Importing Packages

```
import numpy as np
import matplotlib.pyplot as plt
```

Hyper Parameters

```
In [2]:

msg_total = 8
channel = 4
epochs = 1000
batch_size = 1024
x=np.random.randint(0,8,10000)
```

Supervised Learning

```
from keras.models import Sequential
from keras.layers import Dense, GaussianNoise
from keras.wrappers.scikit_learn import KerasClassifier

def func():
    model = Sequential()
    model.add(Dense(msg_total,input_dim=1,activation='relu'))
    model.add(Dense(2*channel, activation = 'linear'))
    model.add(GaussianNoise(1))
    model.add(Dense(msg_total, activation = 'softmax'))
    model.compile(loss='categorical_crossentropy', optimizer='adam',metrics=['acc'])
    return model

estimator=KerasClassifier(build_fn=func,epochs=epochs,batch_size=batch_size,verbose=1)

Using TensorFlow backend.
```

3/05/2019	comparison
In [4]:	
history=estimator.fit(x,x)	l
<pre>loss_supervised=history.history['loss']</pre>	
acc=history.history['acc']	
dec-nistory. history[dec]	
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```
Epoch 1/1000
10000/10000 [============== ] - 2s 159us/step - loss: 3.0989 - acc: 0.0958
Epoch 2/1000
10000/10000 [===========] - Os 9us/step - loss: 2.9755 - acc: 0.1041
Epoch 3/1000
Epoch 4/1000
Fnoch 5/1000
10000/10000 [=============] - Os 10us/step - loss: 2.6900 - acc: 0.1286
Epoch 6/1000
Epoch 7/1000
10000/10000 [=============== ] - 0s 9us/step - loss: 2.5812 - acc: 0.1336
Epoch 8/1000
10000/10000 [============= ] - Os 13us/step - loss: 2.5285 - acc: 0.1399
Epoch 9/1000
Epoch 10/1000
Epoch 11/1000
Epoch 12/1000
10000/10000 [=============] - 0s 6us/step - loss: 2.3789 - acc: 0.1550
Epoch 13/1000
10000/10000 [============] - 0s 6us/step - loss: 2.3289 - acc: 0.1578
Epoch 14/1000
10000/10000 [=============] - 0s 6us/step - loss: 2.3275 - acc: 0.1558
Epoch 15/1000
10000/10000 [=============] - 0s 6us/step - loss: 2.2984 - acc: 0.1611
Epoch 16/1000
Epoch 17/1000
Epoch 18/1000
10000/10000 [============== ] - 0s 6us/step - loss: 2.2274 - acc: 0.1743
Epoch 19/1000
Epoch 20/1000
Epoch 21/1000
10000/10000 [=============] - 0s 7us/step - loss: 2.1642 - acc: 0.1880
Epoch 22/1000
Epoch 23/1000
10000/10000 [===========] - 0s 6us/step - loss: 2.1237 - acc: 0.1902
Epoch 24/1000
10000/10000 [============] - 0s 7us/step - loss: 2.1018 - acc: 0.1953
Epoch 25/1000
Epoch 26/1000
10000/10000 [============] - 0s 6us/step - loss: 2.0619 - acc: 0.1967
Epoch 27/1000
10000/10000 [============= ] - Os 6us/step - loss: 2.0517 - acc: 0.1988
Epoch 28/1000
Epoch 29/1000
10000/10000 [===========] - 0s 6us/step - loss: 2.0161 - acc: 0.2088
Epoch 30/1000
10000/10000 [=============] - 0s 6us/step - loss: 1.9915 - acc: 0.2106
Fnoch 31/1000
Epoch 32/1000
10000/10000 [===========] - 0s 7us/step - loss: 1.9530 - acc: 0.2280
```

Epoch 33/1000			
10000/10000 [=======]	-	0s	8us/step - loss: 1.9489 - acc: 0.2262
Epoch 34/1000 10000/10000 [=======]		٥٥	6us/ston loss: 1 0277 200: 0 2220
Epoch 35/1000	-	05	ous/step - toss. 1.92// - acc. 0.2320
10000/10000 [=======]	_	0s	6us/step - loss: 1.9123 - acc: 0.2257
Epoch 36/1000			•
10000/10000 [======]	-	0s	7us/step - loss: 1.8918 - acc: 0.2341
Epoch 37/1000			
10000/10000 [======]	-	0s	7us/step - loss: 1.8785 - acc: 0.2373
Epoch 38/1000			
10000/10000 [=======]	-	0s	7us/step - loss: 1.8532 - acc: 0.2442
Epoch 39/1000 10000/10000 [=======]		0.0	7us/ston loss, 1 9495 pess 0 2272
Epoch 40/1000	-	05	/us/step - toss: 1.0403 - dcc: 0.23/3
10000/10000 [=======]	_	0s	10us/step - loss: 1.8216 - acc: 0.2508
Epoch 41/1000			
10000/10000 [======]	-	0s	8us/step - loss: 1.8177 - acc: 0.2517
Epoch 42/1000			
10000/10000 [======]	-	0s	6us/step - loss: 1.7970 - acc: 0.2527
Epoch 43/1000			
10000/10000 [=================================	-	0s	8us/step - loss: 1.7828 - acc: 0.2633
Epoch 44/1000 10000/10000 [=======]		٥٥	7us/ston loss: 1 7600 acc: 0 2632
Epoch 45/1000	-	05	/us/step - toss: 1./099 - acc: 0.2032
1000/1000 [======]	_	0s	6us/step - loss: 1.7558 - acc: 0.2597
Epoch 46/1000			
10000/10000 [======]	-	0s	8us/step - loss: 1.7480 - acc: 0.2629
Epoch 47/1000			
10000/10000 [======]	-	0s	6us/step - loss: 1.7353 - acc: 0.2628
Epoch 48/1000			
10000/10000 [=======]	-	0s	/us/step - loss: 1./142 - acc: 0.2/63
Epoch 49/1000 10000/10000 [=======]		٥٥	6us/ston loss: 1 6040 acc: 0 2831
Epoch 50/1000	-	05	ous/step - toss. 1.0949 - acc. 0.2031
10000/10000 [=======]	_	0s	6us/step - loss: 1.6919 - acc: 0.2743
Epoch 51/1000			
10000/10000 [======]	-	0s	8us/step - loss: 1.6732 - acc: 0.2831
Epoch 52/1000			
10000/10000 [======]	-	0s	7us/step - loss: 1.6604 - acc: 0.2914
Epoch 53/1000		0	5 / 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
10000/10000 [=================================	-	0s	6us/step - Loss: 1.64/5 - acc: 0.2946
Epoch 54/1000 10000/10000 [=======]	_	Оc	7us/sten - loss: 1 6371 - acc: 0 2075
Epoch 55/1000	_	03	/us/step - toss. 1.05/1 - acc. 0.25/5
10000/10000 [=======]	_	0s	7us/step - loss: 1.6297 - acc: 0.2900
Epoch 56/1000			•
10000/10000 [======]	-	0s	6us/step - loss: 1.6178 - acc: 0.2980
Epoch 57/1000			
10000/10000 [=================================	-	0s	6us/step - loss: 1.5904 - acc: 0.3142
Epoch 58/1000		0 -	0/
10000/10000 [======] Epoch 59/1000	-	US	8us/step - Loss: 1.5901 - acc: 0.3080
10000/10000 [=================================	_	Ωc	8us/sten - loss: 1 5869 - acc: 0 3079
Epoch 60/1000		03	0437, Step 1033. 1.3003 400. 0.3073
10000/10000 [=======]	-	0s	7us/step - loss: 1.5741 - acc: 0.3152
Epoch 61/1000			•
10000/10000 [=====]	-	0s	11us/step - loss: 1.5594 - acc: 0.3196
Epoch 62/1000			
10000/10000 [======]	-	0s	12us/step - loss: 1.5451 - acc: 0.3236
Epoch 63/1000		0	0.00 / 0.00 0.00 0.00 0.00 0.00 0.00 0.
10000/10000 [======]	-	US	9us/step - Loss: 1.5428 - acc: 0.3215
Epoch 64/1000 10000/10000 [=======]	_	() c	6us/sten - loss: 1 5327 - acc: A 3275
Epoch 65/1000			
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10000/10000 [=]	-	0s	6us/step -	loss:	1.5264 -	acc:	0.3346
Epoch 66/1000								
]	-	0s	6us/step -	loss:	1.5129 -	acc:	0.3340
Epoch 67/1000 10000/10000 [=]	_	05	6us/sten -	1055:	1.5058 -	acc:	0.3308
Epoch 68/1000			0.5	04373100		113030	acc.	0.5500
· ·]	-	0s	7us/step -	loss:	1.4913 -	acc:	0.3405
Epoch 69/1000								
_]	-	0s	6us/step -	loss:	1.4865 -	acc:	0.3447
Epoch 70/1000]		0.0	6us/ston	10001	1 //702	2661	0.2426
Epoch 71/1000		-	05	ous/step -	10551	1.4703 -	acc:	0.3420
']	_	0s	6us/step -	loss:	1.4726 -	acc:	0.3442
Epoch 72/1000								
]	-	0s	7us/step -	loss:	1.4610 -	acc:	0.3555
Epoch 73/1000	1		0 -	7/	1	1 4510		0 2525
Epoch 74/1000]	-	05	/us/step -	1055:	1.4519 -	acc:	0.3323
']	_	0s	6us/step -	loss:	1.4496 -	acc:	0.3576
Epoch 75/1000								
]	-	0s	6us/step -	loss:	1.4378 -	acc:	0.3636
Epoch 76/1000				-	7	1 4000		0 0000
10000/10000 [= Epoch 77/1000]	-	0s	/us/step -	loss:	1.4298 -	acc:	0.3602
]	_	05	6us/step -	loss:	1.4233 -	acc:	0.3714
Epoch 78/1000			0.5	04373100		11.1233	acc.	0.071.
]	-	0s	6us/step -	loss:	1.4086 -	acc:	0.3772
Epoch 79/1000								
]	-	0s	6us/step -	loss:	1.4005 -	acc:	0.3782
Epoch 80/1000]		0 c	7us/sten -	1000	1 /012 -	300:	0 3773
Epoch 81/1000	,		03	7 u 3 / 3 c c p	0331	1.4012	acc.	0.5775
']	-	0s	7us/step -	loss:	1.3888 -	acc:	0.3806
Epoch 82/1000								
]	-	0s	8us/step -	loss:	1.3820 -	acc:	0.3844
Epoch 83/1000	1		0.0	7us/ston	10001	1 2776	2661	0 2076
Epoch 84/1000]	-	05	/us/step -	1055;	1.5//0 -	acc:	0.30/0
']	_	0s	6us/step -	loss:	1.3726 -	acc:	0.3835
Epoch 85/1000								
]	-	0s	7us/step -	loss:	1.3673 -	acc:	0.3901
Epoch 86/1000			0	6 / 1	,	1 2524		0 4010
Epoch 87/1000 [=]	-	05	bus/step -	1055:	1.3534 -	acc:	0.4013
']	_	0s	6us/step -	loss:	1.3464 -	acc:	0.4038
Epoch 88/1000	-			, , , , , ,				
10000/10000 [=]	-	0s	8us/step -	loss:	1.3496 -	acc:	0.4003
Epoch 89/1000				-	7	1 2272		
10000/10000 [= Epoch 90/1000]	-	0S	/us/step -	loss:	1.33/3 -	acc:	0.4089
']	_	05	6us/step -	loss:	1.3305 -	acc:	0.4036
Epoch 91/1000	•			очо, отор		1.0000		000
10000/10000 [=]	-	0s	6us/step -	loss:	1.3252 -	acc:	0.4108
Epoch 92/1000								
]	-	0s	7us/step -	loss:	1.3137 -	acc:	0.4198
Epoch 93/1000]		0 c	Gus/sten -	1000	1 3135 -	3CC:	0 4130
Epoch 94/1000			03	ous/step -		1.5155	acc.	0.4130
']	-	0s	7us/step -	loss:	1.3049 -	acc:	0.4207
Epoch 95/1000								
]	-	0s	6us/step -	loss:	1.2964 -	acc:	0.4236
Epoch 96/1000			0.0	0116/6+00	1000	1 2012	266	0 4270
Epoch 97/1000 [=]	-	05	ous/step -	CUSS!	1.7277 -	act:	0.42/0
']	-	0s	6us/step -	loss:	1.2888 -	acc:	0.4298
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Epoch 98/1000		0	C / I	,	1 2025		0 4222
10000/10000 [======] Epoch 99/1000	-	US	bus/step -	LOSS:	1.2835 -	acc:	0.4232
10000/10000 [=======]	_	0 s	7us/sten -	lnss:	1 2764 -	acc:	0 4319
Epoch 100/1000		0.5	74373666		112701	acci	011313
10000/10000 [======]	-	0s	6us/step -	loss:	1.2689 -	acc:	0.4437
Epoch 101/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	1.2661 -	acc:	0.4429
Epoch 102/1000							
10000/10000 [=================================	-	0s	6us/step -	loss:	1.2634 -	acc:	0.4440
Epoch 103/1000		0 -	0/	1	1 2540		0 4451
10000/10000 [======] Epoch 104/1000	-	US	8us/step -	LOSS:	1.2540 -	acc:	0.4451
10000/10000 [=======]	_	0 c	7us/sten -	1000	1 2490 -	acc.	0 4474
Epoch 105/1000		03	7 d 3 / 3 c c p		112430	acc.	014474
10000/10000 [=======]	_	0s	7us/step -	loss:	1.2391 -	acc:	0.4536
Epoch 106/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	1.2361 -	acc:	0.4516
Epoch 107/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	1.2330 -	acc:	0.4546
Epoch 108/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	1.2257 -	acc:	0.4572
Epoch 109/1000 10000/10000 [======]		0.0	7us/ston	10001	1 2100	2661	0 4622
Epoch 110/1000	-	05	/us/step -	10551	1.2190 -	acc:	0.4023
10000/10000 [======]	_	0s	6us/step -	loss:	1.2138 -	acc:	0.4626
Epoch 111/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	1.2085 -	acc:	0.4695
Epoch 112/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	1.2064 -	acc:	0.4747
Epoch 113/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	1.2036 -	acc:	0.4666
Epoch 114/1000 10000/10000 [=======]		0.5	7115/5+00	1000	1 1005	200.	0 4007
Epoch 115/1000	-	05	/us/step -	1055;	1.1905 -	acc:	0.4007
10000/10000 [======]	_	0.5	6us/step -	loss:	1.1907 -	acc:	0.4775
Epoch 116/1000			040,0100		1.1007		011770
10000/10000 [======]	-	0s	6us/step -	loss:	1.1876 -	acc:	0.4743
Epoch 117/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	1.1842 -	acc:	0.4807
Epoch 118/1000							
10000/10000 [=================================	-	0s	8us/step -	loss:	1.1815 -	acc:	0.4857
Epoch 119/1000		0 -	C / - +	1	1 1700		0 4043
10000/10000 [======] Epoch 120/1000	-	US	ous/step -	LOSS:	1.1/00 -	acc:	0.4843
10000/10000 [=======]	_	0 c	hus/stan -	1000	1 1605 -	acc.	0 4807
Epoch 121/1000		03	оиз/ э сер	(033.	1.1055	acc.	0.4007
10000/10000 [=======]	_	0s	7us/step -	loss:	1.1568 -	acc:	0.4962
Epoch 122/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	1.1598 -	acc:	0.4936
Epoch 123/1000							
10000/10000 [=================================	-	0s	6us/step -	loss:	1.1484 -	acc:	0.4969
Epoch 124/1000			0 / .		1 1440		0 5040
10000/10000 [======]	-	0S	8us/step -	loss:	1.1443 -	acc:	0.5040
Epoch 125/1000		0.0	7us/ston	10001	1 1/20	2661	0 5004
10000/10000 [======] Epoch 126/1000	-	05	rus/step -	10551	1.1429 -	acc:	0.3004
10000/10000 [=======]	_	0s	6us/step -	loss:	1.1425 -	acc:	0.5074
Epoch 127/1000							2-7.
