: 1:04:41 - loss: 0.1488 - acc: 0.96 - ETA: 1:04:45 - loss: 0.1488 - acc: 0.96 - ETA: 1:04:45 - l  
oss: 0.1485 - acc: 0.96 - ETA: 1:04:53 - loss: 0.1488 - acc: 0.96 - ETA: 1:04:58 - loss: 0.1487 -  
acc: 0.96 - ETA: 1:05:03 - loss: 0.1488 - acc: 0.96 - ETA: 1:05:07 - loss: 0.1489 - acc: 0.96 - ET  
A: 1:05:04 - loss: 0.1486 - acc: 0.96 - ETA: 1:05:06 - loss: 0.1483 - acc: 0.96 - ETA: 1:05:11 - l  
oss: 0.1483 - acc: 0.96 - ETA: 1:05:13 - loss: 0.1483 - acc: 0.96 - ETA: 1:05:18 - loss: 0.1482 -  
acc: 0.96 - ETA: 1:05:19 - loss: 0.1483 - acc: 0.96 - ETA: 1:05:21 - loss: 0.1484 - acc: 0.96 - ET  
A: 1:05:22 - loss: 0.1482 - acc: 0.96 - ETA: 1:05:24 - loss: 0.1480 - acc: 0.96 - ETA: 1:05:23 - l  
oss: 0.1478 - acc: 0.96 - ETA: 1:05:18 - loss: 0.1478 - acc: 0.96 - ETA: 1:05:15 - loss: 0.1479 -  
acc: 0.96 - ETA: 1:05:15 - loss: 0.1478 - acc: 0.96 - ETA: 1:05:17 - loss: 0.1475 - acc: 0.96 - ET  
A: 1:05:18 - loss: 0.1476 - acc: 0.96 - ETA: 1:05:24 - loss: 0.1474 - acc: 0.96 - ETA: 1:05:23 - l  
oss: 0.1475 - acc: 0.96 - ETA: 1:05:25 - loss: 0.1475 - acc: 0.96 - ETA: 1:05:25 - loss: 0.1474 -  
acc: 0.96 - ETA: 1:05:25 - loss: 0.1470 - acc: 0.96 - ETA: 1:05:28 - loss: 0.1470 - acc: 0.96 - ET  
A: 1:05:29 - loss: 0.1470 - acc: 0.96 - ETA: 1:05:29 - loss: 0.1468 - acc: 0.96 - ETA: 1:05:28 - l  
oss: 0.1467 - acc: 0.96 - ETA: 1:05:27 - loss: 0.1467 - acc: 0.96 - ETA: 1:05:27 - loss: 0.1468 -  
acc: 0.96 - ETA: 1:05:29 - loss: 0.1469 - acc: 0.96 - ETA: 1:05:30 - loss: 0.1470 - acc: 0.96 - ET  
A: 1:05:32 - loss: 0.1472 - acc: 0.96 - ETA: 1:05:31 - loss: 0.1474 - acc: 0.96 - ETA: 1:05:30 - l  
oss: 0.1472 - acc: 0.96 50048/143613 [=====>.....] - ETA: 1:05:31 - loss: 0.147  
2 - acc: 0.96 - ETA: 1:05:29 - loss: 0.1473 - acc: 0.96 - ETA: 1:05:30 - loss: 0.1474 - acc: 0.96  
- ETA: 1:05:31 - loss: 0.1475 - acc: 0.96 - ETA: 1:05:32 - loss: 0.1472 - acc: 0.96 - ETA: 1:05:34  
- loss: 0.1471 - acc: 0.96 - ETA: 1:05:36 - loss: 0.1470 - acc: 0.96 - ETA: 1:05:37 - loss: 0.1469  
- acc: 0.96 - ETA: 1:05:34 - loss: 0.1470 - acc: 0.96 - ETA: 1:05:34 - loss: 0.1469 - acc: 0.96 -  
ETA: 1:05:32 - loss: 0.1469 - acc: 0.96 - ETA: 1:05:30 - loss: 0.1466 - acc: 0.96 - ETA: 1:05:29 -  
loss: 0.1466 - acc: 0.96 - ETA: 1:05:28 - loss: 0.1466 - acc: 0.96 - ETA: 1:05:24 - loss: 0.1465 -  
acc: 0.96 - ETA: 1:05:21 - loss: 0.1465 - acc: 0.96 - ETA: 1:05:18 - loss: 0.1463 - acc: 0.96 - ET  
A: 1:05:18 - loss: 0.1461 - acc: 0.96 - ETA: 1:05:13 - loss: 0.1462 - acc: 0.96 - ETA: 1:05:08 - l  
oss: 0.1461 - acc: 0.96 - ETA: 1:05:07 - loss: 0.1459 - acc: 0.96 - ETA: 1:05:12 - loss: 0.1460 -  
acc: 0.96 - ETA: 1:05:12 - loss: 0.1461 - acc: 0.96 - ETA: 1:05:14 - loss: 0.1459 - acc: 0.96 - ET  
A: 1:05:13 - loss: 0.1459 - acc: 0.96 - ETA: 1:05:13 - loss: 0.1459 - acc: 0.96 - ETA: 1:05:18 - l  
oss: 0.1460 - acc: 0.96 - ETA: 1:05:17 - loss: 0.1458 - acc: 0.96 - ETA: 1:05:18 - loss: 0.1459 -  
acc: 0.96 - ETA: 1:05:18 - loss: 0.1458 - acc: 0.96 - ETA: 1:05:16 - loss: 0.1459 - acc: 0.96 - ET  
A: 1:05:17 - loss: 0.1459 - acc: 0.96 - ETA: 1:05:17 - loss: 0.1460 - acc: 0.96 - ETA: 1:05:14 - l  
oss: 0.1463 - acc: 0.96 - ETA: 1:05:15 - loss: 0.1465 - acc: 0.96 - ETA: 1:05:19 - loss: 0.1466 -  
acc: 0.96 - ETA: 1:05:17 - loss: 0.1464 - acc: 0.96 - ETA: 1:05:06 - loss: 0.1464 - acc: 0.96 - ET  
A: 1:05:04 -

```

oss: 0.1448 - acc: 0.96 - ETA: 1:04:23 - loss: 0.1448 - acc: 0.96 - ETA: 1:04:20 - loss: 0.1451 -
acc: 0.96 - ETA: 1:04:18 - loss: 0.1453 - acc: 0.96 - ETA: 1:04:17 - loss: 0.1455 - acc: 0.96 - ET
A: 1:04:17 - loss: 0.1455 - acc: 0.96 - ETA: 1:04:16 - loss: 0.1455 - acc: 0.96 - ETA: 1:04:14 - l
oss: 0.1456 - acc: 0.96 - ETA: 1:04:12 - loss: 0.1456 - acc: 0.96 - ETA: 1:04:06 - loss: 0.1456 -
acc: 0.96 - ETA: 1:03:58 - loss: 0.1455 - acc: 0.96 - ETA: 1:03:59 - loss: 0.1456 - acc: 0.96 - ET
A: 1:03:56 - loss: 0.1455 - acc: 0.96 - ETA: 1:03:56 - loss: 0.1454 - acc: 0.96 - ETA: 1:03:54 - l
oss: 0.1455 - acc: 0.96 - ETA: 1:03:54 - loss: 0.1454 - acc: 0.96 - ETA: 1:03:53 - loss: 0.1455 -
acc: 0.96 - ETA: 1:03:54 - loss: 0.1453 - acc: 0.96 - ETA: 1:03:52 - loss: 0.1452 - acc: 0.96 - ET
A: 1:03:53 - loss: 0.1451 - acc: 0.96 - ETA: 1:03:52 - loss: 0.1451 - acc: 0.96 - ETA: 1:03:50 - l
oss: 0.1449 - acc: 0.96 - ETA: 1:03:47 - loss: 0.1449 - acc: 0.96 - ETA: 1:03:46 - loss: 0.1450 -
acc: 0.96 - ETA: 1:03:46 - loss: 0.1449 - acc: 0.96 - ETA: 1:03:46 - loss: 0.1446 - acc: 0.96 - ET
A: 1:03:42 - loss: 0.1446 - acc: 0.96 - ETA: 1:03:41 - loss: 0.1446 - acc: 0.96 - ETA: 1:03:37 - l
oss: 0.1444 - acc: 0.96 - ETA: 1:03:36 - loss: 0.1443 - acc: 0.96 - ETA: 1:03:35 - loss: 0.1441 -
acc: 0.96 - ETA: 1:03:33 - loss: 0.1441 - acc: 0.96 - ETA: 1:03:29 - loss: 0.1441 - acc: 0.96 - ET
A: 1:03:27 - loss: 0.1441 - acc: 0.96 - ETA: 1:03:26 - loss: 0.1441 - acc: 0.96 - ETA: 1:03:25 - l
oss: 0.1442 - acc: 0.96 - ETA: 1:03:25 - loss: 0.1441 - acc: 0.96 - ETA: 1:03:22 - loss: 0.1440 -
acc: 0.96 - ETA: 1:03:19 - loss: 0.1440 - acc: 0.96 - ETA: 1:03:16 - loss: 0.1440 - acc: 0.96 - ET
A: 1:03:12 - loss: 0.1440 - acc: 0.96 - ETA: 1:03:12 - loss: 0.1441 - acc: 0.96 - ETA: 1:03:09 - l
oss: 0.1441 - acc: 0.96 - ETA: 1:03:08 - loss: 0.1440 - acc: 0.96 - ETA: 1:03:04 - loss: 0.1440 -
acc: 0.96 - ETA: 1:03:06 - loss: 0.1440 - acc: 0.96 - ETA: 1:03:06 - loss: 0.1441 - acc: 0.96 - ET
A: 1:03:03 - loss: 0.1440 - acc: 0.96 - ETA: 1:03:02 - loss: 0.1443 - acc: 0.96 - ETA: 1:02:59 - l
oss: 0.1442 - acc: 0.96 - ETA: 1:02:59 - loss: 0.1443 - acc: 0.96 - ETA: 1:02:55 - loss: 0.1442 -
acc: 0.96 - ETA: 1:02:54 - loss: 0.1440 - acc: 0.96 - ETA: 1:02:51 - loss: 0.1438 - acc: 0.96 - ET
A: 1:02:49 - loss: 0.1437 - acc: 0.96 - ETA: 1:02:48 - loss: 0.1437 - acc: 0.96 - ETA: 1:02:46 - l
oss: 0.1435 - acc: 0.96 - ETA: 1:02:41 - loss: 0.1437 - acc: 0.96 - ETA: 1:02:37 - loss: 0.1435 -
acc: 0.96 - ETA: 1:02:34 - loss: 0.1433 - acc: 0.96 - ETA: 1:02:32 - loss: 0.1436 - acc: 0.96 - ET
A: 1:02:28 - loss: 0.1437 - acc: 0.96 - ETA: 1:02:22 - loss: 0.1437 - acc: 0.96 - ETA: 1:02:18 - l
oss: 0.1437 - acc: 0.96 - ETA: 1:02:17 - loss: 0.1437 - acc: 0.96 - ETA: 1:02:13 - loss: 0.1439 -
acc: 0.96 - ETA: 1:02:12 - loss: 0.1439 - acc: 0.96 - ETA: 1:02:07 - loss: 0.1438 - acc: 0.96 - ET
A: 1:02:03 - loss: 0.1437 - acc: 0.96 - ETA: 1:01:58 - loss: 0.1437 - acc: 0.96 - ETA: 1:01:55 - l
oss: 0.1438 - acc: 0.96 - ETA: 1:01:51 - loss: 0.1439 - acc: 0.96 - ETA: 1:01:50 - loss: 0.1440 -
acc: 0.96 - ETA: 1:01:46 - loss: 0.1441 - acc: 0.96 - ETA: 1:01:42 - loss: 0.1441 - acc: 0.96 - ET
A: 1:01:32 - loss: 0.1441 - acc: 0.96 - ETA: 1:01:21 - loss: 0.1440 - acc: 0.96 - ETA: 1:01:10 - l
oss: 0.1440 - acc: 0.96 - ETA: 1:00:58 - loss: 0.1440 - acc: 0.96 - ETA: 1:00:47 - loss: 0.1440 -
acc: 0.96 - ETA: 1:00:36 - loss: 0.1439 - acc: 0.96 - ETA: 1:00:25 - loss: 0.1438 - acc: 0.96 - ET
A: 1:00:14 - loss: 0.1437 - acc: 0.96 - ETA: 1:00:03 - loss: 0.1436 - acc: 0.96 - ETA: 59:59 - los
s: 0.1436 - acc: 0.9635 - ETA: 59:55 - loss: 0.1435 - acc: 0.96 - ETA: 59:52 - loss: 0.1434 - acc:
0.96 - ETA: 59:48 - loss: 0.1434 - acc: 0.96 - ETA: 59:41 - loss: 0.1435 - acc: 0.96 - ETA: 59:32
- loss: 0.1435 - acc: 0.96 - ETA: 59:24 - loss: 0.1435 - acc: 0.96 - ETA: 59:17 - loss: 0.1435 - a
cc: 0.96 - ETA: 59:11 - loss: 0.1437 - acc: 0.96 - ETA: 59:04 - loss: 0.1437 - acc: 0.96 - ETA: 59
:00 - loss: 0.1437 - acc: 0.96 - ETA: 58:53 - loss: 0.1437 - acc: 0.96 - ETA: 58:46 - loss: 0.1438
- acc: 0.96 - ETA: 58:38 - loss: 0.1437 - acc: 0.96 - ETA: 58:32 - loss: 0.1437 - acc: 0.96 - ETA:
58:27 - loss: 0.1437 - acc: 0.96 - ETA: 58:22 - loss: 0.1438 - acc: 0.96 - ETA: 58:18 - loss: 0.14
