

CS 4342 - Machine Learning
Homework - 2 Linear Regression

Method 1: Analytical Method

Training half-MSE = 39.242962

Testing half-MSE = 206.7964

Method 2: Gradient Descent Method

Training half-MSE = 95.2860

Testing half-MSE = 105.4207

Method 3: Gradient Descent Method with L2 Regularization

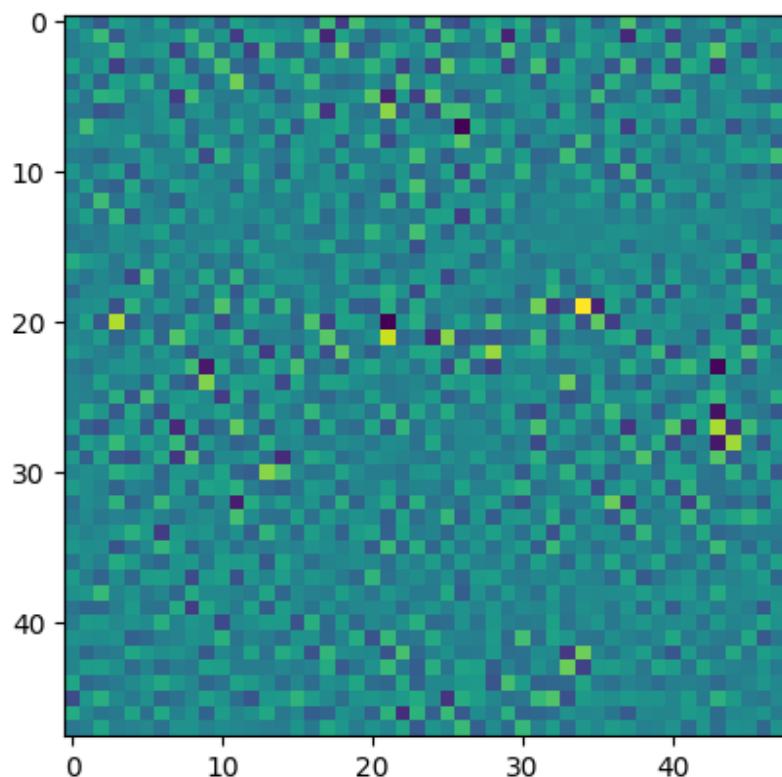
Training half-MSE = 95.2871

Testing half-MSE = 105.4157

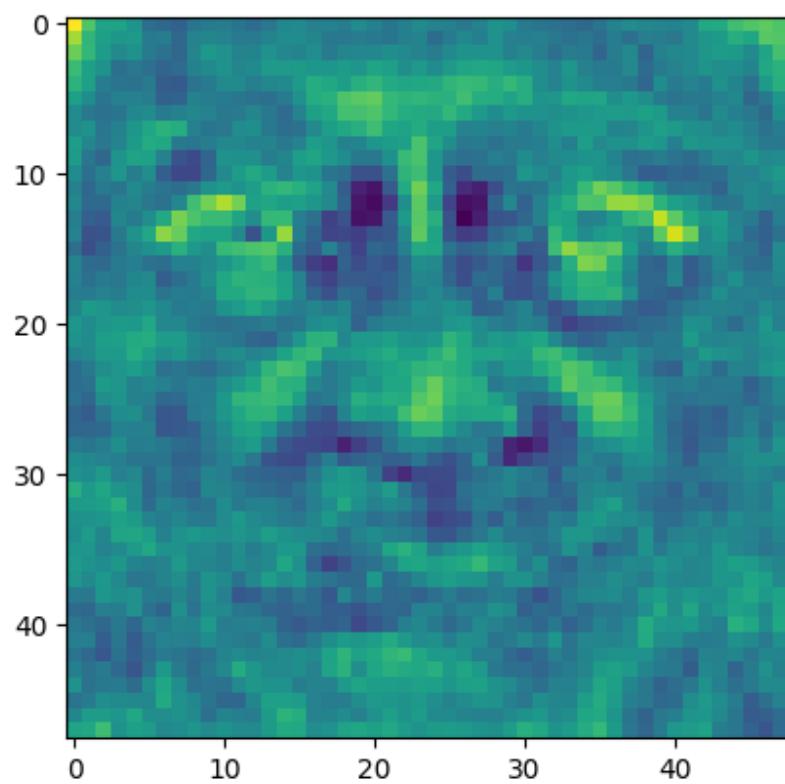
