

Convexity Information을 이용한 Fingertip 인식 및 ID 부여

ISL / 강한솔

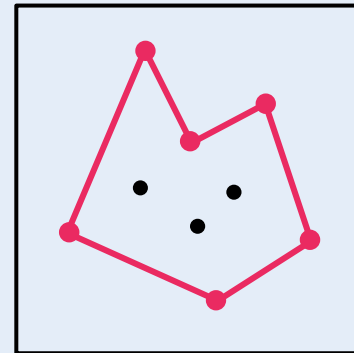
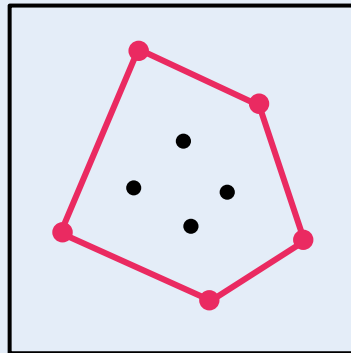
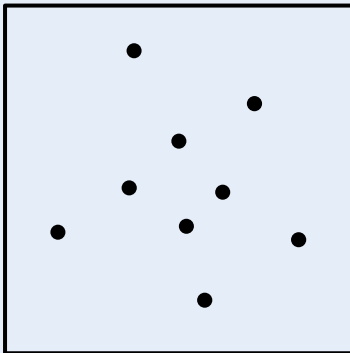
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01 Convexity Information

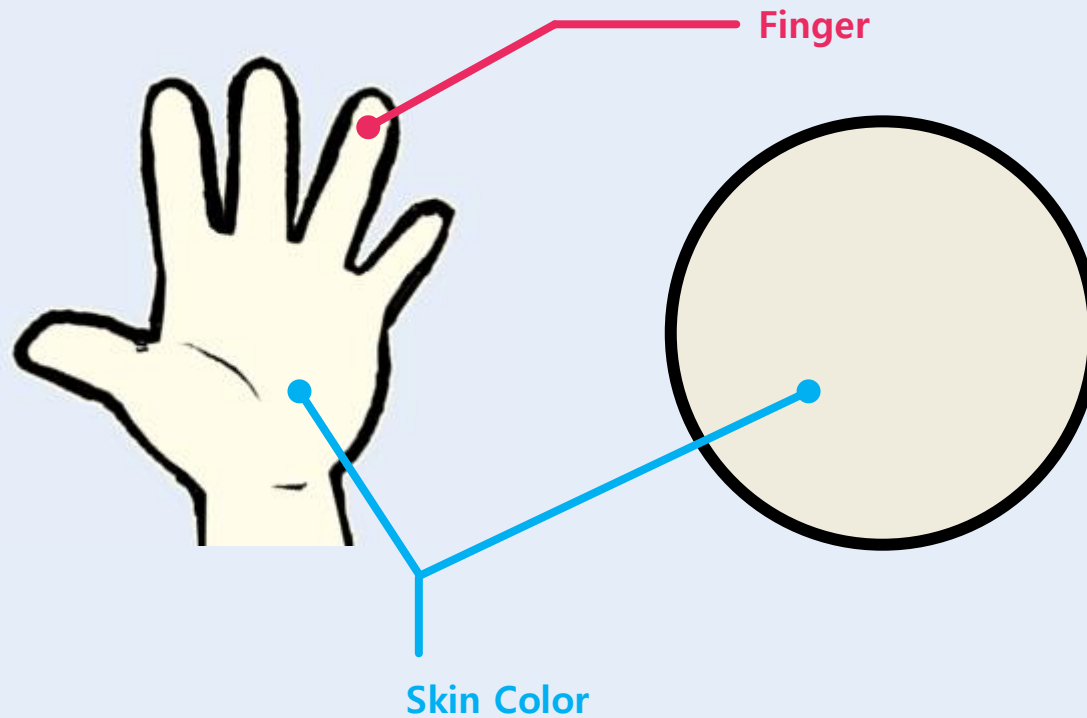
❖ Convex Hull

주어진 모든 점들을 포함하고, 최소 면적의 Convex Polygon을 구성하는 점 집합.



