Nonparametric Canonical Correlation Analysis
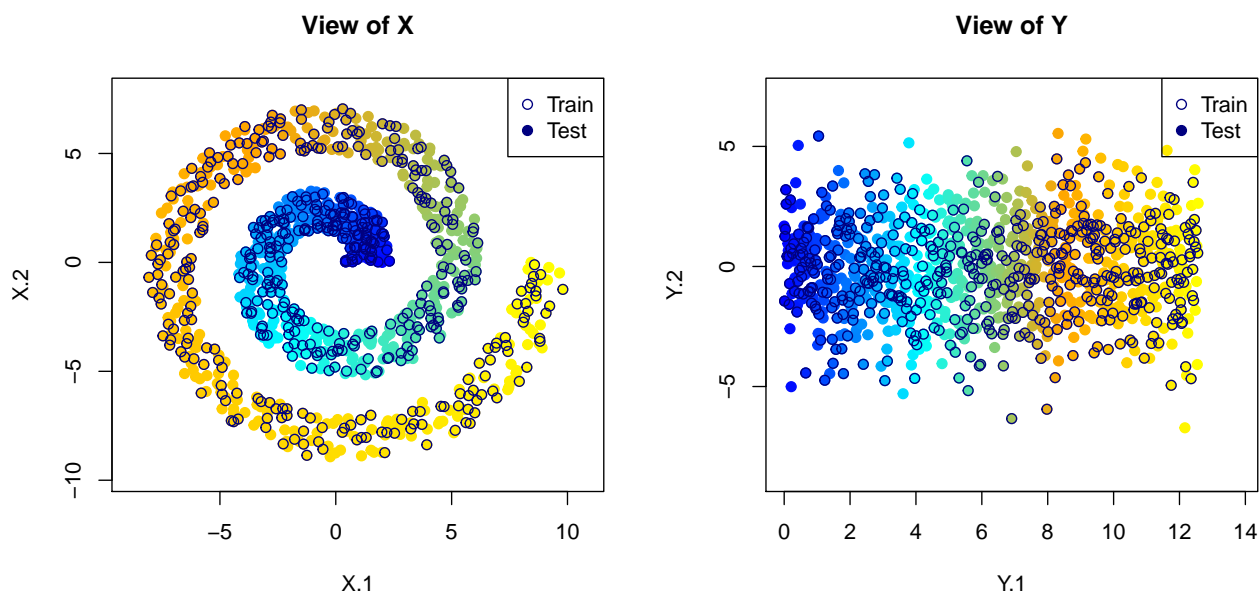
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We try the demo in R. Here is the visualization of input data **X** and **Y**.

We run Run nonparametric CCA.

```r
source("~/Documents/research/rdc/RDCnet/R/ncca.R")
ncca_res <- ncca(X[PairedIndices,],Y[PairedIndices,],
                 X[UnpairedIndices,],Y[UnpairedIndices,],
                 d = 2, hx = 0.75, hy = 0.75, nx = NumNNs_X, ny=NumNNs_Y)
```

```
## Normalizing S to be doubly stochastic ...
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## Performing exact SVD ...
```

```r
X_proj_paired <- ncca_res$X_new
Y_proj_paired <- ncca_res$Y_new
X_proj_unpaired <- ncca_res$XV_new
Y_proj_unpaired <- ncca_res$YV_new

## Visualize the results

plot(c(X_proj_paired[,1], X_proj_unpaired[,1]),
     c(Y_proj_paired[,1], Y_proj_unpaired[,1]),
     col = col_b2y(N)[c(PairedIndices, UnpairedIndices)],
     pch = 19, xlab = "f(x)", ylab = "g(y)", main = "Projections (all)")
points(X_proj_paired[,1], Y_proj_paired[,1], col = "navy")
legend("topleft", c("Train", "Test"), pch = c(1, 19), col = "navy")
```

Projections (all)
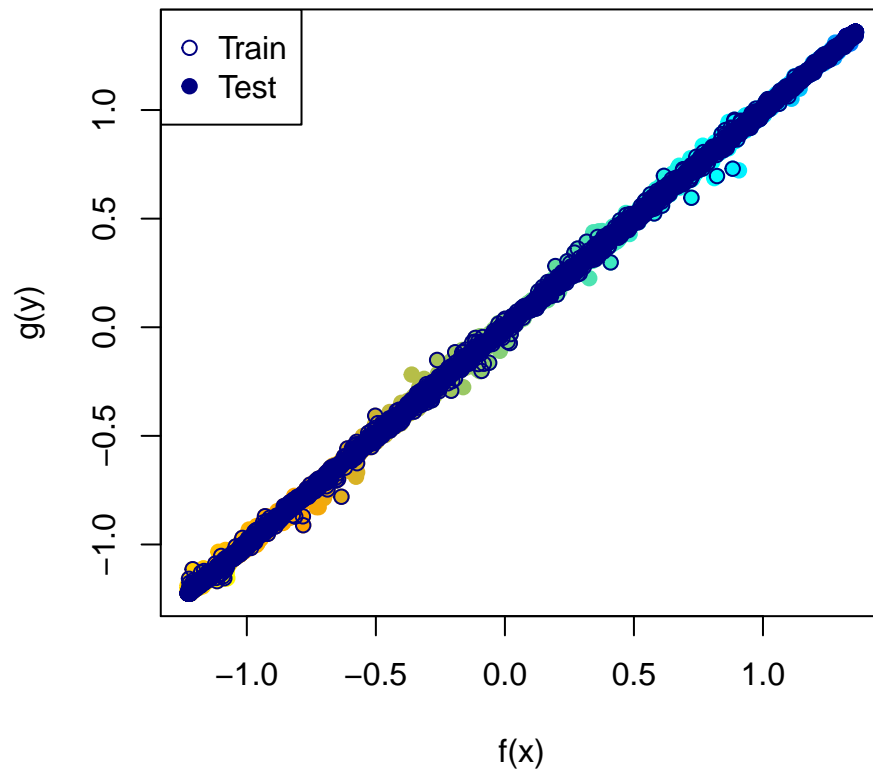

```r
cat("The nonparametric canonical correlation between X and Y is ", ncca_res$cor_XY, "\n")
```

```
## The nonparametric canonical correlation between X and Y is  0.9999074 0.9996553
```