Week 3

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Project of Choice

- Crowd counting using texture repetition

- Most crowd counting currently use either densities or object (human) counting

- We want to see if there are textons which represent a person or part of a person

- If we can find these textons, we can then go about counting the crowd

Readings

- Tuceryan, M. and Jain, A., "Texture Analysis," The Handbook of Pattern Recognition and Computer Vision (2nd edition), pp. 207-248, 1998.

- Thomas Leung, Jitendra Malik, "Recognizing Surfaces Using Three-Dimensional Textons," iccv, vol. 2, pp.1010, Seventh International Conference on Computer Vision (ICCV'99) - Volume 2, 1999

- Zhu, S., Guo, C., Wang, Y., and Xu, Z., "What are Textons?" Internation Journal of Computer Vision, 62, pp. 121-143, 2005.

Template Matching

- Given some image and a template, find all instances of template inside image.

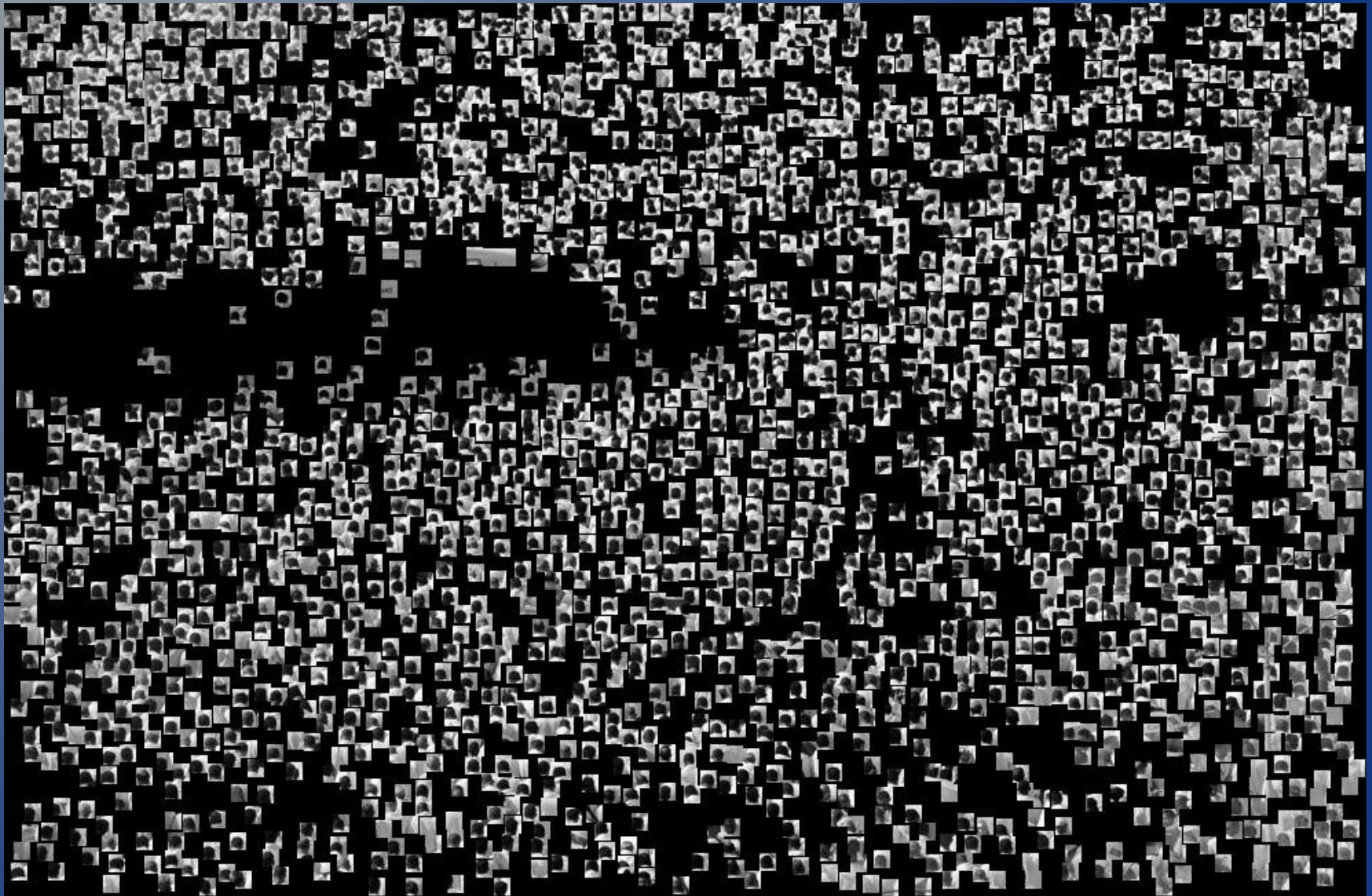- Sum of absolute distance to determine matches
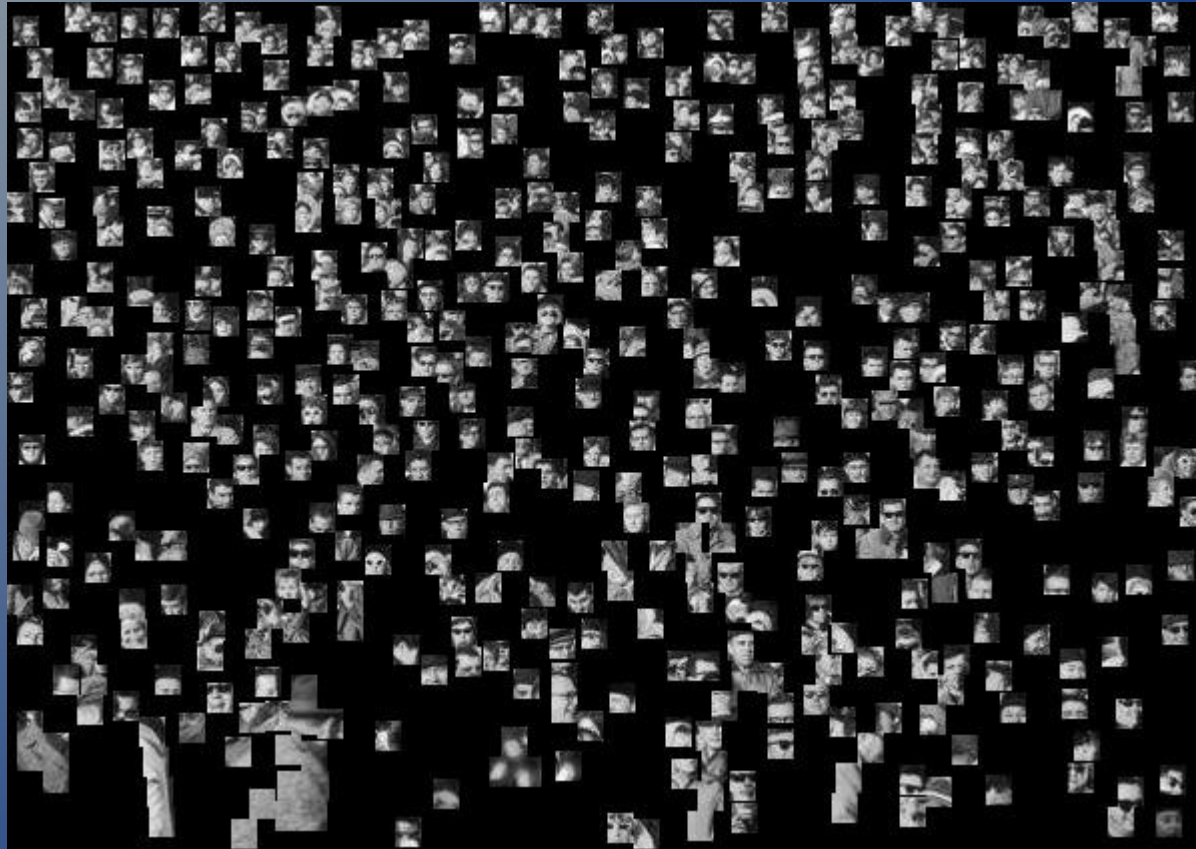
Image

