

# Homework 2 - CS 4342

- Kushal Gandhi

## Method 1: Analytical Solution

Training half-MSE: 39.242962989290696

Testing half-MSE: 206.79647484074678

## Method 2: Gradient Descent without Regularization

Training half-MSE: 83.55078670992957

Testing half-MSE: 93.09426974063715

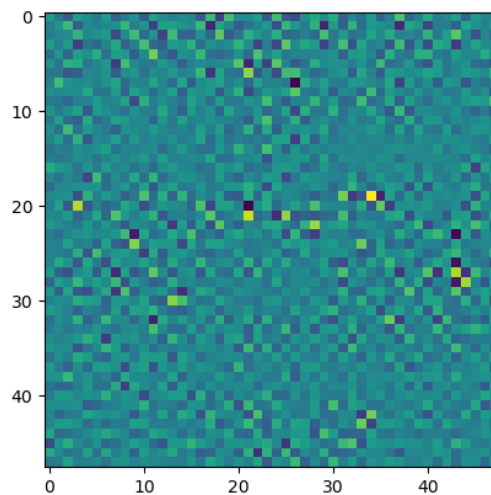
## Method 3: Gradient Descent with Regularization

Training half-MSE: 83.54970519500948

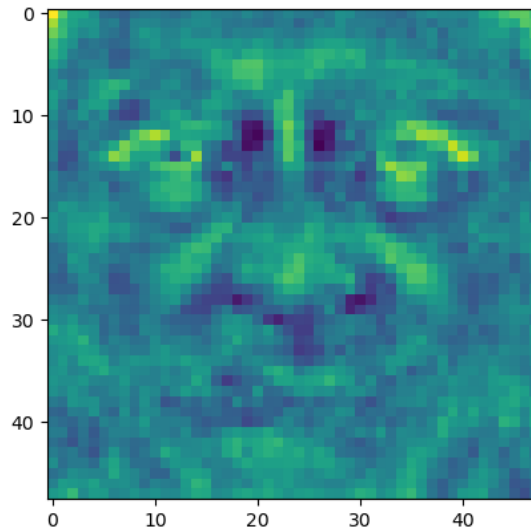
Testing half-MSE: 93.0949660237978

## Weights:

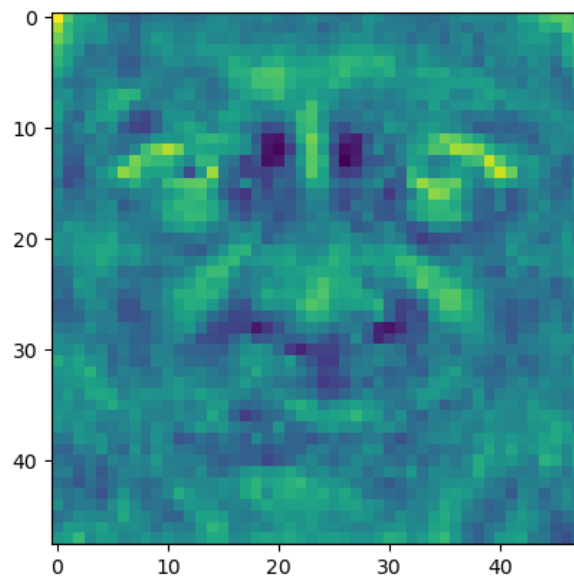
### 1. Weights from Method 1: Analytical Solution



## 2. Weights from Method 2: Gradient Descent without Regularization



## 3. Weights using Method 3: Gradient Descent with Regularization



As it is clearly visible, weights from method 2 and method 3 are better and different from the weights of method 1. Weights from method 2 and method 3 clearly constitute a face and some features of face are clearly visible like wrinkles, eyes, nose and mouth.

## Images with Egregious Error:

Image 1:

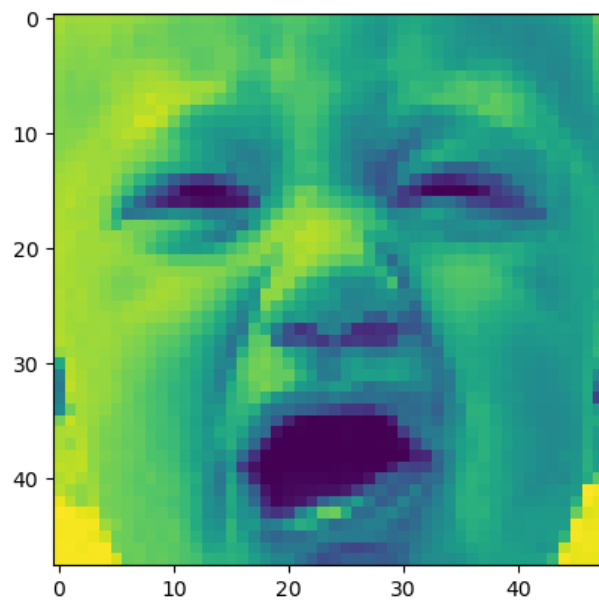
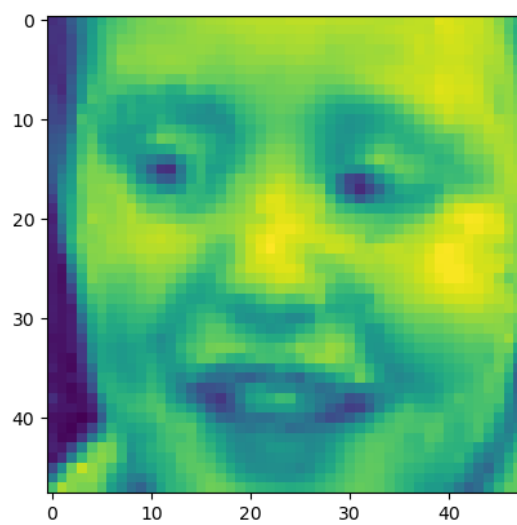
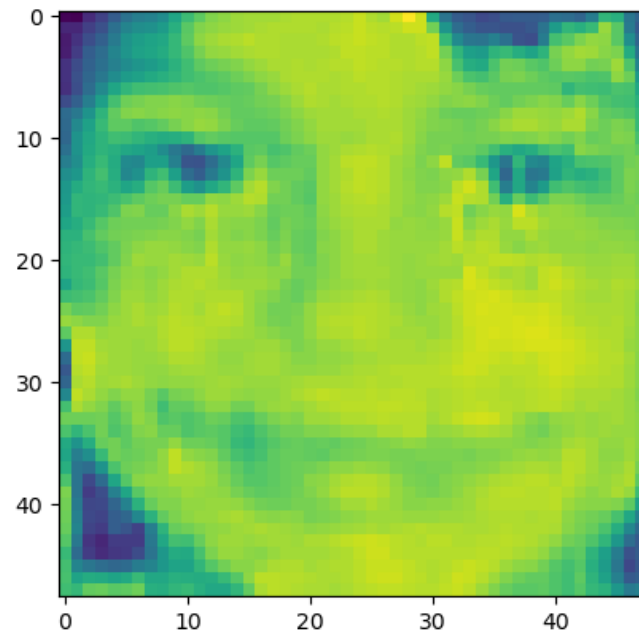


