HAND GESTURE RECOGNITOIN USING KINECT

Presented By:

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Mentor:

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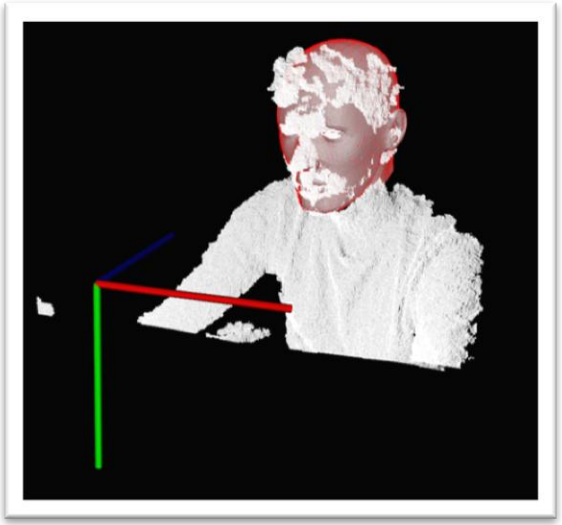
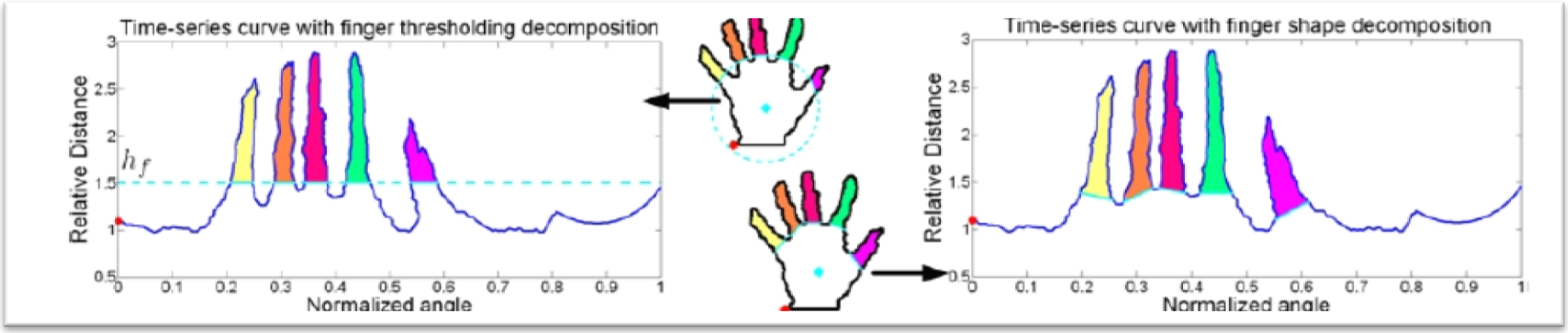
Motivation

- Hand gesture – one of the frontier topics of research since the launch of Kinect
- Traditional hand gesture methods based on optical sensor still far from satisfactory results
- Segmentation of hand – a fairly non trivial task



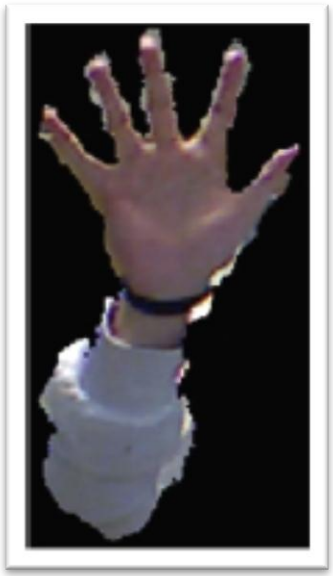
Previous work done

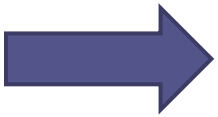
- Z. Ren, J. Yuan, and Z. Zhang. Robust Hand Gesture recognition based on finger-earth mover's distance with a commodity depth camera. In Proc. of ACM MM, 2011

