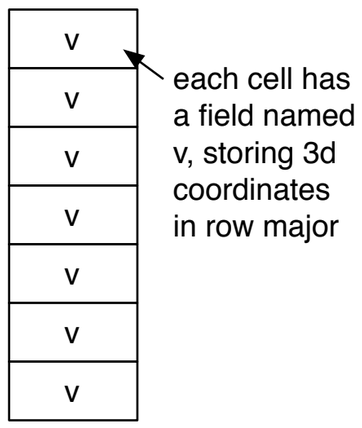
Code for "Real-time Pose Estimation of Deformable Objects Using a Volumetric Approach"

Data structure

All the data including the trainData and testData in the core functions have the following format. Examples are available in /dat.

trainData: n x 1 cell



The v field can be easily extracted from the 3D model files. We provide /src/parseObj.m as an example to convert from .obj files.

We also use another field fn to store the ground truth for evaluation. But that's not necessary to use our code.

Core functions

```
ids = recognize(trainData, testData)
```

Use trainData as the database to search, and testData as the query. This function uses the RankSVM weights encoded in `weights.txt`, and then returns a cell array of the id of the most similar instance in `trainData` regarding to the weighted Hamming distance.

```
feature = buildPtPyramid(data)
```

Extract the pyramid volumetric feature as mentioned in the paper. `data` has the same format as `trainData`, which is illustrated in the Data structure part.

Note this MATLAB version is modified from our C# implementation for easier use for the community, and therefore it doesn't directly use the Signed Distance Function but brute-forcely compute the features, which may result in a performance loss.

```
weights = trainWeights(histbar_train,
          histbar_calib, ids)
```

[Coming in the next release update]
Train a RankSVM using the given training and calibration features, and the ground truth rank.

Usage

We provide a sample MATLAB script with sample data to demonstrate the usage of our code.

Simply enter `/src`, and type `run()` in MATLAB command line to check the demo. There is nothing requiring compilation in this version.

Citation

Please kindly cite our paper if you use our code.

Yinxiao Li, Yan Wang, Michael Case, Shih-Fu Chang, and Peter K. Allen, "Real-time Pose Estimation of Deformable Objects Using a Volumetric Approach," Proc. of IROS, 2014.

```
@InProceedings{IROS14:volumetric,
    Author = {Li, Yinxiao and Wang, Yan and
Case, Michael and Chang, Shih-Fu and Allen,
Peter K.},
    Title = {Real-time Pose Estimation of
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Approach},
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    Year = {2014}
}
```