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QEA I Module II Final Project: Outline

1. Executive Summary
   1. Discuss the ubiquitous nature of eigenvalue and eigenvectors, in that they are used in a wide range of fields and ideas that involve data compression or large sets of data
   2. Plan is to compare the performance of an Eigen faces algorithm for facial recognition with other algorithms, such as pixel space and correlation.
   3. Trying to prove the power of Eigen stuff
2. Background and Terminology
   1. Discuss Matrices, LSAE, Applying them to Data
   2. Talk all about Eigen stuff
   3. Explain how facial recognition works
3. Algorithms and Justifications
   1. Talk about Pixel Space Algorithm, what it is and its pros and cons
   2. Talk about Correlation Algorithm, what it is and its pros and cons
   3. Talk about Eigen face Algorithm, what it is, and why we believe it’s superior in performance, and maybe accuracy
4. Comparison of performance
   1. Discuss how accuracy and performance, maybe also the numbers of lines of code play into determining how good an algorithm is. Space could also be a factor.
   2. Compare the performance of the three algorithms with a 344 training dataset and a 43 test set.
   3. Compare the performance of the three algorithms with a 43 training dataset and a 344 test set.
   4. Talk about why the results are what they are
5. Conclusions
   1. Validate/Disprove the power of the eigen stuff
   2. Thinking about eigen stuff and what they mean, talk about defense of assertions about eigen algorithm and the extent to which it was true
   3. Talk about improvements/fallacies in the experiment.
   4. Talk about how to potentially fix lighting/contrast problems, being able to extend this to all kinds of images, not just the class data.
   5. Talk about Fisher faces and what they could potentially do
   6. End with a majestic statement.

Data for Performance Runs

|  |  |  |
| --- | --- | --- |
| 301 TRAINING SET | Time | Accuracy |
| Eigenfaces | 122.83 seconds | 100% |
| Image Correlation | 95.74 seconds | 100% |
| Euclidean Distance | 23.55 seconds | 100% |

|  |  |  |
| --- | --- | --- |
| 43 TRAINING SET | Time | Accuracy |
| E100%15.63igenfaces | 72.93 seconds | 89.37% |
| Image Correlation | 121.64 seconds | 89.37% |
| Euclidean Distance | 47.16 seconds | 88.03% |

|  |  |  |
| --- | --- | --- |
| NEW IMAGES 344 TRAINING | Time | Accuracy |
| Eigenfaces | 90.24 seconds | 15.63% |
| Image Correlation | 72.05 seconds | 21.88% |
| Euclidean Distance | 17.05 seconds | 15.63% |

|  |  |  |
| --- | --- | --- |
| NEW IMAGES 43 TRAINING | Time | Accuracy |
| Eigenfaces | 7.87 seconds | 18.75% |
| Image Correlation | 14.77 seconds | 18.75% |
| Euclidean Distance | 6.62 seconds | 18.75% |

Math Figures:

Image Correlation way to do it with Matrices

Eigenfaces Mathematical Proof

DRAFT REVISION NOTES

* A lot more words, a lot less math than you need
* Present more with equations and talk about the equations and explain it through them.
* Changing section organization
  + Introduction
    - Context
    - Identify what the contribution is, what this paper does
    - Identify a roadmap
    - What is the insight, conclusion of the argument
  + Summary – the argument is shady, make an argument, but it seems that I don’t believe
    - Comparing three algorithms, all do well, but eigenfaces is a bit better for larger data sets
    - All did pretty well in dataset, all did shit in new images, but eigenfaces are still better
    - Context is facial recognition is an interesting problem, examine three diff algorithms for facial recognition and discuss the results are.
  + Two sections that are algorithms right now, have a shorter background and terminology that doesn’t go into algorithm
  + Make sure that context and contribution and argument are changed to line up with the evidence and what I found
  + Next section is facial recognition approaches
    - Image matrices as data
    - Challenges – brightness, contrast
  + Given two arrays of images, look at how to see what is most simiar
  + Then go into distance, correlation, eigenfaces
  + Combine section II and III and make it more concise
  + Don’t repeat
  + Describe an interpret evidence, what does it say and what does it mean
    - Do a nice job for a lot of them
  + Make sure that figures are described well in the text (distance figure)
  + Once we get into correlation, we need more math
    - Pair of pixel no Bueno
  + Image to Image correlation
    - Correlation two by two doesn’t say much
    - Use a 3x3, bring in images to show what’s being compared
  + Eigenstuff, PCA
    - Figure 2 is PCA, but PCA comes later
    - Make sure the math flows well
    - Graphical representation
    - Combine with Eigenfaces
    - Make sure math works
  + Figures, explanation and interpret done well
  + Performance
    - Bar graphs, make sure to account for error in accuracy
    - Space – have some mathematical equations, make a figure comparing , make it more quantitative
  + Conclusion
    - More succinct
    - Less math text
    - Can I say it more simply?
  + Don’t be generic, be more specific
  + Cut it down, less flavor, tell it to them straight
  + Correlation
    - Show 3x3 correlation, and explain what it shows
  + Cut text!