RECOGNIZE FOOD IMAGES USING SIFT

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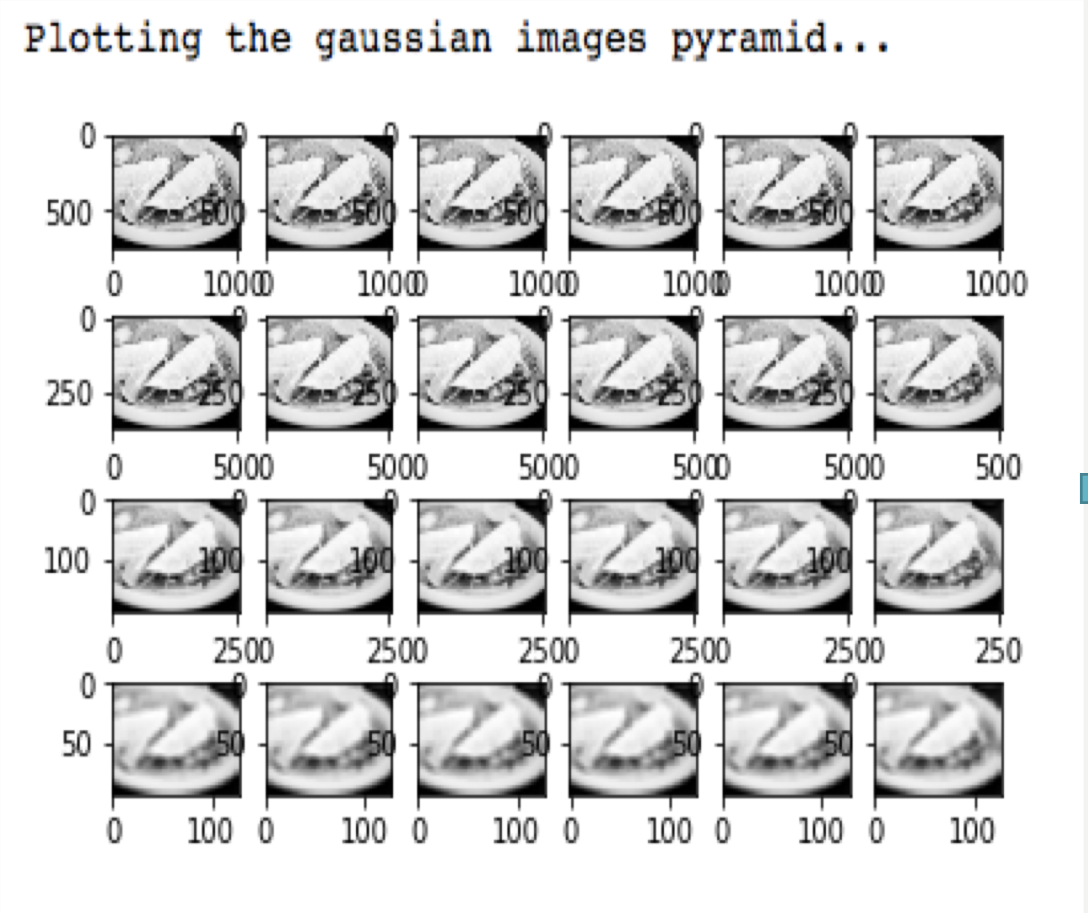
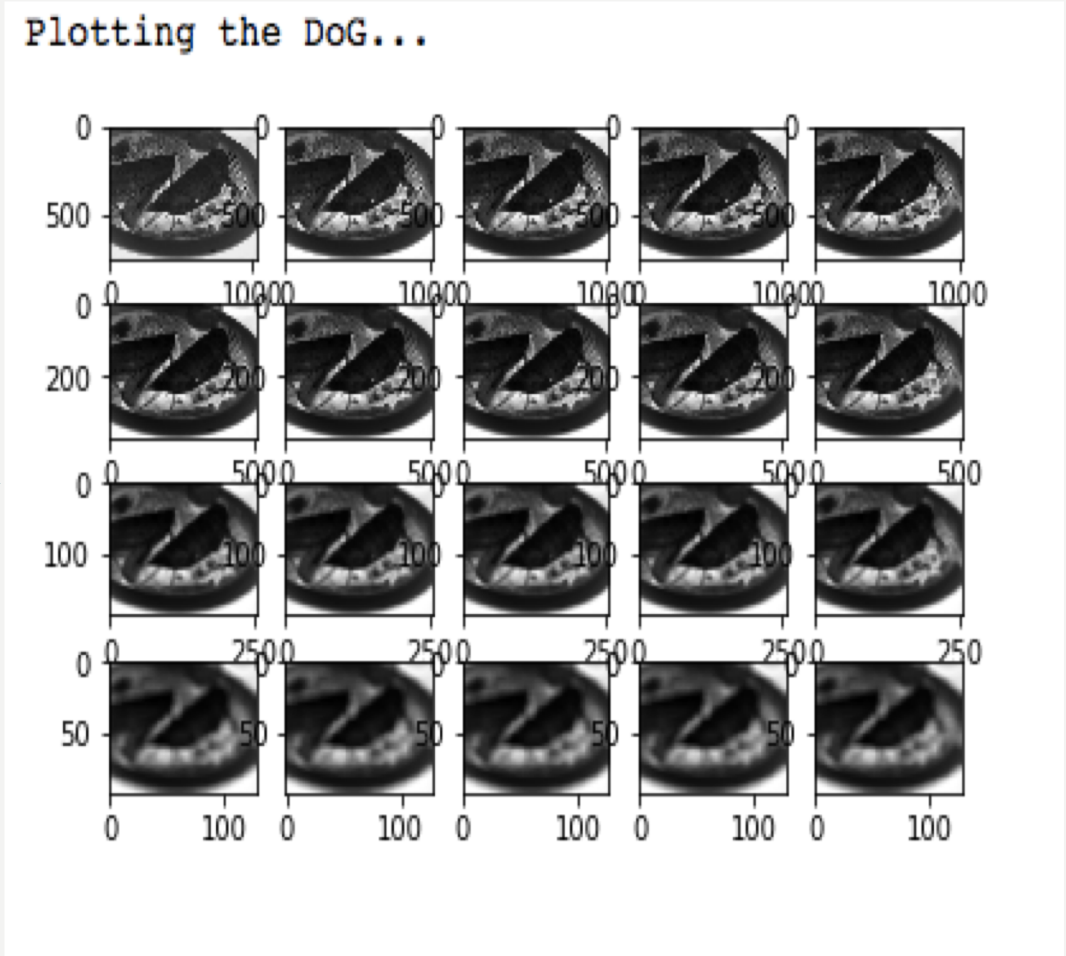
SIFT – SCALE INVARIANT FEATURE TRANSFORM