Template

Result

1,891 matches

Image
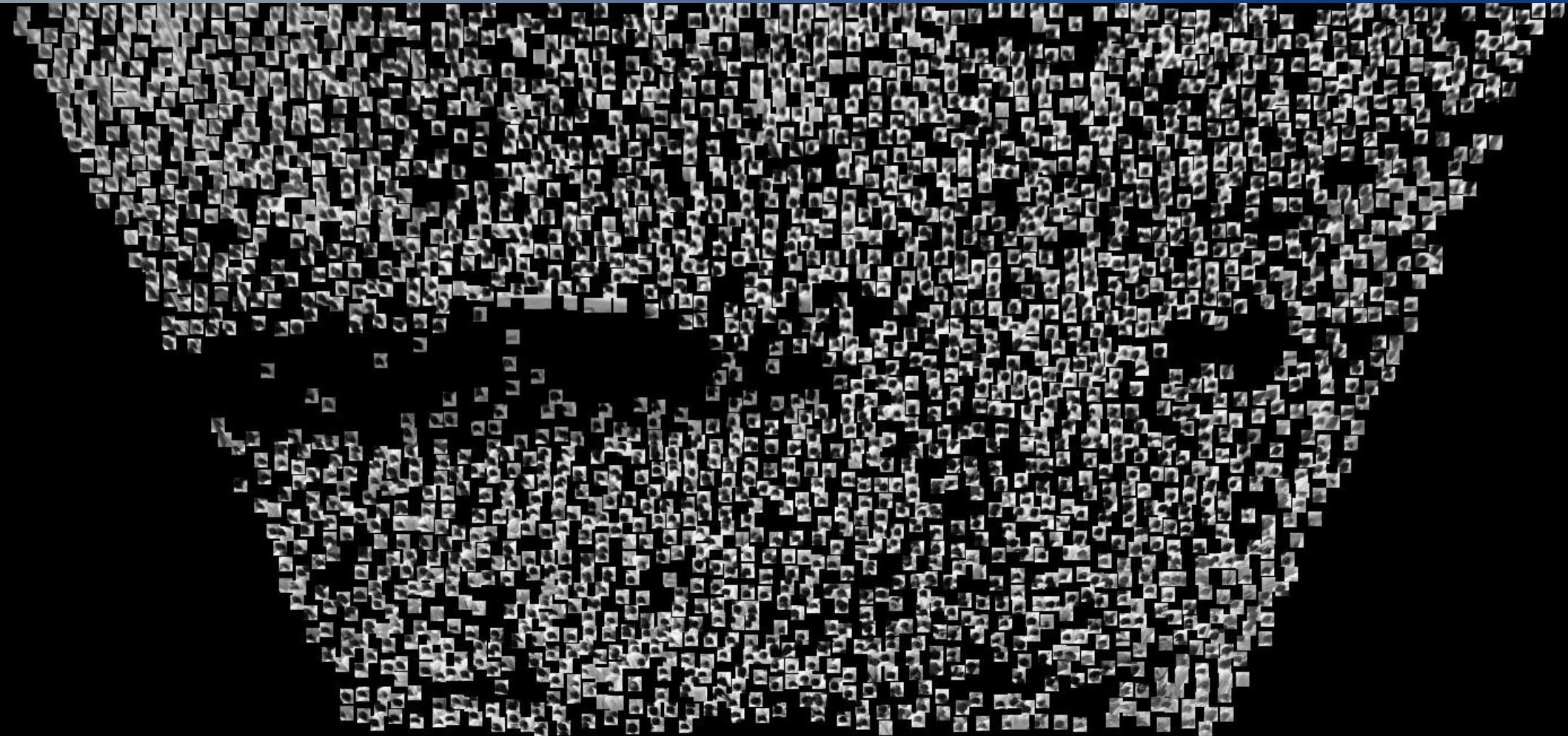

Template

Result

480 matches

Issues

- Perspective causes misses on potiental matches near back