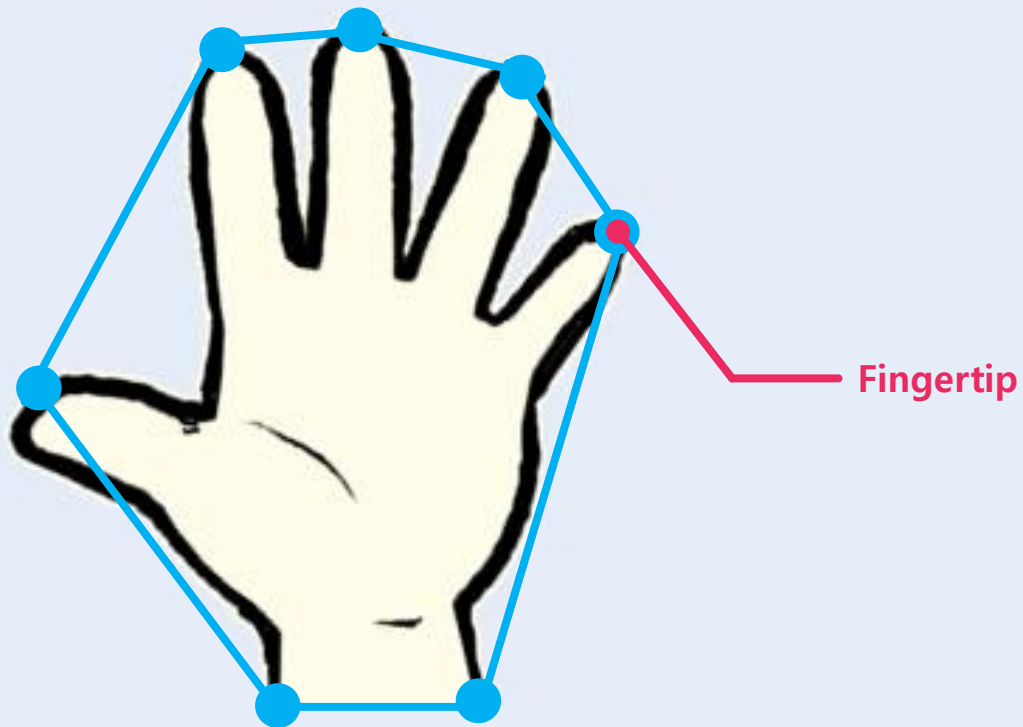
01 Convexity Information

❖ Convex Hull의 필요성



01 Convexity Information

❖ Convex Hull의 필요성

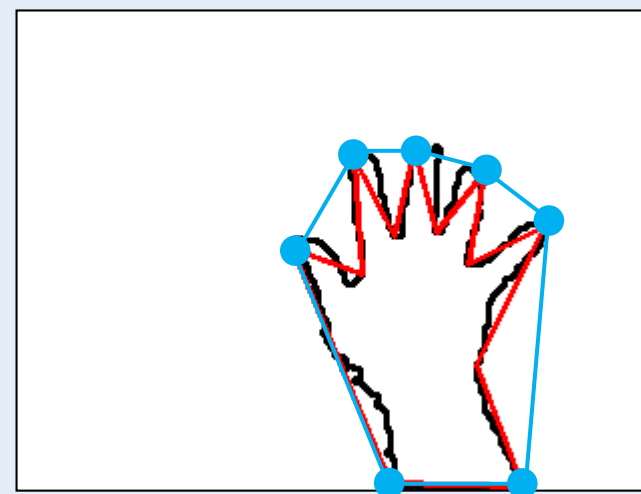
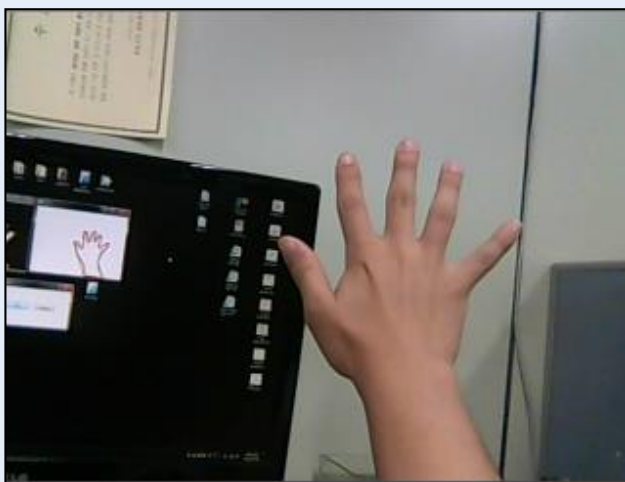


