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CS 4342

Homework 2

For all implementations of MSE, I used the “half MSE” method.

1A. Table showing the MSE for the training and testing set using the analytical solution

	Training Set	Testing Set
Mean Squared Error	39.2469	206.8378

1B. Table showing the MSE for the training and testing set using Gradient Descent

	Training Set	Testing Set
Mean Squared Error	83.5723	93.1206

1C. Table showing the MSE for the training and testing set using Gradient Descent with Regularization

	Training Set	Testing Set
Mean Squared Error	83.5518	93.1033

1D.
The RMSE for the testing set of method 3 (Gradient Descent with Regularization) is 9.65 years.

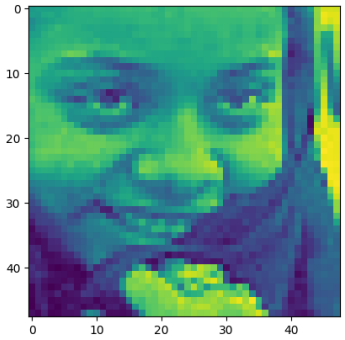
	Image	Guess	Actual
Image 1		59.96	10

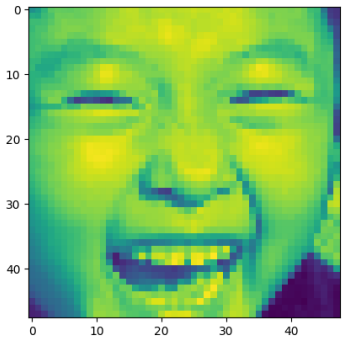
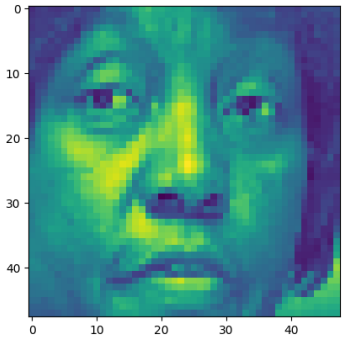
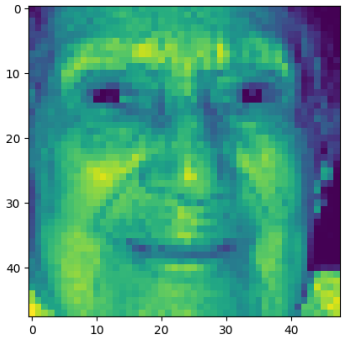
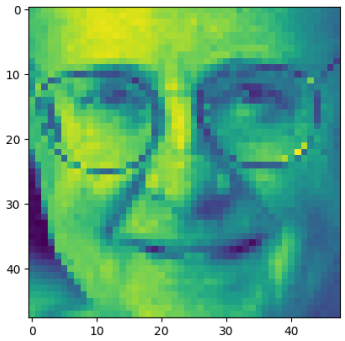
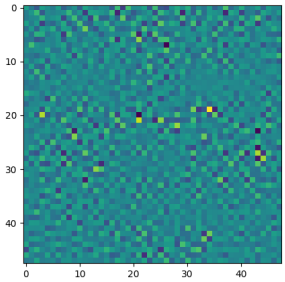
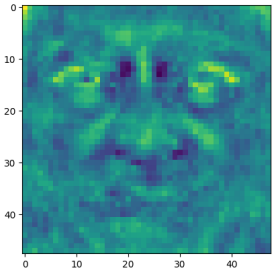
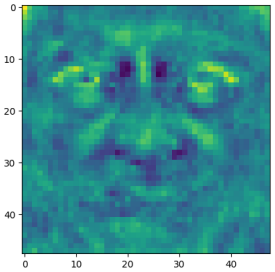
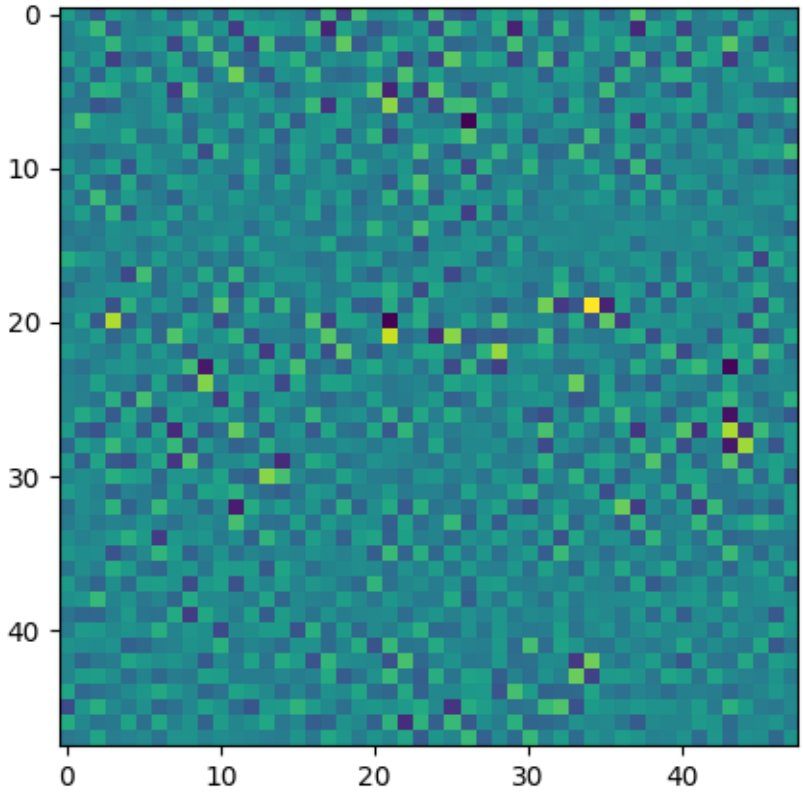
Image 2		52.4357	4
Image 3		41.6052	89
Image 4		33.3303	80

Image 5		53.54	8

Analytical Solution	Gradient Descent	Gradient Descent with Regularization
		

The weight vectors are very different depending upon the method used. In each image, you can see the features of a face getting more defined. With the analytical solution, it is just a very light outline of the face. With the gradient descent solution it is more defined but when using regularization it becomes much more clear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