10000/10000 [======]	-	0s	6us/step -	loss:	1.1347 -	acc:	0.5158
Epoch 128/1000			•				
10000/10000 [======]	-	0s	6us/step -	loss:	1.1291 -	acc:	0.5175
Epoch 129/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	1.1242 -	acc:	0.5065
Epoch 130/1000							
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10000/10000 [======]	-	0s	9us/step - loss	: 1.1171 - acc	: 0.5309
Epoch 131/1000					
10000/10000 [=================================	-	0s	6us/step - loss	: 1.1170 - acc	: 0.5146
Epoch 132/1000		0	6 ()	1 1114	0 5220
10000/10000 [=======]	-	0S	bus/step - loss	: 1.1114 - acc	0.5220
Epoch 133/1000 10000/10000 [=======]		0.0	6us/sten - loss	. 1 10/12 - 200	· 0 5312
Epoch 134/1000	_	03	003/31ep - 1033	. 1.1042 - acc	. 0.5512
10000/10000 [=======]	_	0s	6us/step - loss	: 1.1001 - acc	: 0.5233
Epoch 135/1000					
10000/10000 [=======]	-	0s	8us/step - loss	: 1.0962 - acc	: 0.5286
Epoch 136/1000					
10000/10000 [=================================	-	0s	7us/step - loss	: 1.0942 - acc	: 0.5306
Epoch 137/1000		0	7 / 1	1 0010	0 5007
10000/10000 [======] Epoch 138/1000	-	ΘS	/us/step - loss	: 1.0910 - acc	0.5297
10000/10000 [=======]	_	0.5	6us/sten - loss	· 1 0858 - acc	. 0 5202
Epoch 139/1000		03	оиз/ этер созз	. 1.0050 acc	0.3232
10000/10000 [=======]	_	0s	7us/step - loss	: 1.0770 - acc	: 0.5408
Epoch 140/1000			·		
10000/10000 [======]	-	0s	7us/step - loss	: 1.0784 - acc	: 0.5378
Epoch 141/1000					
10000/10000 [=================================	-	0s	7us/step - loss	: 1.0698 - acc	0.5443
Epoch 142/1000		0.5	Gua/atan laga	. 1 0674	. 0 5422
10000/10000 [======] Epoch 143/1000	-	05	bus/step - loss	: 1.06/4 - acc	0.5423
10000/10000 [=======]	_	05	6us/sten - loss	: 1.0652 - acc	. 0.5500
Epoch 144/1000		0.5	оцо, о сор сооо	. 1.0032	013300
10000/10000 [=======]	-	0s	6us/step - loss	: 1.0592 - acc	: 0.5495
Epoch 145/1000					
10000/10000 [======]	-	0s	7us/step - loss	: 1.0498 - acc	: 0.5567
Epoch 146/1000					
10000/10000 [=================================	-	0s	6us/step - loss	: 1.0504 - acc	c: 0.5610
Epoch 147/1000 10000/10000 [=======]		0.5	6us/sten - loss	. 1 0447 - 200	. 0 5587
Epoch 148/1000	_	03	003/31ep - 1033	. 1.0447 - acc	. 0.5507
10000/10000 [=======]	_	0s	6us/step - loss	: 1.0408 - acc	: 0.5608
Epoch 149/1000					
10000/10000 [======]	-	0s	6us/step - loss	: 1.0366 - acc	: 0.5657
Epoch 150/1000					
10000/10000 [=================================	-	0s	9us/step - loss	: 1.0354 - acc	: 0.5635
Epoch 151/1000		0 -	0/	1 0245	0 5000
10000/10000 [======] Epoch 152/1000	-	05	ous/step - 1055	: 1.0345 - acc	.: 0.3000
10000/10000 [=======]	_	0s	7us/step - loss	: 1.0273 - acc	: 0.5735
Epoch 153/1000			, as, stop 1000		0.0700
10000/10000 [=======]	-	0s	6us/step - loss	: 1.0204 - acc	: 0.5831
Epoch 154/1000					
10000/10000 [======]	-	0s	6us/step - loss	: 1.0174 - acc	: 0.5814
Epoch 155/1000					
10000/10000 [======]	-	0s	9us/step - loss	: 1.0187 - acc	c: 0.5684
Epoch 156/1000 10000/10000 [======]		0.0	6us/sten - loss	. 1 0118 - 200	. 0 5686
Epoch 157/1000	_	03	003/31ep - 1033	. 1.0110 - acc	. 0.3000
10000/10000 [=======]	_	0s	7us/step - loss	: 1.0085 - acc	: 0.5855
Epoch 158/1000					
10000/10000 [======]	-	0s	8us/step - loss	: 1.0025 - acc	: 0.5846
Epoch 159/1000					
10000/10000 [=================================	-	0s	6us/step - loss	: 1.0010 - acc	: 0.5784
Epoch 160/1000		0 -	0110/0400 1-	. 0 0007 -	. 0 5020
10000/10000 [======] Epoch 161/1000	-	US	ous/step - toss	. ש.ששמ/ - acc	0.3920
10000/10000 [=======]	_	(·) <	7us/sten - loss	: 0.9908 - acc	: 0.5864
Epoch 162/1000		55	. 30, 0 000		010007
10000/10000 [======]	-	0s	9us/step - loss	: 0.9858 - acc	: 0.5921
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Epoch 163/1000	
	=] - 0s 7us/step - loss: 0.9806 - acc: 0.5932
Epoch 164/1000	1 00 600 (atom loss, 0 0014 pee, 0 5001
Epoch 165/1000	=] - 0s 6us/step - loss: 0.9814 - acc: 0.5901
	=] - 0s 8us/step - loss: 0.9777 - acc: 0.5907
Epoch 166/1000	-1 03 0u3/3tcp t033. 0.3/// ucc. 0.330/
	=] - 0s 9us/step - loss: 0.9766 - acc: 0.5959
Epoch 167/1000	
10000/10000 [=================================	=] - 0s 8us/step - loss: 0.9712 - acc: 0.5957
Epoch 168/1000	
10000/10000 [=======	=] - 0s 7us/step - loss: 0.9639 - acc: 0.5975
Epoch 169/1000	
	=] - 0s 6us/step - loss: 0.9609 - acc: 0.6008
Epoch 170/1000	1 0 6 / 1 1 0 0500
Epoch 171/1000	=] - 0s 6us/step - loss: 0.9583 - acc: 0.6124
	=] - 0s 7us/step - loss: 0.9571 - acc: 0.5974
Epoch 172/1000	-1 03 /us/step toss: 0.55/1 dec. 0.55/4
	=] - 0s 6us/step - loss: 0.9526 - acc: 0.6037
Epoch 173/1000	•
10000/10000 [=================================	=] - 0s 6us/step - loss: 0.9499 - acc: 0.5998
Epoch 174/1000	
	=] - 0s 10us/step - loss: 0.9412 - acc: 0.6157
Epoch 175/1000	
	=] - 0s 11us/step - loss: 0.9373 - acc: 0.6137
Epoch 176/1000	=] - 0s 9us/step - loss: 0.9337 - acc: 0.6148
Epoch 177/1000	-1 03 3u3/3tep to33: 0.333/ ucc. 0.0140
	=] - 0s 10us/step - loss: 0.9325 - acc: 0.6204
Epoch 178/1000	
10000/10000 [=================================	=] - 0s 7us/step - loss: 0.9305 - acc: 0.6122
Epoch 179/1000	
I	=] - 0s 7us/step - loss: 0.9278 - acc: 0.6136
Epoch 180/1000	=] - 0s 8us/step - loss: 0.9209 - acc: 0.6215
Epoch 181/1000	-] - 03 0u3/3tep - t033. 0.9209 - acc. 0.0213
	=] - 0s 7us/step - loss: 0.9142 - acc: 0.6241
Epoch 182/1000	
10000/10000 [=================================	e] - 0s 6us/step - loss: 0.9167 - acc: 0.6133
Epoch 183/1000	
	=] - 0s 6us/step - loss: 0.9114 - acc: 0.6265
Epoch 184/1000	1 00 600/0400 1000 0 0045 000 0 6205
Epoch 185/1000	=] - 0s 6us/step - loss: 0.9045 - acc: 0.6305
	=] - 0s 6us/step - loss: 0.9040 - acc: 0.6210
Epoch 186/1000	
10000/10000 [=================================	=] - 0s 8us/step - loss: 0.9020 - acc: 0.6258
Epoch 187/1000	
	=] - 0s 6us/step - loss: 0.8962 - acc: 0.6340
Epoch 188/1000	1 0- 7/ 1 0 0020 0 0210
Epoch 189/1000	=] - 0s 7us/step - loss: 0.8930 - acc: 0.6318
· ·	=] - 0s 7us/step - loss: 0.8935 - acc: 0.6369
Epoch 190/1000	1 00 740,0100 10001 010000
· ·	=] - 0s 8us/step - loss: 0.8865 - acc: 0.6346
Epoch 191/1000	
	=] - 0s 6us/step - loss: 0.8853 - acc: 0.6379
Epoch 192/1000	1 0-0-1-1-1 0 0005
10000/10000 [=================================	=] - 0s 6us/step - loss: 0.8805 - acc: 0.6339
· ·	=] - 0s 6us/step - loss: 0.8757 - acc: 0.6395
Epoch 194/1000	, 15 cas, 5 cas coss, 5 coss, 4 cos 6 coss
· ·	=] - 0s 7us/step - loss: 0.8719 - acc: 0.6427
Epoch 195/1000	
I	

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10000/10000 [======]	-	0s	6us/step - l	055:	0.8738 - a	icc:	0.6355
Epoch 196/1000							
10000/10000 [=======]	-	0s	7us/step - l	055:	0.8682 - a	ICC:	0.6401
Epoch 197/1000 10000/10000 [======]	_	0 s	6us/sten - 1	055'	0 8625 - a	ıcc:	ი 6491
Epoch 198/1000		03	043/3100	.0331	010025		010431
10000/10000 [=======]	-	0s	6us/step - l	055:	0.8653 - a	icc:	0.6460
Epoch 199/1000							
10000/10000 [=================================	-	0s	6us/step - l	055:	0.8613 - a	icc:	0.6443
Epoch 200/1000 10000/10000 [======]		0.0	6us/ston 1	0001	0.9564		0 6437
Epoch 201/1000	-	05	ous/step - t	.055.	0.0304 - 8	icc.	0.0437
10000/10000 [======]	-	0s	6us/step - l	oss:	0.8517 - a	icc:	0.6537
Epoch 202/1000							
10000/10000 [=================================	-	0s	7us/step - l	055:	0.8486 - a	icc:	0.6396
Epoch 203/1000 10000/10000 [=======]		0.0	7us/ston 1	0661	0.0422 -		0 6625
Epoch 204/1000	-	05	/us/step - t	.055.	0.0423 - 6	icc.	0.0055
10000/10000 [======]	-	0s	7us/step - l	oss:	0.8433 - a	icc:	0.6489
Epoch 205/1000							
10000/10000 [=================================	-	0s	6us/step - l	055:	0.8381 - a	icc:	0.6586
Epoch 206/1000		0.0	Suc/ston 1	0661	0.0254 -		0 6540
10000/10000 [======] Epoch 207/1000	-	05	ous/step - t	.055;	0.0334 - d	ICC;	0.0540
10000/10000 [======]	-	0s	7us/step - l	055:	0.8347 - a	icc:	0.6530
Epoch 208/1000							
10000/10000 [=======]	-	0s	6us/step - l	055:	0.8296 - a	icc:	0.6570
Epoch 209/1000 10000/10000 [======]		0.0	7us/ston 1	0661	0.9240 -		0 6667
Epoch 210/1000	-	05	/us/step - t	.055;	0.0240 - d	ICC;	0.0007
10000/10000 [=======]	-	0s	7us/step - l	055:	0.8253 - a	icc:	0.6627
Epoch 211/1000							
10000/10000 [=======]	-	0s	6us/step - l	055:	0.8224 - a	icc:	0.6632
Epoch 212/1000		0.0	Suc/ston 1	0661	0.0164		0 6626
10000/10000 [======] Epoch 213/1000	-	05	ous/step - t	.055.	0.0104 - 8	icc.	0.0020
10000/10000 [======]	-	0s	6us/step - l	oss:	0.8176 - a	icc:	0.6646
Epoch 214/1000							
10000/10000 [=======]	-	0s	6us/step - l	055:	0.8128 - a	icc:	0.6704
Epoch 215/1000		0.5	7uc/c+on 1		0.000		0 6710
10000/10000 [======] Epoch 216/1000	-	05	/us/step - t	.055;	0.0000 - d	ICC;	0.0719
10000/10000 [=======]	-	0s	6us/step - l	055:	0.8084 - a	icc:	0.6612
Epoch 217/1000							
10000/10000 [========]	-	0s	8us/step - l	055:	0.8005 - a	icc:	0.6797
Epoch 218/1000 10000/10000 [======]		0.5	7us/sten - 1	0661	0 7087 - 3		0 6750
Epoch 219/1000		03	/us/step - t	.033.	0.7507 - 6	icc.	0.0750
10000/10000 [======]	-	0s	6us/step - l	055:	0.7950 - a	icc:	0.6758
Epoch 220/1000							
10000/10000 [========]	-	0s	7us/step - l	055:	0.7933 - a	icc:	0.6739
Epoch 221/1000 10000/10000 [======]	_	0.5	7us/sten - 1	nee:	0 7001 - a).C.C.	0 6766
Epoch 222/1000		03	743/3 CCp	.033.	0.7501	1001	0.0700
10000/10000 [=======]	-	0s	7us/step - l	oss:	0.7883 - a	icc:	0.6684
Epoch 223/1000							
10000/10000 [=======]	-	0s	6us/step - l	055:	0.7804 - a	icc:	0.6831
Epoch 224/1000 10000/10000 [======]	_	0 s	6us/sten - 1	nss:	0 7837 - a	ıcc:	0 6741
Epoch 225/1000	-	U S	543,310p - 1		517057 - 0		J.U/41
10000/10000 [======]	-	0s	6us/step - l	oss:	0.7775 - a	icc:	0.6868
Epoch 226/1000							
10000/10000 [=======]	-	0s	/us/step - l	055:	0.7746 - a	icc:	0.6849
Epoch 227/1000 10000/10000 [======]	_	0<	6us/sten - 1	055'	0.7698 - =	icc'	0.6798
		J J	545,5 ccp = C		3.7330		3.3730

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Epoch 228/1000					
10000/10000 [======]	-	0s	6us/step - loss:	0.7656 - acc:	0.6866
Epoch 229/1000 10000/10000 [======]		0.0	7us/ston loss:	0 7655 2001	0 6910
Epoch 230/1000	_	03	7u3/3tep - t033.	0.7055 - acc.	0.0010
10000/10000 [=======]	_	0s	7us/step - loss:	0.7623 - acc:	0.6889
Epoch 231/1000			•		
10000/10000 [=====]	-	0s	6us/step - loss:	0.7605 - acc:	0.6812
Epoch 232/1000					
10000/10000 [========]	-	0s	7us/step - loss:	0.7549 - acc:	0.6897
Epoch 233/1000 10000/10000 [=======]		0.0	Suc/ston loss.	0 7525 2001	0 6041
Epoch 234/1000	-	05	ous/step - toss.	0.7323 - acc.	0.0941
10000/10000 [=======]	_	0s	6us/step - loss:	0.7535 - acc:	0.6837
Epoch 235/1000					
10000/10000 [=====]	-	0s	6us/step - loss:	0.7471 - acc:	0.6947
Epoch 236/1000					
10000/10000 [======]	-	0s	6us/step - loss:	0.7488 - acc:	0.6890
Epoch 237/1000 10000/10000 [=======]		0.0	fuc/ston loss.	0.7429 2001	0 6007
Epoch 238/1000	-	05	ous/step - toss:	0.7420 - acc:	0.0007
10000/10000 [=======]	_	0s	6us/step - loss:	0.7425 - acc:	0.6889
Epoch 239/1000					
10000/10000 [======]	-	0s	6us/step - loss:	0.7389 - acc:	0.6971
Epoch 240/1000					
10000/10000 [======]	-	0s	7us/step - loss:	0.7369 - acc:	0.6968
Epoch 241/1000 10000/10000 [======]	_	0 c	7us/sten - loss:	0 7314 - acc:	0 6036
Epoch 242/1000	_	03	7u3/3tep - t033.	0.7514 - acc.	0.0950
10000/10000 [==========]	-	0s	6us/step - loss:	0.7283 - acc:	0.7023
Epoch 243/1000					
10000/10000 [======]	-	0s	6us/step - loss:	0.7239 - acc:	0.7066
Epoch 244/1000		0	7 ()	0.7040	. 7000
10000/10000 [======] Epoch 245/1000	-	0S	/us/step - loss:	0./240 - acc:	0.7008
10000/10000 [=======]	_	05	6us/sten - loss:	0.7182 - acc:	0.7076
Epoch 246/1000		0.5	00075000 00001	017102 dee1	017070
10000/10000 [=================================	-	0s	6us/step - loss:	0.7161 - acc:	0.7056
Epoch 247/1000					
10000/10000 [========]	-	0s	7us/step - loss:	0.7122 - acc:	0.7100
Epoch 248/1000		0.5	Oue /eten less.	0 7072	0 7120
10000/10000 [======] Epoch 249/1000	-	05	8us/step - toss:	0.7073 - acc:	0.7129
10000/10000 [======]	_	0s	6us/step - loss:	0.7050 - acc:	0.7205
Epoch 250/1000			,		
10000/10000 [======]	-	0s	6us/step - loss:	0.7024 - acc:	0.7234
Epoch 251/1000					