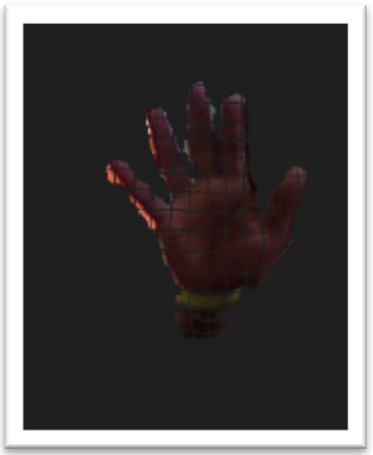


	Thresholding Decomposition+FEMD
Mean Accuracy	90.6%
Mean Running Time	0.5004s

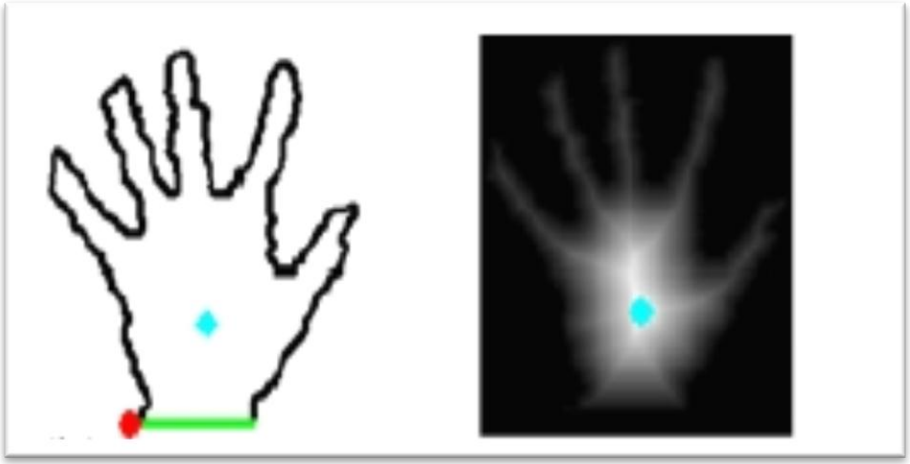
Step 1: Segmenting hand

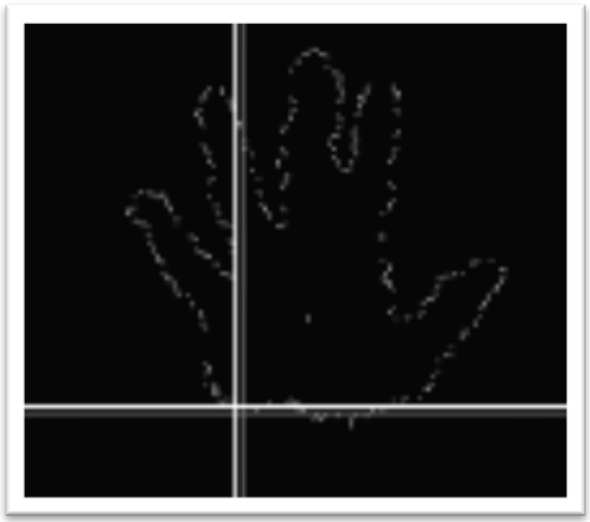


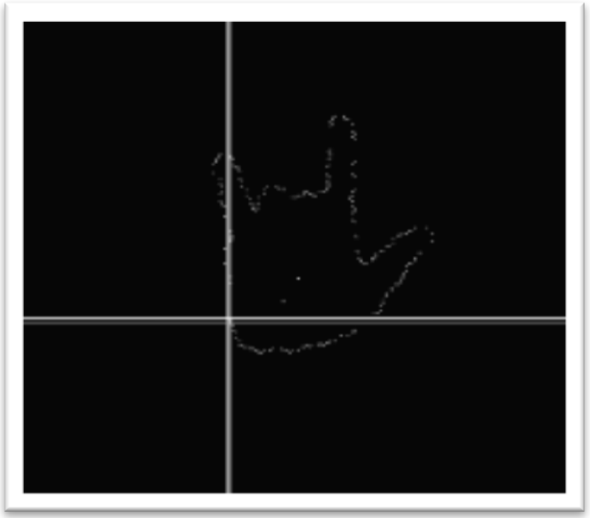




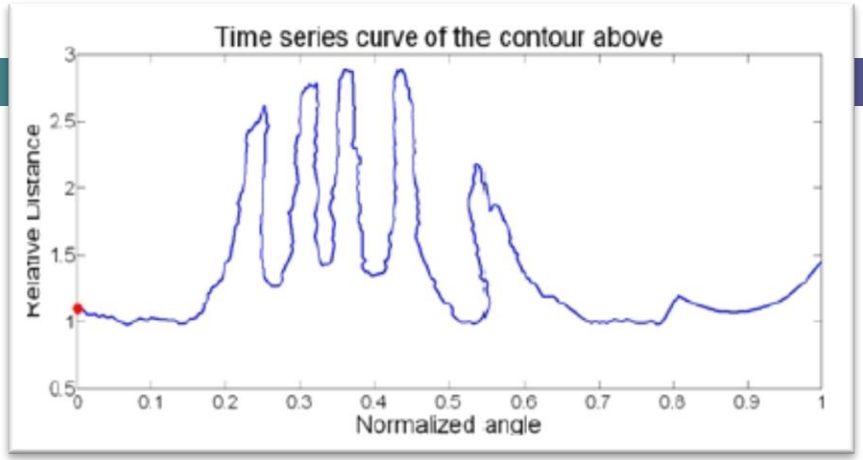
Step 2: Distance Transform

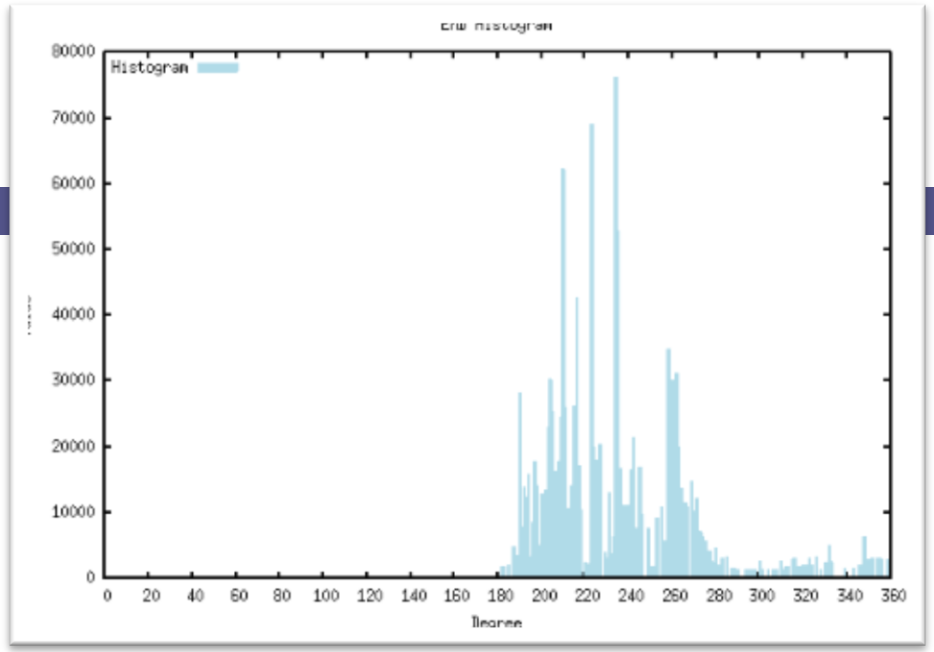