Testing half-RMSE = 10.26722

Learned Weights

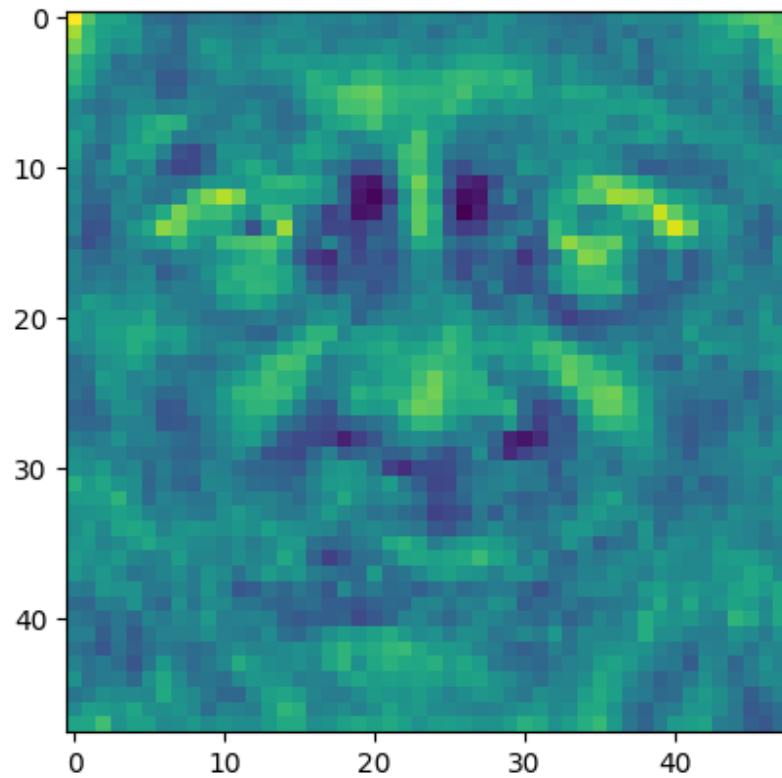
1. W1



2. W2



3. W3:



The first weight, W1, is totally different from W2 and W3. It doesn't appear to be an image of a face. On the other hand, W2 and W3 appear similar and more like an image of an old person (specifically an old man). These two weights contain the aging features such as wrinkles, depression above the eye socket and white hair.