01 Convexity Information

❖ Convex Hull의 구현

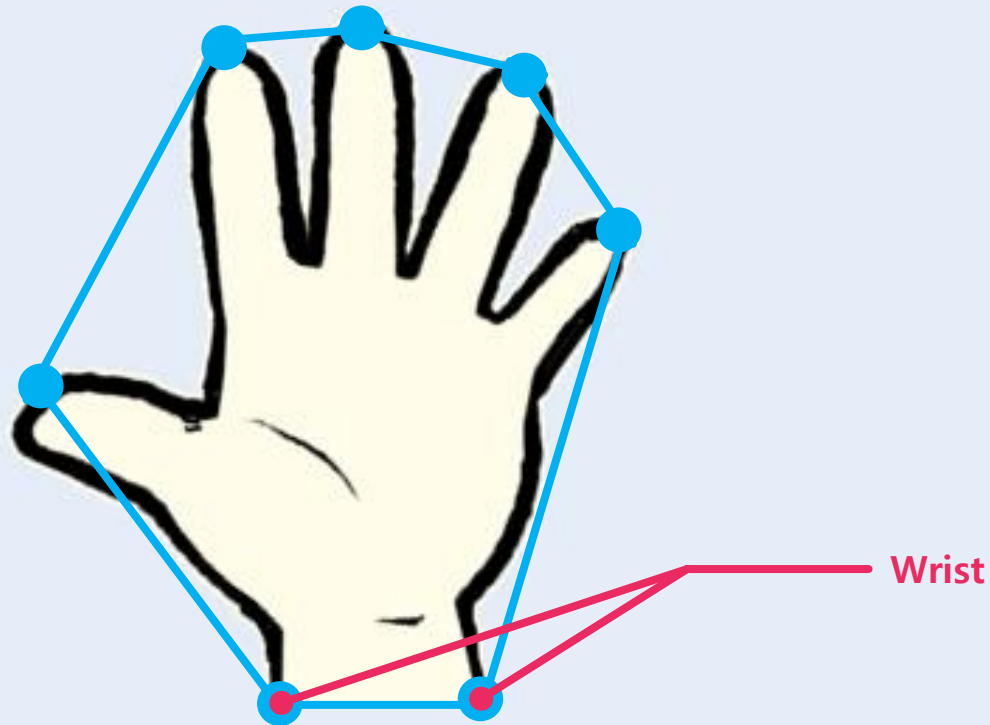


— : Contour
— : Approximation



01 Convexity Information

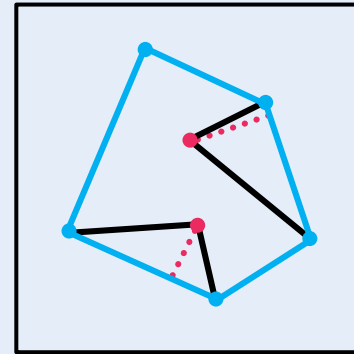
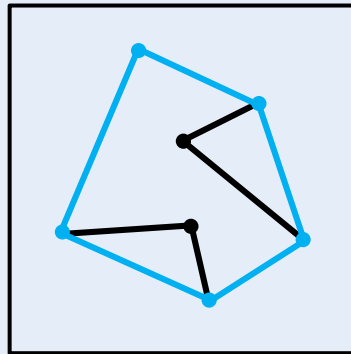