- Use of projective transform on image improved matching

- False positives
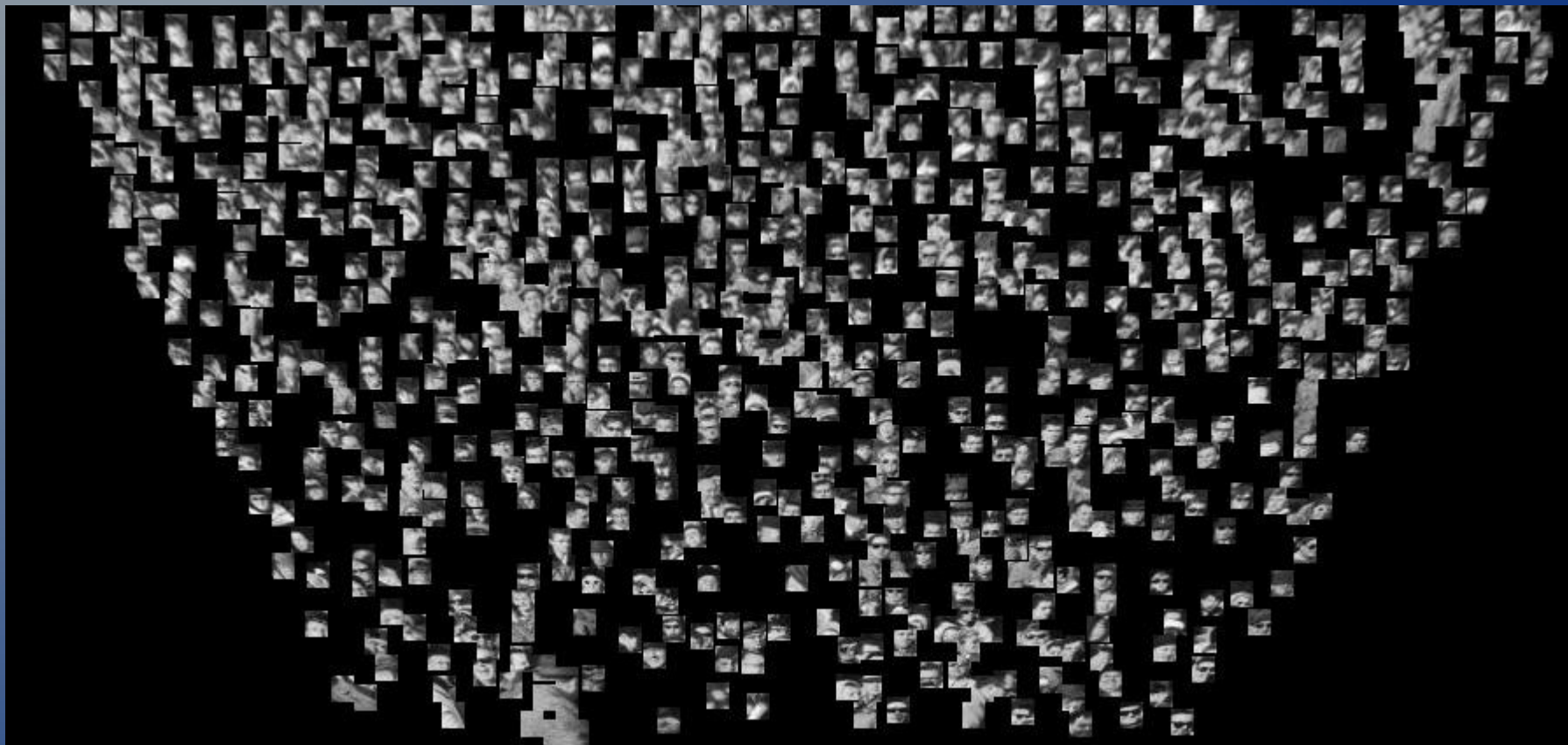
Transformed Image
(same template as before)

