Towards Retail Product Search using A Two-Layered System

Milestone III

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Project Summary
The Big Idea

- Content – Based Image Search (CBIR) system for a Retail Management System.
- Create convenience for the retail sellers and customers in the market.
Goal

Start

Milestone 1

Literature Review
Research & Project Proposal

Implementation of all Data and Transaction modules

Milestone 1

Dynamic Forms

Milestone 2

Reverse Image Search Implementation

Application Testing

Milestone 3

End

Final Report and Presentation
Preliminary Results
Proposed vs Actual

AIO DESK

Retail Product Search
Evaluation

Google images

Google Reverse Image Search

Yandex
### Evaluation

<table>
<thead>
<tr>
<th>Distortions</th>
<th>pHash Result</th>
<th>pHash Robustness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Resize</td>
<td>Invariant</td>
<td>Invariant</td>
</tr>
<tr>
<td>2. Scale / Zoom</td>
<td>Not Invariant</td>
<td></td>
</tr>
<tr>
<td>3. Gaussian Blur</td>
<td>Invariant</td>
<td>Invariant</td>
</tr>
<tr>
<td>4. Grayscale</td>
<td>Invariant</td>
<td>Invariant</td>
</tr>
<tr>
<td>5. Crop</td>
<td>Invariant</td>
<td>Invariant</td>
</tr>
<tr>
<td>6. Rotation</td>
<td>Not Invariant</td>
<td>Invariant</td>
</tr>
</tbody>
</table>
Evaluation – Improved Matching

Distortion: Scale (10%)
SSIM: 0.47

Distortion: Scale (10%)
SSIM: 0.54

Distortion: Resize (factor 4)
SSIM: 0.60

Distortion: Resize (factor 4)
SSIM: 0.93
Evaluation

Distortion: Resize | SSIM: 0.60

Distortion: Grayscale | SSIM: 0.99

Distortion: Crop | SSIM: 0.37

Distortion: Scale | SSIM: 0.54

Distortion: Rotation | SSIM: 0.69

Distortion: Gaussian Blur | SSIM: 0.87
## Evaluation

<table>
<thead>
<tr>
<th>Category</th>
<th>Precision/Accuracy</th>
<th>Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Watches</td>
<td>0.89</td>
<td>0.72</td>
</tr>
<tr>
<td>2. Top wear</td>
<td>0.83</td>
<td>0.67</td>
</tr>
<tr>
<td>3. Fragrance</td>
<td>0.83</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Overall accuracy: 85%*

*Recall: 80%*
Conclusion
Conclusion

- Help aid customers especially with communication difficulty with their retail needs.
- Most commonly used minor distortions on an image are considered similar.
- Perceptive Hash does not seem to be invariant to rotation.
Future Work
Future Work

- Cloud - based.
- Product Search directly for checkout.
- Use Deep Learning approach.
References


Thank You!

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