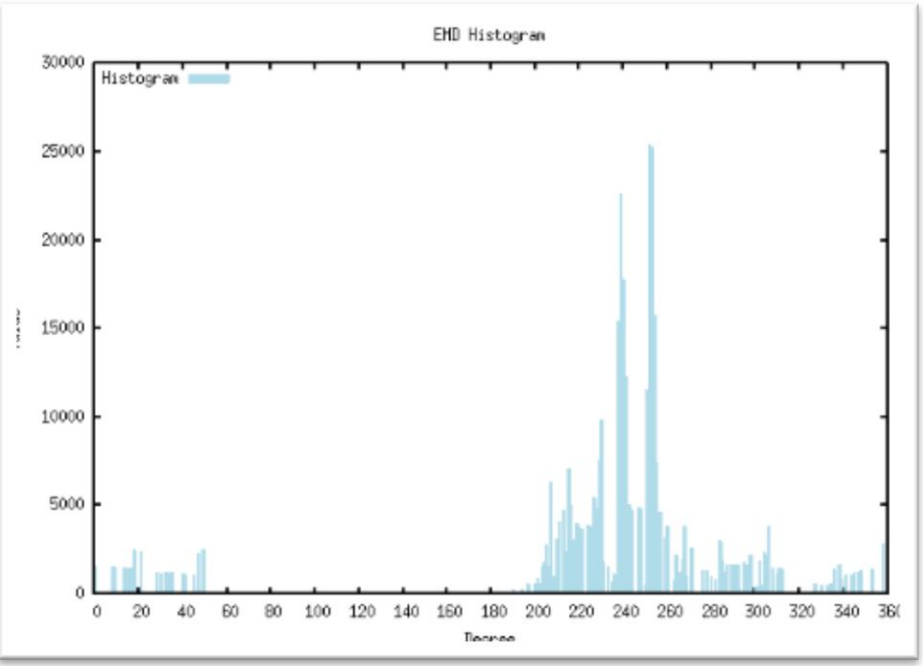


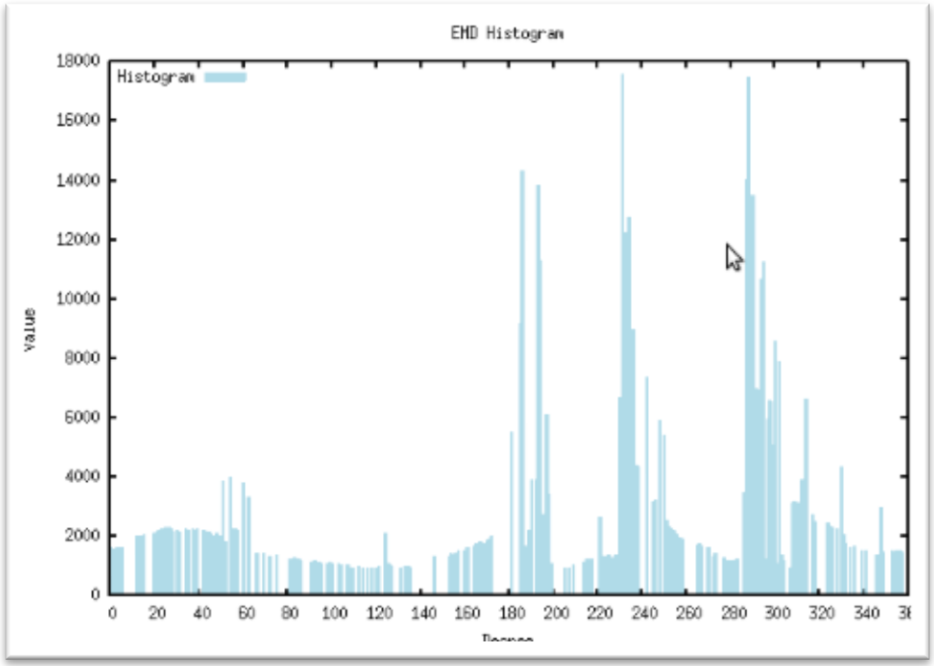


Step 3: Histogram





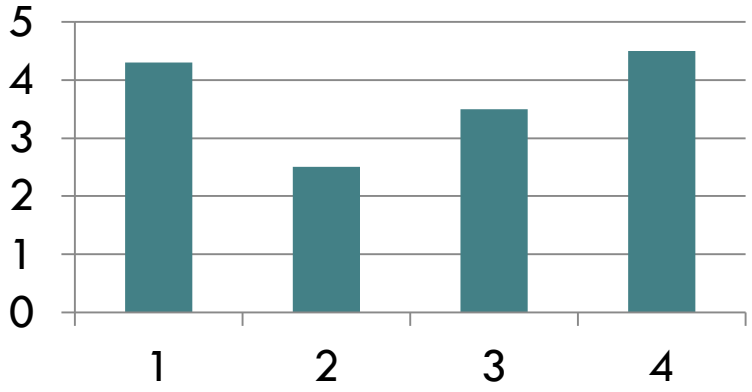


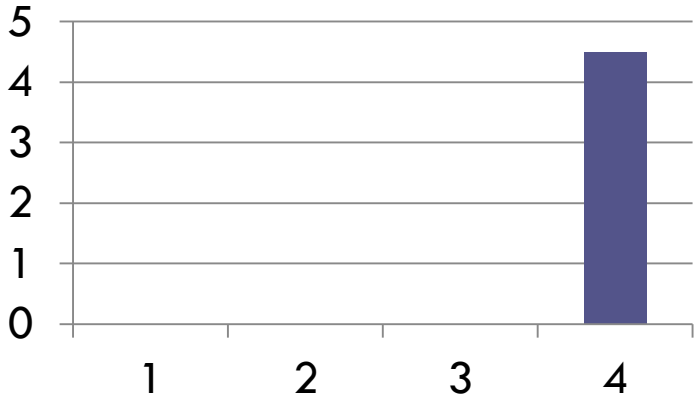


Step 4: EMD + Regularization

- Compare two histograms
- PENALTY

$$\begin{aligned}\mathrm{FEMD}(R,\ T) &= \beta E_{move} + (1-\beta)E_{empty}, \\ &= \frac{\beta \sum_{i=1}^{m}\sum_{j=1}^{n} d_{ij} f_{ij} + (1-\beta)\left|\sum_{i=1}^{m} w_{\mathbf{r}_i} - \sum_{j=1}^{n} w_{\mathbf{t}_j}\right|}{\sum_{i=1}^{m}\sum_{i=1}^{n} f_{ij}}\end{aligned}$$





References

- Z. Ren, J. Yuan, and Z. Zhang. Robust Hand Gesture recognition based on finger-earth mover's distance with a commodity depth camera. In Proc. of ACM MM, 2011

- The presentation uses images from the aforesaid paper.

Questions???