39 - acc: 0.96 - ETA: 58:12 - loss: 0.1439 - acc: 0.96 - ETA: 58:05 - loss: 0.1439 - acc: 0.96 - E
TA: 58:01 - loss: 0.1438 - acc: 0.96 - ETA: 57:55 - loss: 0.1438 - acc: 0.96 - ETA: 57:45 - loss:
0.1439 - acc: 0.96 - ETA: 57:35 - loss: 0.1438 - acc: 0.96 - ETA: 57:28 - loss: 0.1437 - acc: 0.96
- ETA: 57:23 - loss: 0.1437 - acc: 0.96 - ETA: 57:19 - loss: 0.1437 - acc: 0.96 - ETA: 57:15 - los
s: 0.1436 - acc: 0.96 - ETA: 57:10 - loss: 0.1436 - acc: 0.96 - ETA: 57:07 - loss: 0.1438 - acc: 0
.9635 76160/143613 [=====>.....] - ETA: 57:04 - loss: 0.1438 - acc: 0.96 - ETA:
57:00 - loss: 0.1438 - acc: 0.96 - ETA: 56:56 - loss: 0.1437 - acc: 0.96 - ETA: 56:52 - loss: 0.14
38 - acc: 0.96 - ETA: 56:51 - loss: 0.1438 - acc: 0.96 - ETA: 56:47 - loss: 0.1439 - acc: 0.96 - E
TA: 56:45 - loss: 0.1439 - acc: 0.96 - ETA: 56:42 - loss: 0.1439 - acc: 0.96 - ETA: 56:38 - loss:
0.1440 - acc: 0.96 - ETA: 56:33 - loss: 0.1439 - acc: 0.96 - ETA: 56:32 - loss: 0.1440 - acc: 0.96
- ETA: 56:29 - loss: 0.1440 - acc: 0.96 - ETA: 56:26 - loss: 0.1439 - acc: 0.96 - ETA: 56:22 - los
s: 0.1439 - acc: 0.96 - ETA: 56:18 - loss: 0.1441 - acc: 0.96 - ETA: 56:14 - loss: 0.1443 - acc: 0
.96 - ETA: 56:09 - loss: 0.1442 - acc: 0.96 - ETA: 56:06 - loss: 0.1441 - acc: 0.96 - ETA: 56:03 -
loss: 0.1442 - acc: 0.96 - ETA: 56:00 - loss: 0.1440 - acc: 0.96 - ETA: 55:56 - loss: 0.1440 - acc
: 0.96 - ETA: 55:53 - loss: 0.1440 - acc: 0.96 - ETA: 55:50 - loss: 0.1440 - acc: 0.96 - ETA: 55:4
7 - loss: 0.1440 - acc: 0.96 - ETA: 55:45 - loss: 0.1439 - acc: 0.96 - ETA: 55:43 - loss: 0.1437 -
acc: 0.96 - ETA: 55:41 - loss: 0.1437 - acc: 0.96 - ETA: 55:38 - loss: 0.1436 - acc: 
```

```
.96 - ETA: 53:17 - loss: 0.1438 - acc: 0.96 - ETA: 53:13 - loss: 0.1439 - acc: 0.96 - ETA: 53:09 -
loss: 0.1439 - acc: 0.96 - ETA: 53:07 - loss: 0.1439 - acc: 0.96 - ETA: 53:04 - loss: 0.1438 - acc:
: 0.96 - ETA: 53:01 - loss: 0.1438 - acc: 0.96 - ETA: 52:58 - loss: 0.1437 - acc: 0.96 - ETA: 52:5
4 - loss: 0.1437 - acc: 0.96 - ETA: 52:51 - loss: 0.1437 - acc: 0.96 - ETA: 52:46 - loss: 0.1436 -
acc: 0.96 - ETA: 52:43 - loss: 0.1437 - acc: 0.96 - ETA: 52:40 - loss: 0.1435 - acc: 0.96 - ETA: 5
2:36 - loss: 0.1434 - acc: 0.96 - ETA: 52:32 - loss: 0.1434 - acc: 0.96 - ETA: 52:29 - loss: 0.143
3 - acc: 0.96 - ETA: 52:25 - loss: 0.1435 - acc: 0.96 - ETA: 52:22 - loss: 0.1434 - acc: 0.96 - ET
A: 52:18 - loss: 0.1433 - acc: 0.96 - ETA: 52:16 - loss: 0.1434 - acc: 0.96 - ETA: 52:14 - loss: 0
.1433 - acc: 0.96 - ETA: 52:11 - loss: 0.1433 - acc: 0.96 - ETA: 52:08 - loss: 0.1434 - acc: 0.96
- ETA: 52:05 - loss: 0.1433 - acc: 0.96 - ETA: 52:02 - loss: 0.1433 - acc: 0.96 - ETA: 51:58 - los
s: 0.1434 - acc: 0.96 - ETA: 51:55 - loss: 0.1433 - acc: 0.96 - ETA: 51:52 - loss: 0.1433 - acc: 0
.96 - ETA: 51:48 - loss: 0.1435 - acc: 0.96 - ETA: 51:44 - loss: 0.1435 - acc: 0.96 - ETA: 51:40 -
loss: 0.1434 - acc: 0.96 - ETA: 51:37 - loss: 0.1434 - acc: 0.96 - ETA: 51:34 - loss: 0.1434 - acc
: 0.96 - ETA: 51:29 - loss: 0.1434 - acc: 0.96 - ETA: 51:26 - loss: 0.1432 - acc: 0.96 - ETA: 51:2
2 - loss: 0.1432 - acc: 0.96 - ETA: 51:18 - loss: 0.1432 - acc: 0.96 - ETA: 51:15 - loss: 0.1431 -
acc: 0.96 - ETA: 51:11 - loss: 0.1431 - acc: 0.96 - ETA: 51:08 - loss: 0.1431 - acc: 0.96 - ETA: 5
1:04 - loss: 0.1430 - acc: 0.96 - ETA: 51:00 - loss: 0.1429 - acc: 0.96 - ETA: 50:55 - loss: 0.143
0 - acc: 0.96 - ETA: 50:51 - loss: 0.1430 - acc: 0.96 - ETA: 50:47 - loss: 0.1429 - acc: 0.96 - ET
A: 50:42 - loss: 0.1429 - acc: 0.96 - ETA: 50:39 - loss: 0.1429 - acc: 0.96 - ETA: 50:35 - loss: 0
.1428 - acc: 0.96 - ETA: 50:32 - loss: 0.1427 - acc: 0.96 - ETA: 50:28 - loss: 0.1427 - acc: 0.96
- ETA: 50:24 - loss: 0.1428 - acc: 0.96 - ETA: 50:20 - loss: 0.1428 - acc: 0.96 - ETA: 50:16 - los
s: 0.1428 - acc: 0.96 - ETA: 50:13 - loss: 0.1428 - acc: 0.96 - ETA: 50:09 - loss: 0.1428 - acc: 0
.96 - ETA: 50:06 - loss: 0.1427 - acc: 0.96 - ETA: 50:01 - loss: 0.1427 - acc: 0.96 - ETA: 49:57 -
loss: 0.1426 - acc: 0.96 - ETA: 49:54 - loss: 0.1426 - acc: 0.96 - ETA: 49:50 - loss: 0.1425 - acc
: 0.96 - ETA: 49:47 - loss: 0.1424 - acc: 0.96 - ETA: 49:43 - loss: 0.1424 - acc: 0.96 - ETA: 49:3
8 - loss: 0.1426 - acc: 0.96 - ETA: 49:34 - loss: 0.1425 - acc: 0.96 - ETA: 49:30 - loss: 0.1425 -
acc: 0.96 - ETA: 49:26 - loss: 0.1425 - acc: 0.96 - ETA: 49:22 - loss: 0.1425 - acc: 0.96 - ETA: 4
9:18 - loss: 0.1427 - acc: 0.96 - ETA: 49:14 - loss: 0.1428 - acc: 0.96 - ETA: 49:10 - loss: 0.142
7 - acc: 0.96 - ETA: 49:06 - loss: 0.1428 - acc: 0.96 - ETA: 49:03 - loss: 0.1428 - acc: 0.96 - ET
A: 48:59 - loss: 0.1428 - acc: 0.96 - ETA: 48:55 - loss: 0.1428 - acc: 0.96 - ETA: 48:51 - loss: 0
.1428 - acc: 0.96 - ETA: 48:45 - loss: 0.1428 - acc: 0.96 - ETA: 48:40 - loss: 0.1428 - acc: 0.96
- ETA: 48:36 - loss: 0.1428 - acc: 0.96 - ETA: 48:31 - loss: 0.1428 - acc: 0.96 - ETA: 48:27 - los
s: 0.1428 - acc: 0.96 - ETA: 48:23 - loss: 0.1427 - acc: 0.96 - ETA: 48:20 - loss: 0.1428 - acc: 0
.96 - ETA: 48:16 - loss: 0.1427 - acc: 0.96 - ETA: 48:12 - loss: 0.1427 - acc: 0.96 - ETA: 48:07 -
loss: 0.1426 - acc: 0.96 - ETA: 48:03 - loss: 0.1427 - acc: 0.96 - ETA: 47:58 - loss: 0.1428 - acc
: 0.96 - ETA: 47:54 - loss: 0.1427 - acc: 0.96 - ETA: 47:50 - loss: 0.1427 - acc: 0.96 - ETA: 47:4
5 - loss: 0.1426 - acc: 0.96 - ETA: 47:41 - loss: 0.1428 - acc: 0.96 - ETA: 47:37 - loss: 0.1428 -
acc: 0.96 - ETA: 47:33 - loss: 0.1427 - acc: 0.96 - ETA: 47:29 - loss: 0.1427 - acc: 0.96 - ETA: 4
7:25 - loss: 0.1427 - acc: 0.96 - ETA: 47:21 - loss: 0.1427 - acc: 0.96 - ETA: 47:17 - loss: 0.142
7 - acc: 0.96 - ETA: 47:12 - loss: 0.1427 - acc: 0.96 - ETA: 47:07 - loss: 0.1427 - acc: 0.96 - ET
A: 47:03 - loss: 0.1427 - acc: 0.96 - ETA: 47:00 - loss: 0.1428 - acc: 0.96 - ETA: 46:55 - loss: 0
.1428 - acc: 0.96 - ETA: 46:51 - loss: 0.1428 - acc: 0.96 - ETA: 46:48 - loss: 0.1428 - acc: 0.96
- ETA: 46:43 - loss: 0.1428 - acc: 0.96 - ETA: 46:39 - loss: 0.1428 - acc: 0.96 - ETA: 46:36 - los
s: 0.1428 - acc: 0.96 - ETA: 46:32 - loss: 0.1428 - acc: 0.96 - ETA: 46:29 - loss: 0.1430 - acc: 0
.96 - ETA: 46:24 - loss: 0.1429 - acc: 0.96 - ETA: 46:19 - loss: 0.1429 - acc: 0.96 - ETA: 46:15 -
loss: 0.1428 - acc: 0.96 - ETA: 46:11 - loss: 0.1428 - acc: 0.96 - ETA: 46:07 - loss: 0.1428 - acc
: 0.96 - ETA: 46:03 - loss: 0.1429 - acc: 0.96 - ETA: 45:58 - loss: 0.1429 - acc: 0.96 - ETA: 45:5
3 - loss: 0.1429 - acc: 0.96 - ETA: 45:48 - loss: 0.1430 - acc: 0.96 - ETA: 45:44 - loss: 0.1431 -
acc: 0.96 - ETA: 45:40 - loss: 0.1431 - acc: 0.96 - ETA: 45:36 - loss: 0.1431 - acc: 0.96 - ETA: 4
5:32 - loss: 0.1431 - acc: 0.96 - ETA: 45:27 - loss: 0.1430 - acc: 0.96 - ETA: 45:22 - loss: 0.142
9 - acc: 0.96 - ETA: 45:18 - loss: 0.1430 - acc: 0.96 - ETA: 45:13 - loss: 0.1430 - acc: 0.96 - ET
A: 45:08 - loss: 0.1429 - acc: 0.96 - ETA: 45:04 - loss: 0.1430 - acc: 0.96 - ETA: 44:59 - loss: 0
.1430 - acc: 0.96 - ETA: 44:55 - loss: 0.1430 - acc: 0.96 - ETA: 44:51 - loss: 0.1429 - acc: 0.96
- ETA: 44:46 - loss: 0.1430 - acc: 0.96 - ETA: 44:41 - loss: 0.1429 - acc: 0.96 - ETA: 44:36 - los
s: 0.1429 - acc: 0.96 - ETA: 44:33 - loss: 0.1430 - acc: 0.9635102272/143613
[=====]>.....] - ETA: 44:29 - loss: 0.1430 - acc: 0.96 - ETA: 44:24 - loss: 0.14
30 - acc: 0.96 - ETA: 44:20 - loss: 0.1429 - acc: 0.96 - ETA: 44:15 - loss: 0.1428 - acc: 0.96 - E
TA: 44:11 - loss: 0.1427 - acc: 0.96 - ETA: 44:07 - loss: 0.1428 - acc: 0.96 - ETA: 44:03 - loss:
0.1428 - acc: 0.96 - ETA: 43:58 - loss: 0.1428 - acc: 0.96 - ETA: 43:54 - loss: 0.1427 - acc: 0.96
- ETA: 43:50 - loss: 0.1427 - acc: 0.96 - ETA: 43:45 - loss: 0.1426 - acc: 0.96 - ETA: 43:40 - los
s: 0.1426 - acc: 0.96 - ETA: 43:36 - loss: 0.1426 - acc: 0.96 - ETA: 43:32 - loss: 0.1426 - acc: 0
.96 -
```