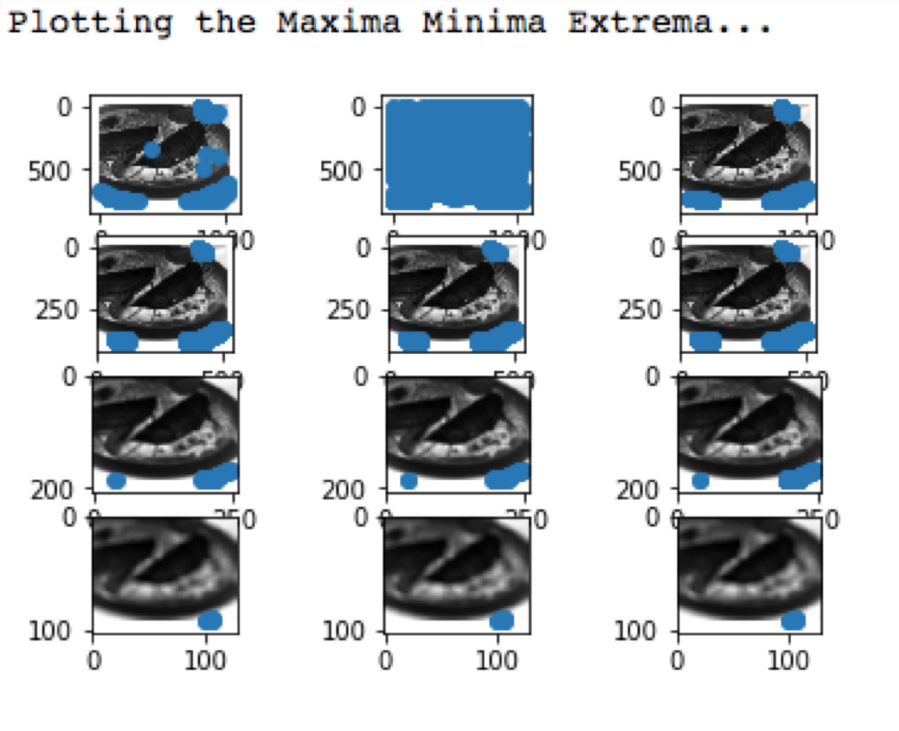
- **Scale-space extrema detection:**
  Searches over all scales and image locations using difference-of-Gaussian (DoG) function to identify potential interest points that are invariant to scale and orientation.
- **Key point localization:**
  Initial Rejection - Discard low contrast key points
  Outlier Rejection – Reject less stable or far away key points using Hessian Matrix
- **Orientation assignment:**
  Assign one or more orientations to each key point based on local image gradient directions.
- **Key point descriptor:**
  Local image gradients are measured at the selected scale in the region around each key point. These are transformed into a representation (8 bin histogram) that allows for significant levels of local shape distortion and change in illumination. Each key point has a descriptor of length 128.