10000/10000 [======]	-	0s	7us/step - loss:	0.6997 - acc:	0.7188
Epoch 252/1000 10000/10000 [======]		0.0	Que/eton locci	0 6066 366	0 7300
Epoch 253/1000	-	05	ous/step - toss.	0.0900 - acc.	0.7309
10000/10000 [=========]	-	0s	6us/step - loss:	0.6956 - acc:	0.7225
Epoch 254/1000					
10000/10000 [======]	-	0s	6us/step - loss:	0.6919 - acc:	0.7250
Epoch 255/1000		0	6 / 1	0.6067	0 7061
10000/10000 [======] Epoch 256/1000	-	05	bus/step - loss:	0.686/ - acc:	0./301
10000/10000 [=======]	_	0s	7us/step - loss:	0.6845 - acc:	0.7350
Epoch 257/1000					
10000/10000 [=====]	-	0s	7us/step - loss:	0.6806 - acc:	0.7423
Epoch 258/1000					
10000/10000 [======]	-	0s	6us/step - loss:	0.6793 - acc:	0.7403
Epoch 259/1000 10000/10000 [======]		0.0	7uc/ston 1000	0 6716	0 7500
Epoch 260/1000	-	05	,us/step - t055;	0.0/10 - acc:	0.7509
,,					

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Epoch 261/1000
10000/10000 [============== ] - 0s 8us/step - loss: 0.6663 - acc: 0.7557
Epoch 262/1000
10000/10000 [============= ] - 0s 6us/step - loss: 0.6659 - acc: 0.7504
Epoch 263/1000
10000/10000 [============== ] - 0s 6us/step - loss: 0.6623 - acc: 0.7579
Fnoch 264/1000
10000/10000 [============= ] - Os 7us/step - loss: 0.6566 - acc: 0.7572
Epoch 265/1000
10000/10000 [============] - 0s 6us/step - loss: 0.6534 - acc: 0.7631
Epoch 266/1000
10000/10000 [============== ] - Os 6us/step - loss: 0.6531 - acc: 0.7643
Epoch 267/1000
10000/10000 [============] - 0s 6us/step - loss: 0.6398 - acc: 0.7800
Epoch 268/1000
10000/10000 [===========] - 0s 6us/step - loss: 0.6406 - acc: 0.7799
Fnoch 269/1000
Epoch 270/1000
Epoch 271/1000
10000/10000 [============= ] - Os 6us/step - loss: 0.6242 - acc: 0.7904
Epoch 272/1000
10000/10000 [============== ] - 0s 6us/step - loss: 0.6181 - acc: 0.7941
Epoch 273/1000
10000/10000 [============= ] - 0s 6us/step - loss: 0.6107 - acc: 0.7971
Epoch 274/1000
10000/10000 [============] - 0s 7us/step - loss: 0.6076 - acc: 0.8005
Epoch 275/1000
Epoch 276/1000
tep - loss: 0.5938 - acc: 0.8142
Epoch 277/1000
10000/10000 [============== ] - 0s 6us/step - loss: 0.5884 - acc: 0.8170
Epoch 278/1000
Epoch 279/1000
Epoch 280/1000
Epoch 281/1000
Epoch 282/1000
Epoch 283/1000
Epoch 284/1000
Epoch 285/1000
Epoch 286/1000
Epoch 287/1000
10000/10000 [===========] - 0s 6us/step - loss: 0.5177 - acc: 0.8616
Epoch 288/1000
10000/10000 [============] - 0s 7us/step - loss: 0.5112 - acc: 0.8643
Epoch 289/1000
Epoch 290/1000
10000/10000 [===========] - 0s 7us/step - loss: 0.5023 - acc: 0.8675
Epoch 291/1000
Epoch 292/1000
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10000/10000 [======]	-	0s	6us/step -	loss:	0.4902 - 8	acc:	0.8708
Epoch 293/1000				_			
10000/10000 [=======]	-	0s	7us/step -	loss:	0.4863 - 8	acc:	0.8744
Epoch 294/1000 10000/10000 [======]	_	0 s	7us/sten -	loss:	0.4790 - 2	acc:	0.8808
Epoch 295/1000		03	74373 сер	.0551	014750	1001	0.0000
10000/10000 [=======]	-	0s	6us/step -	loss:	0.4711 - 8	acc:	0.8826
Epoch 296/1000							
10000/10000 [=================================	-	0s	6us/step -	loss:	0.4700 - 8	acc:	0.8827
Epoch 297/1000 10000/10000 [======]		0.0	7us/ston	10001	0 4506	2001	0 0001
Epoch 298/1000	-	05	/us/step -	1055.	0.4590 - 6	, , , ,	0.0004
10000/10000 [======]	-	0s	6us/step -	loss:	0.4601 - 8	acc:	0.8862
Epoch 299/1000							
10000/10000 [=================================	-	0s	7us/step -	loss:	0.4502 - 8	acc:	0.8930
Epoch 300/1000 10000/10000 [======]		0.0	7us/stop	10001	0 4475	2661	0 9027
Epoch 301/1000	-	05	/us/step -	1055.	0.44/3 - 0	, , , ,	0.0927
10000/10000 [======]	-	0s	6us/step -	loss:	0.4455 - 8	acc:	0.8937
Epoch 302/1000							
10000/10000 [=================================	-	0s	6us/step -	loss:	0.4383 - 8	acc:	0.8974
Epoch 303/1000		0.0	6us/stop	10001	0 4211	2661	0 0005
10000/10000 [======] Epoch 304/1000	-	05	ous/step -	1055:	0.4311 - 6	: 226	0.9005
10000/10000 [======]	-	0s	8us/step -	loss:	0.4300 - 8	acc:	0.8989
Epoch 305/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	0.4238 - 8	acc:	0.9027
Epoch 306/1000		0.5	Gus /stan	1000.	0 4217		0 0042
10000/10000 [======] Epoch 307/1000	-	05	ous/step -	1055:	0.4217 - 6	: 226	0.9042
10000/10000 [=======]	-	0s	6us/step -	loss:	0.4150 - 8	acc:	0.9030
Epoch 308/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	0.4132 - 8	acc:	0.9045
Epoch 309/1000		0.0	6us/stop	10001	0.4050	2661	0 0000
10000/10000 [======] Epoch 310/1000	-	05	ous/step -	1055.	0.4030 - 6	, , , ,	0.9090
10000/10000 [======]	-	0s	7us/step -	loss:	0.4049 - 8	acc:	0.9100
Epoch 311/1000							
10000/10000 [=======]	-	0s	7us/step -	loss:	0.4022 - 3	acc:	0.9063
Epoch 312/1000 10000/10000 [======]		0.0	6us/stop	10001	0.2046	2661	0 0000
Epoch 313/1000	-	05	ous/step -	1055:	0.3940 - 6	: 226	0.9099
10000/10000 [=======]	-	0s	6us/step -	loss:	0.3930 - 8	acc:	0.9135
Epoch 314/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	0.3911 - 8	acc:	0.9119
Epoch 315/1000 10000/10000 [======]		0.0	6us/stop	10001	0.2060 -	2661	0.0140
Epoch 316/1000	-	05	ous/step -	1055.	0.3000 - 6	, , , ,	0.9140
10000/10000 [======]	-	0s	7us/step -	loss:	0.3850 - 8	acc:	0.9127
Epoch 317/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	0.3763 - 8	acc:	0.9206
Epoch 318/1000 10000/10000 [======]		0.5	Gus/stan -	1000	0 3708 - 3	acc:	0 0131
Epoch 319/1000		03	003/31ep -		0.5790 - 6	i ook	0.9131
10000/10000 [=======]	-	0s	7us/step -	loss:	0.3747 - 8	acc:	0.9197
Epoch 320/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	0.3676 - 8	acc:	0.9188
Epoch 321/1000 10000/10000 [======]		0.5	Rus/stan -	1000	A 3660 - :	acc:	0 0107
Epoch 322/1000	-	U.S	ous/step -	.033.	0.5003 - (,	0.3131
10000/10000 [=======]	-	0s	7us/step -	loss:	0.3609 - 8	acc:	0.9246
Epoch 323/1000							
10000/10000 [=======]	-	0s	7us/step -	loss:	0.3613 - 8	acc:	0.9191
Epoch 324/1000 10000/10000 [======]	_	0 <	7us/sten -	1055.	0.3540 - :	acc:	0.9275
	-	03	, 43, 3 CGp -	.033.	5.5545 - (,	J.J2/J

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Epoch 325/1000 10000/10000 [===========]	00 600 /oton 1000 0 2522 000 0 0251	
Epoch 326/1000	- 05 0us/step - toss: 0.5552 - acc: 0.9251	
10000/10000 [========]	- 0s 6us/step - loss: 0.3499 - acc: 0.9252	
Epoch 327/1000		
10000/10000 [======]	- Os 6us/step - loss: 0.3460 - acc: 0.9248	
Epoch 328/1000		
10000/10000 [======] Epoch 329/1000	- Us 8us/step - Loss: 0.3449 - acc: 0.9265	
10000/10000 [=======]	- As Aus/sten - loss: A 3428 - acc: A 9247	
Epoch 330/1000	υσ ομαγιστέρ του στ. υ. 5420 ατέ. υ. 5247	
10000/10000 [=======]	- Os 6us/step - loss: 0.3379 - acc: 0.9292	
Epoch 331/1000		
10000/10000 [======]	- Os 7us/step - loss: 0.3345 - acc: 0.9321	
Epoch 332/1000	0 11 / 1 0 0000	0
10000/10000 [======] Epoch 333/1000	- Us Ilus/step - Loss: 0.3326 - acc: 0.929	2
10000/10000 [=======]	- As 8us/sten - loss: A 3294 - acc: A 9376	
Epoch 334/1000	03 0d3/3 ccp	
10000/10000 [=======]	- Os 6us/step - loss: 0.3257 - acc: 0.9345	
Epoch 335/1000		
10000/10000 [======]	- Os 6us/step - loss: 0.3243 - acc: 0.9343	
Epoch 336/1000		
10000/10000 [=================================	- 0s 8us/step - Loss: 0.3185 - acc: 0.9381	
Epoch 337/1000 10000/10000 [============]	- As 7us/sten - loss: A 3179 - acc: A 9393	
Epoch 338/1000	03 / d3/ 3 ccp	
10000/10000 [===========]	- Os 7us/step - loss: 0.3133 - acc: 0.9393	
Epoch 339/1000		
10000/10000 [======]	- Os 7us/step - loss: 0.3113 - acc: 0.9433	
Epoch 340/1000	0 7 / 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
10000/10000 [======] Epoch 341/1000	- Os /us/step - Loss: 0.3109 - acc: 0.9392	
10000/10000 [=======]	- 0s 6us/sten - loss: 0.3074 - acc: 0.9418	
Epoch 342/1000	03 0d3/3 ccp	
10000/10000 [===========]	- 0s 8us/step - loss: 0.3021 - acc: 0.9435	
Epoch 343/1000		
10000/10000 [======]	- Os 6us/step - loss: 0.3024 - acc: 0.9368	
Epoch 344/1000	0.6.7.1	
10000/10000 [======] Epoch 345/1000	- 05 bus/step - loss: 0.3006 - acc: 0.9443	
10000/10000 [======]	- 0s 7us/step - loss: 0.2937 - acc: 0.9468	
Epoch 346/1000	33 1 33 7 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3	
10000/10000 [======]	- 0s 6us/step - loss: 0.2915 - acc: 0.9476	
Epoch 347/1000		
10000/10000 [=======]	- 0s 6us/step - loss: 0.2905 - acc: 0.9439	
Epoch 348/1000 10000/10000 [===========]	0s 6us/stan lass, 0.2002 ass, 0.0427	
Epoch 349/1000	- 05 0us/step - 10ss: 0.2092 - acc: 0.9457	
10000/10000 [======]	- 0s 7us/step - loss: 0.2843 - acc: 0.9476	
Epoch 350/1000		
10000/10000 [======]	- Os 8us/step - loss: 0.2834 - acc: 0.9480	
Epoch 351/1000		
10000/10000 [======]	- 0s 6us/step - loss: 0.2816 - acc: 0.9491	
Epoch 352/1000 10000/10000 [===========]	0s 6us/stop loss: 0 2776 200: 0 0470	
Epoch 353/1000	υ. ομο, στορ - τοσο. υ.2//υ - αcc: υ.94/υ	
10000/10000 [======]	- 0s 7us/step - loss: 0.2770 - acc: 0.9488	
Epoch 354/1000		
10000/10000 [=====]	- 0s 6us/step - loss: 0.2773 - acc: 0.9488	
Epoch 355/1000	0.7.4.	
10000/10000 [======]	- Us /us/step - Loss: 0.2/32 - acc: 0.9495	
Epoch 356/1000 10000/10000 [===========]	- 0s 7us/sten - loss: 0.2607 - acc: 0.0515	
Epoch 357/1000	13 . d.s., 510p 1033. 012037 dec. 0.3313	
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10000/10000 [=====]	-	0s	7us/step - 1	Loss:	0.2677 - a	acc:	0.9503
Epoch 358/1000							
10000/10000 [=======]	-	0s	6us/step - 1	LOSS:	0.2668 - a	icc:	0.9504
Epoch 359/1000 10000/10000 [=======]	_	0 s	6us/sten - 1	nss:	0 2649 - a	acc.	ი 9533
Epoch 360/1000		03	оиз/ 3 сер	.0331	012045	1001	0.5555
10000/10000 [=======]	-	0s	7us/step - 1	loss:	0.2620 - a	acc:	0.9522
Epoch 361/1000							
10000/10000 [======]	-	0s	7us/step - 1	LOSS:	0.2542 - a	acc:	0.9578
Epoch 362/1000 10000/10000 [======]		0.0	7us/ston 1	0001	0 2557 5		0.530
Epoch 363/1000	-	05	/us/step - 1	.055.	0.2337 - 6	icc.	0.9559
10000/10000 [======]	-	0s	6us/step - 1	Loss:	0.2536 - a	acc:	0.9552
Epoch 364/1000							
10000/10000 [========]	-	0s	6us/step - 1	LOSS:	0.2517 - a	acc:	0.9584
Epoch 365/1000 10000/10000 [======]		0.0	7us/ston 1	0001	0.2467 =		0 0602
Epoch 366/1000	-	05	/us/step - 1	10551	0.2407 - 6	icc:	0.9003
10000/10000 [========]	-	0s	7us/step - 1	loss:	0.2469 - a	acc:	0.9588
Epoch 367/1000							
10000/10000 [======]	-	0s	7us/step - 1	Loss:	0.2456 - a	acc:	0.9572
Epoch 368/1000		0.5	Gua/atan 1		0.2420 -		0 0554
10000/10000 [======] Epoch 369/1000	-	05	ous/step -	LOSS:	0.2438 - 6	icc:	0.9554
10000/10000 [======]	-	0s	6us/step - 1	loss:	0.2405 - a	acc:	0.9595
Epoch 370/1000							
10000/10000 [======]	-	0s	6us/step - 1	Loss:	0.2374 - a	acc:	0.9607
Epoch 371/1000		0.5	7 / a thom		0 2271 -		0 0570
10000/10000 [======] Epoch 372/1000	-	05	/us/step - 0	LOSS:	0.23/1 - a	icc:	0.9579
10000/10000 [======]	_	0s	7us/step - 1	Loss:	0.2321 - a	acc:	0.9619
Epoch 373/1000							
10000/10000 [======]	-	0s	6us/step - 1	Loss:	0.2329 - a	acc:	0.9587
Epoch 374/1000		0.5	Gua/atan 1		0 2207 -		0 0634
10000/10000 [======] Epoch 375/1000	-	05	ous/step -	LOSS:	0.2287 - 6	icc:	0.9034
10000/10000 [======]	_	0s	6us/step - 1	Loss:	0.2285 - a	acc:	0.9611
Epoch 376/1000							
10000/10000 [======]	-	0s	6us/step - 1	Loss:	0.2258 - a	acc:	0.9631
Epoch 377/1000		0 -	7/		0 2250 -		0.0643
10000/10000 [======] Epoch 378/1000	-	05	/us/step - 0	LOSS:	U.2250 - a	icc:	0.9642
10000/10000 [======]	_	0s	7us/step - 1	Loss:	0.2237 - a	acc:	0.9622
Epoch 379/1000							
10000/10000 [=====]	-	0s	7us/step - 1	Loss:	0.2225 - a	acc:	0.9599
Epoch 380/1000		0.5	7 / 0. + 0 1		0 2224 -		0 0635
10000/10000 [======] Epoch 381/1000	-	05	/us/step - 0	LOSS:	0.2224 - 8	icc:	0.9025
10000/10000 [======]	-	0s	6us/step - 1	loss:	0.2146 - a	acc:	0.9645
Epoch 382/1000							
10000/10000 [======]	-	0s	6us/step - 1	Loss:	0.2145 - a	acc:	0.9662
Epoch 383/1000		0.5	Gua /atan		0 2142 -		0 0655
10000/10000 [======] Epoch 384/1000	-	05	ous/step -	LOSS:	U.2143 - a	icc:	0.9055
10000/10000 [======]	_	0s	7us/step - 1	Loss:	0.2091 - a	acc:	0.9675
Epoch 385/1000							
10000/10000 [======]	-	0s	6us/step - 1	Loss:	0.2110 - a	acc:	0.9649
Epoch 386/1000		0	0/ 3		0 2000		0 0073
10000/10000 [======] Epoch 387/1000	-	US	ous/step -	LOSS:	⊍.∠⊍9⊍ - a	icc:	U.96/3