[illegible]

[illegible]

loss: 0.1430 - acc: 0.963 - ETA: 7:31 - loss: 0.1430 - acc: 0.963 - ETA: 7:40 - loss: 0.1430 - acc: 0.963 - ETA: 7:41 - loss: 0.1435 - acc: 0.963 - ETA: 7:36 - loss: 0.1435 - acc: 0.963 - ETA: 7:31 - loss: 0.1435 - acc: 0.963 - ETA: 7:27 - loss: 0.1435 - acc: 0.963 - ETA: 7:22 - loss: 0.1436 - acc: 0.963 - ETA: 7:17 - loss: 0.1436 - acc: 0.963 - ETA: 7:12 - loss: 0.1435 - acc: 0.963 - ETA: 7:07 - loss: 0.1435 - acc: 0.963 - ETA: 7:02 - loss: 0.1435 - acc: 0.963 - ETA: 6:57 - loss: 0.1435 - acc: 0.963 - ETA: 6:52 - loss: 0.1434 - acc: 0.963 - ETA: 6:47 - loss: 0.1434 - acc: 0.963 - ETA: 6:42 - loss: 0.1434 - acc: 0.963 - ETA: 6:38 - loss: 0.1433 - acc: 0.963 - ETA: 6:33 - loss: 0.1434 - acc: 0.963 - ETA: 6:28 - loss: 0.1434 - acc: 0.963 - ETA: 6:23 - loss: 0.1433 - acc: 0.963 - ETA: 6:19 - loss: 0.1434 - acc: 0.963 - ETA: 6:14 - loss: 0.1434 - acc: 0.963 - ETA: 6:09 - loss: 0.1434 - acc: 0.963 - ETA: 6:04 - loss: 0.1433 - acc: 0.963 - ETA: 5:59 - loss: 0.1433 - acc: 0.963 - ETA: 5:54 - loss: 0.1432 - acc: 0.963 - ETA: 5:49 - loss: 0.1432 - acc: 0.963 - ETA: 5:44 - loss: 0.1432 - acc: 0.963 - ETA: 5:39 - loss: 0.1432 - acc: 0.963 - ETA: 5:35 - loss: 0.1432 - acc: 0.963 - ETA: 5:30 - loss: 0.1432 - acc: 0.963 - ETA: 5:25 - loss: 0.1432 - acc: 0.963 - ETA: 5:20 - loss: 0.1431 - acc: 0.963 - ETA: 5:16 - loss: 0.1432 - acc: 0.963 - ETA: 5:11 - loss: 0.1432 - acc: 0.963 - ETA: 5:06 - loss: 0.1432 - acc: 0.963 - ETA: 5:01 - loss: 0.1432 - acc: 0.963 - ETA: 4:56 - loss: 0.1432 - acc: 0.963 - ETA: 4:51 - loss: 0.1432 - acc: 0.963 - ETA: 4:46 - loss: 0.1432 - acc: 0.963 - ETA: 4:42 - loss: 0.1432 - acc: 0.963 - ETA: 4:37 - loss: 0.1432 - acc: 0.963 - ETA: 4:32 - loss: 0.1432 - acc: 0.963 - ETA: 4:27 - loss: 0.1432 - acc: 0.963 - ETA: 4:23 - loss: 0.1432 - acc: 0.963 - ETA: 4:18 - loss: 0.1432 - acc: 0.963 - ETA: 4:13 - loss: 0.1432 - acc: 0.963 - ETA: 4:08 - loss: 0.1433 - acc: 0.963 - ETA: 4:03 - loss: 0.1432 - acc: 0.963 - ETA: 3:59 - loss: 0.1433 - acc: 0.963 - ETA: 3:54 - loss: 0.1433 - acc: 0.963 - ETA: 3:49 - loss: 0.1432 - acc: 0.963 - ETA: 3:44 - loss: 0.1432 - acc: 0.963 - ETA: 3:40 - loss: 0.1432 - acc: 0.963 - ETA: 3:35 - loss: 0.1432 - acc: 0.963 - ETA: 3:30 - loss: 0.1433 - acc: 0.963 - ETA: 3:26 - loss: 0.1433 - acc: 0.963 - ETA: 3:21 - loss: 0.1433 - acc: 0.963 - ETA: 3:16 - loss: 0.1433 - acc: 0.963 - ETA: 3:11 - loss: 0.1433 - acc: 0.963 - ETA: 3:06 - loss: 0.1432 - acc: 0.963 - ETA: 3:02 - loss: 0.1432 - acc: 0.963 - ETA: 2:57 - loss: 0.1432 - acc: 0.963 - ETA: 2:52 - loss: 0.1432 - acc: 0.963 - ETA: 2:48 - loss: 0.1432 - acc: 0.963 - ETA: 2:43 - loss: 0.1432 - acc: 0.963 - ETA: 2:38 - loss: 0.1432 - acc: 0.963 - ETA: 2:33 - loss: 0.1431 - acc: 0.963 - ETA: 2:29 - loss: 0.1431 - acc: 0.963 - ETA: 2:24 - loss: 0.1431 - acc: 0.963 - ETA: 2:19 - loss: 0.1431 - acc: 0.963 - ETA: 2:14 - loss: 0.1431 - acc: 0.963 - ETA: 2:10 - loss: 0.1431 - acc: 0.963 - ETA: 2:05 - loss: 0.1431 - acc: 0.963 - ETA: 2:01 - loss: 0.1430 - acc: 0.963 - ETA: 1:56 - loss: 0.1430 - acc: 0.963 - ETA: 1:51 - loss: 0.1431 - acc: 0.963 - ETA: 1:47 - loss: 0.1431 - acc: 0.963 - ETA: 1:42 - loss: 0.1431 - acc: 0.963 - ETA: 1:37 - loss: 0.1431 - acc: 0.963 - ETA: 1:32 - loss: 0.1431 - acc: 0.963 - ETA: 1:28 - loss: 0.1430 - acc: 0.963 - ETA: 1:23 - loss: 0.1430 - acc: 0.963 - ETA: 1:18 - loss: 0.1430 - acc: 0.963 - ETA: 1:14 - loss: 0.1431 - acc: 0.963 - ETA: 1:09 - loss: 0.1430 - acc: 0.963 - ETA: 1:04 - loss: 0.1430 - acc: 0.963 - ETA: 1:00 - loss: 0.1430 - acc: 0.963 - ETA: 55s - loss: 0.1431 - acc: 0.963 - ETA: 50s - loss: 0.1431 - acc: 0.96 - ETA: 46s - loss: 0.1431 - acc: 0.96 - ETA: 41s - loss: 0.1430 - acc: 0.96 - ETA: 36s - loss: 0.1430 - acc: 0.96 - ETA: 32s - loss: 0.1431 - acc: 0.96 - ETA: 27s - loss: 0.1431 - acc: 0.96 - ETA: 23s - loss: 0.1431 - acc: 0.96 - ETA: 18s - loss: 0.1431 - acc: 0.96 - ETA: 13s - loss: 0.1431 - acc: 0.96 - ETA: 9s - loss: 0.1431 - acc: 0.9633 - ETA: 4s - loss: 0.1431 - acc: 0.963 - 5286s 37ms/step - loss: 0.1431 - acc: 0.9633 - val\_loss: 0.1390 - val\_acc: 0.9641

ROC-AUC - epoch: 1 - score: 0.502803

Epoch 00001: val\_acc improved from -inf to 0.96408, saving model to weights\_base.best.hdf5  
Epoch 2/4

