Creative Inquiry: Semester Project Ideas

Future Computing Technologies Lab

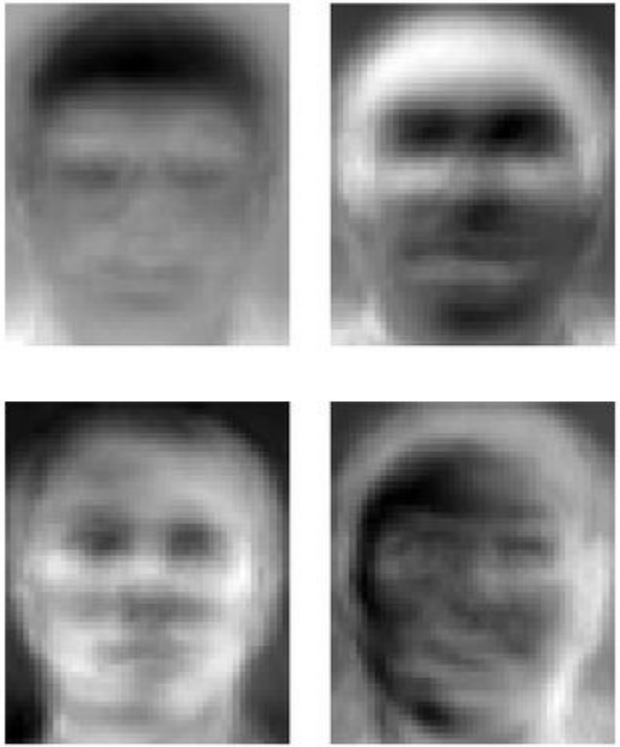
Guidelines

- Pick your dataset
  - Multivariate dataset (Iris, Boston housing prices, etc)
  - Image dataset (MNIST, CIFAR-10, etc)
  - Text dataset
  - Time-series data
- Pick your task
  - Regression
  - Classification
  - Clustering
  - Visualization
  - Object detection

Our Projects

Face Recognition

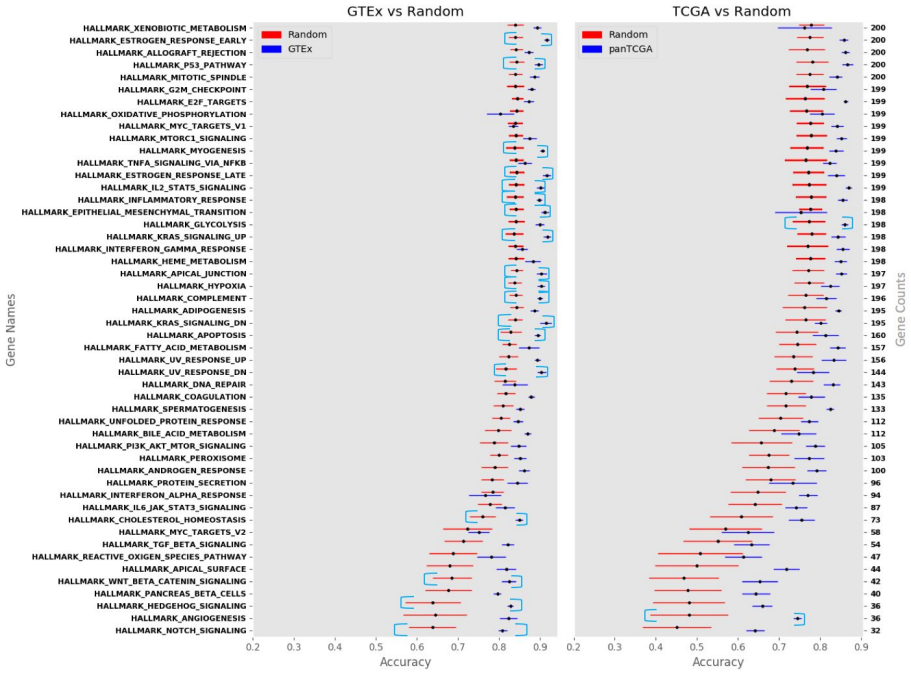
- Real-time face recognition
- Performance comparisons
  - PCA/kNN
  - MLP
- Other applications
  - Emoji detector
  - Lab usage tracker



Feature Selection

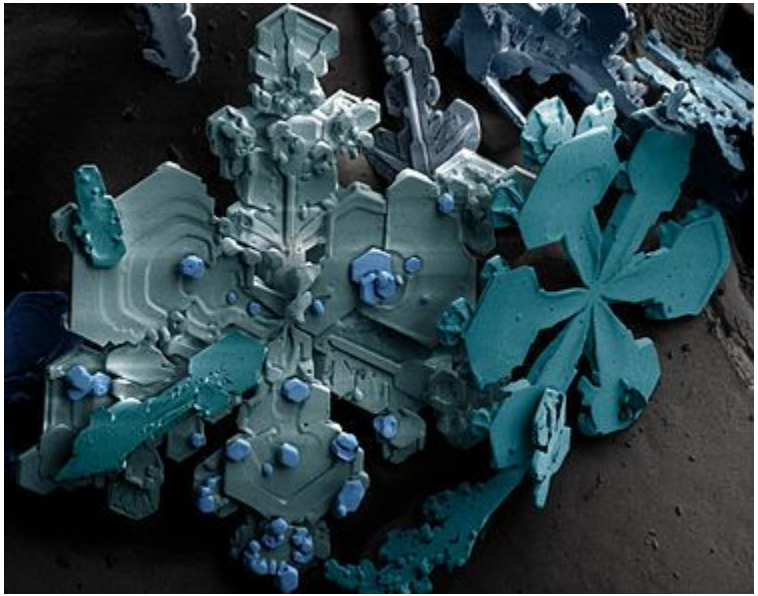
- Which features are the most salient?

