MOTEF_example.m selected output

April 29, 2019

```
>>
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%-- Running MOTEF Gibbs sampler
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

rng(1342);
[jointalloc,labelsout,margalloc,~,time,infout,...
~] = MOTEF(data,convars,couvars,[],[],catvars,...
chains,burn,nrun,thin,K0,K0lbd,K,Klbd,alpha0,alpha,true);
MOTEF: Chain 1
10% Complete.
20% Complete.
.
.
.
[Output truncated for this file]
.
.
.
MOTEF: Chain 5
10% Complete.
20% Complete.
30% Complete.
40% Complete.
50% Complete.
60% Complete.
70% Complete.
80% Complete.
90% Complete.
100% Complete.

>>
%-- Computing point estimate of the joint clustering variables by
%-- minimizing Binder's loss

jointalloctmp = reshape(permute(jointalloc,[1,3,2]),[],nsamp);
tic;
[optclu,optitr] = minBinderLoop2_mex(jointalloctmp);
```

```
time2 = toc;
Binder Loss.
Opt. Clu. Sel. Prog.: 10.00%
Opt. Clu. Sel. Prog.: 20.00%
Opt. Clu. Sel. Prog.: 30.00%
Opt. Clu. Sel. Prog.: 40.00%
Opt. Clu. Sel. Prog.: 50.00%
Opt. Clu. Sel. Prog.: 60.00%
Opt. Clu. Sel. Prog.: 70.00%
Opt. Clu. Sel. Prog.: 80.00%
Opt. Clu. Sel. Prog.: 90.00%
Opt. Clu. Sel. Prog.: 100.00%

>>
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%-- Examining some output
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% The following summarizes the selected optimal joint clustering
tabulate(optclu)
Value    Count   Percent
1      578     57.80%
2      204     20.40%
3      218     21.80%
>>
% The following performs a cross tabulation between the true clustering
% (joint_clu_t) and the model-based optimal clustering (optclu)
crosstab(joint_clu_t,optclu)

ans =

20   195     3
518     5    17
40     4   198

>>
% The following computes the multivariate potential scale reduction factor
% for assessing convergence of all the paiwise measure of mutual
% information for assessing pairwise dependence among all pairs of
% variables.
mpsrf(infout)

ans =

1.1957

>>
% The following is a summary plot for assessing pairwise dependence among
```

```
% all pairs of variables
p = numel(labelsout);
[pinfest,tdm] = deal(zeros(p,p));

trudep = [catvars([2,3,7,8,12]);convars(1);couvars(1)];

epostpinf = mean(mean(infout > 0),3)';
contl = 0;
for j1 = 1:(p-1)
for j2 = (j1+1):p
contl = contl + 1;
[pinfest(j1,j2),pinfest(j2,j1)] = deal(epostpinf(contl));
[tdm(j1,j2),tdm(j2,j1)] = deal(prod(ismember([labelsout(j1),...
labelsout(j2)],trudep)));
end
end
```

```
figure('Units' , 'inches' , 'Position', [0, 0, 22.5, 4.2]);
subplot(1,3,1);heatmap(labelsout,...
labelsout,tdm,'Colormap',flipud(hot));
title("True Dependence");
subplot(1,3,2);heatmap(labelsout,...
labelsout,pinfest,'Colormap',flipud(hot));
title("Posterior Probability of Dependence");
subplot(1,3,3);heatmap(labelsout,...
labelsout,1*(pinfest>0.95),'Colormap',flipud(hot));
title("Posterior Probability of Dependence > 0.95");
```