Top 5 most egregious predictions

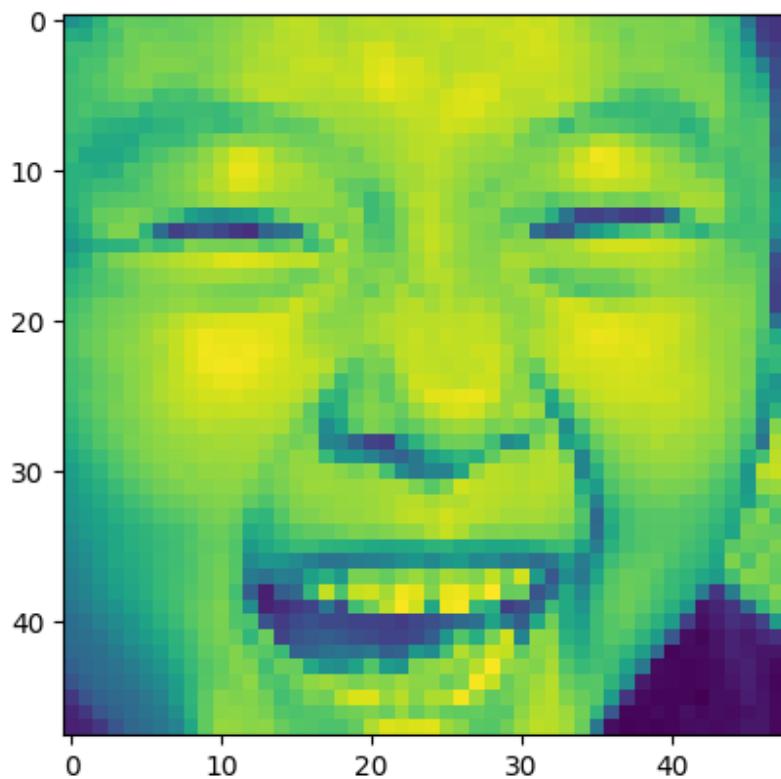


Image 1

Actual Age: 4

Predicted Age: 56.16

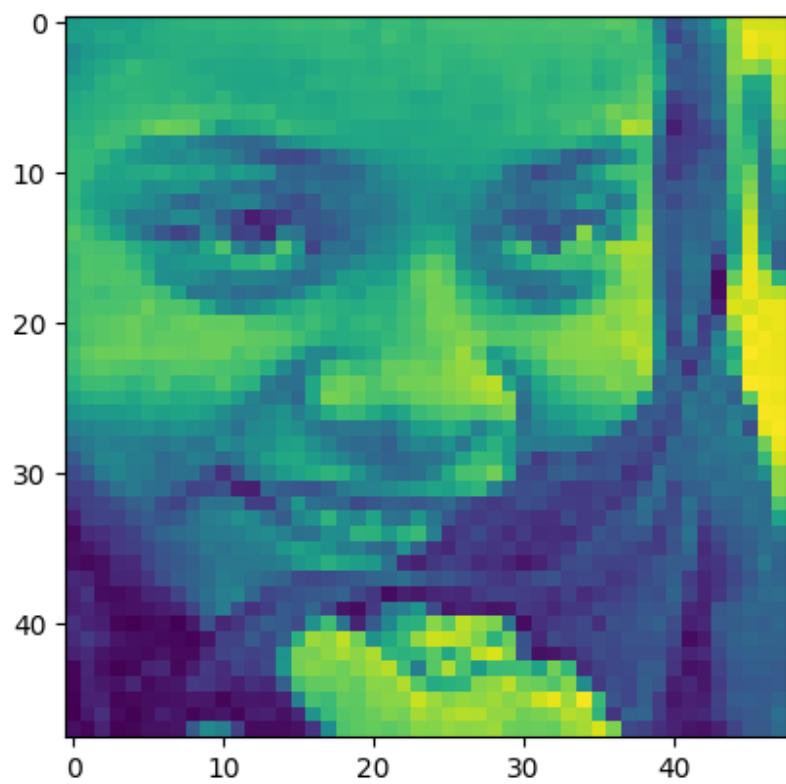


Image 2
Actual Age:10
Predicted Age: 59.7

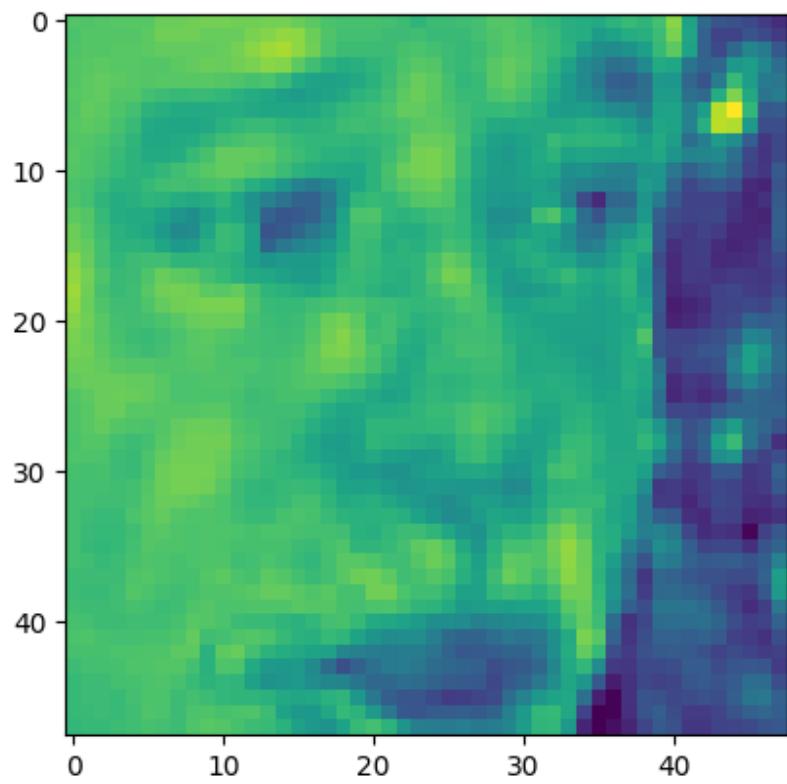


