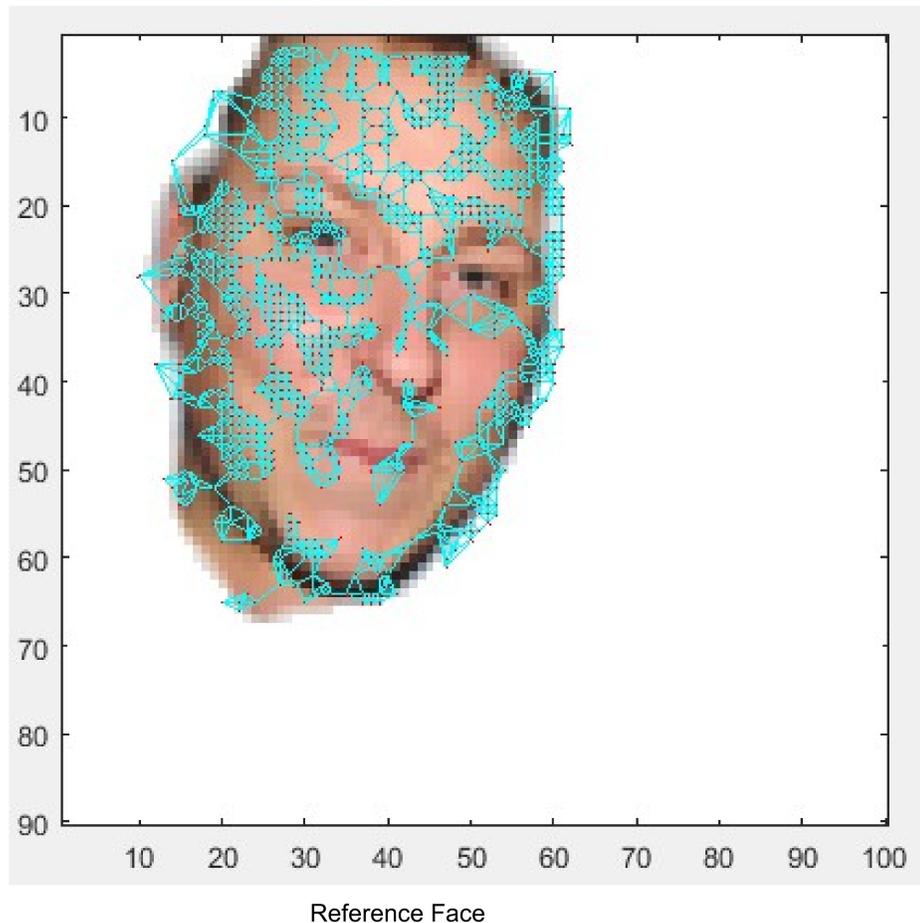


Visual Recognition without Features or Training Data

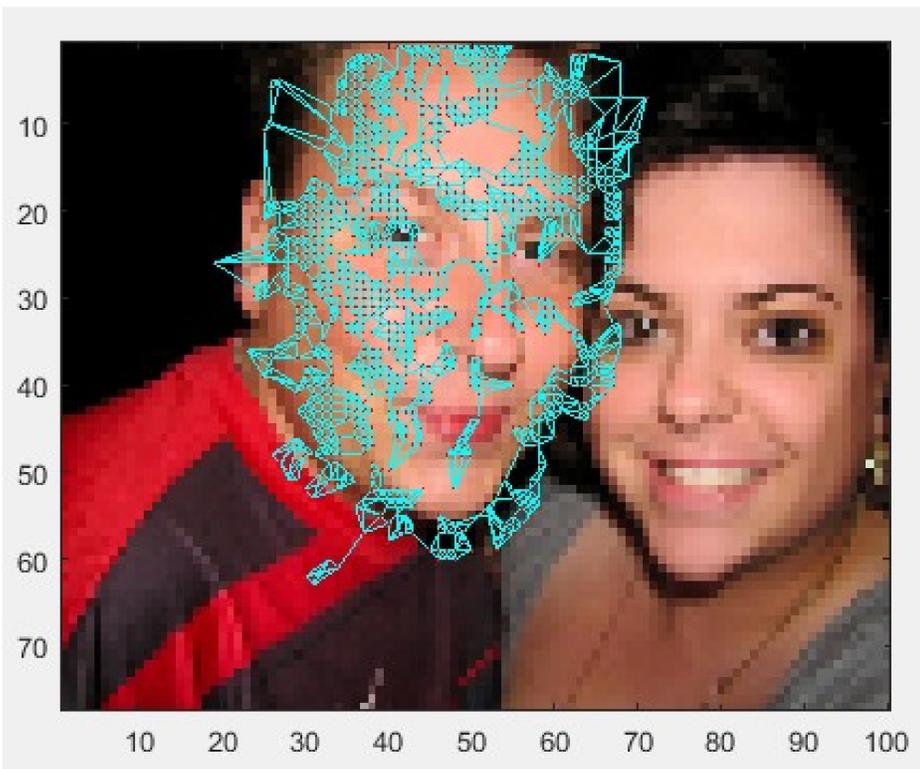
Frederick Stentiford



This paper addresses the problem of face recognition using a graphical representation to identify structure that is common to pairs of images. Matching graphs are constructed where nodes correspond to local brightness gradient directions and edges are dependent on the relative orientation of the nodes. Similarity is determined from the size of maximal matching cliques in pattern pairs. The method uses a single reference face image to obtain recognition without a training stage. This is illustrated below where an identical clique is located in the reference image and the candidate.