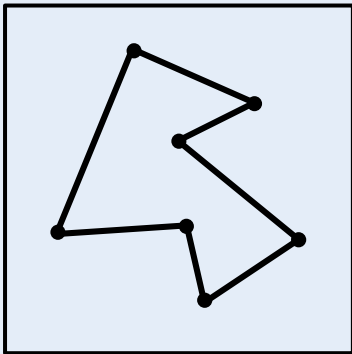
❖ Convex Hull의 한계



01 Convexity Information

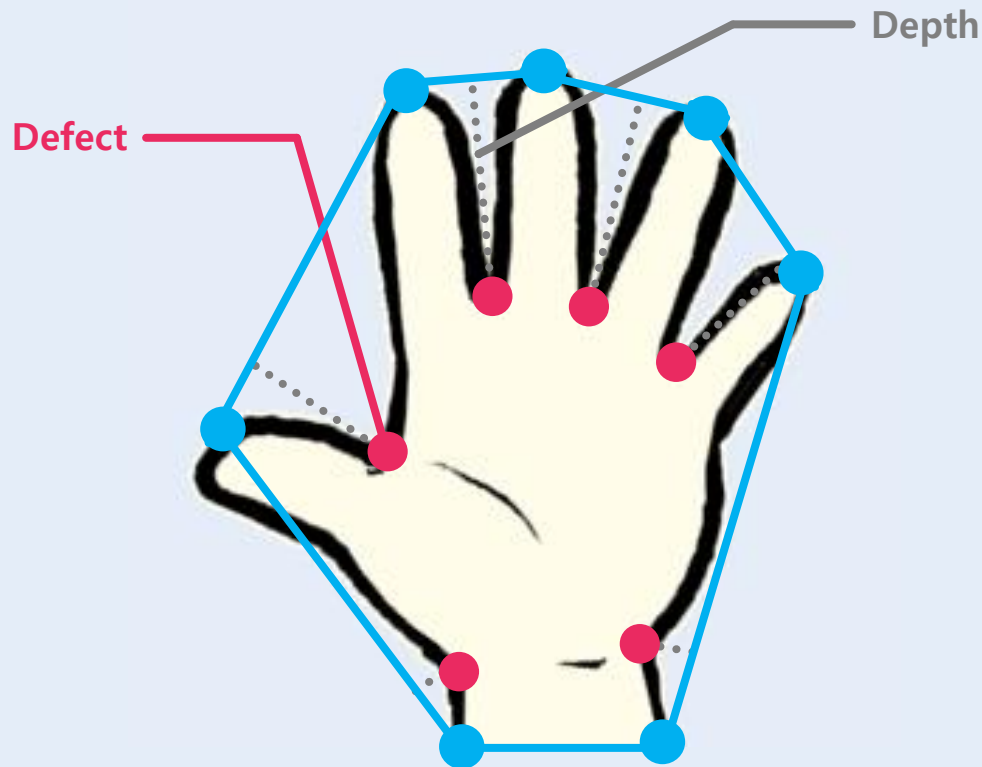
❖ Convexity Defects

Contour에서 2개의 Convex Hull 사이의 오목한 점 집합.



