

Jordan Rosenblum (jr3478)  
Machine Learning for Data Science  
Homework 5

**Problem 1:**

```
t = 10
UW-Whitewater 0.0153227778802
MountUnion 0.0130742707022
ColoradoSt-Pueblo 0.010261008372
OhioState 0.00900979434094
Linfield 0.00878443452911
MinnSt-Mankato 0.00821200630016
Wartburg 0.00801802217138
Wesley 0.00748839125774
SouthernOregon 0.00744005399386
Oregon 0.0071542337095
Alabama 0.00714054428404
NorthDakotaSt 0.00669991126614
TCU 0.00645504966615
MaryHardin-Baylor 0.00597635138467
FloridaSt 0.005944344405
Hobart 0.00590135339447
JohnCarroll 0.00586308936461
MarianIN 0.00580349073704
Widener 0.00578632328033
Concord 0.00568551087686
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```
t = 100
UW-Whitewater 0.0292759841104
OhioState 0.0276631131678
Oregon 0.0227262816528
Alabama 0.0186769498344
TCU 0.0183015022646
MountUnion 0.0168714020987
FloridaSt 0.0146308745614
MichiganSt 0.0130287913339
ColoradoSt-Pueblo 0.012999116209
SouthernOregon 0.0124931074259
Baylor 0.0122206343863
GeorgiaTech 0.0118210801366
Wartburg 0.0106811487305
UCLA 0.0106652138505
Mississippi 0.0103657540733
CarrollMT 0.0102792997905
Georgia 0.0101168632625
Arizona 0.00994307528077
ArizonaSt 0.00912162056362
MississippiSt 0.0090671268847
```

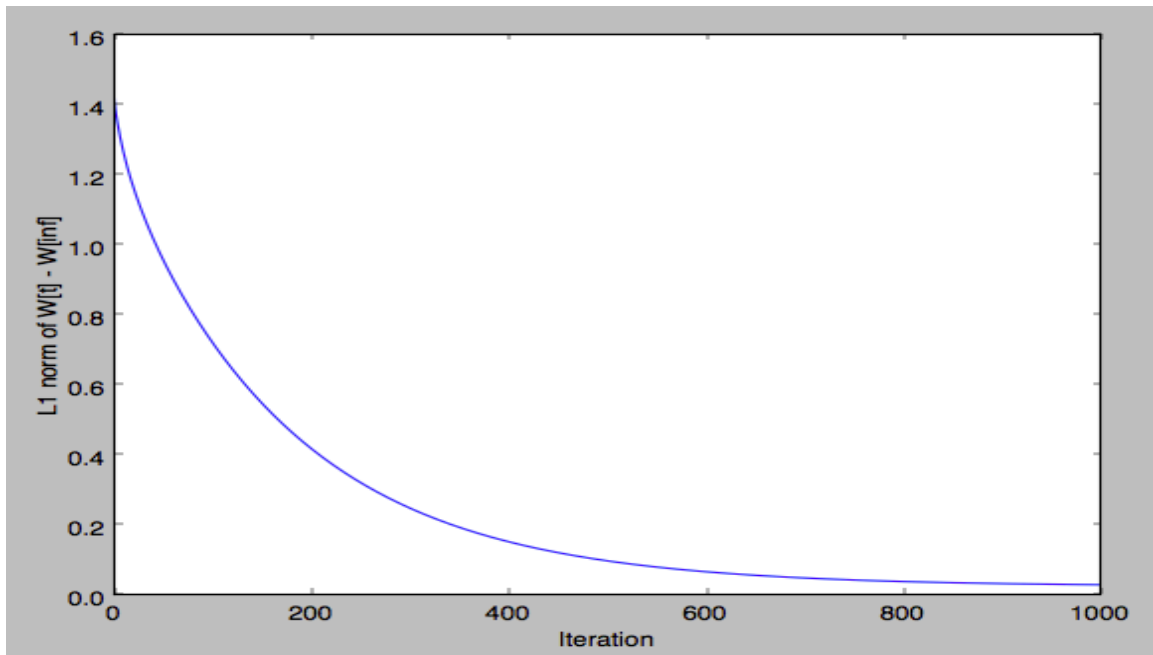
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t = 200  
OhioState 0.0363316355665  
Oregon 0.0298306907239  
Alabama 0.0243530549619  
TCU 0.0240409405987  
FloridaSt 0.0191361282377  
UW-Whitewater 0.0182123273704  
MichiganSt 0.0169569400722  
Baylor 0.0160206375044  
GeorgiaTech 0.0154243558734  
UCLA 0.0139841818668  
Mississippi 0.0134738824039  
Georgia 0.0130837202891  
Arizona 0.0130263839136  
ArizonaSt 0.0119023046243  
MississippiSt 0.0117965208801  
Missouri 0.0111035953543  
Clemson 0.0104986782094  
SouthernCal 0.0104490838612  
Wisconsin 0.0104461197528  
Auburn 0.0102624439426