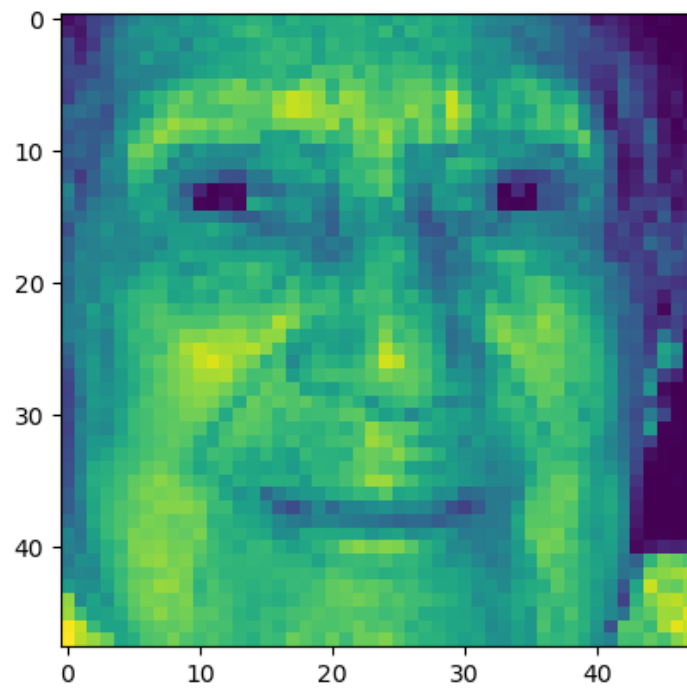
Image 2:



**Image 3:**



**Image 4:**



**Image 5:**

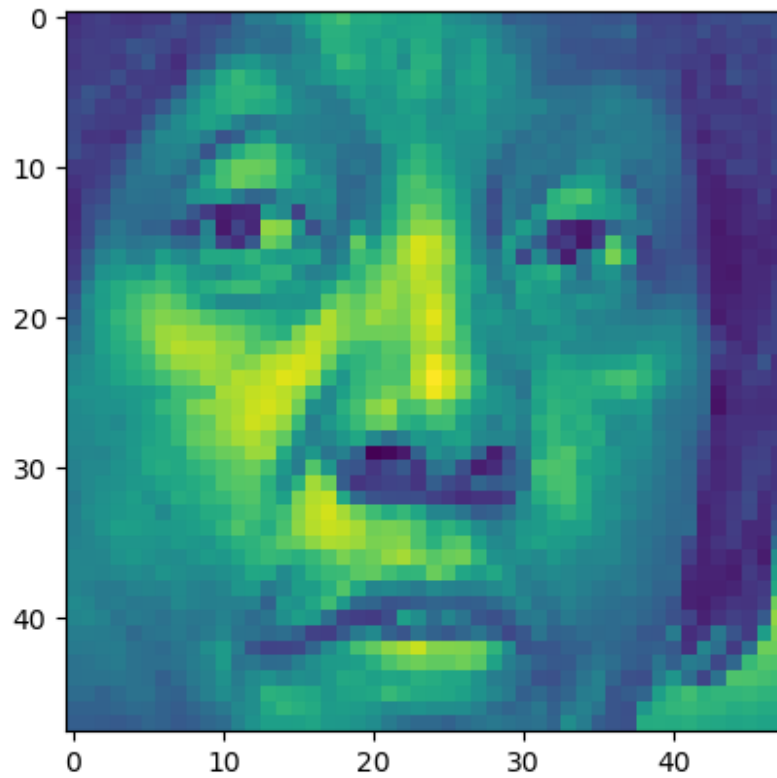


Image Number	Actual Age (Y)	Predicted Age ( $y^{\wedge}$ )
89	45.780131795853926	1.0
287	46.76113233801144	5.0
389	48.486351476760674	8.0
581	33.281936396799324	80.0
830	41.61449196055031	89.0