Image 3

Actual Age: 72
Predicted Age: 22.72

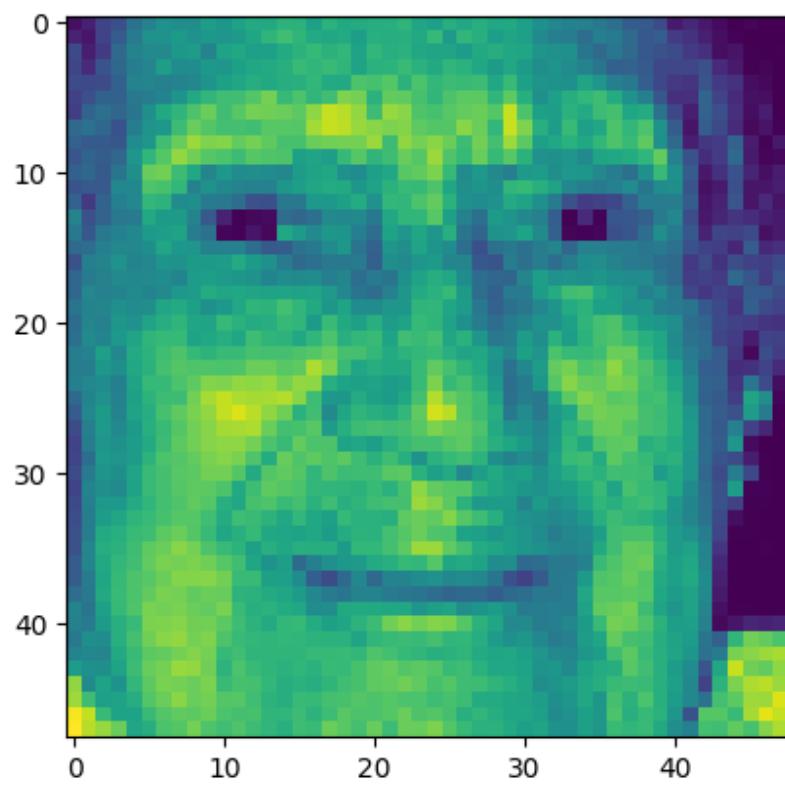


Image 4
Actual Age: 80
Predicted Age: 30.78

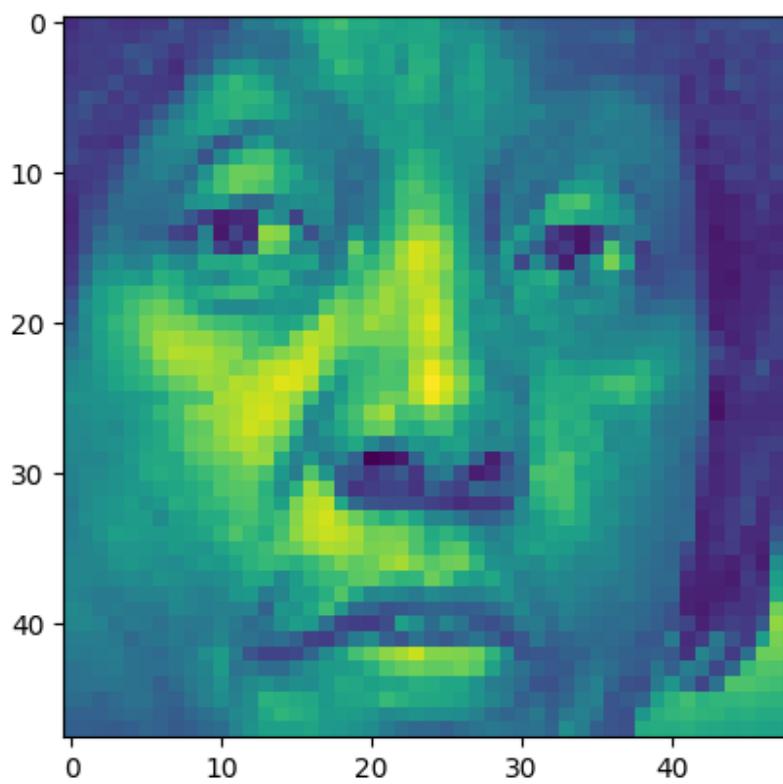


Image 5

Actual Age: 89
Predicted Age: 40.14