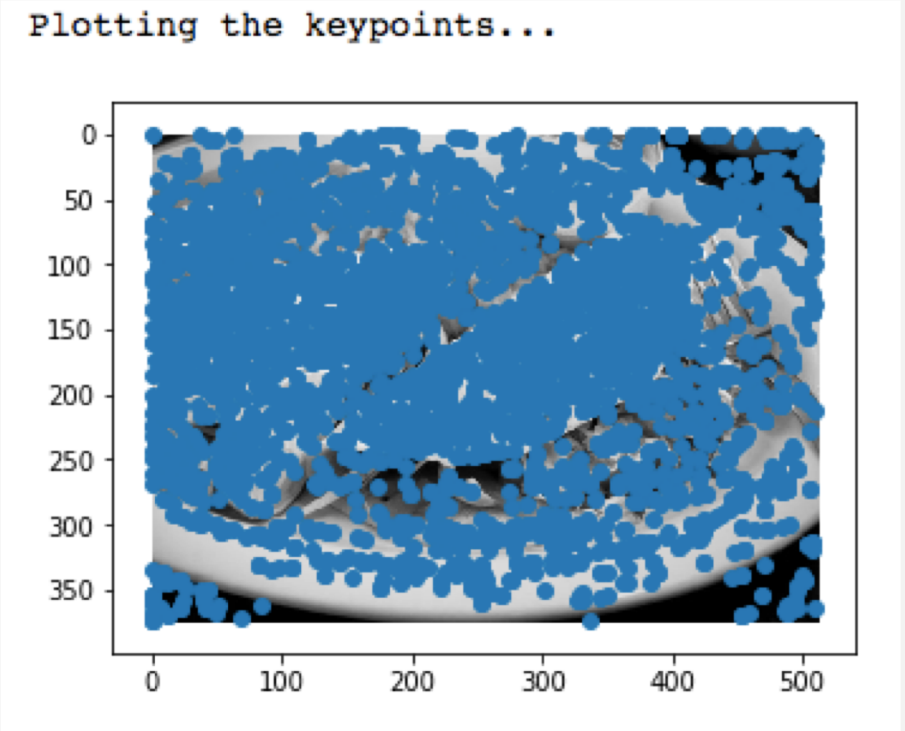
GAUSSIAN IMAGES AND DIFFERENCE OF GAUSSIAN