- Which feature subsets are the most salient?



Structure Identification

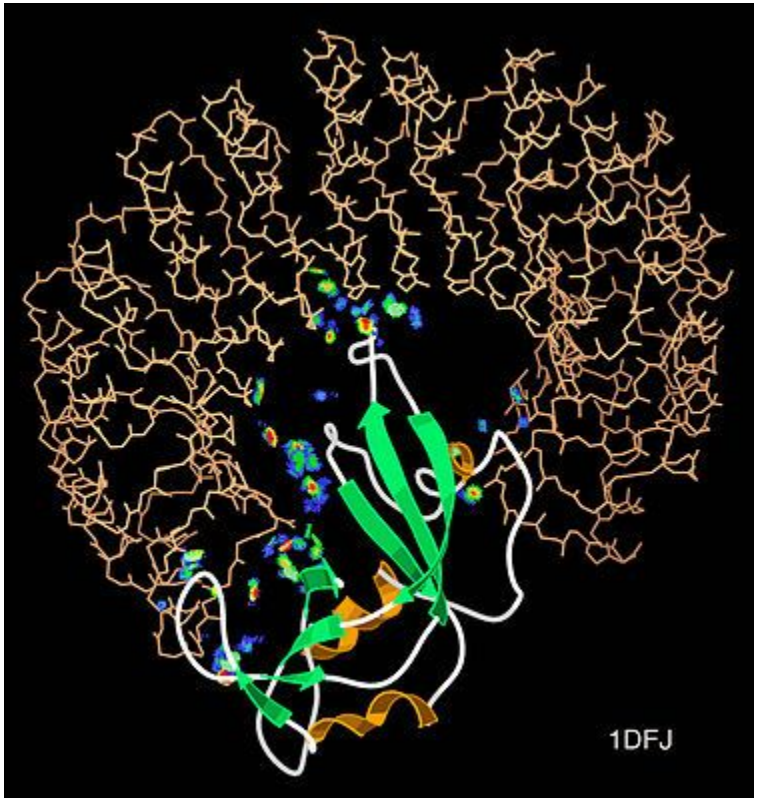
- Classify graphs based on structure
  - 3-D coordinates
  - Adjacency matrix
  - Distance matrix



Protein Binding Energy Prediction

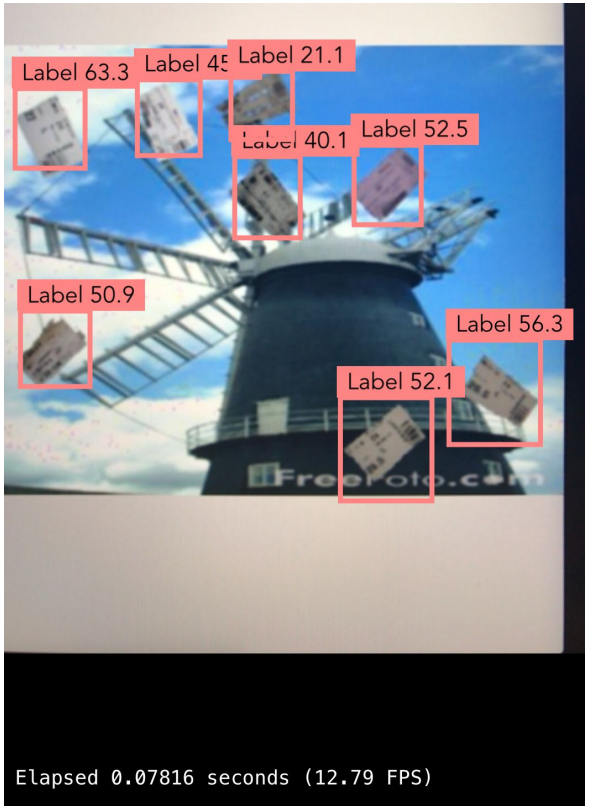
- Predict the change in free energy that occurs in protein interactions

- Want to predict whether a point mutation causes a malignant change



Warehouse Label Detector

- Given images of warehouse, detect where labels are in them.
- Augment the dataset with your own images and effects.
- Choose different CNN architectures to get better performance on the dataset.
- Type of problem: Regression, Classification
- Dataset Type: Image/
- Possible Mini Project: Build a small classifier to detect if a given sheet of paper to see if it's a label or not.



Deep OCR

- An optical character recognition application for detecting text in natural high-res images.
- Uses a two stage pipeline to first find text in images and then detect what that text means.
- Entirely CNN based pipeline.
  - Future Improvement: Learning text from previously detected text (a.k.a sequential processing).
- Possible Mini Project: Build a mini CNN based pipeline to classify images into their respective classes.