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Limb vein pattern analysis: a biometric for human forensic identification

Vascular patterning is influenced by both genetic and environmental factors. In broad terms, genetic factors determine 'where' the vein should form in the developing fetus, whereas the specific pattern adopted by the superficial venous network is influenced by individualistic events. As such, the influences of these individual events results in a pattern that is unique to the individual and can therefore be utilised for personal identification.

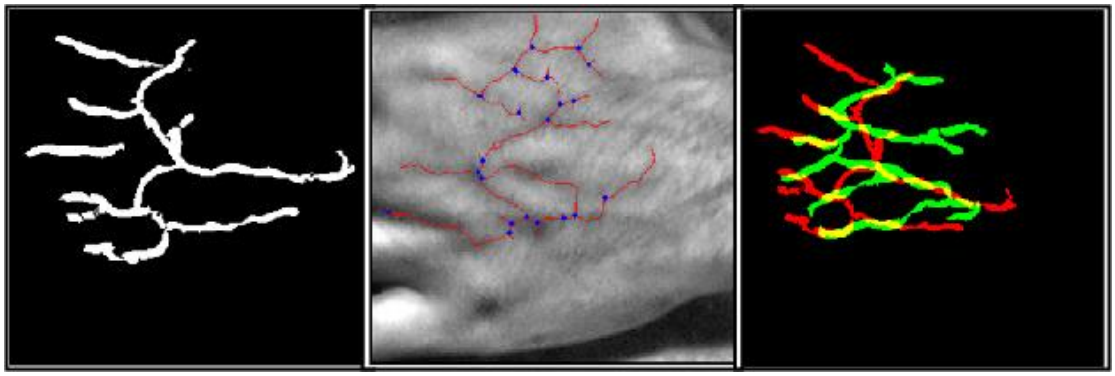

Figure - Examples of a binary and skeletonised mask of the superficial veins as seen in the dorsum of the hand.

Superficial vein pattern recognition is currently employed as a biometric authenticator in a number of high security areas to heighten the degree of sensitivity surrounding confirmation of personal identity. Venous patterning in the hand is already well established as a reliable means of confirming identity, however the extent of variation into other parts of the body is less well documented.

This project seeks to enhance the work that has already begun in this area and examine and analyse the superficial venous patterns of the upper and lower limbs to determine the veracity of such pattern analysis to a forensic environment. Images are recorded and assessed to determine (i) whether a positive identification can be established on the basis of feature and model prediction data contained within the superficial venous pattern of the limbs and (ii) whether this information has a viable forensic application with regards to stability of data. This is the first time that work of this nature has been linked to an anatomy department and represents a growing realization that new technology must be predicated on sound anatomical fact and biological understanding.