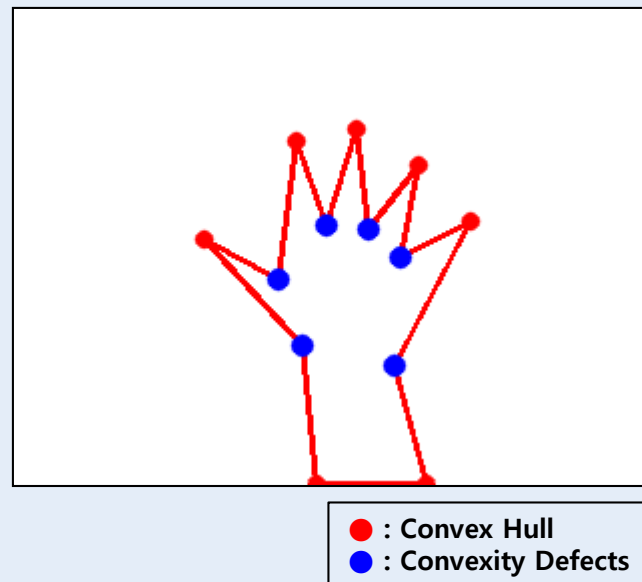
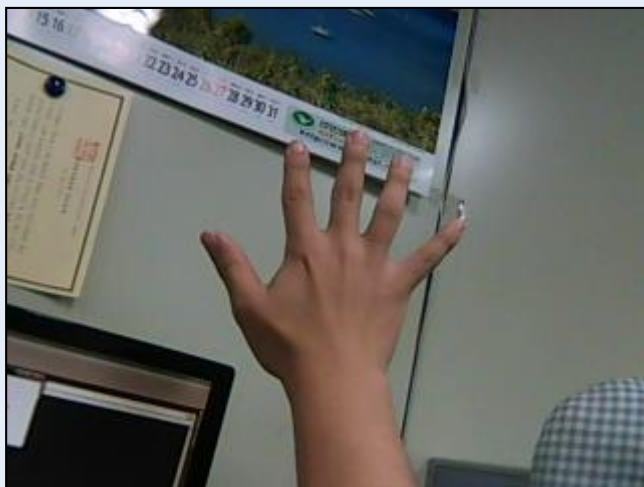
01 Convexity Information

