# DDSOM (Data-driven Second Order Model) readme

## ◆ Setup

- Operating System: Windows XP or Windows 7

    Step 1. Please download DDSOM.rar

    (http://www.stat.sinica.edu.tw/gshieh/ddsom/DDSOM.rar) first, and unzip to

    "C:\", then DDSOM folder will be generated.

    Step 2. Please copy the cmath.dll and cstat.dll from "C:\DDSOM\isml" to

    "C:\Windows\system".

## ◆ Execution

- Please execute srs.exe which is in "C:\DDSOM".
- The results are in "C:\DDSOM\output".

## ◆ Example: Application 2: Predicting AT/RT of 63 genes in yeast.

● Input:

Microarray gene expression data: expr.txt

Gene name: genes.txt

**Note：**

The last row of the input file can't be blank, otherwise the code cannot be executed.

● Output: the triplets sorted by '*Score*' are outputted

Predicted _output_tlag_full.txt

● Need to manually match the output and GIs/TIs of interest.

Step 1. Suppose one pair in 132 AT/RTs is ROX1 ⊣ CYC7.

| TF | Targe | AT(+)/RT(-) |
|------|------|-------------|
| ROX1 | CYC7 | - |

While the predicted triplets with *Score* < 0.3 include both ROX1 $\longrightarrow$ CYC7 and ROX1 $\longmapsto$ CYC7 which are contradictory, thus are removed. For example,

| A | R | T |
|---|---|---|
| ROX1 | SWI5 | CYC7 |
| CLN2 | ROX1 | CYC7 |

Step 2. When there are more than one triplets having the same AT/RT, we select the triplet with the minimum *Score*. For example,

| A | R | T | Score(A,R,T) |
|---|---|---|---|
| SWI5 | YOX1 | NDL1 | 0.170289 |
| BAS1 | YOX1 | NDL1 | 0.214514 |
| PHO11 | YOX1 | NDL1 | 0.215139 |
| CLN3 | YOX1 | NDL1 | 0.221794 |

**Result of Application 2:** the ratio of correctly predicted TIs (the bold faced ones in the following table) over the intersection of the predicted and TRANSFAC = 6/14

| TIs from TRANSFAC | | | The predicted | | |
|---|---|---|---|---|---|
| TF | Targe | AT(+)/RT(-) | A | R | T |
| ASH1 | HO | - | ASH1 | YGP1 | HO |
| **FKH2** | **RAX2** | + | **FKH2** | **CRH1** | **RAX2** |
| GCN4 | HIS4 | + | MRH1 | GCN4 | HIS4 |
| HAP1 | CTT1 | + | PCL9 | HAP1 | CTT1 |
| HAP1 | CYC7 | + | CRH1 | HAP1 | CYC7 |
| HAP1 | HMG1 | + | MRH1 | HAP1 | HMG1 |
| HAP1 | SOD2 | + | CDC46 | HAP1 | SOD2 |
| MSN4 | CTT1 | + | PCL9 | MSN4 | CTT1 |
| ROX1 | COX5B | - | ROX1 | MRH1 | COX5B |
| **ROX1** | **HMG1** | - | **MRH1** | **ROX1** | **HMG1** |
| **SWI4** | **FKS1** | + | **SWI4** | **MRH1** | **FKS1** |
| **WHI5** | **PCL1** | - | **SWI5** | **WHI5** | **PCL1** |
| **YOX1** | **NDL1** | - | **SWI5** | **YOX1** | **NDL1** |
| **YOX1** | **YMR031C** | - | **MRH1** | **YOX1** | **YMR031C** |