26112/143613 [====>.....] - ETA: 1:13:04 - loss: 0.1274 - acc: 0.97 - ETA: 52:59 - loss: 0.1269 - acc: 0.9681 - ETA: 45:28 - loss: 0.1150 - acc: 0.97 - ETA: 42:15 - loss: 0.1150 - acc: 0.97 - ETA: 40:02 - loss: 0.1259 - acc: 0.96 - ETA: 39:17 - loss: 0.1314 - acc: 0.96 - ETA: 38:16 - loss: 0.1258 - acc: 0.96 - ETA: 41:38 - loss: 0.1243 - acc: 0.96 - ETA: 45:05 - loss: 0.1266 - acc: 0.96 - ETA: 47:48 - loss: 0.1257 - acc: 0.96 - ETA: 49:58 - loss: 0.1268 - acc: 0.96 - ETA: 52:09 - loss: 0.1302 - acc: 0.96 - ETA: 53:26 - loss: 0.1287 - acc: 0.96 - ETA: 51:52 - loss: 0.1287 - acc: 0.96 - ETA: 50:26 - loss: 0.1252 - acc: 0.96 - ETA: 49:12 - loss: 0.1252 - acc: 0.96 - ETA: 48:04 - loss: 0.1262 - acc: 0.96 - ETA: 47:20 - loss: 0.1230 - acc: 0.96 - ETA: 46:30 - loss: 0.1237 - acc: 0.96 - ETA: 47:54 - loss: 0.1257 - acc: 0.96 - ETA: 49:30 - loss: 0.1256 - acc: 0.96 - ETA: 51:01 - loss: 0.1259 - acc: 0.96 - ETA: 52:26 - loss: 0.1253 - acc: 0.96 - ETA: 53:26 - loss: 0.1291 - acc: 0.96 - ETA: 54:10 - loss: 0.1296 - acc: 0.96 - ETA: 54:31 - loss: 0.1287 - acc: 0.96 - ETA: 53:37 - loss: 0.1288 - acc: 0.96 - ETA: 52:54 - loss: 0.1283 - acc: 0.96 - ETA: 52:12 - loss: 0.1266 - acc: 0.96 - ETA: 51:31 - loss: 0.1263 - acc: 0.96 - ETA: 51:14 - loss: 0.1276 - acc: 0.96 - ETA: 51:52 - loss: 0.1290 - acc: 0.96 - ETA: 52:36 - loss: 0.1325 - acc: 0.96 - ETA: 53:27 - loss: 0.1317 - acc: 0.96 - ETA: 53:57 - loss: 0.1313 - acc: 0.96 - ETA: 54:28 - loss: 0.1310 - acc: 0.96 - ETA: 54:58 - loss: 0.1307 - acc: 0.96 - ETA: 54:36 - loss: 0.1305 - acc: 0.96 - ETA: 53:59 - loss: 0.1304 - acc: 0.96 - ETA: 53:24 - loss: 0.1292 - acc: 0.96 - ETA: 52:48 - loss: 0.1290 - acc: 0.96 - ETA: 52:17 - loss: 0.1285 - acc: 0.96 - ETA: 52:26 - loss: 0.1294 - acc: 0.96 - ETA: 52:54 - loss: 0.1305 - acc: 0.96 - ETA: 53:17 - loss: 0.1320 - acc: 0.96 - ETA: 53:41 - loss: 0.1333 - acc: 0.96 - ETA: 54:03 - loss: 0.1340 - acc: 0.96 - ETA: 54:23 - loss: 0.1338 - acc: 0.96 - ETA: 54:38 - loss: 0.1349 - acc: 0.96 - ETA: 54:10 - loss: 0.1342 - acc: 0.96 - ETA: 53:42 - loss: 0.1343 - acc: 0.96 - ETA: 53:16 - loss: 0.1347 - acc: 0.96 - ETA: 52:48 - loss: 0.1353 - acc: 0.96 - ETA: 52:31 - loss: 0.1354 - acc: 0.96 - ETA: 52:51 - loss: 0.1360 - acc: 0.96 - ETA: 53:11 - loss: 0.1351 - acc: 0.96 - ETA: 53:26 - loss: 0.1345 - acc: 0.96 - ETA: 53:39 - loss: 0.1341 - acc: 0.96 - ETA: 53:50 - loss: 0.1343 - acc: 0.96 - ETA: 54:01 - loss: 0.1339 - acc: 0.96 - ETA: 54:14 - loss: 0.1343 - acc: 0.96 - ETA: 54:11 - loss: 0.1344 - acc: 0.96 - ETA: 53:46 - loss: 0.1345 - acc: 0.96 - ETA: 53:20 - loss: 0.1338 - acc: 0.96 - ETA: 52:55 - loss: 0.1338 - acc: 0.96 - ETA: 52:31 - loss: 0.1351 - acc: 0.96 - ETA: 52:15 - loss: 0.1359 - acc: 0.96 - ETA: 52:29 - loss: 0.1353 - acc: 0.96 - ETA: 52:40 - loss: 0.1359 - acc: 0.96 - ETA: 52:55 - loss: 0.1357 - acc: 0.96 - ETA: 53:09 - loss: 0.1358 - acc: 0.96 - ETA: 53:09 - loss: 0.1360 - acc: 0.96 - ETA: 52:47 - loss: 0.1360 - acc: 0.96 - ETA: 52:27 - loss: 0.1368 - acc: 0.96 - ETA: 52:07 - loss: 0.1371 - acc: 0.96



[illegible]





[illegible]

[illegible]

.1417 - acc: 0.963 - ETA: 5:30 - loss: 0.1417 - acc: 0.963 - ETA: 5:27 - loss: 0.1416 - acc: 0.963 - ETA: 5:24 - loss: 0.1417 - acc: 0.963 - ETA: 5:20 - loss: 0.1417 - acc: 0.963 - ETA: 5:17 - loss: 0.1417 - acc: 0.963 - ETA: 5:14 - loss: 0.1418 - acc: 0.963 - ETA: 5:11 - loss: 0.1417 - acc: 0.963 - ETA: 5:09 - loss: 0.1418 - acc: 0.9633143613/143613 [=====] - ETA: 5:06 - loss: 0.1418 - acc: 0.963 - ETA: 5:03 - loss: 0.1418 - acc: 0.963 - ETA: 5:00 - loss: 0.1418 - acc: 0.963 - ETA: 4:57 - loss: 0.1418 - acc: 0.963 - ETA: 4:54 - loss: 0.1418 - acc: 0.963 - ETA: 4:51 - loss: 0.1418 - acc: 0.963 - ETA: 4:48 - loss: 0.1418 - acc: 0.963 - ETA: 4:45 - loss: 0.1418 - acc: 0.963 - ETA: 4:41 - loss: 0.1419 - acc: 0.963 - ETA: 4:38 - loss: 0.1418 - acc: 0.963 - ETA: 4:35 - loss: 0.1418 - acc: 0.963 - ETA: 4:33 - loss: 0.1418 - acc: 0.963 - ETA: 4:30 - loss: 0.1418 - acc: 0.963 - ETA: 4:27 - loss: 0.1418 - acc: 0.963 - ETA: 4:24 - loss: 0.1419 - acc: 0.963 - ETA: 4:21 - loss: 0.1419 - acc: 0.963 - ETA: 4:18 - loss: 0.1420 - acc: 0.963 - ETA: 4:15 - loss: 0.1419 - acc: 0.963 - ETA: 4:12 - loss: 0.1420 - acc: 0.963 - ETA: 4:09 - loss: 0.1420 - acc: 0.963 - ETA: 4:06 - loss: 0.1419 - acc: 0.963 - ETA: 4:02 - loss: 0.1419 - acc: 0.963 - ETA: 3:59 - loss: 0.1419 - acc: 0.963 - ETA: 3:57 - loss: 0.1419 - acc: 0.963 - ETA: 3:54 - loss: 0.1419 - acc: 0.963 - ETA: 3:51 - loss: 0.1419 - acc: 0.963 - ETA: 3:48 - loss: 0.1419 - acc: 0.963 - ETA: 3:45 - loss: 0.1419 - acc: 0.963 - ETA: 3:42 - loss: 0.1419 - acc: 0.963 - ETA: 3:39 - loss: 0.1419 - acc: 0.963 - ETA: 3:36 - loss: 0.1418 - acc: 0.963 - ETA: 3:33 - loss: 0.1418 - acc: 0.963 - ETA: 3:29 - loss: 0.1418 - acc: 0.963 - ETA: 3:26 - loss: 0.1418 - acc: 0.963 - ETA: 3:23 - loss: 0.1418 - acc: 0.963 - ETA: 3:20 - loss: 0.1418 - acc: 0.963 - ETA: 3:17 - loss: 0.1417 - acc: 0.963 - ETA: 3:14 - loss: 0.1418 - acc: 0.963 - ETA: 3:11 - loss: 0.1418 - acc: 0.963 - ETA: 3:09 - loss: 0.1419 - acc: 0.963 - ETA: 3:06 - loss: 0.1418 - acc: 0.963 - ETA: 3:03 - loss: 0.1419 - acc: 0.963 - ETA: 3:00 - loss: 0.1419 - acc: 0.963 - ETA: 2:57 - loss: 0.1418 - acc: 0.963 - ETA: 2:54 - loss: 0.1419 - acc: 0.963 - ETA: 2:50 - loss: 0.1419 - acc: 0.963 - ETA: 2:47 - loss: 0.1419 - acc: 0.963 - ETA: 2:44 - loss: 0.1419 - acc: 0.963 - ETA: 2:41 - loss: 0.1419 - acc: 0.963 - ETA: 2:38 - loss: 0.1419 - acc: 0.963 - ETA: 2:35 - loss: 0.1419 - acc: 0.963 - ETA: 2:32 - loss: 0.1419 - acc: 0.963 - ETA: 2:29 - loss: 0.1419 - acc: 0.963 - ETA: 2:26 - loss: 0.1419 - acc: 0.963 - ETA: 2:23 - loss: 0.1419 - acc: 0.963 - ETA: 2:20 - loss: 0.1419 - acc: 0.963 - ETA: 2:17 - loss: 0.1419 - acc: 0.963 - ETA: 2:14 - loss: 0.1419 - acc: 0.963 - ETA: 2:11 - loss: 0.1419 - acc: 0.963 - ETA: 2:08 - loss: 0.1419 - acc: 0.963 - ETA: 2:05 - loss: 0.1419 - acc: 0.963 - ETA: 2:02 - loss: 0.1419 - acc: 0.963 - ETA: 1:59 - loss: 0.1419 - acc: 0.963 - ETA: 1:56 - loss: 0.1418 - acc: 0.963 - ETA: 1:53 - loss: 0.1418 - acc: 0.963 - ETA: 1:50 - loss: 0.1418 - acc: 0.963 - ETA: 1:47 - loss: 0.1418 - acc: 0.963 - ETA: 1:43 - loss: 0.1418 - acc: 0.963 - ETA: 1:40 - loss: 0.1419 - acc: 0.963 - ETA: 1:37 - loss: 0.1419 - acc: 0.963 - ETA: 1:34 - loss: 0.1419 - acc: 0.963 - ETA: 1:31 - loss: 0.1418 - acc: 0.963 - ETA: 1:28 - loss: 0.1419 - acc: 0.963 - ETA: 1:25 - loss: 0.1419 - acc: 0.963 - ETA: 1:22 - loss: 0.1419 - acc: 0.963 - ETA: 1:19 - loss: 0.1419 - acc: 0.963 - ETA: 1:16 - loss: 0.1419 - acc: 0.963 - ETA: 1:13 - loss: 0.1419 - acc: 0.963 - ETA: 1:10 - loss: 0.1419 - acc: 0.963 - ETA: 1:07 - loss: 0.1419 - acc: 0.963 - ETA: 1:04 - loss: 0.1420 - acc: 0.963 - ETA: 1:01 - loss: 0.1420 - acc: 0.963 - ETA: 58s - loss: 0.1420 - acc: 0.963 - ETA: 55s - loss: 0.1419 - acc: 0.96 - ETA: 52s - loss: 0.1420 - acc: 0.96 - ETA: 48s - loss: 0.1420 - acc: 0.96 - ETA: 45s - loss: 0.1419 - acc: 0.96 - ETA: 42s - loss: 0.1419 - acc: 0.96 - ETA: 39s - loss: 0.1419 - acc: 0.96 - ETA: 36s - loss: 0.1419 - acc: 0.96 - ETA: 33s - loss: 0.1419 - acc: 0.96 - ETA: 30s - loss: 0.1419 - acc: 0.96 - ETA: 27s - loss: 0.1419 - acc: 0.96 - ETA: 24s - loss: 0.1419 - acc: 0.96 - ETA: 21s - loss: 0.1420 - acc: 0.96 - ETA: 18s - loss: 0.1420 - acc: 0.96 - ETA: 15s - loss: 0.1420 - acc: 0.96 - ETA: 12s - loss: 0.1419 - acc: 0.96 - ETA: 9s - loss: 0.1419 - acc: 0.9633 - ETA: 6s - loss: 0.1419 - acc: 0.963 - ETA: 2s - loss: 0.1419 - acc: 0.963 - 3557s 25ms/step - loss: 0.1419 - acc: 0.9633 - val\_loss: 0.1392 - val\_acc: 0.9641