Result

2,298 matches

Transformed Image
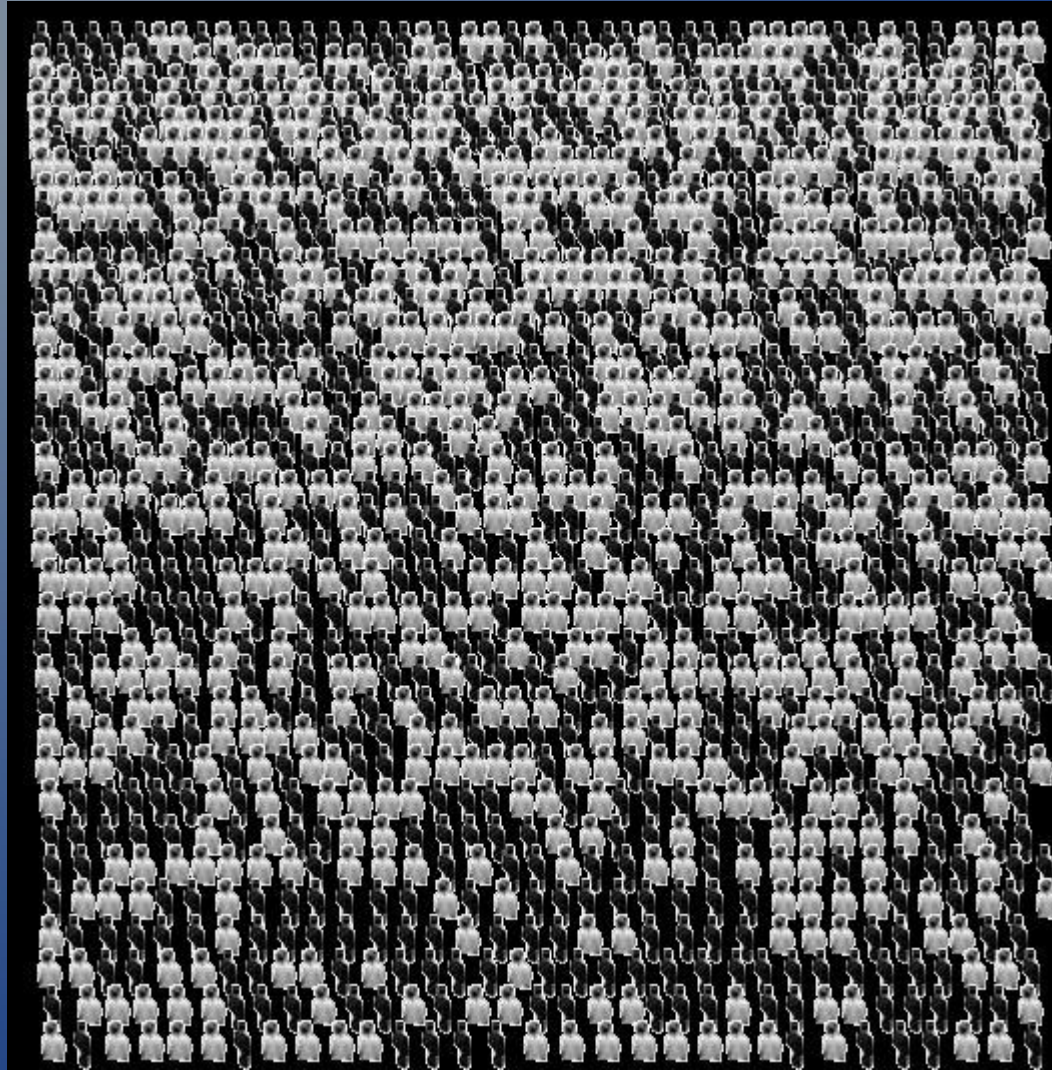## (same template as before)

