artificial intelligence & image recognition
WHY AI IS NOT THE ANSWER
Proud to think differently

- no pre-selected features required with our solution
- AI training data is not infallible.
- our results are explainable

Prof. Fred Stentiford
commonality

Reference

Candidate
graphical representation

• Brightness Gradient Direction is measured for each pixel.

• A relationship exists between pixels if BGD and relative orientation match that of a pair in a second image.

• A maximal clique is the largest subset of pixels that all possess a relationship with all others.
clique construction

Reference

Candidate
cliques of interest points

Similarity = size of maximal clique
Maximal similarity with reference ⇒ Recognition
yale face database A
yale face database A
face matching

reference 1764 points

Relative Orientation < 20°
Brightness Gradient Direction < 55°
Close-up showing matching gradient orientations
results – expressions
Gradient direction not affected in most shadow areas.
results – illumination
results - occlusions
results - occlusions
extreme expressions

Salient changes ignored
Essex *Grimace* database
results - occlusions
100 megface candidates
100 megaface references

100% Result
cropped references
matching maximal clique

Reference

Candidate
matching maximal clique

Reference

Candidate
matching maximal clique

Reference

Candidate
gradient directions

Reference

Candidate
Certain neurons are sensitive to brightness gradient vector orientation.

stereo analysis

Camera Distances
background commonality - saliency

Properties of salient object not required.
papers


patents

- A Method and Apparatus of Processing an Image. - GB2477116 - 22.1.2010

- US hardware application: A Pattern Recognition system using parallel computations of cliques of Interest - underway
benefits of our approach

- Avoids the problems of feature selection and training associated with AI methods
- Automatic location of match
- Displays immunity to distortions
- Potential for parallel implementation
- Mechanism can extract stereo information and saliency