ROC-AUC - epoch: 2 - score: 0.500493

Epoch 00002: val\_acc did not improve from 0.96408

Epoch 3/4

25984/143613 [====>.....] - ETA: 1:19:07 - loss: 0.1656 - acc: 0.95 - ETA: 1:18:37 - loss: 0.1623 - acc: 0.95 - ETA: 1:17:21 - loss: 0.1706 - acc: 0.95 - ETA: 1:16:37 - loss: 0.1642 - acc: 0.95 - ETA: 1:16:30 - loss: 0.1643 - acc: 0.95 - ETA: 1:16:05 - loss: 0.1670 - acc: 0.95 - ETA: 1:14:08 - loss: 0.1643 - acc: 0.95 - ETA: 1:09:09 - loss: 0.1594 - acc: 0.95 - ETA: 1:05:03 - loss: 0.1604 - acc: 0.95 - ETA: 1:01:51 - loss: 0.1587 - acc: 0.95 - ETA: 59:44 - loss: 0.1547 - acc: 0.9593 - ETA: 1:01:20 - loss: 0.1621 - acc: 0.95 - ETA: 1:02:20 - loss: 0.1612 - acc: 0.95 - ETA: 1:03:13 - loss: 0.1632 - acc: 0.95 - ETA: 1:04:03 - loss: 0.1593 - acc: 0.95 - ETA: 1:04:28 - loss: 0.1606 - acc: 0.95 - ETA: 1:05:01 - loss: 0.1577 - acc: 0.95 - ETA: 1:03:30 - loss: 0.1578 - acc: 0.95 - ETA: 1:01:50 - loss: 0.1551 - acc: 0.95 - ETA: 1:00:21 - loss: 0.1550 - acc: 0.95 - ETA: 59:01 - loss: 0.1526 - acc: 0.9594 - ETA: 57:49 - loss: 0.1512 - acc: 0.95 - ETA: 58:06 - loss: 0.1496 - acc: 0.96 - ETA: 58:49 - loss: 0.1480 - acc: 0.96 - ETA: 59:26 - loss: 0.1475 - acc: 0.96 - ETA: 59:59 - loss: 0.1478 - acc: 0.96 - ETA: 1:00:26 - loss: 0.1454 - acc: 0.96 - ETA: 1:00:59 - loss: 0.1459 - acc: 0.96 - ETA: 1:00:11 - loss: 0.1461 - acc: 0.96 - ETA: 59:11 - loss: 0.1451 - acc: 0.9617 - ETA: 58:18 - loss: 0.1442 - acc: 0.96 - ETA: 57:26 - loss: 0.1437 - acc: 0.96 - ETA: 56:38 - loss: 0.1437 - acc: 0.96 - ETA: 55:58 - loss: 0.1438 - acc: 0.96 - ETA: 56:27 - loss: 0.1433 - acc: 0.96 - ETA: 56:55 - loss: 0.1434 - acc: 0.96 - ETA: 57:24 - loss: 0.1433 - acc: 0.96 - ETA: 57:50 - loss: 0.1448 - acc: 0.96 - ETA: 58:12 - loss: 0.1456 - acc: 0.96 - ETA: 57:55 - loss: 0.1463 - acc: 0.96 - ETA: 57:14 - loss: 0.1470 - acc: 0.96 - ETA: 56:36 - loss: 0.1456 - acc: 0.96 - ETA: 55:59 - loss: 0.1446 - acc: 0.96 - ETA: 55:22 - loss: 0.1443 - acc: 0.96 - ETA: 54:47 - loss: 0.1444 - acc: 0.96 - ETA: 54:57 - loss: 0.1436 - acc: 0.96 - ETA: 55:19 - loss: 0.1427 - acc: 0.96 - ETA: 55:40 - loss: 0.1449 - acc: 0.96 - ETA: 55:57 - loss: 0.1441 - acc: 0.96 - ETA: 56:16 - loss: 0.1433 - acc: 0.96 - ETA: 56:37 - loss: 0.1433 - acc: 0.96 - ETA: 56:12 - loss: 0.1436 - acc: 0.96 - ETA: 55:40 - loss: 0.1446 - acc: 0.96 - ETA: 55:10 - loss: 0.1440 - acc: 0.96 - ETA: 54:41 - loss: 0.1433 - acc: 0.96 - ETA: 54:15 - loss: 0.1440 - acc: 0.96 - ETA: 53:47 - loss: 0.1443 - acc: 0.96 - ETA: 54:03 - loss: 0.1442 - acc: 0.96 - ETA: 54:22 - loss: 0.1442 - acc: 0.96 - ETA: 54:42 - loss: 0.1441 - acc: 0.96 - ETA: 55:02 - loss: 0.1435 - acc: 0.96 - ETA: 55:16 -

[illegible]

[illegible]



[illegible]

[illegible]

[illegible]

acc: 0.963 - ETA: 8:42 - loss: 0.1417 - acc: 0.963 - ETA: 8:38 - loss: 0.1418 - acc: 0.963 - ETA: 8:34 - loss: 0.1418 - acc: 0.963 - ETA: 8:29 - loss: 0.1418 - acc: 0.963 - ETA: 8:25 - loss: 0.1418 - acc: 0.963 - ETA: 8:21 - loss: 0.1418 - acc: 0.963 - ETA: 8:16 - loss: 0.1418 - acc: 0.963 - ETA: 8:12 - loss: 0.1419 - acc: 0.963 - ETA: 8:08 - loss: 0.1419 - acc: 0.963 - ETA: 8:03 - loss: 0.1419 - acc: 0.963 - ETA: 7:59 - loss: 0.1419 - acc: 0.963 - ETA: 7:55 - loss: 0.1419 - acc: 0.963 - ETA: 7:50 - loss: 0.1418 - acc: 0.963 - ETA: 7:46 - loss: 0.1419 - acc: 0.963 - ETA: 7:42 - loss: 0.1419 - acc: 0.963 - ETA: 7:37 - loss: 0.1419 - acc: 0.963 - ETA: 7:33 - loss: 0.1420 - acc: 0.963 - ETA: 7:29 - loss: 0.1420 - acc: 0.9633143613/143613 [=====] - ETA: 7:25 - loss: 0.1420 - acc: 0.963 - ETA: 7:20 - loss: 0.1420 - acc: 0.963 - ETA: 7:16 - loss: 0.1420 - acc: 0.963 - ETA: 7:12 - loss: 0.1419 - acc: 0.963 - ETA: 7:07 - loss: 0.1419 - acc: 0.963 - ETA: 7:03 - loss: 0.1419 - acc: 0.963 - ETA: 6:58 - loss: 0.1420 - acc: 0.963 - ETA: 6:54 - loss: 0.1420 - acc: 0.963 - ETA: 6:49 - loss: 0.1420 - acc: 0.963 - ETA: 6:45 - loss: 0.1419 - acc: 0.963 - ETA: 6:41 - loss: 0.1419 - acc: 0.963 - ETA: 6:36 - loss: 0.1419 - acc: 0.963 - ETA: 6:32 - loss: 0.1419 - acc: 0.963 - ETA: 6:28 - loss: 0.1419 - acc: 0.963 - ETA: 6:23 - loss: 0.1419 - acc: 0.963 - ETA: 6:19 - loss: 0.1418 - acc: 0.963 - ETA: 6:15 - loss: 0.1418 - acc: 0.963 - ETA: 6:10 - loss: 0.1418 - acc: 0.963 - ETA: 6:06 - loss: 0.1417 - acc: 0.963 - ETA: 6:02 - loss: 0.1417 - acc: 0.963 - ETA: 5:57 - loss: 0.1417 - acc: 0.963 - ETA: 5:53 - loss: 0.1417 - acc: 0.963 - ETA: 5:48 - loss: 0.1418 - acc: 0.963 - ETA: 5:44 - loss: 0.1417 - acc: 0.963 - ETA: 5:40 - loss: 0.1417 - acc: 0.963 - ETA: 5:35 - loss: 0.1417 - acc: 0.963 - ETA: 5:31 - loss: 0.1417 - acc: 0.963 - ETA: 5:27 - loss: 0.1417 - acc: 0.963 - ETA: 5:22 - loss: 0.1417 - acc: 0.963 - ETA: 5:18 - loss: 0.1417 - acc: 0.963 - ETA: 5:14 - loss: 0.1417 - acc: 0.963 - ETA: 5:09 - loss: 0.1417 - acc: 0.963 - ETA: 5:05 - loss: 0.1418 - acc: 0.963 - ETA: 5:01 - loss: 0.1417 - acc: 0.963 - ETA: 4:56 - loss: 0.1418 - acc: 0.963 - ETA: 4:52 - loss: 0.1418 - acc: 0.963 - ETA: 4:48 - loss: 0.1418 - acc: 0.963 - ETA: 4:43 - loss: 0.1418 - acc: 0.963 - ETA: 4:39 - loss: 0.1418 - acc: 0.963 - ETA: 4:34 - loss: 0.1418 - acc: 0.963 - ETA: 4:30 - loss: 0.1418 - acc: 0.963 - ETA: 4:26 - loss: 0.1418 - acc: 0.963 - ETA: 4:21 - loss: 0.1418 - acc: 0.963 - ETA: 4:17 - loss: 0.1418 - acc: 0.963 - ETA: 4:13 - loss: 0.1418 - acc: 0.963 - ETA: 4:09 - loss: 0.1418 - acc: 0.963 - ETA: 4:04 - loss: 0.1418 - acc: 0.963 - ETA: 4:00 - loss: 0.1419 - acc: 0.963 - ETA: 3:55 - loss: 0.1419 - acc: 0.963 - ETA: 3:51 - loss: 0.1419 - acc: 0.963 - ETA: 3:47 - loss: 0.1419 - acc: 0.963 - ETA: 3:42 - loss: 0.1420 - acc: 0.963 - ETA: 3:38 - loss: 0.1419 - acc: 0.963 - ETA: 3:34 - loss: 0.1419 - acc: 0.963 - ETA: 3:29 - loss: 0.1420 - acc: 0.963 - ETA: 3:25 - loss: 0.1420 - acc: 0.963 - ETA: 3:21 - loss: 0.1420 - acc: 0.963 - ETA: 3:16 - loss: 0.1420 - acc: 0.963 - ETA: 3:12 - loss: 0.1421 - acc: 0.963 - ETA: 3:08 - loss: 0.1421 - acc: 0.963 - ETA: 3:03 - loss: 0.1420 - acc: 0.963 - ETA: 2:59 - loss: 0.1420 - acc: 0.963 - ETA: 2:55 - loss: 0.1420 - acc: 0.963 - ETA: 2:50 - loss: 0.1420 - acc: 0.963 - ETA: 2:46 - loss: 0.1420 - acc: 0.963 - ETA: 2:42 - loss: 0.1420 - acc: 0.963 - ETA: 2:37 - loss: 0.1420 - acc: 0.963 - ETA: 2:33 - loss: 0.1420 - acc: 0.963 - ETA: 2:29 - loss: 0.1420 - acc: 0.963 - ETA: 2:24 - loss: 0.1420 - acc: 0.963 - ETA: 2:20 - loss: 0.1420 - acc: 0.963 - ETA: 2:16 - loss: 0.1420 - acc: 0.963 - ETA: 2:11 - loss: 0.1420 - acc: 0.963 - ETA: 2:07 - loss: 0.1420 - acc: 0.963 - ETA: 2:03 - loss: 0.1420 - acc: 0.963 - ETA: 1:58 - loss: 0.1421 - acc: 0.963 - ETA: 1:54 - loss: 0.1421 - acc: 0.963 - ETA: 1:50 - loss: 0.1421 - acc: 0.963 - ETA: 1:45 - loss: 0.1421 - acc: 0.963 - ETA: 1:41 - loss: 0.1421 - acc: 0.963 - ETA: 1:36 - loss: 0.1421 - acc: 0.963 - ETA: 1:32 - loss: 0.1421 - acc: 0.963 - ETA: 1:28 - loss: 0.1421 - acc: 0.963 - ETA: 1:23 - loss: 0.1421 - acc: 0.963 - ETA: 1:19 - loss: 0.1421 - acc: 0.963 - ETA: 1:14 - loss: 0.1422 - acc: 0.963 - ETA: 1:10 - loss: 0.1422 - acc: 0.963 - ETA: 1:06 - loss: 0.1423 - acc: 0.963 - ETA: 1:01 - loss: 0.1422 - acc: 0.963 - ETA: 57s - loss: 0.1422 - acc: 0.963 - ETA: 52s - loss: 0.1423 - acc: 0.963 - ETA: 48s - loss: 0.1423 - acc: 0.963 - ETA: 44s - loss: 0.1423 - acc: 0.963 - ETA: 39s - loss: 0.1423 - acc: 0.963 - ETA: 35s - loss: 0.1422 - acc: 0.963 - ETA: 30s - loss: 0.1422 - acc: 0.963 - ETA: 26s - loss: 0.1422 - acc: 0.963 - ETA: 21s - loss: 0.1422 - acc: 0.963 - ETA: 17s - loss: 0.1422 - acc: 0.963 - ETA: 13s - loss: 0.1422 - acc: 0.963 - ETA: 8s - loss: 0.1421 - acc: 0.9633 - ETA: 4s - loss: 0.1421 - acc: 0.963 - 5095s 35ms/step - loss: 0.1421 - acc: 0.9633 - val\_loss: 0.1408 - val\_acc: 0.9641