Result

683 matches

Crowd Synthesis

- Wrote a quick program to generate rudimentary crowd

- Could not find exsisting high dense crowd counts

- Can be improved but will no longer work on it since it is not required to solve problem

Synthesised Crowd
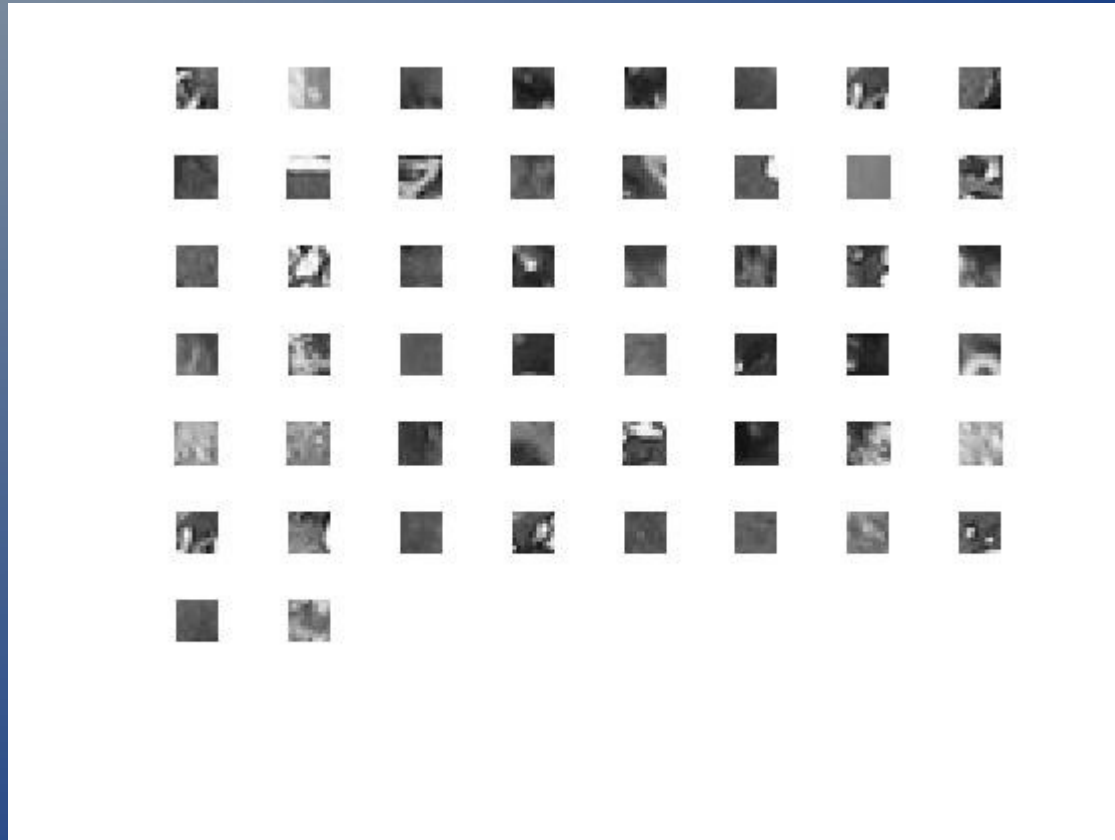
Learning Textons

- Given an image, take multiple patches from random location

- Generate filter responses for each patch and create a vector

- Cluster vectors via K-Means