❖ 손의 Convexity Defects



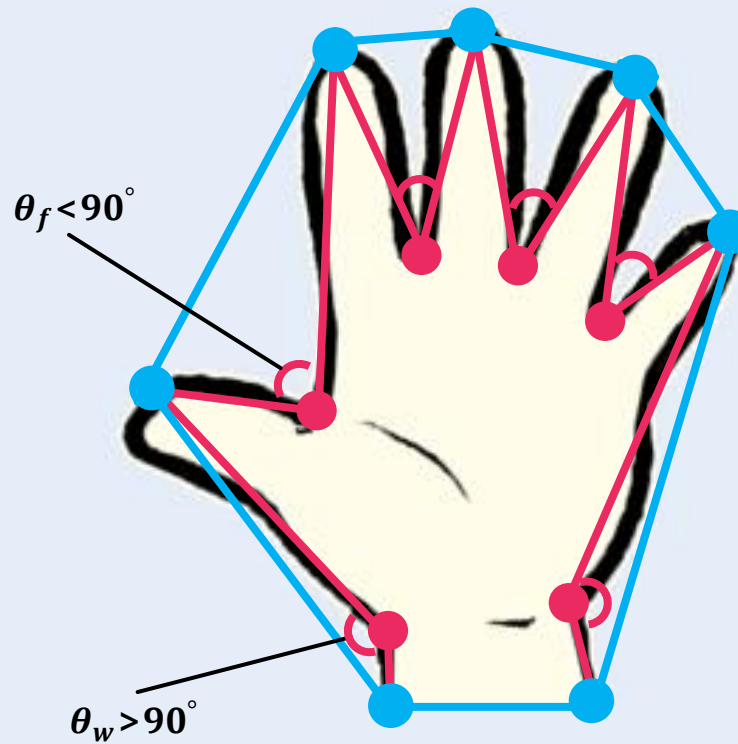
01 Convexity Information

❖ Convexity Defects 구현



02 Removing The Wrist

❖ Using the angle



02 Removing The Wrist

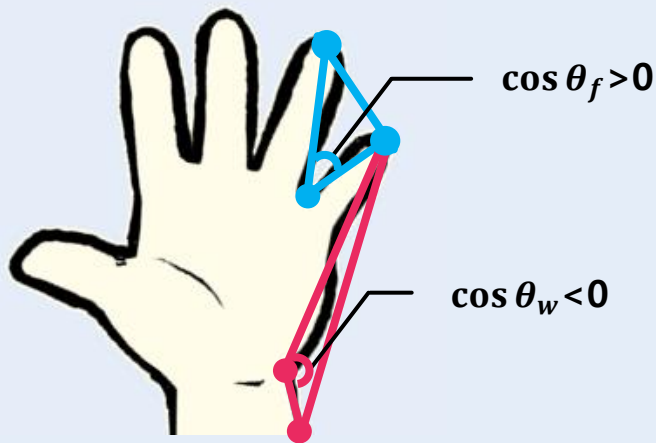
❖ Law of cosines

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

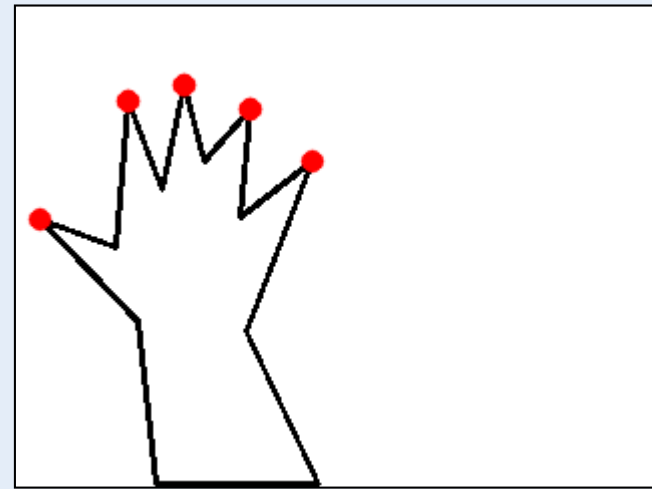


❖ Value of cosines



02 Removing The Wrist

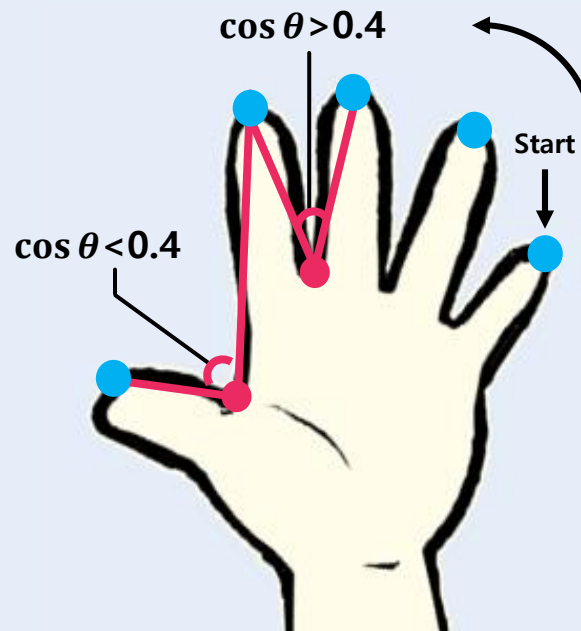
❖ 손목제거 구현