ROC-AUC - epoch: 3 - score: 0.500077

Epoch 00003: val\_acc did not improve from 0.96408

Epoch 4/4

24832/143613 [====>.....] - ETA: 1:26:29 - loss: 0.1990 - acc: 0.94 - ETA: 1:22:03 - loss: 0.1894 - acc: 0.94 - ETA: 1:24:32 - loss: 0.1543 - acc: 0.96 - ETA: 1:30:59 - loss: 0.1594 - acc: 0.95 - ETA: 1:34:23 - loss: 0.1801 - acc: 0.95 - ETA: 1:33:10 - loss: 0.1849 - acc: 0.94 - ETA: 1:34:06 - loss: 0.1804 - acc: 0.95 - ETA: 1:35:31 - loss: 0.1711 - acc: 0.95 - ETA: 1:32:55 - loss: 0.1740 - acc: 0.95 - ETA: 1:29:17 - loss: 0.1680 - acc: 0.95 - ETA: 1:27:20 - loss: 0.1637 - acc: 0.95 - ETA: 1:28:07 - loss: 0.1648 - acc: 0.95 - ETA: 1:29:50 - loss: 0.1626 - acc: 0.95 - ETA: 1:30:40 - loss: 0.1645 - acc: 0.95 - ETA: 1:31:36 - loss: 0.1630 - acc: 0.95 - ETA: 1:33:01 - loss: 0.1642 - acc: 0.95 - ETA: 1:34:37 - loss: 0.1644 - acc: 0.95 - ETA: 1:35:22 - loss: 0.1633 - acc: 0.95 - ETA: 1:35:40 - loss: 0.1608 - acc: 0.95 - ETA: 1:34:56 - loss: 0.1592 - acc: 0.95 - ETA: 1:35:14 - loss: 0.1588 - acc: 0.95 - ETA: 1:36:27 - loss: 0.1579 - acc: 0.95 - ETA: 1:37:08 - loss: 0.1560 - acc: 0.95 - ETA: 1:37:45 - loss: 0.1555 - acc: 0.95 - ETA: 1:38:48 - loss: 0.1556 - acc: 0.95 - ETA: 1:38:59 - loss: 0.1568 - acc: 0.95 - ETA: 1:39:08 - loss: 0.1544 - acc: 0.95 - ETA: 1:39:34 - loss: 0.1541 - acc: 0.95 - ETA: 1:40:15 - loss: 0.1539 - acc: 0.95 - ETA: 1:40:15 - loss: 0.1560 - acc: 0.95 - ETA: 1:40:20 - loss: 0.1536 - acc: 0.95 - ETA: 1:39:59 - loss: 0.1527 - acc: 0.96 - ETA: 1:38:35 - loss: 0.1523 - acc: 0.96 - ETA: 1:38:28 - loss: 0.1510 - acc: 0.96 - ETA: 1:37:49 - loss: 0.1490 - acc: 0.96 - ETA: 1:37:54 - loss: 0.1482 - acc: 0.96 - ETA: 1:37:55 - loss: 0.1465 - acc: 0.96 - ETA: 1:37:16 - loss: 0.1459 - acc: 0.96 - ETA: 1:37:17 - loss: 0.1465 - acc: 0.96 - ETA: 1:37:44 - loss: 0.1458 - acc: 0.96 - ETA: 1:38:01 - loss: 0.1466 - acc: 0.96 - ETA: 1:38:19 - loss: 0.1460 - acc: 0.96 - ETA: 1:38:29 - loss: 0.1477 - acc: 0.96 - ETA: 1:37:51 - loss: 0.1474 - acc: 0.96 - ETA: 1:37:12 - loss: 0.1462 - acc: 0.96 - ETA: 1:37:00 - loss: 0.1460 - acc: 0.96 - ETA: 1:36:43 - loss: 0.1468 - acc: 0.96 - ETA: 1:36:18 - loss: 0.1473 - acc:

0.96 - ETA: 1:35:57 - loss: 0.1471 - acc: 0.96 - ETA: 1:34:54 - loss: 0.1474 - acc: 0.96 - ETA: 1:  
34:23 - loss: 0.1478 - acc: 0.96 - ETA: 1:33:46 - loss: 0.1475 - acc: 0.96 - ETA: 1:33:35 - loss:  
0.1478 - acc: 0.96 - ETA: 1:33:46 - loss: 0.1470 - acc: 0.96 - ETA: 1:34:01 - loss: 0.1457 - acc:  
0.96 - ETA: 1:33:50 - loss: 0.1462 - acc: 0.96 - ETA: 1:33:18 - loss: 0.1454 - acc: 0.96 - ETA: 1:  
33:11 - loss: 0.1449 - acc: 0.96 - ETA: 1:33:03 - loss: 0.1452 - acc: 0.96 - ETA: 1:32:48 - loss:  
0.1456 - acc: 0.96 - ETA: 1:32:37 - loss: 0.1449 - acc: 0.96 - ETA: 1:32:31 - loss: 0.1444 - acc:  
0.96 - ETA: 1:32:15 - loss: 0.1442 - acc: 0.96 - ETA: 1:32:23 - loss: 0.1437 - acc: 0.96 - ETA: 1:  
32:46 - loss: 0.1436 - acc: 0.96 - ETA: 1:32:46 - loss: 0.1436 - acc: 0.96 - ETA: 1:32:34 - loss:  
0.1430 - acc: 0.96 - ETA: 1:32:41 - loss: 0.1426 - acc: 0.96 - ETA: 1:32:49 - loss: 0.1421 - acc:  
0.96 - ETA: 1:32:55 - loss: 0.1424 - acc: 0.96 - ETA: 1:32:55 - loss: 0.1421 - acc: 0.96 - ETA: 1:  
32:50 - loss: 0.1418 - acc: 0.96 - ETA: 1:33:03 - loss: 0.1418 - acc: 0.96 - ETA: 1:33:13 - loss:  
0.1416 - acc: 0.96 - ETA: 1:33:17 - loss: 0.1423 - acc: 0.96 - ETA: 1:33:06 - loss: 0.1428 - acc:  
0.96 - ETA: 1:33:06 - loss: 0.1431 - acc: 0.96 - ETA: 1:33:27 - loss: 0.1430 - acc: 0.96 - ETA: 1:  
33:42 - loss: 0.1427 - acc: 0.96 - ETA: 1:33:51 - loss: 0.1434 - acc: 0.96 - ETA: 1:33:40 - loss:  
0.1433 - acc: 0.96 - ETA: 1:33:30 - loss: 0.1441 - acc: 0.96 - ETA: 1:33:26 - loss: 0.1441 - acc:  
0.96 - ETA: 1:32:53 - loss: 0.1448 - acc: 0.96 - ETA: 1:32:42 - loss: 0.1445 - acc: 0.96 - ETA: 1:  
32:40 - loss: 0.1446 - acc: 0.96 - ETA: 1:32:41 - loss: 0.1443 - acc: 0.96 - ETA: 1:32:14 - loss:  
0.1446 - acc: 0.96 - ETA: 1:31:55 - loss: 0.1439 - acc: 0.96 - ETA: 1:31:49 - loss: 0.1437 - acc:  
0.96 - ETA: 1:31:44 - loss: 0.1436 - acc: 0.96 - ETA: 1:31:41 - loss: 0.1440 - acc: 0.96 - ETA: 1:  
31:37 - loss: 0.1443 - acc: 0.96 - ETA: 1:31:20 - loss: 0.1443 - acc: 0.96 - ETA: 1:31:01 - loss:  
0.1445 - acc: 0.96 - ETA: 1:30:31 - loss: 0.1440 - acc: 0.96 - ETA: 1:29:59 - loss: 0.1446 - acc:  
0.96 - ETA: 1:29:39 - loss: 0.1443 - acc: 0.96 - ETA: 1:29:39 - loss: 0.1443 - acc: 0.96 - ETA: 1:  
29:38 - loss: 0.1446 - acc: 0.96 - ETA: 1:29:48 - loss: 0.1445 - acc: 0.96 - ETA: 1:29:41 - loss:  
0.1453 - acc: 0.96 - ETA: 1:29:37 - loss: 0.1451 - acc: 0.96 - ETA: 1:29:31 - loss: 0.1448 - acc:  
0.96 - ETA: 1:29:33 - loss: 0.1445 - acc: 0.96 - ETA: 1:29:12 - loss: 0.1440 - acc: 0.96 - ETA: 1:  
28:47 - loss: 0.1441 - acc: 0.96 - ETA: 1:28:21 - loss: 0.1445 - acc: 0.96 - ETA: 1:27:57 - loss:  
0.1443 - acc: 0.96 - ETA: 1:27:46 - loss: 0.1443 - acc: 0.96 - ETA: 1:27:52 - loss: 0.1443 - acc:  
0.96 - ETA: 1:27:53 - loss: 0.1438 - acc: 0.96 - ETA: 1:27:37 - loss: 0.1437 - acc: 0.96 - ETA: 1:  
27:26 - loss: 0.1431 - acc: 0.96 - ETA: 1:27:12 - loss: 0.1430 - acc: 0.96 - ETA: 1:27:08 - loss:  
0.1430 - acc: 0.96 - ETA: 1:27:03 - loss: 0.1425 - acc: 0.96 - ETA: 1:26:55 - loss: 0.1421 - acc:  
0.96 - ETA: 1:26:45 - loss: 0.1421 - acc: 0.96 - ETA: 1:26:32 - loss: 0.1421 - acc: 0.96 - ETA: 1:  
26:24 - loss: 0.1421 - acc: 0.96 - ETA: 1:26:14 - loss: 0.1425 - acc: 0.96 - ETA: 1:26:10 - loss:  
0.1427 - acc: 0.96 - ETA: 1:26:03 - loss: 0.1429 - acc: 0.96 - ETA: 1:25:55 - loss: 0.1427 - acc:  
0.96 - ETA: 1:25:33 - loss: 0.1429 - acc: 0.96 - ETA: 1:25:26 - loss: 0.1427 - acc: 0.96 - ETA: 1:  
25:16 - loss: 0.1426 - acc: 0.96 - ETA: 1:25:07 - loss: 0.1422 - acc: 0.96 - ETA: 1:25:11 - loss:  
0.1427 - acc: 0.96 - ETA: 1:25:13 - loss: 0.1429 - acc: 0.96 - ETA: 1:25:17 - loss: 0.1431 - acc:  
0.96 - ETA: 1:25:19 - loss: 0.1429 - acc: 0.96 - ETA: 1:25:02 - loss: 0.1429 - acc: 0.96 - ETA: 1:  
24:48 - loss: 0.1431 - acc: 0.96 - ETA: 1:24:38 - loss: 0.1428 - acc: 0.96 - ETA: 1:24:31 - loss:  
0.1425 - acc: 0.96 - ETA: 1:24:28 - loss: 0.1424 - acc: 0.96 - ETA: 1:24:20 - loss: 0.1422 - acc:  
0.96 - ETA: 1:24:04 - loss: 0.1420 - acc: 0.96 - ETA: 1:23:54 - loss: 0.1421 - acc: 0.96 - ETA: 1:  
23:52 - loss: 0.1417 - acc: 0.96 - ETA: 1:23:49 - loss: 0.1417 - acc: 0.96 - ETA: 1:23:49 - loss:  
0.1415 - acc: 0.96 - ETA: 1:23:55 - loss: 0.1417 - acc: 0.96 - ETA: 1:23:51 - loss: 0.1415 - acc:  
0.96 - ETA: 1:23:55 - loss: 0.1416 - acc: 0.96 - ETA: 1:23:53 - loss: 0.1415 - acc: 0.96 - ETA: 1:  
23:55 - loss: 0.1416 - acc: 0.96 - ETA: 1:24:00 - loss: 0.1416 - acc: 0.96 - ETA: 1:24:03 - loss:  
0.1415 - acc: 0.96 - ETA: 1:24:06 - loss: 0.1413 - acc: 0.96 - ETA: 1:24:04 - loss: 0.1416 - acc:  
0.96 - ETA: 1:24:06 - loss: 0.1413 - acc: 0.96 - ETA: 1:24:13 - loss: 0.1412 - acc: 0.96 - ETA: 1:  
24:16 - loss: 0.1411 - acc: 0.96 - ETA: 1:24:17 - loss: 0.1411 - acc: 0.96 - ETA: 1:24:22 - loss:  
0.1410 - acc: 0.96 - ETA: 1:24:26 - loss: 0.1408 - acc: 0.96 - ETA: 1:24:26 - loss: 0.1409 - acc:  
0.96 - ETA: 1:24:31 - loss: 0.1411 - acc: 0.96 - ETA: 1:24:26 - loss: 0.1411 - acc: 0.96 - ETA: 1:  
24:26 - loss: 0.1410 - acc: 0.96 - ETA: 1:24:25 - loss: 0.1414 - acc: 0.96 - ETA: 1:24:23 - loss:  
0.1416 - acc: 0.96 - ETA: 1:24:22 - loss: 0.1415 - acc: 0.96 - ETA: 1:24:22 - loss: 0.1413 - acc:  
0.96 - ETA: 1:24:23 - loss: 0.1414 - acc: 0.96 - ETA: 1:24:16 - loss: 0.1411 - acc: 0.96 - ETA: 1:  
24:07 - loss: 0.1412 - acc: 0.96 - ETA: 1:24:02 - loss: 0.1414 - acc: 0.96 - ETA: 1:23:51 - loss:  
0.1417 - acc: 0.96 - ETA: 1:23:44 - loss: 0.1417 - acc: 0.96 - ETA: 1:23:28 - loss: 0.1416 - acc:  
0.96 - ETA: 1:23:08 - loss: 0.1415 - acc: 0.96 - ETA: 1:22:55 - loss: 0.1415 - acc: 0.96 - ETA: 1:  
22:42 - loss: 0.1415 - acc: 0.96 - ETA: 1:22:35 - loss: 0.1417 - acc: 0.96 - ETA: 1:22:28 - loss:  
0.1415 - acc: 0.96 - ETA: 1:22:20 - loss: 0.1420 - acc: 0.96 - ETA: 1:22:14 - loss: 0.1423 - acc:  
0.96 - ETA: 1:22:02 - loss: 0.1422 - acc: 0.96 - ETA: 1:22:00 - loss: 0.1422 - acc: 0.96 - ETA: 1:  
21:49 - loss: 0.1422 - acc: 0.96 - ETA: 1:21:39 - loss: 0.1421 - acc: 0.96 - ETA: 1:21:36 - loss:  
0.1424 - acc: 0.96 - ETA: 1:21:34 - loss: 0.1425 - acc: 0.96 - ETA: 1:21:24 - loss: 0.1424 - acc:  
0.96 - ETA: 1:21:15 - loss: 0.1425 - acc: 0.96 - ETA: 1:21:05 - loss: 0.1425 - acc: 0.96 - ETA: 1:  
21:04 - loss: 0.1427 - acc: 0.96 - ETA: 1:20:51 - loss: 0.1429 - acc: 0.96 - ETA: 1:20:46 - loss:  
0.1428 - acc: 0.96 - ETA: 1:20:42 - loss: 0.1428 - acc: 0.9631 50176/143613  
[=====>.....] - ETA: 1:20:39 - loss: 0.1429 - acc: 0.96 - ETA: 1:20:39 - loss:  
0.1433 - acc: 0.96 - ETA: 1:20:35 - loss: 0.1431 - acc: 0.96 - ETA: 1:20:29 - loss: 0.1432 - acc:  
0.96 - ETA: 1:20:26 - loss: 0.1431 - acc: 0.96 - ETA: 1:20:18 - loss: 0.1430 - acc: 0.96 - ETA: 1:  
20:13 - loss: 0.1428 - acc: 0.96 - ETA: 1:20:11 - loss: 0.1428 - acc: 0.96 - ETA: 1:20:08 - loss:  
0.1427 - acc: 0.96 - ETA: 1:20:00 - loss: 0.1426 - acc: 0.96 - ETA: 1:19:52 - loss: 0.1426 - acc:  
0.96 - ETA: 1:19:39 - loss: 0.1427 - acc: 0.96 - ETA: 1:19:19 - loss: 0.1425 - acc: 0.96 - ETA: 1:  
18:58 - loss: 0.1427 - acc: 0.96 - ETA: 1:18:39 - loss: 0.1426 - acc: 0.96 - ETA: 1:18:19 - loss:  
0.1425 - acc: 0.96 - ETA: 1:17:59 - loss: 0.1427 - acc: 0.96 - ETA: 1:17:40 - loss: 0.1429 - acc:  
0.96 - ETA: 1:17:21 - loss: 0.1430 - acc: 0.96 - ETA: 1:17:01 - loss: 0.1427 - acc: 0.96 - ETA: 1:  
16:43 - loss: 0.1425 - acc: 0.96 - ETA: 1:16:32 - loss: 0.1423 - acc: 0.96 - ETA: 1:16:25 - loss:  
0.1426 - acc: 0.96 - ETA: 1:16:16 - loss: 0.1427 - acc: 0.96 - ETA: 1:16:01 - loss: 0.1426 - acc:  
0.96 - ETA: 1:15:43 - loss: 0.1425 - acc: 0.96 - ETA: 1:15:25 - loss: 0.1425 - acc: 0.96 - ETA: 1:  
15:07 - loss: 0.1425 - acc: 0.96 - ETA: 1:14:49 - loss: 0.1423 - acc: 0.96 - ETA: 1:14:31 - loss:  
0.1424 - acc: 0.96 - ETA: 1:14:14 - loss: 0.1422 - acc: 0.96 - ETA: 1:14:06 - loss: 0.1421 - acc:

```
0.96 - ETA: 1:13:57 - loss: 0.1422 - acc: 0.96 - ETA: 1:13:50 - loss: 0.1421 - acc: 0.96 - ETA: 1:
13:38 - loss: 0.1423 - acc: 0.96 - ETA: 1:13:21 - loss: 0.1427 - acc: 0.96 - ETA: 1:13:04 - loss:
0.1427 - acc: 0.96 - ETA: 1:12:48 - loss: 0.1427 - acc: 0.96 - ETA: 1:12:31 - loss: 0.1430 - acc:
0.96 - ETA: 1:12:15 - loss: 0.1430 - acc: 0.96 - ETA: 1:12:05 - loss: 0.1430 - acc: 0.96 - ETA: 1:
11:57 - loss: 0.1431 - acc: 0.96 - ETA: 1:11:50 - loss: 0.1432 - acc: 0.96 - ETA: 1:11:43 - loss:
0.1434 - acc: 0.96 - ETA: 1:11:29 - loss: 0.1433 - acc: 0.96 - ETA: 1:11:13 - loss: 0.1432 - acc:
0.96 - ETA: 1:10:57 - loss: 0.1432 - acc: 0.96 - ETA: 1:10:41 - loss: 0.1433 - acc: 0.96 - ETA: 1:
10:25 - loss: 0.1433 - acc: 0.96 - ETA: 1:10:12 - loss: 0.1430 - acc: 0.96 - ETA: 1:10:05 - loss:
0.1430 - acc: 0.96 - ETA: 1:09:59 - loss: 0.1427 - acc: 0.96 - ETA: 1:09:53 - loss: 0.1425 - acc:
0.96 - ETA: 1:09:47 - loss: 0.1424 - acc: 0.96 - ETA: 1:09:38 - loss: 0.1427 - acc: 0.96 - ETA: 1:
09:23 - loss: 0.1427 - acc: 0.96 - ETA: 1:09:09 - loss: 0.1427 - acc: 0.96 - ETA: 1:08:54 - loss:
0.1426 - acc: 0.96 - ETA: 1:08:40 - loss: 0.1426 - acc: 0.96 - ETA: 1:08:31 - loss: 0.1426 - acc:
0.96 - ETA: 1:08:25 - loss: 0.1425 - acc: 0.96 - ETA: 1:08:19 - loss: 0.1423 - acc: 0.96 - ETA: 1:
08:13 - loss: 0.1425 - acc: 0.96 - ETA: 1:08:03 - loss: 0.1422 - acc: 0.96 - ETA: 1:07:49 - loss:
0.1420 - acc: 0.96 - ETA: 1:07:35 - loss: 0.1421 - acc: 0.96 - ETA: 1:07:21 - loss: 0.1420 - acc:
0.96 - ETA: 1:07:07 - loss: 0.1423 - acc: 0.96 - ETA: 1:06:53 - loss: 0.1423 - acc: 0.96 - ETA: 1:
06:46 - loss: 0.1422 - acc: 0.96 - ETA: 1:06:40 - loss: 0.1421 - acc: 0.96 - ETA: 1:06:34 - loss:
0.1421 - acc: 0.96 - ETA: 1:06:28 - loss: 0.1420 - acc: 0.96 - ETA: 1:06:22 - loss: 0.1420 - acc:
0.96 - ETA: 1:06:16 - loss: 0.1422 - acc: 0.96 - ETA: 1:06:06 - loss: 0.1422 - acc: 0.96 - ETA: 1:
05:54 - loss: 0.1421 - acc: 0.96 - ETA: 1:05:42 - loss: 0.1423 - acc: 0.96 - ETA: 1:05:36 - loss:
0.1422 - acc: 0.96 - ETA: 1:05:32 - loss: 0.1422 - acc: 0.96 - ETA: 1:05:27 - loss: 0.1421 - acc:
0.96 - ETA: 1:05:22 - loss: 0.1420 - acc: 0.96 - ETA: 1:05:17 - loss: 0.1420 - acc: 0.96 - ETA: 1:
05:06 - loss: 0.1419 - acc: 0.96 - ETA: 1:04:53 - loss: 0.1418 - acc: 0.96 - ETA: 1:04:40 - loss:
0.1419 - acc: 0.96 - ETA: 1:04:28 - loss: 0.1418 - acc: 0.96 - ETA: 1:04:15 - loss: 0.1418 - acc:
0.96 - ETA: 1:04:09 - loss: 0.1418 - acc: 0.96 - ETA: 1:04:05 - loss: 0.1419 - acc: 0.96 - ETA: 1:
03:59 - loss: 0.1419 - acc: 0.96 - ETA: 1:03:53 - loss: 0.1418 - acc: 0.96 - ETA: 1:03:45 - loss:
0.1416 - acc: 0.96 - ETA: 1:03:32 - loss: 0.1417 - acc: 0.96 - ETA: 1:03:20 - loss: 0.1417 - acc:
0.96 - ETA: 1:03:08 - loss: 0.1419 - acc: 0.96 - ETA: 1:02:55 - loss: 0.1421 - acc: 0.96 - ETA: 1:
02:43 - loss: 0.1421 - acc: 0.96 - ETA: 1:02:30 - loss: 0.1421 - acc: 0.96 - ETA: 1:02:24 - loss:
0.1420 - acc: 0.96 - ETA: 1:02:20 - loss: 0.1419 - acc: 0.96 - ETA: 1:02:15 - loss: 0.1418 - acc:
0.96 - ETA: 1:02:10 - loss: 0.1417 - acc: 0.96 - ETA: 1:01:59 - loss: 0.1417 - acc: 0.96 - ETA: 1:
01:47 - loss: 0.1417 - acc: 0.96 - ETA: 1:01:35 - loss: 0.1417 - acc: 0.96 - ETA: 1:01:23 - loss:
0.1418 - acc: 0.96 - ETA: 1:01:11 - loss: 0.1419 - acc: 0.96 - ETA: 1:01:00 - loss: 0.1419 - acc:
0.96 - ETA: 1:00:48 - loss: 0.1420 - acc: 0.96 - ETA: 1:00:43 - loss: 0.1421 - acc: 0.96 - ETA: 1:
00:38 - loss: 0.1420 - acc: 0.96 - ETA: 1:00:33 - loss: 0.1420 - acc: 0.96 - ETA: 1:00:29 - loss:
0.1420 - acc: 0.96 - ETA: 1:00:24 - loss: 0.1420 - acc: 0.96 - ETA: 1:00:12 - loss: 0.1419 - acc:
0.96 - ETA: 1:00:01 - loss: 0.1418 - acc: 0.96 - ETA: 59:50 - loss: 0.1418 - acc: 0.9634 - ETA: 59
:39 - loss: 0.1418 - acc: 0.96 - ETA: 59:27 - loss: 0.1417 - acc: 0.96 - ETA: 59:16 - loss: 0.1417
- acc: 0.96 - ETA: 59:11 - loss: 0.1418 - acc: 0.96 - ETA: 59:06 - loss: 0.1417 - acc: 0.96 - ETA:
59:02 - loss: 0.1417 - acc: 0.96 - ETA: 58:56 - loss: 0.1418 - acc: 0.96 - ETA: 58:45 - loss: 0.14
18 - acc: 0.96 - ETA: 58:34 - loss: 0.1417 - acc: 0.96 - ETA: 58:23 - loss: 0.1416 - acc: 0.96 - E
TA: 58:13 - loss: 0.1418 - acc: 0.96 - ETA: 58:02 - loss: 0.1417 - acc: 0.96 - ETA: 57:51 - loss:
0.1417 - acc: 0.96 - ETA: 57:42 - loss: 0.1419 - acc: 0.96 - ETA: 57:38 - loss: 0.1421 - acc: 0.96
- ETA: 57:33 - loss: 0.1421 - acc: 0.96 - ETA: 57:28 - loss: 0.1420 - acc: 0.96 - ETA: 57:24 - los
s: 0.1422 - acc: 0.96 - ETA: 57:13 - loss: 0.1422 - acc: 0.96 - ETA: 57:03 - loss: 0.1421 - acc: 0
.96 - ETA: 56:53 - loss: 0.1421 - acc: 0.96 - ETA: 56:42 - loss: 0.1422 - acc: 0.96 - ETA: 56:32 -
loss: 0.1420 - acc: 0.96 - ETA: 56:22 - loss: 0.1419 - acc: 0.96 - ETA: 56:12 - loss: 0.1419 - acc
: 0.96 - ETA: 56:08 - loss: 0.1418 - acc: 0.96 - ETA: 56:04 - loss: 0.1419 - acc: 0.96 - ETA: 55:5
9 - loss: 0.1418 - acc: 0.96 - ETA: 55:54 - loss: 0.1417 - acc: 0.96 - ETA: 55:43 - loss: 0.1418 -
acc: 0.96 - ETA: 55:34 - loss: 0.1416 - acc: 0.96 - ETA: 55:24 - loss: 0.1417 - acc: 0.96 - ETA: 5
5:14 - loss: 0.1419 - acc: 0.96 - ETA: 55:04 - loss: 0.1420 - acc: 0.96 - ETA: 54:54 - loss: 0.141
9 - acc: 0.96 - ETA: 54:45 - loss: 0.1419 - acc: 0.96 - ETA: 54:39 - loss: 0.1420 - acc: 0.96 - ET
A: 54:35 - loss: 0.1422 - acc: 0.96 - ETA: 54:31 - loss: 0.1421 - acc: 0.96 - ETA: 54:27 - loss: 0
.1421 - acc: 0.96 - ETA: 54:20 - loss: 0.1422 - acc: 0.96 - ETA: 54:10 - loss: 0.1421 - acc: 0.96
- ETA: 54:01 - loss: 0.1421 - acc: 0.96 - ETA: 53:51 - loss: 0.1422 - acc: 0.96 - ETA: 53:41 - los
s: 0.1422 - acc: 0.96 - ETA: 53:32 - loss: 0.1420 - acc: 0.96 - ETA: 53:23 - loss: 0.1419 - acc: 0
.96 - ETA: 53:14 - loss: 0.1419 - acc: 0.96 - ETA: 53:09 - loss: 0.1418 - acc: 0.96 - ETA: 53:05 -
loss: 0.1419 - acc: 0.96 - ETA: 53:01 - loss: 0.1418 - acc: 0.96 - ETA: 52:57 - loss: 0.1418 - acc
: 0.96 - ETA: 52:50 - loss: 0.1418 - acc: 0.96 - ETA: 52:41 - loss: 0.1418 - acc: 0.96 - ETA: 52:3
2 - loss: 0.1418 - acc: 0.96 - ETA: 52:23 - loss: 0.1418 - acc: 0.96 - ETA: 52:14 - loss: 0.1419 -
acc: 0.96 - ETA: 52:04 - loss: 0.1420
```