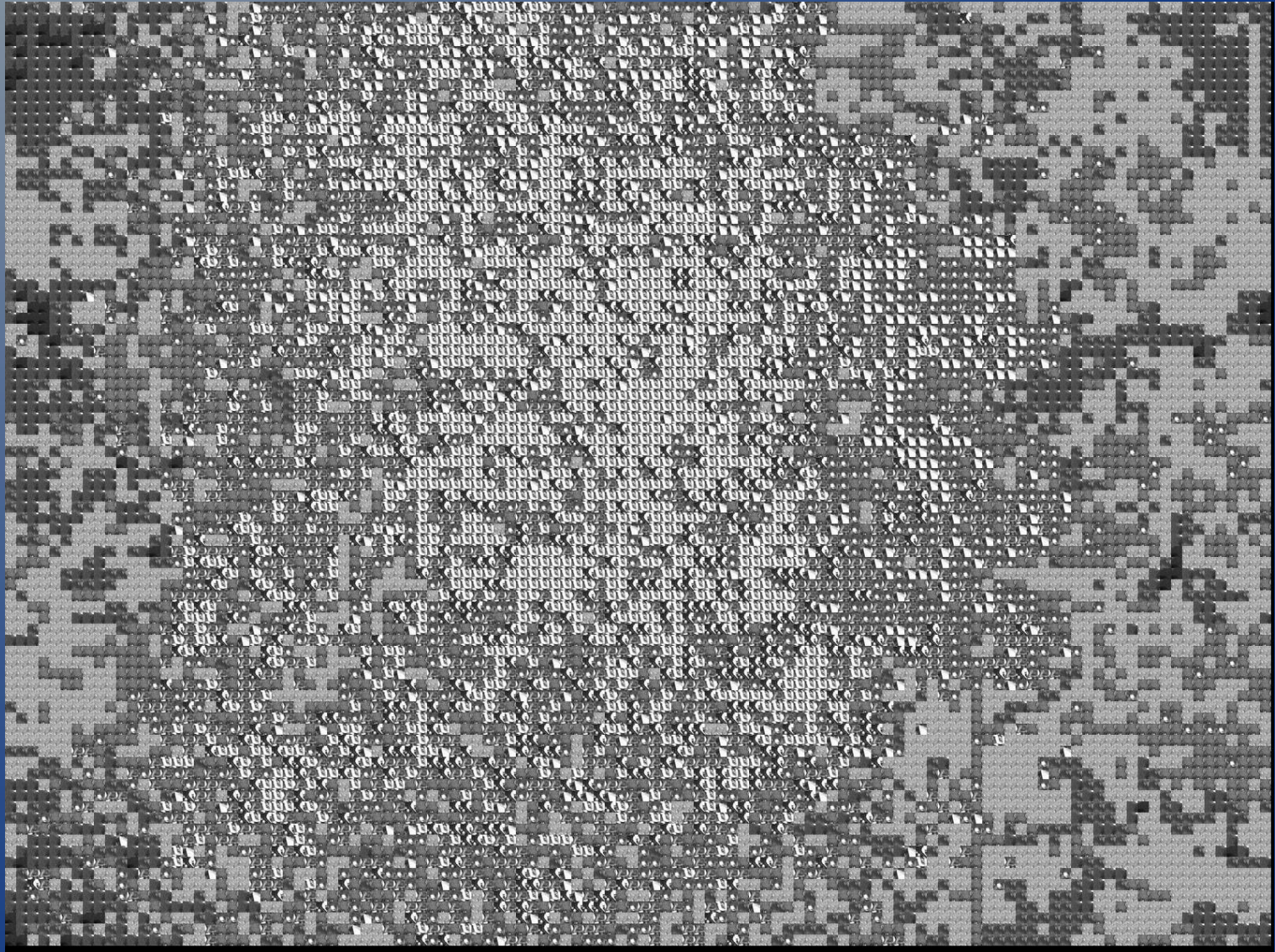
- Center points are the textons

Image

Textons, where k = 50

Recreation of image via textons
k = 10

Next Steps

- Need to create textons which represent a single person in a crowd or parts of person

- To do this, we need to find preprocessing steps which facilitate creation of these textons

- Currently applying edge detection, image segmentation, DoG, LoG, etc... in order to find useful patterns or information