10000/10000 [======]	_	0s	7us/step - 1	Loss:	0.2062 - a	acc:	0.9666
Epoch 388/1000			P				
10000/10000 [======]	-	0s	6us/step - 1	Loss:	0.2054 - a	acc:	0.9672
Epoch 389/1000		0	7.10 /-2		0 1000		0 0700
10000/10000 [======]	-	US	/us/step -	LOSS:	0.1998 - S	ICC:	U.9/U8

1							
Epoch 390/1000		0	6 ()	,	0 1000		0.000
10000/10000 [======] Epoch 391/1000	-	0S	bus/step -	LOSS:	0.1983 -	acc:	0.9695
10000/10000 [======]	_	0 s	hus/sten -	1055	ი 1996 -	acc:	0 9666
Epoch 392/1000		0.5	оаз, э сор	.0551	011330	acc.	013000
10000/10000 [======]	-	0s	6us/step -	loss:	0.2003 -	acc:	0.9652
Epoch 393/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.1952 -	acc:	0.9698
Epoch 394/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.1941 -	acc:	0.9688
Epoch 395/1000		0.5	7/2.4.2.2	1	0 1042		0.0600
10000/10000 [======] Epoch 396/1000	-	05	/us/step -	1055:	0.1942 -	acc:	0.9099
10000/10000 [======]	_	05	7us/sten -	1055:	0.1909 -	acc:	0.9700
Epoch 397/1000			7 4.57 5 1 5 5		0.2000		0.07.00
10000/10000 [======]	-	0s	6us/step -	loss:	0.1895 -	acc:	0.9707
Epoch 398/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.1870 -	acc:	0.9730
Epoch 399/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.1868 -	acc:	0.9692
Epoch 400/1000		0.5	Gua /atan	1	0 1072		0 0710
10000/10000 [======] Epoch 401/1000	-	05	bus/step -	LOSS:	0.18/3 -	acc:	0.9/10
10000/10000 [======]	_	05	6us/sten -	1055:	0.1845 -	acc:	0.9697
Epoch 402/1000		03	оиз/ э сер		011045	acc.	0.3037
10000/10000 [===========]	-	0s	6us/step -	loss:	0.1805 -	acc:	0.9722
Epoch 403/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.1787 -	acc:	0.9731
Epoch 404/1000							
10000/10000 [========]	-	0s	6us/step -	loss:	0.1770 -	acc:	0.9724
Epoch 405/1000		0	6 / 1	,	0 1705		0 0705
10000/10000 [======] Epoch 406/1000	-	05	ous/step -	LOSS:	0.1/85 -	acc:	0.9705
10000/10000 [======]	_	05	6us/sten -	1055:	0.1745 -	acc:	0.9731
Epoch 407/1000			000,000		0.17.10		0.0701
10000/10000 [======]	-	0s	6us/step -	loss:	0.1735 -	acc:	0.9732
Epoch 408/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.1735 -	acc:	0.9742
Epoch 409/1000				_			
10000/10000 [======]	-	0s	6us/step -	loss:	0.1723 -	acc:	0.9746
Epoch 410/1000 10000/10000 [======]		0.0	7us/ston	10001	0 1670	2001	0 0726
Epoch 411/1000	-	05	/us/step -	1055;	0.10/9 -	acc:	0.9720
10000/10000 [=======]	_	0 s	7us/step -	loss:	0.1676 -	acc:	0.9762
Epoch 412/1000			,				
10000/10000 [======]	-	0s	6us/step -	loss:	0.1652 -	acc:	0.9758
Epoch 413/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.1646 -	acc:	0.9752
Epoch 414/1000							
10000/10000 [=========]	-	0s	7us/step -	loss:	0.1644 -	acc:	0.9761
Epoch 415/1000		0.5	Gus /ston	1000	0 1500	200.	0 0701
10000/10000 [======] Epoch 416/1000	-	05	ous/step -	1055;	0.1590 -	acc:	0.9701
10000/10000 [======]	_	05	6us/sten -	1055:	0.1595 -	acc:	0.9779
Epoch 417/1000		0.5	043, 3 ccp	.0551	0.1333	acc.	013773
10000/10000 [===========]	-	0s	8us/step -	loss:	0.1610 -	acc:	0.9752
Epoch 418/1000			•				
10000/10000 [=====]	-	0s	6us/step -	loss:	0.1585 -	acc:	0.9777
Epoch 419/1000							
10000/10000 [=====]	-	0s	6us/step -	loss:	0.1554 -	acc:	0.9781
Epoch 420/1000		0	7/	1 -	0 1563		0.0750
10000/10000 [======]	-	θS	/us/step -	LOSS:	U.1567 -	acc:	⊎.9/50
Epoch 421/1000 10000/10000 [======]	_	00	hus/sten	10551	0 1533	acc:	O 0727
Epoch 422/1000	-	US	ous/scep -	.0331	0.1333 -	acc.	0.3/0/
_p3611 122/ 2000							

3/05/2019			comparison			
10000/10000 [======]	-	0s	7us/step - los	s: 0.1531	- acc:	0.9764
Epoch 423/1000						
10000/10000 [======]	-	0s	5us/step - los	s: 0.1520	- acc:	0.9775
Epoch 424/1000		0	7 () 7	0 1400		0 0011
10000/10000 [=======]	-	0s	/us/step - los	s: 0.1493	- acc:	0.9811
Epoch 425/1000 10000/10000 [=======]		0.5	Que/sten - los	s: 0 1470	- acc:	0 0808
Epoch 426/1000		03	543/3 сер соз	3. 0.1473	acc.	0.5000
1000/10000 [=======]	_	0s	7us/step - los	s: 0.1488	- acc:	0.9778
Epoch 427/1000			,			
10000/10000 [=======]	-	0s	6us/step - los	s: 0.1434	- acc:	0.9821
Epoch 428/1000						
10000/10000 [======]	-	0s	7us/step - los	s: 0.1446	- acc:	0.9803
Epoch 429/1000				0 1440		0.0700
10000/10000 [=======]	-	0s	bus/step - los	s: 0.1443	- acc:	0.9798
Epoch 430/1000 10000/10000 [=======]		0.5	Aus/sten - los	s: 0 1412	- acc:	0 0816
Epoch 431/1000		03	0u3/3tep - tos	3. 0.1412	- acc.	0.9010
1000/10000 [=======]	_	0s	6us/step - los	s: 0.1395	- acc:	0.9809
Epoch 432/1000			·			
10000/10000 [======]	-	0s	7us/step - los	s: 0.1418	- acc:	0.9786
Epoch 433/1000						
10000/10000 [=======]	-	0s	6us/step - los	s: 0.1403	- acc:	0.9801
Epoch 434/1000		0 -	C / - + 1	- 0 1205		0 0700
10000/10000 [======] Epoch 435/1000	-	05	ous/step - los	S: 0.1385	- acc:	0.9799
10000/10000 [=======]	_	0 s	7us/sten - los	s. 0 1350	- acc:	0 9818
Epoch 436/1000		03	74373 ccp cos	3. 0.1555	acc:	0.5010
10000/10000 [======]	-	0s	7us/step - los	s: 0.1379	- acc:	0.9772
Epoch 437/1000						
10000/10000 [======]	-	0s	7us/step - los	s: 0.1352	- acc:	0.9802
Epoch 438/1000						
10000/10000 [=================================	-	0s	8us/step - los	s: 0.1336	- acc:	0.9830
Epoch 439/1000 10000/10000 [=======]		0.0	7us/ston los	c: 0 1209	3661	0 0831
Epoch 440/1000		03	7u3/3tep - tos	3. 0.1290	- acc.	0.9051
1000/10000 [=======]	_	0s	8us/step - los	s: 0.1332	- acc:	0.9819
Epoch 441/1000			·			
10000/10000 [======]	-	0s	7us/step - los	s: 0.1311	- acc:	0.9829
Epoch 442/1000						
10000/10000 [======]	-	0s	7us/step - los	s: 0.1299	- acc:	0.9816
Epoch 443/1000		0	6 ()	0 1202		0.0006
10000/10000 [======] Epoch 444/1000	-	05	ous/step - los	S: 0.1302	- acc:	0.9800
10000/10000 [=======]	_	05	7us/sten - los	s: 0.1284	- acc:	0.9821
Epoch 445/1000		0.5	, as, seep ess	31 011201	acc:	0.5021
10000/10000 [======]	-	0s	6us/step - los	s: 0.1287	- acc:	0.9800
Epoch 446/1000						
10000/10000 [======]	-	0s	6us/step - los	s: 0.1266	- acc:	0.9824
Epoch 447/1000						
10000/10000 [======]	-	0s	7us/step - los	s: 0.1230	- acc:	0.9837
Epoch 448/1000 10000/10000 [=======]		0.5	Rus/sten - los	s: 0 1234	- acc:	0 0836
Epoch 449/1000		03	0u3/3tep - tos	3. 0.1254	- acc.	0.9050
1000/10000 [=======]	_	0s	7us/step - los	s: 0.1227	- acc:	0.9823
Epoch 450/1000						
10000/10000 [=======]	-	0s	6us/step - los	s: 0.1246	- acc:	0.9805
Epoch 451/1000						
10000/10000 [======]	-	0s	6us/step - los	s: 0.1207	- acc:	0.9842
Epoch 452/1000		0	C	- 0 1170		0.0005
10000/10000 [======] Enoch 453/1000	-	٥s	ous/step - los	s: 0.11/9	- acc:	U.9865
Epoch 453/1000 10000/10000 [=======]	_	0 <	7us/sten - los	s: 0 1177	- 2001	0.0837
Epoch 454/1000	-	U S	, as, step - tos	J. U.II//	ucc.	0.3037
1000/1000 [======]	_	0s	8us/step - los	s: 0.1183	- acc:	0.9841
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Epoch 455/1000		0.5	7 / 0.4.0.0	1	0 1175		0 0043
10000/10000 [======] Epoch 456/1000	-	05	/us/step	- 1055:	0.11/5 -	acc:	0.9842
10000/10000 [======]	-	0s	6us/step	loss:	0.1178 -	acc:	0.9845
Epoch 457/1000							
10000/10000 [======] Epoch 458/1000	-	0s	7us/step	- loss:	0.1143 -	acc:	0.9859
10000/10000 [======]	_	0s	7us/step	loss:	0.1117 -	acc:	0.9871
Epoch 459/1000			·				
10000/10000 [=================================	-	0s	7us/step	loss:	0.1137 -	acc:	0.9858
Epoch 460/1000 10000/10000 [======]	_	0 s	6us/sten	- loss:	0.1127 -	acc:	0.9842
Epoch 461/1000		0.5	00373100	.0001	011127	acc:	013012
10000/10000 [=====]	-	0s	6us/step	loss:	0.1108 -	acc:	0.9856
Epoch 462/1000		0.5	Eug/ston	1000	0 1117	2001	0 0040
10000/10000 [======] Epoch 463/1000	-	05	ous/step	- 1055;	0.111/ -	acc:	0.9649
10000/10000 [======]	-	0s	7us/step	loss:	0.1094 -	acc:	0.9842
Epoch 464/1000			6 / 1	7	0 1000		0.0064
10000/10000 [======] Epoch 465/1000	-	0S	bus/step	- LOSS:	0.1069 -	acc:	0.9864
10000/10000 [======]	-	0s	8us/step	loss:	0.1061 -	acc:	0.9867
Epoch 466/1000							
10000/10000 []	-	0s	6us/step	- loss:	0.1059 -	acc:	0.9869
Epoch 467/1000 10000/10000 [======]	_	0s	7us/step	loss:	0.1061 -	acc:	0.9858
Epoch 468/1000							
10000/10000 [=======]	-	0s	7us/step	- loss:	0.1047 -	acc:	0.9865
Epoch 469/1000 10000/10000 [======]	_	05	6us/sten	loss:	0.1026 -	acc:	0.9884
Epoch 470/1000			040,010		0.1010		
10000/10000 []	-	0s	7us/step	loss:	0.1016 -	acc:	0.9889
Epoch 471/1000 10000/10000 [======]		0 s	Gus/sten	. 1000	0 1027 -	acc:	A 9873
Epoch 472/1000		03	003/31СР	(033)	0.1027	acc.	0.3073
10000/10000 [=====]	-	0s	6us/step	loss:	0.1004 -	acc:	0.9864
Epoch 473/1000 10000/10000 [======]		0.5	746/6+00	1000	0 1005	2661	0 0053
Epoch 474/1000	-	05	/us/step	- 1055;	0.1005 -	acc:	0.9652
10000/10000 [======]	-	0s	7us/step	loss:	0.1005 -	acc:	0.9870
Epoch 475/1000		0	7 / 1	1	0 0077		0.0000
10000/10000 [======] Epoch 476/1000	-	θS	/us/step	- LOSS:	0.09// -	acc:	0.9883
10000/10000 [======]	-	0s	7us/step	loss:	0.0984 -	acc:	0.9865
Epoch 477/1000							
10000/10000 [======] Epoch 478/1000	-	0s	8us/step	- loss:	0.0990 -	acc:	0.9850
10000/10000 [======]	-	0s	7us/step	loss:	0.0957 -	acc:	0.9895
Epoch 479/1000							
10000/10000 [======] Epoch 480/1000	-	0s	6us/step	- loss:	0.0965 -	acc:	0.9876
10000/10000 [======]	_	0s	8us/step	loss:	0.0947 -	acc:	0.9891
Epoch 481/1000							
10000/10000 [========]	-	0s	7us/step	- loss:	0.0936 -	acc:	0.9878
Epoch 482/1000 10000/10000 [======]	_	0 s	8us/sten	- loss:	0.0933 -	acc:	0.9888
Epoch 483/1000		55	,, э сор				
10000/10000 []	-	0s	7us/step	- loss:	0.0925 -	acc:	0.9888
Epoch 484/1000 10000/10000 [======]	_	٥٠	7115/ston	. 1000	0 0030	acc:	0 0276
Epoch 485/1000	-	U.S	, u3/31ch	.0331	0.0333 -	ucc.	0.30/0
10000/10000 []	-	0s	7us/step	loss:	0.0901 -	acc:	0.9900
Epoch 486/1000		0.0	6115/5+55	1000	0 0012	200:	0 0005
10000/10000 [======] Epoch 487/1000	-	05	ous/step	- 10551	0.0912 -	acc:	0.9090

5/05	/2019			comparison
	10000/10000 []	-	0s	6us/step - loss: 0.0901 - acc: 0.9893
	Epoch 488/1000			
	10000/10000 [==========]	-	0s	10us/step - loss: 0.0904 - acc: 0.9878
	Epoch 489/1000 10000/10000 [=======]	_	0 <	7us/sten - loss: 0 0885 - acc: 0 0888
	Epoch 490/1000		03	743/31CP 1033. 0.0003 4CC. 0.3000
	10000/10000 [=======]	_	0s	7us/step - loss: 0.0910 - acc: 0.9890
	Epoch 491/1000			•
	10000/10000 [======]	-	0s	6us/step - loss: 0.0862 - acc: 0.9891
	Epoch 492/1000			
	10000/10000 [=================================	-	0s	7us/step - loss: 0.0848 - acc: 0.9898
	Epoch 493/1000		0.5	6us/ston loss, 0.0022 pss, 0.0012
	10000/10000 [======] Epoch 494/1000	-	05	ous/step - toss: 0.0033 - acc: 0.9913
	10000/10000 [========]	_	0s	6us/step - loss: 0.0851 - acc: 0.9911
	Epoch 495/1000			
	10000/10000 [=================================	-	0s	7us/step - loss: 0.0851 - acc: 0.9898
	Epoch 496/1000			
	10000/10000 [=================================	-	0s	7us/step - loss: 0.0848 - acc: 0.9896
	Epoch 497/1000		0 -	7/
	10000/10000 [=======] Epoch 498/1000	-	US	/us/step - loss: 0.082/ - acc: 0.9898
	10000/10000 [=======]	_	05	6us/sten - loss: 0.0826 - acc: 0.9904
	Epoch 499/1000		0.5	
	10000/10000 [=======]	-	0s	7us/step - loss: 0.0818 - acc: 0.9905
	Epoch 500/1000			
	10000/10000 [======]	-	0s	7us/step - loss: 0.0801 - acc: 0.9903
	Epoch 501/1000		0 -	7/
	10000/10000 [======] Epoch 502/1000	-	US	/us/step - loss: 0.0801 - acc: 0.9910
	10000/10000 [=======]	_	05	7us/sten - loss: 0.0795 - acc: 0.9910
	Epoch 503/1000			, 45, 5 top 1000. 0.075
	10000/10000 [=================================	-	0s	7us/step - loss: 0.0807 - acc: 0.9897
	Epoch 504/1000			
	10000/10000 [======]	-	0s	6us/step - loss: 0.0776 - acc: 0.9909
	Epoch 505/1000			7 /
	10000/10000 [======] Epoch 506/1000	-	05	/us/step - loss: 0.0/96 - acc: 0.989/
	10000/10000 [=======]	_	05	9us/sten - loss: 0.0774 - acc: 0.9901
	Epoch 507/1000		03	343/31ep 1033. 0.0//4 4cc. 0.3301
	10000/10000 [======]	-	0s	10us/step - loss: 0.0777 - acc: 0.9904
	Epoch 508/1000			
	10000/10000 [======]	-	0s	13us/step - loss: 0.0772 - acc: 0.9902
	Epoch 509/1000		0	0 / 1 0 0762 0 0000
	10000/10000 [======] Epoch 510/1000	-	US	9us/step - Loss: 0.0/62 - acc: 0.9909
	10000/10000 [=======]	_	05	10us/sten - loss: 0.0762 - acc: 0.9898
	Epoch 511/1000		0.5	1003, 5100 10331 010,02 0001 013030