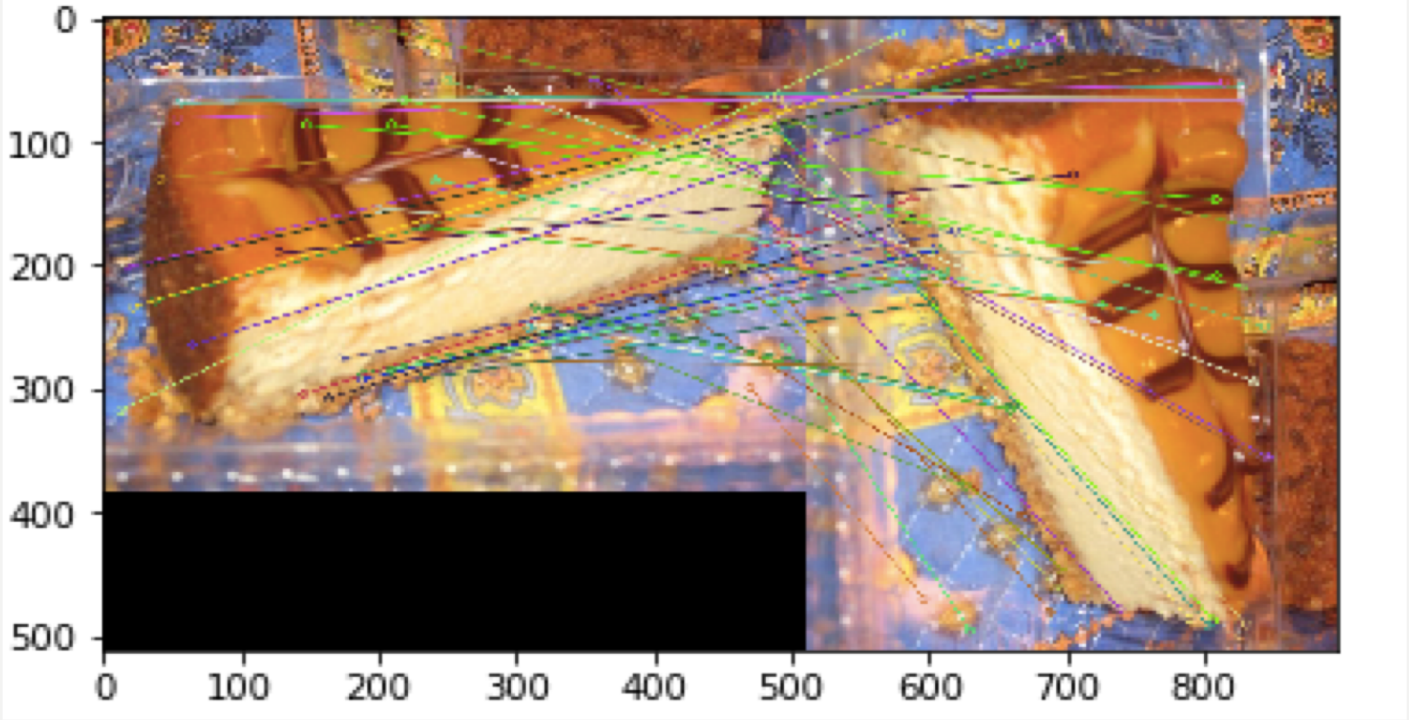


KEY POINTS DETECTED AT DIFFERENT SCALES AND OCTAVES





KEY POINT MATCHING



BAG OF WORDS MODEL FOR OBJECT RECOGNITION

- Vertical stack of all descriptors
- Clustering:
  k means cluster classifier
  unsupervised learning, clusters = 100
- Generating Vocabulary
  Histogram of clustered feature descriptors
- Training and testing
  - SVC (Support Vector Classifier)
    Accuracy – 62%
  - Random Forest Classifier
    Accuracy – 75%


THANK YOU