DETECTING the PIGMENT NETWORK in DERMOSCOPY IMAGES:  
A DIRECTIONAL APPROACH

C. Barata  
IST/ISR

J.S. Marques  
IST/ISR

J. Rozeira  
Hospital Pedro Hispano

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Objective: Detection of Pigment Network in Dermoscopy Images – linear dark structures with different orientations over a lighter background.

Overview of the Detection System

Pre-processing → Network Enhancement → Detection

Directional Filters

Enhance linear structures such as Pigment Network’s dark lines and hair.

Hair and Reflection Detection

Hair and Reflection Detection

Network Enhancement and Detection

Network Enhancement - 18 Directional Filters + Thresholding

Network Detection - Connect component Analysis (Regions $R_i$) + Exclusion of small Areas

$A(R_i) > A_{min}$

Examples:

Results

<table>
<thead>
<tr>
<th></th>
<th>Not detected</th>
<th>Detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>No network</td>
<td>67.5%</td>
<td>32.5%</td>
</tr>
<tr>
<td>Pigment network</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Conclusions

An algorithm for network detection that explores the line color and geometry was proposed. This algorithm uses a bank of directional filters. Experimental results show that the algorithm achieves good detection scores and it is therefore a good tool in a dermoscopy analysis system.