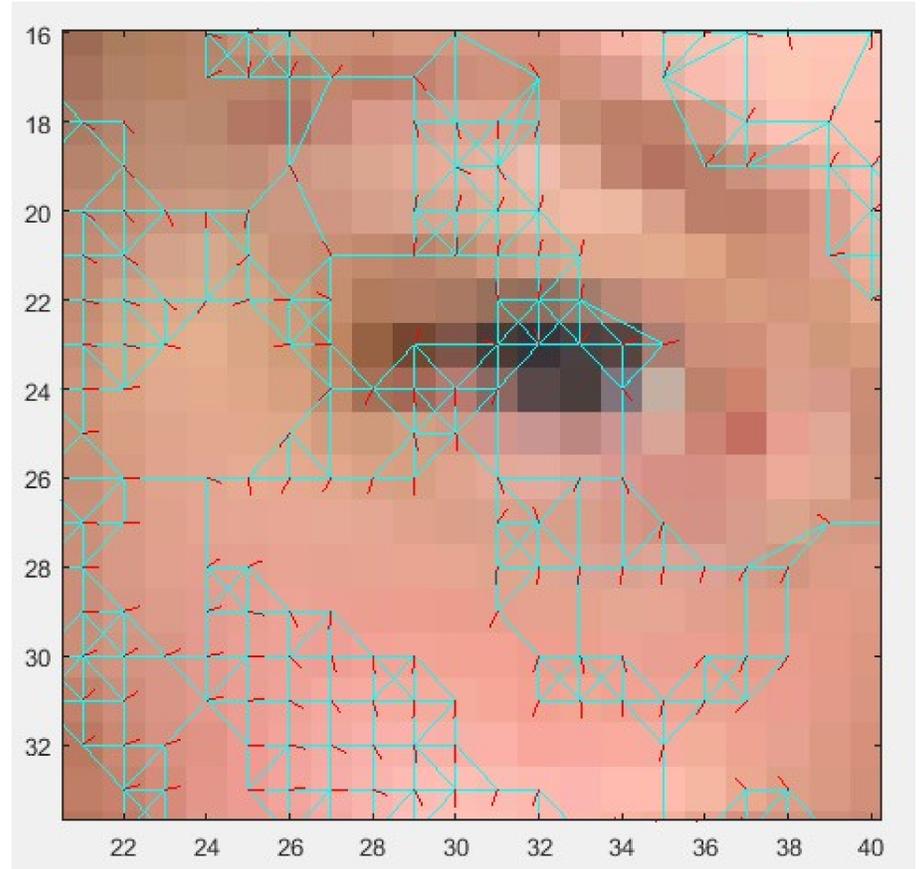


Reference Face

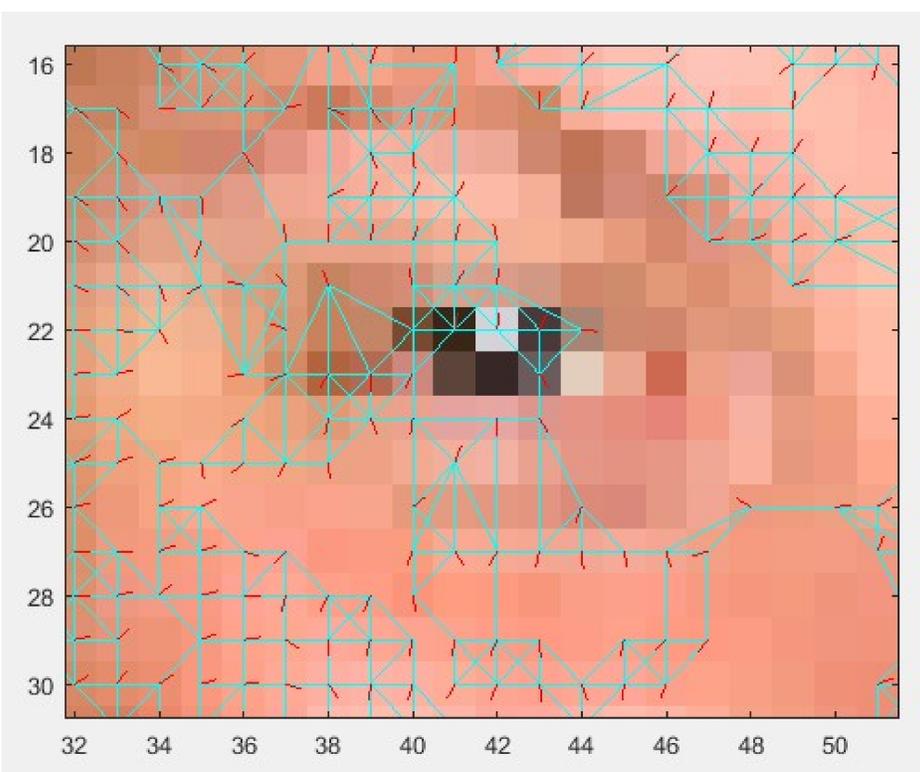


Candidate Face

There are 1053 nodes in the matching clique some of which are matching the background but the majority are matching facial structure. The search for a maximal clique is based on trial and error search not a mathematical algorithm. Gödel's Incompleteness Theorem is relevant to this search because it has been shown that not all truths in a mathematical framework can be logically identified. This can mean that not all unseen patterns can be identified using a mathematical algorithm.



Magnified Reference Image



Magnified Candidate Image

Brightness gradient direction at each matching node is indicated by red line indicators. Nodes match if the brightness gradient direction differs by less than 55° and relative orientation with adjacent nodes differs by less than 20° . Results on 100 individuals from the MegaFace database [4] obtained a 100% correct recognition result.

References

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