● : Finger Tip

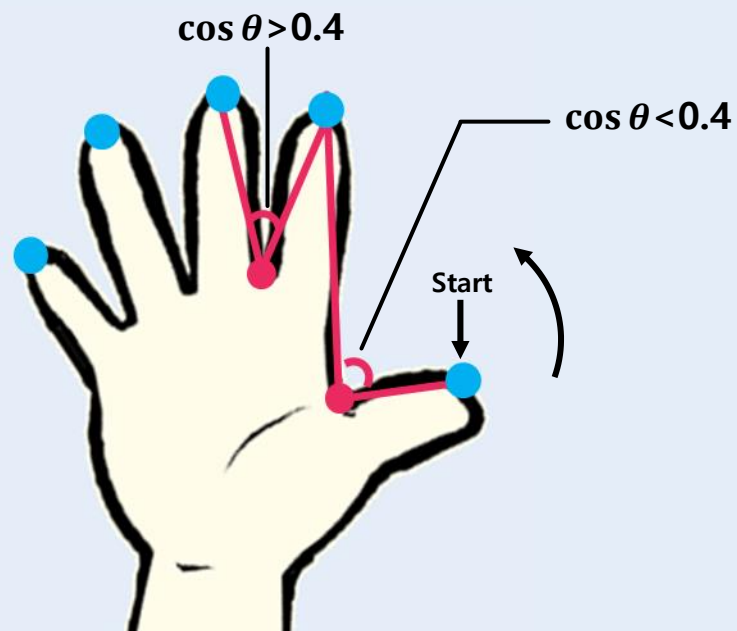
03 Finger ID

❖ Using the value of cosine



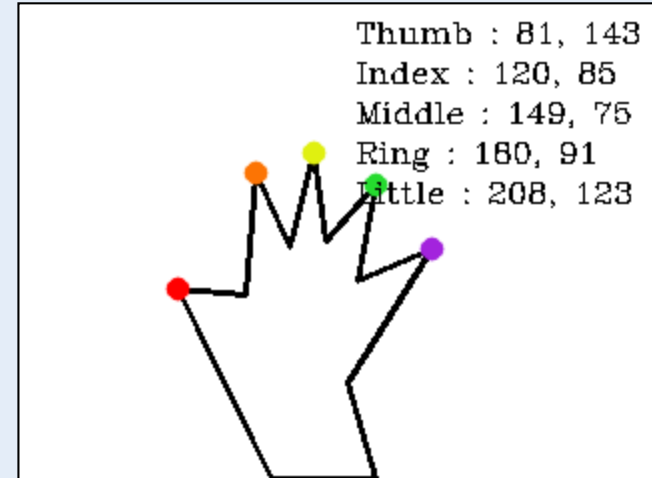
03 Finger ID

❖ Using the value of cosine



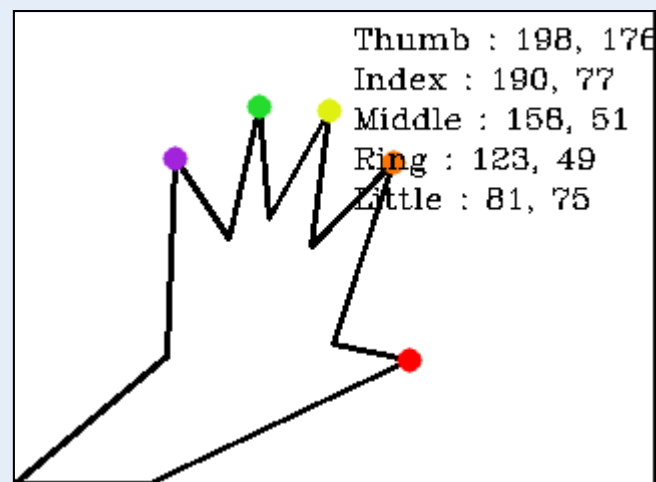
04 Results

❖ Right Hand



04 Results

❖ Left Hand



05 Conclusion

- Convexity Information을 이용하여 손목 제거 및 각 손가락마다 ID를 부여
 - 손목과 손가락 사이의 각도를 이용
- 찾아진 손가락을 바탕으로 Tracking이나 Gesture Recognition이 요구됨.

Q & A