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t = 1000  
OhioState 0.0473971919558  
Oregon 0.0387971225418  
Alabama 0.0316777096693  
TCU 0.0313994942541  
FloridaSt 0.0249885243121  
MichiganSt 0.0219768459681  
Baylor 0.0208884123061  
GeorgiaTech 0.0201149670139  
UCLA 0.0181695841427  
Mississippi 0.0174792512804  
Georgia 0.0169436471106  
Arizona 0.0168959738481  
ArizonaSt 0.0154034382393  
MississippiSt 0.0153259619966  
Missouri 0.014157805926  
Clemson 0.0136641097675  
SouthernCal 0.013544901098  
Wisconsin 0.0133728015051  
Auburn 0.0133087636274  
Utah 0.0129390741129

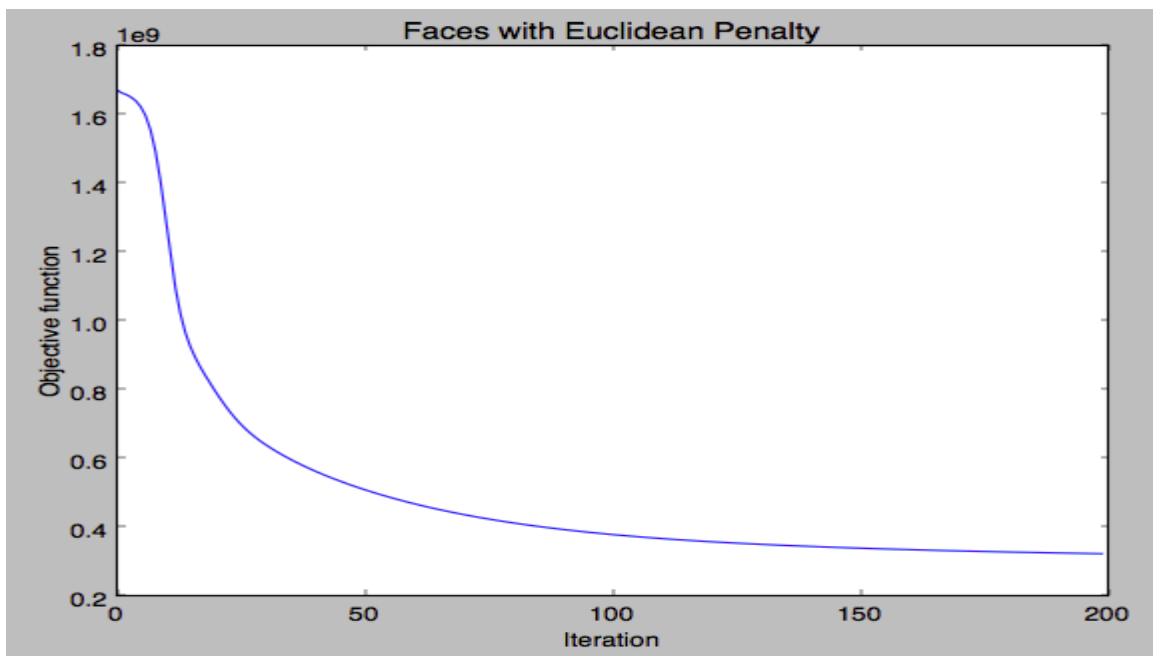
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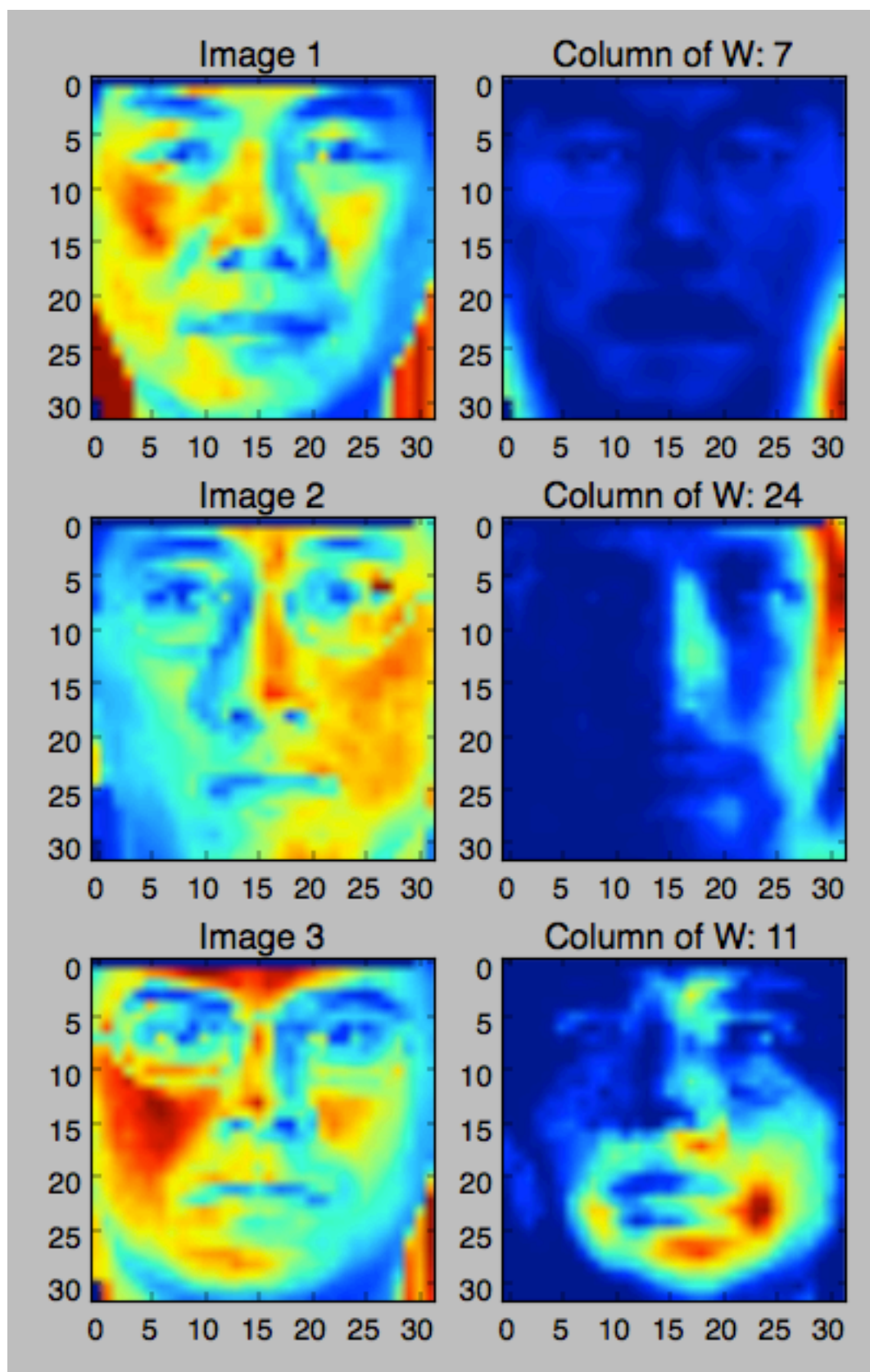