	10000/10000 [=======]	-	0s	9us/step - loss: 0.0736 - acc: 0.9917
	Epoch 512/1000			
	10000/10000 [=================================	-	0s	7us/step - loss: 0.0754 - acc: 0.9911
	Epoch 513/1000		0 -	C / 1 0 0721 0 0020
	10000/10000 [======] Epoch 514/1000	-	05	bus/step - Loss: 0.0/21 - acc: 0.9928
	10000/10000 [=======]	_	0s	6us/step - loss: 0.0720 - acc: 0.9921
	Epoch 515/1000			
	10000/10000 [======]	-	0s	7us/step - loss: 0.0739 - acc: 0.9919
	Epoch 516/1000			
	10000/10000 [=================================	-	0s	7us/step - loss: 0.0718 - acc: 0.9918
	Epoch 517/1000		0	7us/ston loss: 0.0710 0.0000
	10000/10000 [======] Epoch 518/1000	-	٥S	/us/step - toss: 0.0/18 - acc: 0.9900
	10000/10000 [=======]	_	05	7us/step - loss: 0.0693 - acc: 0.9930
	Epoch 519/1000			
	10000/10000 [=========]	-	0s	6us/step - loss: 0.0713 - acc: 0.9916
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Epoch 520/1000
Epoch 521/1000
Epoch 522/1000
10000/10000 [============] - 0s 6us/step - loss: 0.0707 - acc: 0.9915
Fnoch 523/1000
Epoch 524/1000
10000/10000 [===========] - 0s 6us/step - loss: 0.0677 - acc: 0.9924
Epoch 525/1000
10000/10000 [===========] - 0s 6us/step - loss: 0.0676 - acc: 0.9923
Epoch 526/1000
10000/10000 [============= ] - 0s 6us/step - loss: 0.0662 - acc: 0.9932
Epoch 527/1000
10000/10000 [=============] - 0s 7us/step - loss: 0.0655 - acc: 0.9930
Epoch 528/1000
tep - loss: 0.0654 - acc: 0.9933
Epoch 529/1000
Epoch 530/1000
Epoch 531/1000
10000/10000 [============== ] - 0s 7us/step - loss: 0.0644 - acc: 0.9919
Epoch 532/1000
10000/10000 [============] - 0s 7us/step - loss: 0.0627 - acc: 0.9930
Epoch 533/1000
10000/10000 [============] - 0s 7us/step - loss: 0.0615 - acc: 0.9937
Epoch 534/1000
Epoch 535/1000
Epoch 536/1000
10000/10000 [============== ] - 0s 6us/step - loss: 0.0609 - acc: 0.9931
Epoch 537/1000
10000/10000 [============== ] - 0s 6us/step - loss: 0.0609 - acc: 0.9947
Epoch 538/1000
10000/10000 [============] - Os 7us/step - loss: 0.0595 - acc: 0.9940
Epoch 539/1000
10000/10000 [=============] - Os 6us/step - loss: 0.0591 - acc: 0.9950
Epoch 540/1000
10000/10000 [=============] - Os 6us/step - loss: 0.0597 - acc: 0.9925
Epoch 541/1000
10000/10000 [=============] - 0s 7us/step - loss: 0.0581 - acc: 0.9935
Epoch 542/1000
Epoch 543/1000
10000/10000 [============] - Os 9us/step - loss: 0.0574 - acc: 0.9942
Epoch 544/1000
10000/10000 [============] - 0s 7us/step - loss: 0.0573 - acc: 0.9937
Epoch 545/1000
10000/10000 [============] - 0s 9us/step - loss: 0.0566 - acc: 0.9938
Epoch 546/1000
10000/10000 [============= ] - Os 7us/step - loss: 0.0546 - acc: 0.9948
Epoch 547/1000
10000/10000 [===========] - 0s 7us/step - loss: 0.0569 - acc: 0.9934
Epoch 548/1000
10000/10000 [============] - 0s 6us/step - loss: 0.0571 - acc: 0.9921
Fnoch 549/1000
10000/10000 [============= ] - Os 7us/step - loss: 0.0557 - acc: 0.9940
Epoch 550/1000
Epoch 551/1000
10000/10000 [============= ] - Os 7us/step - loss: 0.0536 - acc: 0.9948
```

,,							
Epoch 552/1000		0.5	7/2.	1	0 0535		0 0053
10000/10000 [=======] Epoch 553/1000	-	05	/us/step	. 1055:	0.0323 -	acc:	0.9952
10000/10000 [======]	-	0s	7us/step	loss:	0.0514 -	acc:	0.9947
Epoch 554/1000							
10000/10000 [======] Epoch 555/1000	-	0s	7us/step	· loss:	0.0524 -	acc:	0.9946
10000/10000 [======]	_	0s	6us/step	loss:	0.0509 -	acc:	0.9958
Epoch 556/1000							
10000/10000 [=====]	-	0s	6us/step	loss:	0.0503 -	acc:	0.9950
Epoch 557/1000 10000/10000 [=======]		0.0	Ous/ston	10001	0 0500	2661	0 0047
Epoch 558/1000	-	05	3u3/3tep	. (055.	0.0300 -	acc.	0.9947
10000/10000 [======]	-	0s	8us/step	loss:	0.0503 -	acc:	0.9955
Epoch 559/1000							
10000/10000 [======] Epoch 560/1000	-	0s	8us/step	· loss:	0.0511 -	acc:	0.9933
10000/10000 []	_	0s	6us/step	loss:	0.0475 -	acc:	0.9960
Epoch 561/1000							
10000/10000 [======]	-	0s	7us/step	loss:	0.0469 -	acc:	0.9957
Epoch 562/1000 10000/10000 [======]		0.0	Suc/ston	10001	0 0483	2001	0.040
Epoch 563/1000	-	05	Jus/step	. (055.	0.0485 -	acc.	0.9949
10000/10000 [======]	-	0s	6us/step	loss:	0.0466 -	acc:	0.9964
Epoch 564/1000							
10000/10000 [======] Epoch 565/1000	-	0s	5us/step	· loss:	0.0488 -	acc:	0.9938
10000/10000 [======]	-	0s	6us/step	loss:	0.0468 -	acc:	0.9956
Epoch 566/1000							
10000/10000 [=================================	-	0s	6us/step	loss:	0.0455 -	acc:	0.9962
Epoch 567/1000 10000/10000 [======]		0 c	Gus/sten	. loss:	0 0460 -	acc.	A 9953
Epoch 568/1000	_	03	0u3/3tep		0.0400	acc.	0.9933
10000/10000 [======]	-	0s	7us/step	loss:	0.0448 -	acc:	0.9960
Epoch 569/1000		0	7	,	0.0456		0.0054
10000/10000 [======] Epoch 570/1000	-	θS	/us/step	· LOSS:	0.0456 -	acc:	0.9954
10000/10000 [=======]	-	0s	6us/step	loss:	0.0447 -	acc:	0.9960
Epoch 571/1000							
10000/10000 [=======]	-	0s	6us/step	loss:	0.0440 -	acc:	0.9954
Epoch 572/1000 10000/10000 [======]	_	0 s	6us/sten	1055:	0.0430 -	acc:	0.9959
Epoch 573/1000			040, 510p		0.0.50		0.000
10000/10000 [=====]	-	0s	7us/step	loss:	0.0419 -	acc:	0.9962
Epoch 574/1000		0.5	746/6+00	1000	0 0417	2001	0 0066
10000/10000 [======] Epoch 575/1000	-	05	/us/step	. (055;	0.0417 -	acc:	0.9900
10000/10000 [======]	-	0s	8us/step	loss:	0.0416 -	acc:	0.9968
Epoch 576/1000							
10000/10000 [======] Epoch 577/1000	-	0s	6us/step	· loss:	0.0433 -	acc:	0.9954
10000/10000 [======]	_	0s	6us/step	loss:	0.0410 -	acc:	0.9966
Epoch 578/1000							
10000/10000 [======]	-	0s	6us/step	loss:	0.0409 -	acc:	0.9964
Epoch 579/1000 10000/10000 [======]		0 c	7us/sten	. loss:	0 0421 -	acc.	n 9964
Epoch 580/1000		U J	, us/step .	.0331	3.3721 -	acc.	3.3304
10000/10000 []	-	0s	7us/step	loss:	0.0403 -	acc:	0.9967
Epoch 581/1000		0	7 / 1	1	0 0477	_	0.0050
10000/10000 [======] Epoch 582/1000	-	ÜS	/us/step	LOSS:	0.0411 -	acc:	0.9956
10000/10000 [======]	-	0s	6us/step	loss:	0.0397 -	acc:	0.9964
Epoch 583/1000							
10000/10000 [=======]	-	0s	7us/step	loss:	0.0409 -	acc:	0.9952
Epoch 584/1000							

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10000/10000 [======]	-	0s	6us/step -	loss:	0.0394 - a	acc:	0.9957
Epoch 585/1000							
10000/10000 [=======]	-	0s	7us/step -	loss:	0.0384 - a	ICC:	0.9969
Epoch 586/1000 10000/10000 [======]	_	0 s	7us/sten -	1055:	0.0389 - a	acc:	0.9968
Epoch 587/1000		03	7 d 3 / 3 c c p	.0551	010303	1001	0.5500
10000/10000 [=======]	-	0s	7us/step -	loss:	0.0363 - a	acc:	0.9974
Epoch 588/1000							
10000/10000 [=======]	-	0s	7us/step -	loss:	0.0371 - a	icc:	0.9970
Epoch 589/1000 10000/10000 [======]		0.0	6us/ston	10001	0 0373 -	2001	0.0060
Epoch 590/1000	_	05	ous/step -	1055.	0.03/3 - 6	100.	0.9909
10000/10000 [======]	-	0s	6us/step -	loss:	0.0360 - a	acc:	0.9977
Epoch 591/1000							
10000/10000 [=================================	-	0s	7us/step -	loss:	0.0376 - a	icc:	0.9961
Epoch 592/1000		0.0	6us/ston	10001	0 0266 -	2001	0 0070
10000/10000 [======] Epoch 593/1000	-	05	ous/step -	1055;	0.0300 - a	100:	0.9970
10000/10000 [=======]	-	0s	6us/step -	loss:	0.0374 - a	acc:	0.9963
Epoch 594/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.0345 - a	acc:	0.9980
Epoch 595/1000		0.5	Gua /atan	1	0 0353 -		0 0070
10000/10000 [======] Epoch 596/1000	-	05	ous/step -	1055:	0.0333 - 6	icc:	0.9979
10000/10000 [======]	-	0s	8us/step -	loss:	0.0363 - a	acc:	0.9962
Epoch 597/1000			·				
10000/10000 [======]	-	0s	6us/step -	loss:	0.0354 - a	acc:	0.9970
Epoch 598/1000		0.5	7 / 0. + 0. 0	1	0 0247 -		0 0071
10000/10000 [======] Epoch 599/1000	-	05	/us/step -	LOSS:	0.0347 - a	icc:	0.9971
10000/10000 [======]	_	0s	7us/step -	loss:	0.0336 - a	acc:	0.9978
Epoch 600/1000			·				
10000/10000 [======]	-	0s	6us/step -	loss:	0.0350 - a	acc:	0.9974
Epoch 601/1000		0.5	Gua /atan	1	0 0224 -		0 0060
10000/10000 [======] Epoch 602/1000	-	05	ous/step -	1055:	0.0334 - a	100:	0.9908
10000/10000 [======]	_	0s	6us/step -	loss:	0.0348 - a	acc:	0.9967
Epoch 603/1000			·				
10000/10000 [======]	-	0s	6us/step -	loss:	0.0327 - a	acc:	0.9969
Epoch 604/1000		0 -	C / - +	1	0 0220 -		0 0071
10000/10000 [======] Epoch 605/1000	-	05	bus/step -	LOSS:	0.0338 - 8	icc:	0.9971
10000/10000 [======]	_	0s	6us/step -	loss:	0.0343 - a	acc:	0.9967
Epoch 606/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.0327 - a	icc:	0.9976
Epoch 607/1000		0.5	Gua /atan	1	0 0220 -		0 0074
10000/10000 [======] Epoch 608/1000	-	05	ous/step -	1055:	0.0320 - 8	100:	0.9974
10000/10000 [======]	-	0s	8us/step -	loss:	0.0310 - a	acc:	0.9977
Epoch 609/1000			·				
10000/10000 [======]	-	0s	6us/step -	loss:	0.0318 - a	acc:	0.9973
Epoch 610/1000		0.5	Gua /atan	1	0 0200 -		0 0077
10000/10000 [======] Epoch 611/1000	-	05	ous/step -	1055:	0.0308 - 6	100:	0.9977
10000/10000 [======]	_	0s	6us/step -	loss:	0.0316 - a	acc:	0.9977
Epoch 612/1000			·				
10000/10000 [======]	-	0s	7us/step -	loss:	0.0302 - a	acc:	0.9977
Epoch 613/1000		0	0 / 1	,	0.0201		0 0000
10000/10000 [======] Epoch 614/1000	-	US	ous/step -	LOSS:	U.U3U1 - a	ICC:	U.9980
10000/10000 [=======]	_	0s	7us/step -	loss:	0.0301 - a	acc:	0.9980
Epoch 615/1000			- 1-				
10000/10000 [======]	-	0s	6us/step -	loss:	0.0294 - a	icc:	0.9982
Epoch 616/1000		0	7 / :	1	0.0304		0 007-
10000/10000 []	-	ÜS	/us/step -	LOSS:	U.U3U4 - a	ICC:	0.99/1

,,							
Epoch 617/1000		0.5	7 / 5 + 5 =	1	0.0204		0 0077
10000/10000 [======] Epoch 618/1000	-	05	/us/step	- 1055:	0.0284 -	acc:	0.9977
10000/10000 [=======]	-	0s	6us/step	- loss:	0.0296 -	acc:	0.9974
Epoch 619/1000							
10000/10000 [======]	-	0s	6us/step	- loss:	0.0299 -	acc:	0.9975
Epoch 620/1000 10000/10000 [======]	_	0 s	6us/step	- loss:	0.0295 -	acc:	0.9979
Epoch 621/1000			040,0100		0.0200		0.0070
10000/10000 [======]	-	0s	6us/step	- loss:	0.0273 -	acc:	0.9985
Epoch 622/1000 10000/10000 [======]		0.0	7us /s+on	10001	0 0205	2661	0 0079
Epoch 623/1000	-	05	/us/step	- 1055:	0.0203 -	acc:	0.9976
10000/10000 [======]	-	0s	7us/step	- loss:	0.0289 -	acc:	0.9980
Epoch 624/1000							
10000/10000 [=======]	-	0s	6us/step	- loss:	0.0284 -	acc:	0.9980
Epoch 625/1000 10000/10000 [======]	_	05	6us/sten	- loss:	0.0274 -	acc:	0.9981
Epoch 626/1000			040,0100		0.027.		0.0001
10000/10000 [=====]	-	0s	6us/step	- loss:	0.0261 -	acc:	0.9986
Epoch 627/1000		0.5	Eug/ston	1000	0 0200	2661	0 0076
10000/10000 [======] Epoch 628/1000	-	05	ous/step	- 1055:	0.0280 -	acc:	0.9976
10000/10000 [======]	-	0s	9us/step	- loss:	0.0277 -	acc:	0.9979
Epoch 629/1000							
10000/10000 [=======]	-	0s	8us/step	- loss:	0.0276 -	acc:	0.9980
Epoch 630/1000 10000/10000 [======]	_	0s	7us/step	- loss:	0.0268 -	acc:	0.9985
Epoch 631/1000			, , , , , ,				
10000/10000 [======]	-	0s	6us/step	- loss:	0.0271 -	acc:	0.9976
Epoch 632/1000 10000/10000 [======]		0.5	746/6+00	1000	0 0255	2001	0 0006
Epoch 633/1000	-	05	/us/step	- 1055:	0.0255 -	acc:	0.9900
10000/10000 [======]	-	0s	6us/step	- loss:	0.0258 -	acc:	0.9983
Epoch 634/1000							
10000/10000 [======] Epoch 635/1000	-	0s	7us/step	- loss:	0.0251 -	acc:	0.9982
10000/10000 [======]	_	0s	6us/step	- loss:	0.0265 -	acc:	0.9978
Epoch 636/1000							
10000/10000 [=================================	-	0s	8us/step	- loss:	0.0260 -	acc:	0.9979
Epoch 637/1000 10000/10000 [======]		0 c	Sus/stan	- lnss:	0 0257 -	acc.	A 9978
Epoch 638/1000		03	003/3100	.0331	0.0237	acc.	0.3370
10000/10000 [=====]	-	0s	6us/step	- loss:	0.0258 -	acc:	0.9973
Epoch 639/1000		0 -	C / - +	1	0 0250		0 0070
10000/10000 [======] Epoch 640/1000	-	05	ous/step	- LOSS:	0.0259 -	acc:	0.9978
10000/10000 [======]	-	0s	6us/step	- loss:	0.0253 -	acc:	0.9980
Epoch 641/1000							
10000/10000 [=======]	-	0s	7us/step	- loss:	0.0254 -	acc:	0.9976
Epoch 642/1000 10000/10000 [======]	_	0s	9us/step	- loss:	0.0234 -	acc:	0.9987
Epoch 643/1000			, , , , ,				
10000/10000 [=====]	-	0s	7us/step	- loss:	0.0237 -	acc:	0.9986
Epoch 644/1000 10000/10000 [======]		0.0	6us/ston	10001	0 0237	2001	0.000
Epoch 645/1000	-	05	ous/steh	.055;	0.023/ -	acci	0.3300
10000/10000 [=======]	-	0s	6us/step	- loss:	0.0241 -	acc:	0.9977
Epoch 646/1000			0 / .		0.000		0.0000
10000/10000 [======] Epoch 647/1000	-	0s	8us/step	- loss:	0.0234 -	acc:	⊍.9988
10000/10000 [======]	_	0s	6us/step	- loss:	0.0247 -	acc:	0.9982