[illegible]

[illegible]



[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

```
submission = pd.read_csv('sample_submission.csv')
submission[["toxic", "severe_toxic", "obscene", "threat", "insult", "identity_hate"]] = y_pred
submission.to_csv('final_submission_combined_6.csv', index=False)
```

```
final_submission_combined_7.csv = pd.read_csv('sample_submission.csv')
```

```
for label in label_col:
    final_submission_combined_7[label] = (sub_df_mnb[label]+sub_df_lr[label]+sub_df_rf[label]+sub_d
f bp_mll[label]+final_submission_combined_6[label])
```

```
final_submission_combined_7.csv.to_csv('final_submission_combined_7.csv.csv', index=False)
```

```
from prettytable import PrettyTable

x = PrettyTable()

x.field_names = ["ML Models", "Class Label with ROC AUC on Train data", "Class Label ROC AUC on Validation data"]

x.add_row(['MultinomialNB', 'Toxic : 0.9837\n Severe Toxic : 0.9929\n Obscene : 0.9891\n Threat : 0.9941\n Insult : 0.9880\n Identity Hate : 0.9896', 'Toxic : 0.9525\n Severe Toxic : 0.9727\n Obscene : 0.9583\n Threat : 0.9143\n Insult : 0.9570\n Identity Hate : 0.9400'])

x.add_row([" ----- ", " ----- ", " ----- "])

x.add_row(['Logistic Regression', 'Toxic : 0.9977\n Severe Toxic : 0.9982\n Obscene : 0.9985\n Threat : 0.9998\n Insult : 0.9973\n Identity Hate : 0.9990', 'Toxic : 0.9684\n Severe Toxic : 0.9789\n Obscene : 0.9798\n Threat : 0.9724\n Insult : 0.9690\n Identity Hate : 0.9659'])

x.add_row([" ----- ", " ----- ", " ----- "])
```

```

x.add_row(['BR-MultinomialNB','Toxic : 0.9604\n Severe Toxic : 0.7846\n Obscene : 0.9051\n Threat : 0.7122\n Insult : 0.9048\n Identity Hate : 0.7705','Toxic : 0.9404\n Severe Toxic : 0.7811\n Obscene : 0.8982\n Threat : 0.7083\n Insult : 0.8969\n Identity Hate : 0.7668'])

x.add_row([" ----- ", " ----- ", " ----- "])

x.add_row(['LP-Logistic Regression','Toxic : 0.9862\n Severe Toxic : 0.9214\n Obscene : 0.9622\n Threat : 0.8748\n Insult : 0.9640\n Identity Hate : 0.9152','Toxic : 0.9715\n Severe Toxic : 0.9196\n Obscene : 0.9601\n Threat : 0.8782\n Insult : 0.9609\n Identity Hate : 0.9159'])

x.add_row([" ----- ", " ----- ", " ----- "])

x.add_row(['BR-SVM','Toxic : 0.9703\n Severe Toxic : 0.6832\n Obscene : 0.9124\n Threat : 0.6132\n Insult : 0.9285\n Identity Hate : 0.6866','Toxic : 0.9597\n Severe Toxic : 0.6752\n Obscene : 0.9110\n Threat : 0.6202\n Insult : 0.9220\n Identity Hate : 0.7002'])

x.add_row([" ----- ", " ----- ", " ----- "])

x.add_row(['CC-MultinomialNB','Toxic : 0.9604\n Severe Toxic : 0.7846\n Obscene : 0.9051\n Threat : 0.7122\n Insult : 0.9048\n Identity Hate : 0.7705','Toxic : 0.9404\n Severe Toxic : 0.7811\n Obscene : 0.8982\n Threat : 0.7083\n Insult : 0.8969\n Identity Hate : 0.7668'])

x.add_row([" ----- ", " ----- ", " ----- "])

x.add_row(['Random Forest','Toxic : 0.0.9998\n Severe Toxic : 0.9998\n Obscene : 0.9998\n Threat : 0.9999\n Insult : 0.9997\n Identity Hate : 0.9998','Toxic : 0.9343\n Severe Toxic : 0.8699\n Obscene : 0.9621\n Threat : 0.7234\n Insult : 0.9414\n Identity Hate : 0.8319'])

print(x)

```

-----+-----+-----		
-----+		
ML Models	Class Label with ROC AUC on Train data	Class Label ROC AUC on Validation data
-----+-----+-----		
MultinomialNB	Toxic : 0.9837	Toxic : 0.9525
	Severe Toxic : 0.9929	Severe Toxic : 0.
	Obscene : 0.9891	Obscene : 0.958
	Threat : 0.9941	Threat : 0.914
	Insult : 0.9880	Insult : 0.957
Identity Hate : 0.9400	Identity Hate : 0.9896	Identity Hate :
-----+-----+-----		
Logistic Regression	Toxic : 0.9977	Toxic : 0.9684
	Severe Toxic : 0.9982	Severe Toxic : 0.
	Obscene : 0.9985	Obscene : 0.979
	Threat : 0.9998	Threat : 0.972
	Insult : 0.9973	Insult : 0.969
Identity Hate : 0.9659	Identity Hate : 0.9990	Identity Hate :
-----+-----+-----		
BR-MultinomialNB	Toxic : 0.9604	Toxic : 0.9404
	Severe Toxic : 0.7846	Severe Toxic : 0.
	Obscene : 0.9051	Obscene : 0.898
	Threat : 0.7122	Threat : 0.708

		Insult : 0.9048	Insult : 0.896
		Identity Hate : 0.7705	Identity Hate :
0.7668			
	LP-Logistic Regression	Toxic : 0.9862	Toxic : 0.9715
		Severe Toxic : 0.9214	Severe Toxic : 0.
96		Obscene : 0.9622	Obscene : 0.960
		Threat : 0.8748	Threat : 0.878
		Insult : 0.9640	Insult : 0.960
		Identity Hate : 0.9152	Identity Hate :
0.9159			
	BR-SVM	Toxic : 0.9703	Toxic : 0.9597
		Severe Toxic : 0.6832	Severe Toxic : 0.
52		Obscene : 0.9124	Obscene : 0.911
		Threat : 0.6132	Threat : 0.620
		Insult : 0.9285	Insult : 0.922
		Identity Hate : 0.6866	Identity Hate :
0.7002			
	CC-MultinomialNB	Toxic : 0.9604	Toxic : 0.9404
		Severe Toxic : 0.7846	Severe Toxic : 0.
11		Obscene : 0.9051	Obscene : 0.898
		Threat : 0.7122	Threat : 0.708
		Insult : 0.9048	Insult : 0.896
		Identity Hate : 0.7705	Identity Hate :
0.7668			
	Random Forest	Toxic : 0.0.9998	Toxic : 0.9343
		Severe Toxic : 0.9998	Severe Toxic : 0.
99		Obscene : 0.9998	Obscene : 0.962
		Threat : 0.9999	Threat : 0.723
		Insult : 0.9997	Insult : 0.941
		Identity Hate : 0.9998	Identity Hate :
0.8319			