$$\|w_{1000} - u_1 / \sum_j u_1(j)\|_1 = 0.029920879422943969$$

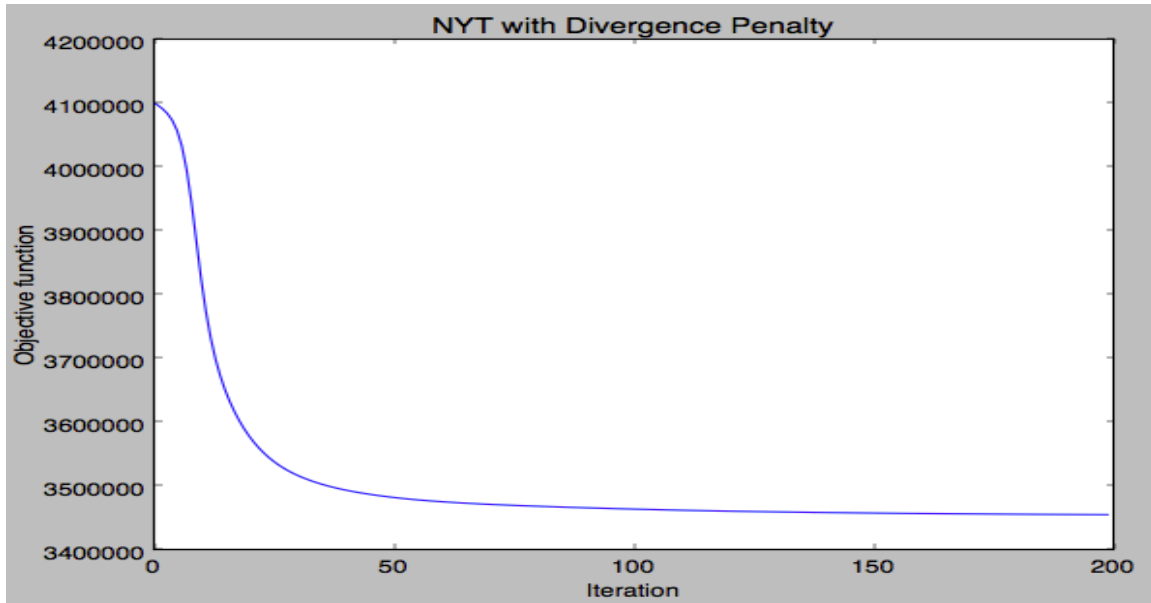
## **Problem 2:**

### *Part 1:*





Part 2:



Column of W: 0  
police 0.0283555922022  
charge 0.0214894705358  
officer 0.0153558656161  
crime 0.0142941053335  
arrest 0.0136752829891  
trial 0.0136597613895  
case 0.0130138646719  
man 0.0126776942441  
criminal 0.0115377851835  
prison 0.0112440033531

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Column of W: 5  
building 0.0207480364191  
house 0.01826598096  
store 0.0137547130195  
owner 0.012711714106  
home 0.0115856598439  
open 0.0113257479093  
room 0.0110299281401  
shop 0.0100169213725  
build 0.00998240898635  
floor 0.00994117521096

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Column of W: 10  
wear 0.0132472985617  
stand 0.0077981126322  
little 0.00652401871794  
dress 0.00631465834832  
hand 0.00621411944872  
white 0.00620149335895  
away 0.00600817349976  
turn 0.00600366899628  
head 0.00594066359045  
blue 0.00589855693319

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Column of W: 17  
percent 0.0289724360937  
number 0.0207329884951  
increase 0.0123831884079  
result 0.01099115686  
large 0.0109176462944  
low 0.0104373680187  
change 0.00981584018776  
accord 0.00979694209032  
average 0.0093731520872  
far 0.00855929735075

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Column of W: 22  
water 0.0127512581637  
mile 0.0126923008787  
car 0.0109454125078  
plant 0.010004416151  
official 0.00782976841892  
area 0.0075449753306  
driver 0.00728073408549  
air 0.00712336686686  
road 0.00704323444417  
hour 0.00692529007845

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