Epoch 648/1000							
10000/10000 [=======]	-	0s	8us/step	- loss:	0.0228 -	acc:	0.9984
Epoch 649/1000							

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10000/10000 [=============] - Os 7us/step - loss: 0.0228 - acc: 0.9984
Epoch 650/1000
10000/10000 [============= ] - 0s 7us/step - loss: 0.0230 - acc: 0.9986
Epoch 651/1000
10000/10000 [============= ] - 0s 6us/step - loss: 0.0225 - acc: 0.9986
Epoch 652/1000
10000/10000 [===========] - 0s 6us/step - loss: 0.0234 - acc: 0.9983
Fnoch 653/1000
Epoch 654/1000
Epoch 655/1000
Epoch 656/1000
10000/10000 [============] - Os 10us/step - loss: 0.0222 - acc: 0.9984
Epoch 657/1000
Epoch 658/1000
10000/10000 [============] - 0s 9us/step - loss: 0.0211 - acc: 0.9985
Epoch 659/1000
Epoch 660/1000
Epoch 661/1000
10000/10000 [===========] - 0s 7us/step - loss: 0.0205 - acc: 0.9990
Epoch 662/1000
10000/10000 [============] - 0s 9us/step - loss: 0.0213 - acc: 0.9984
Epoch 663/1000
10000/10000 [=============] - 0s 7us/step - loss: 0.0203 - acc: 0.9988
Epoch 664/1000
Epoch 665/1000
Epoch 666/1000
10000/10000 [=============] - Os 10us/step - loss: 0.0209 - acc: 0.9988
Epoch 667/1000
10000/10000 [=============] - 0s 11us/step - loss: 0.0210 - acc: 0.9977
Epoch 668/1000
Epoch 669/1000
Epoch 670/1000
Epoch 671/1000
Epoch 672/1000
10000/10000 [=============] - 0s 9us/step - loss: 0.0192 - acc: 0.9986
Epoch 673/1000
Epoch 674/1000
Epoch 675/1000
10000/10000 [============= ] - Os 10us/step - loss: 0.0191 - acc: 0.9987
Epoch 676/1000
Epoch 677/1000
10000/10000 [============] - Os 10us/step - loss: 0.0190 - acc: 0.9987
Epoch 678/1000
Fnoch 679/1000
Epoch 680/1000
Epoch 681/1000
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Epoch 682/1000	
	=] - 0s 11us/step - loss: 0.0185 - acc: 0.9986
Epoch 683/1000	
	=] - 0s 10us/step - loss: 0.0170 - acc: 0.9992
Epoch 684/1000	=] - 0s 11us/step - loss: 0.0178 - acc: 0.9990
Epoch 685/1000	=] - 05 11u5/5tep - t055: 0.01/0 - acc: 0.9990
	=] - 0s 9us/step - loss: 0.0180 - acc: 0.9984
Epoch 686/1000	-1 03 3u3/3tcp to33: 0:0100 ucc. 0:3304
	=] - 0s 11us/step - loss: 0.0182 - acc: 0.9991
Epoch 687/1000	
10000/10000 [=======	=] - 0s 10us/step - loss: 0.0182 - acc: 0.9991
Epoch 688/1000	
10000/10000 [=================================	=] - 0s 11us/step - loss: 0.0181 - acc: 0.9990
Epoch 689/1000	
	=] - 0s 10us/step - loss: 0.0173 - acc: 0.9991
Epoch 690/1000	1 0-11/
Epoch 691/1000	=] - 0s 11us/step - loss: 0.0168 - acc: 0.9987
	=] - 0s 9us/step - loss: 0.0171 - acc: 0.9994
Epoch 692/1000	1 03 343/3 (6) (0331 0101/1 4001 01333
	=] - 0s 9us/step - loss: 0.0168 - acc: 0.9991
Epoch 693/1000	
10000/10000 [========	=] - 0s 10us/step - loss: 0.0167 - acc: 0.9988
Epoch 694/1000	
	=] - 0s 10us/step - loss: 0.0168 - acc: 0.9993
Epoch 695/1000	1 0 11 / 1 0 0100
Epoch 696/1000	=] - 0s 11us/step - loss: 0.0169 - acc: 0.9989
l ·	=] - 0s 10us/step - loss: 0.0160 - acc: 0.9992
Epoch 697/1000	-1 03 10d3/3tep 10331 0.0100 dec. 0.3332
· ·	=] - 0s 11us/step - loss: 0.0173 - acc: 0.9981
Epoch 698/1000	
10000/10000 [=======	=] - 0s 10us/step - loss: 0.0170 - acc: 0.9988
Epoch 699/1000	
	=] - 0s 10us/step - loss: 0.0165 - acc: 0.9989
Epoch 700/1000	=] - 0s 9us/step - loss: 0.0166 - acc: 0.9989
Epoch 701/1000	=] - 05 9us/step - toss: 0.0100 - acc: 0.9909
l ·	=] - 0s 8us/step - loss: 0.0158 - acc: 0.9987
Epoch 702/1000	
10000/10000 [=======	=] - 0s 7us/step - loss: 0.0164 - acc: 0.9987
Epoch 703/1000	
	=] - Os 6us/step - loss: 0.0155 - acc: 0.9989
Epoch 704/1000	
	=] - 0s 6us/step - loss: 0.0152 - acc: 0.9994
Epoch 705/1000	=] - 0s 9us/step - loss: 0.0154 - acc: 0.9992
Epoch 706/1000	-1 03 3d3/3cep 10331 010154 dec. 013332
l ·	=] - 0s 8us/step - loss: 0.0160 - acc: 0.9989
Epoch 707/1000	
10000/10000 [=======	=] - 0s 8us/step - loss: 0.0156 - acc: 0.9991
Epoch 708/1000	
	=] - 0s 6us/step - loss: 0.0154 - acc: 0.9992
Epoch 709/1000	=] - 0s 6us/step - loss: 0.0153 - acc: 0.9989
Epoch 710/1000	=] - 05 0us/step - toss: 0.0133 - acc: 0.9909
·	=] - 0s 7us/step - loss: 0.0151 - acc: 0.9990
Epoch 711/1000	
·	=] - 0s 8us/step - loss: 0.0151 - acc: 0.9995
Epoch 712/1000	
	=] - 0s 7us/step - loss: 0.0150 - acc: 0.9993
Epoch 713/1000	-1 Oc Suc/oton 1000 0 0140 0 0000
Epoch 714/1000	=] - 0s 6us/step - loss: 0.0149 - acc: 0.9988
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10000/10000 [=============] - Os 7us/step - loss: 0.0146 - acc: 0.9994
Epoch 715/1000
Epoch 716/1000
10000/10000 [============== ] - 0s 8us/step - loss: 0.0144 - acc: 0.9991
Epoch 717/1000
Fnoch 718/1000
10000/10000 [=============] - Os 11us/step - loss: 0.0142 - acc: 0.9990
Epoch 719/1000
10000/10000 [============] - 0s 9us/step - loss: 0.0138 - acc: 0.9995
Epoch 720/1000
Epoch 721/1000
10000/10000 [============] - 0s 9us/step - loss: 0.0138 - acc: 0.9990
Epoch 722/1000
10000/10000 [============] - 0s 9us/step - loss: 0.0136 - acc: 0.9994
Fnoch 723/1000
Epoch 724/1000
- loss: 0.0144 - acc: 0.999
Epoch 725/1000
Epoch 726/1000
Epoch 727/1000
10000/10000 [============= ] - Os 8us/step - loss: 0.0135 - acc: 0.9993
Epoch 728/1000
Epoch 729/1000
Epoch 730/1000
10000/10000 [============] - 0s 7us/step - loss: 0.0132 - acc: 0.9992
Epoch 731/1000
Epoch 732/1000
10000/10000 [============] - Os 7us/step - loss: 0.0131 - acc: 0.9995
Epoch 733/1000
10000/10000 [============= ] - Os 5us/step - loss: 0.0132 - acc: 0.9989
Epoch 734/1000
10000/10000 [============= ] - Os 7us/step - loss: 0.0125 - acc: 0.9995
Epoch 735/1000
Epoch 736/1000
10000/10000 [=============] - Os 6us/step - loss: 0.0130 - acc: 0.9988
Epoch 737/1000
Epoch 738/1000
Epoch 739/1000
10000/10000 [============] - 0s 9us/step - loss: 0.0117 - acc: 0.9994
Epoch 740/1000
Epoch 741/1000
Epoch 742/1000
- loss: 0.0122 - acc: 0.999
Fnoch 743/1000
Epoch 744/1000
Epoch 745/1000
10000/10000 [============= ] - Os 7us/step - loss: 0.0118 - acc: 0.9994
```

-		Companison
Epoch 746/1000		
10000/10000 [=================================	- 0s	8 8us/step - loss: 0.0121 - acc: 0.9996
Epoch 747/1000	0.5	. 6ug/atan lagge 0 0114 page 0 0007
10000/10000 [======] Epoch 748/1000	- 05	6 bus/step - toss: 0.0114 - acc: 0.999/
10000/10000 [=======]	- 0s	: 6us/sten - loss: 0 0112 - acc: 0 9998
Epoch 749/1000	0.5	, ous, step toss. 0.0112 dec. 0.5550
10000/10000 [======]	- 0s	6 6us/step - loss: 0.0113 - acc: 0.9997
Epoch 750/1000		·
10000/10000 [======]	- 0s	6 6us/step - loss: 0.0109 - acc: 0.9998
Epoch 751/1000		
10000/10000 [======]	- 0s	8 8us/step - loss: 0.0124 - acc: 0.9990
Epoch 752/1000		
10000/10000 [=======]	- US	s llus/step - loss: 0.0108 - acc: 0.9995
Epoch 753/1000 10000/10000 [=======]	- 0s	: 10us/sten - 10ss: 0 0113 - acc: 0 0006
Epoch 754/1000	03	1003/31cp 1033. 0.0113 dec. 0.3330
10000/10000 [======]	- 0s	: 10us/step - loss: 0.0111 - acc: 0.9993
Epoch 755/1000		
10000/10000 [======]	- 0s	6 6us/step - loss: 0.0116 - acc: 0.9995
Epoch 756/1000		
10000/10000 [=======]	- 0s	6 6us/step - loss: 0.0108 - acc: 0.9992
Epoch 757/1000 10000/10000 [=======]	0.5	6 Gus /stan lass: 0 0111 ass: 0 0003
Epoch 758/1000	- 05	6 dus/step - toss: 0.0111 - acc: 0.9993
10000/10000 [=======]	- 0s	6 6us/step - loss: 0.0101 - acc: 1.0000
Epoch 759/1000		•
10000/10000 [======]	- 0s	6 6us/step - loss: 0.0114 - acc: 0.9993
Epoch 760/1000		
10000/10000 [=================================	- 0s	6 6us/step - loss: 0.0104 - acc: 0.9995
Epoch 761/1000	0 -	. Cu-/-t 1 0 0100 0 0001
10000/10000 [======] Epoch 762/1000	- 05	6 bus/step - toss: 0.0108 - acc: 0.9991
10000/10000 [=======]	- 0s	6 Gus/step - loss: 0.0112 - acc: 0.9993
Epoch 763/1000		
10000/10000 [=======]	- 0s	7us/step - loss: 0.0106 - acc: 0.9998
Epoch 764/1000		
10000/10000 [=================================	- 0s	6 6us/step - loss: 0.0099 - acc: 0.9998
Epoch 765/1000	0 -	. Cur./star. 1 0.0104
10000/10000 [======] Epoch 766/1000	- 05	6 bus/step - toss: 0.0104 - acc: 0.9990
10000/10000 [=======]	- 05	6 Gus/step - loss: 0.0105 - acc: 0.9993
Epoch 767/1000		
10000/10000 [======]	- 0s	6 6us/step - loss: 0.0103 - acc: 0.9996
Epoch 768/1000		
10000/10000 [======]	- 0s	7us/step - loss: 0.0105 - acc: 0.9990
Epoch 769/1000		5 /
10000/10000 [=======]	- 0s	s bus/step - loss: 0.0101 - acc: 0.9995
Epoch 770/1000 10000/10000 [=======]	- 0s	: 6us/sten - loss: 0 0007 - acc: 0 0007
Epoch 771/1000	03	, ous, step (033, 0.005) ucc. 0.5557
10000/10000 [======]	- 0s	6 6us/step - loss: 0.0103 - acc: 0.9992
Epoch 772/1000		
10000/10000 [======]	- 0s	6 Gus/step - loss: 0.0097 - acc: 0.9995
Epoch 773/1000		
10000/10000 [=======]	- 0s	s /us/step - loss: 0.0100 - acc: 0.9995
Epoch 774/1000 10000/10000 [=======]	- 00	605/step - loss: 0 0100 - acc: 0 0006
Epoch 775/1000	0.5	, 543, 510p 1033. 0.0100 - acc. 0.9990
10000/10000 [=======]	- 0s	7us/step - loss: 0.0096 - acc: 0.9995
Epoch 776/1000		
10000/10000 [======]	- 0s	6 6us/step - loss: 0.0097 - acc: 0.9995
Epoch 777/1000		
10000/10000 [=======]	- 0s	s /us/step - loss: 0.0101 - acc: 0.9994
Epoch 778/1000		

		Companso	1			
-	0s	7us/step - lo	ss:	0.0103 - ac	C:	0.9993
-	0s	6us/step - lo	5S:	0.0098 - ac	C:	0.9995
_	0 s	6us/sten - lo	S S .	0 0095 - ac	C '	ი 9992
	05	оиз/ этер то	,,,,	0.0033		0.3332
-	0s	6us/step - lo	SS:	0.0090 - ac	C:	0.9994
-	0s	6us/step - lo	55:	0.0101 - ac	C:	0.9996
	0.5	fuc/stop lo		0 0000 20	٠.	0 0007
-	05	ous/step - to	55:	0.0090 - ac	L i	0.9997
_	0s	7us/step - lo	SS:	0.0090 - ac	C:	0.9997
-	0s	6us/step - lo	ss:	0.0091 - ac	C:	0.9997
-	0s	7us/step - lo	55:	0.0089 - ac	C:	0.9996
_	0 s	8us/sten - lo	S S .	0 0095 - ac	C '	ი 9997
	03	ου3/3τορ το	,,,,	0.0055	U 1	0.5557
-	0s	6us/step - lo	SS:	0.0088 - ac	C:	0.9998
-	0s	6us/step - lo	55:	0.0088 - ac	C:	0.9997
	0 -	C / - t		0.0003		0.000
-	US	bus/step - to	55:	0.0093 - ac	C:	0.9996
_	0s	7us/step - lo	SS:	0.0094 - ac	C:	0.9992
-	0s	6us/step - lo	ss:	0.0084 - ac	C:	1.0000
-	0s	7us/step - lo	55:	0.0086 - ac	C:	0.9998
_	0 s	7us/sten - lo	S S .	0 0003 - ac	C '	n 9994
	03	743/31CP 10	,,,,	0.0055	U 1	0.5554
-	0s	7us/step - lo	SS:	0.0090 - ac	C:	0.9994
-	0s	7us/step - lo	5S:	0.0086 - ac	C:	0.9994
	0.0	7us/stop 1o		0 0007 36	C .	0 0006
-	05	/us/step - to	55;	0.0007 - ac		0.9990
_	0s	6us/step - lo	SS:	0.0084 - ac	C:	0.9997
-	0s	6us/step - lo	55:	0.0094 - ac	C:	0.9987
-	0s	bus/step - Lo	5S:	0.00/8 - ac	€:	0.9997
_	0.5	6us/step - lo	55:	0.0082 - ac	C:	0.9998
-	0s	7us/step - lo	ss:	0.0080 - ac	C:	0.9997
-	0s	8us/step - lo	55:	0.0082 - ac	C:	0.9994
_	0.5	6us/sten - lo	cc:	0 0080 - 30	C !	A 0005
	03	ου3/3τερ - το	55.	0.0000 - ac		0.9995
-	0s	6us/step - lo	ss:	0.0077 - ac	С:	0.9996
-	0s	7us/step - lo	SS:	0.0079 - ac	C:	0.9998
	0 -	C / - t		0.0074		0.000
-	٥s	ous/step - lo	55:	บ.บบ/4 - ac	C:	U.9999
_	0s	6us/step - lo	SS:	0.0079 - ac	C:	0.9996
		, 5 200				
-	0s	7us/step - lo	SS:	0.0075 - ac	C:	0.9998
-	0s	6us/step - lo	SS:	0.0081 - ac	C:	0.9997
		- 0s	- 0s 7us/step - lose	- 0s 6us/step - loss: - 0s 7us/step - loss: - 0s 6us/step - loss: - 0s 7us/step - loss: - 0s 6us/step - loss:	- 0s 7us/step - loss: 0.0103 - according to separate the color of th	- 0s 7us/step - loss: 0.0103 - acc: - 0s 6us/step - loss: 0.0098 - acc: - 0s 6us/step - loss: 0.0099 - acc: - 0s 6us/step - loss: 0.0090 - acc: - 0s 6us/step - loss: 0.0101 - acc: - 0s 6us/step - loss: 0.0090 - acc: - 0s 6us/step - loss: 0.0090 - acc: - 0s 7us/step - loss: 0.0091 - acc: - 0s 6us/step - loss: 0.0091 - acc: - 0s 6us/step - loss: 0.0091 - acc: - 0s 6us/step - loss: 0.0089 - acc: - 0s 6us/step - loss: 0.0088 - acc: - 0s 6us/step - loss: 0.0088 - acc: - 0s 6us/step - loss: 0.0088 - acc: - 0s 6us/step - loss: 0.0093 - acc: - 0s 7us/step - loss: 0.0094 - acc: - 0s 7us/step - loss: 0.0094 - acc: - 0s 7us/step - loss: 0.0086 - acc: - 0s 7us/step - loss: 0.0086 - acc: - 0s 7us/step - loss: 0.0097 - acc: - 0s 6us/step - loss: 0.0087 - acc: - 0s 6us/step - loss: 0.0088 - acc: - 0s 7us/step - loss: 0.0080 - acc: - 0s 6us/step - loss: 0.0084 - acc: - 0s 6us/step - loss: 0.0087 - acc: - 0s 6us/step - loss: 0.0080 - acc: - 0s 6us/step - loss: 0.0082 - acc: - 0s 6us/step - loss: 0.0082 - acc: - 0s 6us/step - loss: 0.0082 - acc: - 0s 6us/step - loss: 0.0087 - acc: - 0s 6us/step - loss: 0.0087 - acc: - 0s 6us/step - loss: 0.0088 - acc: - 0s 6us/step - loss: 0.0088 - acc: - 0s 6us/step - loss: 0.0088 - acc: - 0s 6us/step - loss: 0.0089 - acc: - 0s 6us/step - loss: 0.0088 - acc:

,,						
Epoch 811/1000		0 -	C / - t	0 0077		0.0000
10000/10000 [======] Epoch 812/1000	-	ΘS	bus/step - loss:	0.00// -	acc:	0.9998
10000/10000 [======]	-	0s	7us/step - loss:	0.0075 -	acc:	0.9997
Epoch 813/1000						
10000/10000 [======]	-	0s	7us/step - loss:	0.0087 -	acc:	0.9992
Epoch 814/1000 10000/10000 [======]	_	05	6us/sten - loss:	0.0077 -	acc:	0.9996
Epoch 815/1000		0.5	оиз, этер соззт	010077	acci	0.0000
10000/10000 [======]	-	0s	7us/step - loss:	0.0082 -	acc:	0.9994
Epoch 816/1000		0 -	7/ 1	0.0076		0.0007
10000/10000 [======] Epoch 817/1000	-	05	/us/step - loss:	0.00/6 -	acc:	0.9997
10000/10000 [=======]	_	0s	6us/step - loss:	0.0077 -	acc:	0.9996
Epoch 818/1000						
10000/10000 [=======]	-	0s	7us/step - loss:	0.0082 -	acc:	0.9992
Epoch 819/1000 10000/10000 [======]		0.0	fus/sten - loss:	0 0076 -	3001	0 0007
Epoch 820/1000		03	ous/step - toss.	0.0070 -	acc.	0.9997
10000/10000 [=======]	-	0s	7us/step - loss:	0.0077 -	acc:	0.9996
Epoch 821/1000						
10000/10000 [======] Epoch 822/1000	-	0s	6us/step - loss:	0.0071 -	acc:	0.9997
10000/10000 [======]	_	0s	7us/step - loss:	0.0071 -	acc:	0.9999
Epoch 823/1000			,			
10000/10000 [======]	-	0s	7us/step - loss:	0.0081 -	acc:	0.9993
Epoch 824/1000 10000/10000 [======]		0.0	Tus/sten - loss:	0 0072 -	3001	0 0006
Epoch 825/1000	_	03	703/31ep - 1033.	0.0072	acc.	0.9990
10000/10000 [=======]	-	0s	6us/step - loss:	0.0072 -	acc:	0.9996
Epoch 826/1000			_			
10000/10000 [======] Epoch 827/1000	-	0s	7us/step - loss:	0.0070 -	acc:	0.9998
10000/10000 [=======]	_	0s	6us/step - loss:	0.0068 -	acc:	0.9999
Epoch 828/1000			·			
10000/10000 [=======]	-	0s	6us/step - loss:	0.0070 -	acc:	0.9996
Epoch 829/1000 10000/10000 [=======]		0 c	7us/sten - loss:	0 0070 -	acc.	A 9999
Epoch 830/1000		03	743/3 tcp t033.	0.0070	acc.	0.5555
10000/10000 [======]	-	0s	6us/step - loss:	0.0068 -	acc:	0.9997
Epoch 831/1000		0	6 / 1 1	0.0074		0.0000
10000/10000 [======] Epoch 832/1000	-	ΘS	bus/step - loss:	0.00/4 -	acc:	0.9993
10000/10000 [=======]	_	0s	12us/step - loss	: 0.0071	- acc	0.9998
Epoch 833/1000						
10000/10000 [=======]	-	0s	9us/step - loss:	0.0066 -	acc:	0.9996
Epoch 834/1000 10000/10000 [======]	_	05	6us/step - loss:	0.0068 -	acc:	0.9996
Epoch 835/1000				0.000		0.000
10000/10000 [======]	-	0s	7us/step - loss:	0.0062 -	acc:	0.9998
Epoch 836/1000		0.5	Aug/ston loss.	0.0064	200.	1 0000
10000/10000 [======] Epoch 837/1000	-	05	ous/step - toss:	0.0004 -	acc:	1.0000
10000/10000 [=======]	-	0s	8us/step - loss:	0.0068 -	acc:	0.9996
Epoch 838/1000			_			
10000/10000 [=======]	-	0s	6us/step - loss:	0.0067 -	acc:	0.9997
Epoch 839/1000 10000/10000 [======]	_	0s	7us/step - loss:	0.0066 -	acc:	0.9998
Epoch 840/1000		-	,			
10000/10000 [=======]	-	0s	6us/step - loss:	0.0072 -	acc:	0.9995
Epoch 841/1000 10000/10000 [======]		0.0	fus/stan - loss:	0 0074	acc:	0 0002
Epoch 842/1000	-	US	υωυ, στορ - τυσς:	0.00/4 -	act.	J.JJJZ
10000/10000 [======]	-	0s	6us/step - loss:	0.0071 -	acc:	0.9994
Epoch 843/1000						

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10000/10000 [======]	-	0s	8us/step -	loss:	0.0064 -	acc:	1.0000
Epoch 844/1000							
10000/10000 [=======]	-	0s	8us/step -	loss:	0.0073 -	acc:	0.9996
Epoch 845/1000 10000/10000 [======]	_	05	6us/sten -	1055:	0.0058 -	acc:	0.9999
Epoch 846/1000		03	003/3 ccp		0.0050	acci	0.3333
10000/10000 [======]	-	0s	6us/step -	loss:	0.0064 -	acc:	0.9998
Epoch 847/1000							
10000/10000 [=======]	-	0s	6us/step -	loss:	0.0064 -	acc:	0.9996
Epoch 848/1000 10000/10000 [======]		0.0	6us/ston	10001	0 0063	3661	0 0007
Epoch 849/1000	-	05	ous/step -	1055.	0.0003 -	acc.	0.9997
10000/10000 [======]	-	0s	6us/step -	loss:	0.0066 -	acc:	0.9997
Epoch 850/1000							
10000/10000 [========]	-	0s	7us/step -	loss:	0.0060 -	acc:	1.0000
Epoch 851/1000 10000/10000 [======]		0.0	6us/ston	10001	0 0062	2661	0 0007
Epoch 852/1000	-	05	ous/step -	1055;	0.0003 -	acc:	0.9997
1000/10000 [======]	-	0s	7us/step -	loss:	0.0063 -	acc:	0.9996
Epoch 853/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.0063 -	acc:	0.9996
Epoch 854/1000		0.5	Gua /atan	1	0.0060		0 0007
10000/10000 [======] Epoch 855/1000	-	05	ous/step -	1055:	0.0000 -	acc:	0.9997
10000/10000 [======]	_	0s	6us/step -	loss:	0.0059 -	acc:	0.9999
Epoch 856/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.0062 -	acc:	0.9997
Epoch 857/1000		0.5	7/	1	0.0063		0 0000
10000/10000 [======] Epoch 858/1000	-	05	/us/step -	LOSS:	0.0003 -	acc:	0.9999
10000/10000 [======]	-	0s	6us/step -	loss:	0.0063 -	acc:	0.9998
Epoch 859/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.0058 -	acc:	0.9999
Epoch 860/1000		0.5	Gua /atan	1	0 0056		1 0000
10000/10000 [======] Epoch 861/1000	-	05	ous/step -	1055:	0.0050 -	acc:	1.0000
10000/10000 [======]	-	0s	6us/step -	loss:	0.0055 -	acc:	0.9999
Epoch 862/1000							
10000/10000 [======]	-	0s	8us/step -	loss:	0.0061 -	acc:	0.9995
Epoch 863/1000		0 -	C / - t	1	0.0053		1 0000
10000/10000 [======] Epoch 864/1000	-	05	bus/step -	LOSS:	0.0053 -	acc:	1.0000
10000/10000 [======]	-	0s	6us/step -	loss:	0.0060 -	acc:	0.9996
Epoch 865/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.0060 -	acc:	0.9997
Epoch 866/1000		0.5	Gua /atan	1	0 0056		0 0006
10000/10000 [======] Epoch 867/1000	-	05	ous/step -	1055:	0.0050 -	acc:	0.9996
10000/10000 [=======]	_	0s	7us/step -	loss:	0.0056 -	acc:	0.9997
Epoch 868/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.0053 -	acc:	0.9998
Epoch 869/1000		0.5	7/	1	0.0054		0 0000
10000/10000 [======] Epoch 870/1000	-	05	/us/step -	1055:	0.0054 -	acc:	0.9999
10000/10000 [======]	-	0s	6us/step -	loss:	0.0050 -	acc:	0.9999
Epoch 871/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.0052 -	acc:	1.0000
Epoch 872/1000		0 -	C / - t	1	0 0055		0.0000
10000/10000 [======] Epoch 873/1000	-	٥S	ous/step -	LOSS:	U.UU55 -	acc:	U.9998
10000/10000 [=======]	-	0s	7us/step -	loss:	0.0056 -	acc:	0.9996
Epoch 874/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.0048 -	acc:	0.9998
Epoch 875/1000		0	740 / 5 + - :	1.55	0.0053	20-	0.0000
10000/10000 [======]	-	US	/us/step -	LOSS:	U.UU5Z -	acc:	ช.9998

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Epoch 876/1000		0 -	7/ 1 0.0050 0.0007
10000/10000 [======] Epoch 877/1000	-	05	/us/step - loss: 0.0058 - acc: 0.999/
10000/10000 [=======]	_	0s	7us/step - loss: 0.0052 - acc: 0.9998
Epoch 878/1000			·
10000/10000 [======]	-	0s	7us/step - loss: 0.0048 - acc: 1.0000
Epoch 879/1000		0	6 () 1 0 0052 0 0000
10000/10000 [======] Epoch 880/1000	-	θS	bus/step - Loss: 0.0052 - acc: 0.9999
10000/10000 [=======]	_	0.5	6us/step - loss: 0.0052 - acc: 0.9998
Epoch 881/1000			
10000/10000 [======]	-	0s	6us/step - loss: 0.0056 - acc: 0.9995
Epoch 882/1000			_
10000/10000 [======]	-	0s	10us/step - loss: 0.0050 - acc: 0.9999
Epoch 883/1000 10000/10000 [=======]	_	0,5	7us/sten - loss: 0.0052 - acc: 0.9998
Epoch 884/1000		03	743, 3 tep 1033. 0.0032 dec. 0.3330
10000/10000 [======]	-	0s	6us/step - loss: 0.0052 - acc: 0.9998
Epoch 885/1000			
10000/10000 [=================================	-	0s	8us/step - loss: 0.0049 - acc: 0.9998
Epoch 886/1000 10000/10000 [======]		0.0	6us/ston loss: 0 0052 acc: 0 0007
Epoch 887/1000	-	0.5	ous/step - toss. 0.0032 - acc. 0.999/
10000/10000 [======]	-	0s	6us/step - loss: 0.0051 - acc: 0.9996
Epoch 888/1000			
10000/10000 [=======]	-	0s	6us/step - loss: 0.0046 - acc: 0.9998
Epoch 889/1000 10000/10000 [=======]		0.0	6us/ston loss: 0 0052 acc: 0 0007
Epoch 890/1000	-	05	ous/step - toss: 0.0032 - acc: 0.999/
10000/10000 [=======]	-	0s	6us/step - loss: 0.0052 - acc: 0.9998
Epoch 891/1000			
10000/10000 [======]	-	0s	7us/step - loss: 0.0051 - acc: 0.9996
Epoch 892/1000 10000/10000 [======]		0 -	6.12/atan lass 0.0040 ass 0.0000
Epoch 893/1000	-	05	ous/step - toss: 0.0046 - acc: 0.9999
10000/10000 [======]	_	0s	6us/step - loss: 0.0051 - acc: 0.9998
Epoch 894/1000			
10000/10000 [======]	-	0s	7us/step - loss: 0.0050 - acc: 0.9999
Epoch 895/1000		0 -	7/
10000/10000 [======] Epoch 896/1000	-	05	/us/step - loss: 0.0049 - acc: 0.999/
10000/10000 [=======]	_	0s	8us/step - loss: 0.0051 - acc: 0.9997
Epoch 897/1000			·
10000/10000 [======]	-	0s	6us/step - loss: 0.0047 - acc: 0.9999
Epoch 898/1000		0 -	Cur / 1 0.0040 0.0007
10000/10000 [======] Epoch 899/1000	-	05	bus/step - Loss: 0.0048 - acc: 0.999/
10000/10000 [=================================	_	0s	7us/step - loss: 0.0049 - acc: 0.9998
Epoch 900/1000			
10000/10000 [=====]	-	0s	7us/step - loss: 0.0057 - acc: 0.9994
Epoch 901/1000		0 -	0.00/0400
10000/10000 [======] Epoch 902/1000	-	05	8us/step - toss: 0.0048 - acc: 0.999/
10000/10000 [========]	_	0s	7us/step - loss: 0.0046 - acc: 0.9999
Epoch 903/1000			
10000/10000 [=====]	-	0s	6us/step - loss: 0.0047 - acc: 0.9996
Epoch 904/1000		0.0	7us/stop loss: 0.0044 0.0000
10000/10000 [======] Epoch 905/1000	-	US	/us/step - toss: 0.0044 - acc: 0.9999
10000/10000 [========]	-	0s	7us/step - loss: 0.0048 - acc: 0.9996
Epoch 906/1000			
10000/10000 [======]	-	0s	6us/step - loss: 0.0049 - acc: 0.9996
Epoch 907/1000		0.0	6us/ston loss 0.0047 0.0000
10000/10000 [======] Epoch 908/1000	-	US	ous/step - toss: 0.0047 - dCC: 0.9999
F			

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10000/10000 [======]	-	0s	6us/step -	loss:	0.0046 -	acc:	0.9999
Epoch 909/1000							
10000/10000 [=======]	-	0s	7us/step -	loss:	0.0041 -	acc:	1.0000
Epoch 910/1000 10000/10000 [======]	_	0 s	7us/sten -	1055.	0 0043 -	acc:	1 0000
Epoch 911/1000		03	7 d 3 / 3 c c p	.0551	010045	acci	110000
10000/10000 [=======]	-	0s	6us/step -	loss:	0.0042 -	acc:	1.0000
Epoch 912/1000							
10000/10000 [=================================	-	0s	6us/step -	loss:	0.0045 -	acc:	0.9998
Epoch 913/1000 10000/10000 [======]		0.0	6us/ston	10001	0 00/15	3661	0,000
Epoch 914/1000	_	05	ous/step -	1055.	0.0045	acc.	0.9999
10000/10000 [======]	-	0s	6us/step -	loss:	0.0045 -	acc:	0.9998
Epoch 915/1000							
10000/10000 [=================================	-	0s	6us/step -	loss:	0.0041 -	acc:	0.9998
Epoch 916/1000 10000/10000 [======]		0.0	6us/ston	10001	0 0042	2661	0.000
Epoch 917/1000	-	05	ous/step -	10551	0.0045 -	acc:	0.9999
10000/10000 [=======]	-	0s	6us/step -	loss:	0.0045 -	acc:	0.9998
Epoch 918/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.0040 -	acc:	1.0000
Epoch 919/1000		0.5	7 / 0. + 0. 1	1	0.0040		0 0000
10000/10000 [======] Epoch 920/1000	-	05	/us/step -	1055:	0.0048 -	acc:	0.9992
10000/10000 [======]	-	0s	8us/step -	loss:	0.0043 -	acc:	0.9997
Epoch 921/1000			·				
10000/10000 [======]	-	0s	6us/step -	loss:	0.0039 -	acc:	0.9999
Epoch 922/1000		0.5	Gua /atan	1	0.0040		1 0000
10000/10000 [======] Epoch 923/1000	-	05	bus/step -	LOSS:	0.0040 -	acc:	1.0000
10000/10000 [======]	_	0s	7us/step -	loss:	0.0043 -	acc:	0.9999
Epoch 924/1000			·				
10000/10000 [======]	-	0s	6us/step -	loss:	0.0038 -	acc:	1.0000
Epoch 925/1000		0.5	Gua /atan	1	0 0020		1 0000
10000/10000 [======] Epoch 926/1000	-	05	ous/step -	1055:	0.0038 -	acc:	1.0000
10000/10000 [======]	_	0s	6us/step -	loss:	0.0037 -	acc:	0.9999
Epoch 927/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.0041 -	acc:	0.9998
Epoch 928/1000		0 -	C / - +	1	0 0041		0.0000
10000/10000 [======] Epoch 929/1000	-	05	ous/step -	LOSS:	0.0041 -	acc:	0.9999
10000/10000 [======]	_	0s	7us/step -	loss:	0.0042 -	acc:	0.9998
Epoch 930/1000			·				
10000/10000 [======]	-	0s	6us/step -	loss:	0.0036 -	acc:	1.0000
Epoch 931/1000		0.5	Gua /atan	1	0 0027		0 0007
10000/10000 [======] Epoch 932/1000	-	05	ous/step -	1055:	0.0037 -	acc:	0.9997
10000/10000 [======]	-	0s	7us/step -	loss:	0.0041 -	acc:	0.9999
Epoch 933/1000							
10000/10000 [======]	-	0s	6us/step -	loss:	0.0040 -	acc:	0.9998
Epoch 934/1000		0.5	7 / 0. + 0. 1	1	0 0020		0 0000
10000/10000 [======] Epoch 935/1000	-	05	/us/step -	1055:	0.0039 -	acc:	0.9998
10000/10000 [======]	_	0s	6us/step -	loss:	0.0038 -	acc:	0.9999
Epoch 936/1000							
10000/10000 [======]	-	0s	7us/step -	loss:	0.0037 -	acc:	0.9999
Epoch 937/1000		0	7 / 1	,	0 0007		0.0000
10000/10000 [======] Epoch 938/1000	-	٥S	/us/step -	LOSS:	U.UU3/ -	acc:	0.9999
10000/10000 [=======]	_	0s	6us/step -	loss:	0.0038 -	acc:	0.9999
Epoch 939/1000		-	- 1-		-		
10000/10000 [======]	-	0s	6us/step -	loss:	0.0044 -	acc:	0.9995
Epoch 940/1000		^	C	1	0.0000	_	0.000=
10000/10000 [=======]	-	٥s	ous/step -	LOSS:	0.0038 -	acc:	U.9998

,,							
Epoch 941/1000 10000/10000 [======]		0.5	Eug/ston	1000	0 0030	2661	1 0000
Epoch 942/1000	-	05	ous/step	- 1055:	0.0038 -	acc:	1.0000
10000/10000 [=======]	-	0s	6us/step	- loss:	0.0038 -	acc:	0.9998
Epoch 943/1000							
10000/10000 [======]	-	0s	6us/step	- loss:	0.0040 -	acc:	0.9998
Epoch 944/1000 10000/10000 [======]	_	0 s	6us/step	- loss:	0.0038 -	acc:	1.0000
Epoch 945/1000			о шо, о тор		0.000		1.000
10000/10000 [======]	-	0s	7us/step	- loss:	0.0036 -	acc:	0.9999
Epoch 946/1000 10000/10000 [======]		0.0	6us/ston	10001	0 0020	2661	0 0000
Epoch 947/1000	-	05	ous/step	- 1055:	0.0039 -	acc:	0.9999
10000/10000 [======]	-	0s	6us/step	- loss:	0.0035 -	acc:	0.9998
Epoch 948/1000							
10000/10000 [======]	-	0s	7us/step	- loss:	0.0039 -	acc:	0.9996
Epoch 949/1000 10000/10000 [=======]	_	0 s	7us/step	- loss:	0.0035 -	acc:	1.0000
Epoch 950/1000			,				
10000/10000 [======]	-	0s	8us/step	- loss:	0.0032 -	acc:	0.9998
Epoch 951/1000		0.5	746/6+00	1000	0 0034	2001	0 0000
10000/10000 [======] Epoch 952/1000	-	05	/us/step	- 1055:	0.0034 -	acc:	0.9996
10000/10000 [======]	-	0s	8us/step	- loss:	0.0036 -	acc:	0.9999
Epoch 953/1000							
10000/10000 [======] Epoch 954/1000	-	0s	6us/step	- loss:	0.0036 -	acc:	0.9997
10000/10000 [======]	_	0s	6us/step	- loss:	0.0031 -	acc:	0.9999
Epoch 955/1000							
10000/10000 [=======]	-	0s	7us/step	- loss:	0.0036 -	acc:	0.9998
Epoch 956/1000 10000/10000 [======]		0 c	6us/sten	- 1000	0 0038 -	acc.	A 9997
Epoch 957/1000		03	0u3/3 tep	- (033.	0.0030 -	acc.	0.9997
10000/10000 [======]	-	0s	7us/step	- loss:	0.0035 -	acc:	0.9997
Epoch 958/1000		0	-	-	0.0000		
10000/10000 [======] Epoch 959/1000	-	ΘS	/us/step	- LOSS:	0.0036 -	acc:	0.9998
10000/10000 [======]	-	0s	7us/step	- loss:	0.0036 -	acc:	0.9997
Epoch 960/1000							
10000/10000 [======]	-	0s	6us/step	- loss:	0.0034 -	acc:	1.0000
Epoch 961/1000 10000/10000 [======]	_	0 s	6us/step	- loss:	0.0032 -	acc:	0.9999
Epoch 962/1000			, , , , , ,				
10000/10000 []	-	0s	6us/step	- loss:	0.0035 -	acc:	0.9997
Epoch 963/1000 10000/10000 [======]		0.0	7us/ston	10001	0 0033	2001	0,000
Epoch 964/1000	-	0.5	/us/step	- 1055.	0.0055 -	acc.	0.9999
10000/10000 [======]	-	0s	6us/step	- loss:	0.0031 -	acc:	1.0000
Epoch 965/1000		0	-	7	0.0000		1 0000
10000/10000 [======] Epoch 966/1000	-	0S	/us/step	- LOSS:	0.0033 -	acc:	1.0000
10000/10000 [======]	-	0s	7us/step	- loss:	0.0033 -	acc:	0.9998
Epoch 967/1000							
10000/10000 [=======]	-	0s	7us/step	- loss:	0.0030 -	acc:	1.0000
Epoch 968/1000 10000/10000 [======]	_	0.5	7us/sten	- loss:	0.0030 -	acc:	1.0000
Epoch 969/1000		,,	, o top				, , , ,
10000/10000 [======]	-	0s	6us/step	- loss:	0.0030 -	acc:	0.9998
Epoch 970/1000 10000/10000 [======]		0.0	7115/5+22	1000	0 0024	366:	0.000
Epoch 971/1000	-	05	,us/steh	- 1055:	0.0034 -	acc:	0.3390
10000/10000 [=======]	-	0s	6us/step	- loss:	0.0034 -	acc:	0.9998
Epoch 972/1000		_		7	0.000-		
10000/10000 [=======] Epoch 973/1000	-	0s	bus/step	- LOSS:	0.0029 -	acc:	1.0000

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10000/10000 [=================================	=] -	0s	7us/step	- loss:	0.0031 -	acc:	0.9997
Epoch 974/1000				_			
10000/10000 [=================================	=] -	0s	6us/step	- loss:	0.0029 -	acc:	1.0000
Epoch 975/1000	,	0	6 / 1		0.0000		0.0000
10000/10000 [=================================	=] -	0S	bus/step	- LOSS:	0.0030 -	acc:	0.9999
Epoch 976/1000 10000/10000 [=================================	_1	0.5	7us /ston	1000	0 0030	200.	1 0000
Epoch 977/1000	=] -	05	/us/step	- 1055:	0.0030 -	acc:	1.0000
10000/10000 [=================================	-1 -	0.0	Gus/stan	- 1000	0 0032 -	3CC:	ი 0000
Epoch 978/1000	-] -	03	ous/step	- (033.	0.0032 -	acc.	0.9999
10000/10000 [=================================	=1 -	05	6us/sten	- loss:	0.0033 -	acc:	0.9996
Epoch 979/1000	1	03	оиз/ э сер	00001	0.0055	acc.	0.5550
10000/10000 [=================================	=1 -	0s	6us/step	- loss:	0.0033 -	acc:	0.9997
Epoch 980/1000	1						
10000/10000 [=================================	=] -	0s	6us/step	- loss:	0.0028 -	acc:	0.9999
Epoch 981/1000							
10000/10000 [=================================	=] -	0s	7us/step	- loss:	0.0032 -	acc:	1.0000
Epoch 982/1000							
10000/10000 [=================================	=] -	0s	7us/step	- loss:	0.0032 -	acc:	0.9999
Epoch 983/1000							
10000/10000 [=================================	=] -	0s	6us/step	- loss:	0.0028 -	acc:	0.9999
Epoch 984/1000							
10000/10000 [=================================	=] -	0s	6us/step	- loss:	0.0027 -	acc:	0.9999
Epoch 985/1000							
10000/10000 [=================================	=] -	0s	8us/step	- loss:	0.0031 -	acc:	0.9997
Epoch 986/1000							
10000/10000 [=================================	=] -	0s	6us/step	- Loss:	0.0032 -	acc:	0.9997
Epoch 987/1000	_1	0.5	Gus /ston	1000	0 0022	200.	0 0000
10000/10000 [=================================	=] -	05	ous/step	- 1055:	0.0032 -	acc:	0.9990
10000/10000 [=================================	-1 -	0.0	Gus/stan	- 1000	0 0027 -	acc:	1 0000
Epoch 989/1000	-] -	03	ous/step	- (033.	0.0027	acc.	1.0000
10000/10000 [=================================	=1 -	0,5	6us/sten	- loss:	0.0028 -	acc:	1.0000
Epoch 990/1000	1	0.5	043/3100		010020	acci	110000
10000/10000 [=================================	=1 -	0s	6us/step	- loss:	0.0027 -	acc:	1.0000
Epoch 991/1000	-						
10000/10000 [=================================	=] -	0s	7us/step	- loss:	0.0029 -	acc:	0.9999
Epoch 992/1000							
10000/10000 [=================================	=] -	0s	6us/step	- loss:	0.0029 -	acc:	0.9998
Epoch 993/1000							
10000/10000 [=================================	=] -	0s	7us/step	- loss:	0.0027 -	acc:	0.9999
Epoch 994/1000							
10000/10000 [=================================	=] -	0s	6us/step	- loss:	0.0028 -	acc:	0.9999
Epoch 995/1000							
10000/10000 [=================================	=] -	0s	7us/step	- loss:	0.0029 -	acc:	1.0000
Epoch 996/1000							
10000/10000 [=================================	=] -	0s	6us/step	- Loss:	0.0030 -	acc:	0.9999
Epoch 997/1000	1	0 -	C / - +	1	0 0000		0.0000
10000/10000 [=================================	=] -	05	ous/step	- 1055:	0.0030 -	acc:	0.9998
Epoch 998/1000 10000/10000 [=================================	-1	0.0	hus/stan	- 1000	0 0027	acc:	0 0000
Epoch 999/1000	-1 -	US	ous/steb	10331	0.0027 -	ucc.	0.5555
10000/10000 [=================================	=1 -	(·) <	6us/sten	- loss:	0.0027 -	acc:	0.9997
Epoch 1000/1000	1	55	- ao, o cop				3.0007
10000/10000 [=================================	=] -	0s	6us/step	- loss:	0.0026 -	acc:	1.0000
	4		, о сор				

Alternate learning code

```
In [6]:
import tensorflow as tf
from tensorflow import keras
from tensorflow import keras
from tensorflow.keras.layers import *
from sklearn import preprocessing
import tensorflow.keras.backend as K
from sklearn.metrics import mean_squared_error
sigma= 1e-4
# Peturbation Sampling
def perturbation(x):
    w = K.random normal(shape = (channel,2), mean=0.0,stddev=sigma**0.5,dtype=None)
    xp = ((1-sigma)**0.5)*x + w
    return xp
# Defining transmitter loss
def loss tx(y true, y pred):
    return -y_true*y_pred
# Defining the policy
def get policy(inp):
    xp = inp[0]
    x = inp[1]
    W = XD - X
    policy = -K.sum(w*w)
    return policy
tx_ip = Input((1,))
# Adding embedding layer
embbedings layer = Dense(msg total, activation = 'relu')(tx inp)
layer dense = Dense(2*channel, activation = 'relu')(embbedings layer)
# real to complex
to complex = Reshape((channel,2))(layer dense)
# Normalising the output to unit energy
x = Lambda(lambda x: keras.backend.l2 normalize(x))(to complex)
# Peturbation sampling
xp = Lambda(perturbation)(to_complex)
policy = Lambda(get_policy)([xp,x])
# model for policy training
model policy = keras.models.Model(inputs=tx inp, outputs=policy)
# model to get the peturbatated output
model tx = keras.models.Model(inputs=tx inp, outputs=xp)
# model to get the encoded message to transmit
model_x = keras.models.Model(inputs=tx_inp, outputs=x)
model_policy.compile(loss=loss_tx, optimizer=tf.keras.optimizers.SGD(lr = 1e-5))
print(model_policy.summary())
```

```
rx inp = Input((channel,2))
# complex to real
to_flat = Reshape((2*channel,))(rx_inp)
fc = Dense(8*2*channel, activation = 'relu')(to_flat)
softmax = Dense(msg total, activation = 'softmax')(fc)
model rx = keras.models.Model(inputs=rx inp, outputs=softmax)
model_rx.compile(loss=tf.keras.losses.categorical_crossentropy, optimizer=tf.keras.optimizers.Ad
print(model_rx.summary())
loss_tx = []
loss_rx = []
for epoch in range(epochs):
     Transmitter Training
    raw input = np.random.randint(0,msg total,(batch size))
    label = np.zeros((batch_size, msg_total))
    label[np.arange(batch_size), raw_input] = 1
    tx_input = raw_input/float(msg_total)
    xp = model_tx.predict(tx_input)
    y = xp + np.random.normal(0,0.001,(batch_size, channel,2))
    pred = model_rx.predict(y)
    loss = np.sum(np.square(label - pred), axis = 1)
    history_tx = model_policy.fit(tx_input, loss, batch_size=batch_size, epochs=1, verbose=0)
    loss_tx.append(history_tx.history['loss'][0])
     Receiver Training
    raw input = np.random.randint(0,msg total,(batch size))
    label = np.zeros((batch_size, msg_total))
    label[np.arange(batch_size), raw_input] = 1
    tx input = raw input/float(msg total)
    x = model_x.predict(tx_input)
    y = x + np.random.normal(0,0.001,(batch_size, channel,2))
    history_rx = model_rx.fit(y, label, batch_size=batch_size, epochs=1, verbose=0)
    loss rx.append(history rx.history['loss'][0])
    if(epoch % 100 == 0):
        print('epoch: ', epoch, 'tx loss', history tx.history['loss'][0], 'rx loss', history rx.
history['loss'][0])
```

 Layer (type) =========	Output Shape	Param #	Connected to
==== input_1 (InputLayer)	(None, 1)	0	
dense (Dense)	(None, 8)	16	input_1[0][0]
dense_1 (Dense)	(None, 8)	72	dense[0][0]
reshape (Reshape)	(None, 4, 2)	0	dense_1[0][0]
lambda_1 (Lambda)	(None, 4, 2)	0	reshape[0][0]
lambda (Lambda)	(None, 4, 2)	0	reshape[0][0]
lambda_2 (Lambda)	()	0	lambda_1[0][0] lambda[0][0]
None Layer (type)	Output Shape	Param #	
input_2 (InputLayer)	(None, 4, 2)		===
reshape_1 (Reshape)	(None, 8)		
dense 2 (Dense)	(None, 64)	576	
dense_3 (Dense)	(None, 8)	520	
Total params: 1,096 Trainable params: 1,096 Non-trainable params: 0			===
epoch: 100 tx_loss 1.53 epoch: 200 tx_loss 0.55 epoch: 300 tx_loss 0.23 epoch: 400 tx_loss 1.10 epoch: 500 tx_loss 1.09	9652709961 rx_loss 2.0817 25736999511719 rx_loss 1 19936084747314 rx_loss 1 733562231063843 rx_loss 1 68954467773438 rx_loss 1 12060737609863 rx_loss 1 89741230010986 rx_loss 1	.91928088665008 .67011141777038 1.461821317672 .3234074115753 .16565191745758 .0759291648864	857 7295 174 806 746

Comparision

```
In [7]:
epoch_arr=range(1,epochs+1)
plt.title('Training error with epochs')
plt.plot(epoch_arr,loss_supervised,'r',label='Supervised training')
plt.plot(epoch_arr,loss_rx,'b',label='Alternating training')
plt.xlabel('epochs')
plt.ylabel('training error')
plt.legend()
plt.show()
                  Training error with epochs
   3.0
                                   Supervised training

    Alternating training

   2.5
 training error
1.5
1.0
   0.5
   0.0
               200
                       400
                               600
                                      800
                                             1000
                         epochs
  In [ ]:
```