K = 50, alpha = 0.1, beta = 0.1
[['image' 'images' 'texture' 'color' 'query']
['feature' 'features' 'representation' 'number' 'set']
['input' 'net' 'output' 'neural' 'function']
['position' 'eye' 'system' 'movement' 'head']
['action' 'policy' 'learning' 'optimal' 'control']
['expert' 'hmm' 'system' 'context' 'mlp']
['cell' 'routing' 'system' 'place' 'population']
['problem' 'solution' 'method' 'constraint' 'optimization']
['unit' 'hidden' 'network' 'output' 'input']
['signal' 'filter' 'frequency' 'system' 'auditory']
['data' 'set' 'training' 'method' 'rbf']
['algorithm' 'problem' 'learning' 'step' 'convergence']
['prediction' 'model' 'data' 'error' 'method']
['kernel' 'vector' 'space' 'support' 'projection']
['network' 'neural' 'output' 'input' 'training']
['circuit' 'chip' 'analog' 'current' 'output']
['distribution' 'prior' 'bayesian' 'posterior' 'variables']
['sequence' 'model' 'transition' 'sequences' 'states']
['bound' 'function' 'threshold' 'number' 'case']
['string' 'language' 'symbol' 'context' 'grammar']
['classifier' 'classification' 'class' 'training' 'set']
['learning' 'task' 'trial' 'training' 'information']
['gaussian' 'distribution' 'noise' 'density' 'variance']
['field' 'node' 'graph' 'network' 'mean']
['learning' 'gradient' 'algorithm' 'stochastic' 'convergence']
['word' 'speech' 'character' 'speaker' 'system']
['vector' 'memory' 'bit' 'block' 'number']
['synaptic' 'synapses' 'input' 'hebbian' 'neuron']
['control' 'model' 'controller' 'motor' 'trajectory']
['training' 'error' 'set' 'generalization' 'examples']
['neuron' 'model' 'input' 'potential' 'synaptic']
['level' 'target' 'search' 'segment' 'resolution']
['tree' 'rules' 'rule' 'trees' 'decision']
['weight' 'network' 'learning' 'order' 'number']
['model' 'visual' 'subject' 'representation' 'stimulus']
['function' 'approximation' 'basis' 'order' 'polynomial']
['cluster' 'distance' 'data' 'clustering' 'transformation']
['model' 'data' 'parameter' 'mixture' 'likelihood']
['learning' 'noise' 'error' 'optimal' 'input']
['network' 'dynamic' 'system' 'recurrent' 'neural']
['visual' 'orientation' 'cell' 'cortex' 'field']
['object' 'image' 'images' 'pixel' 'view']
['motion' 'direction' 'contour' 'velocity' 'model']
['layer' 'unit' 'input' 'network' 'activation']
['component' 'analysis' 'source' 'data' 'matrix']
['face' 'oscillator' 'faces' 'representation' 'phase']
['map' 'region' 'mapping' 'space' 'fig']
['spike' 'information' 'correlation' 'firing' 'channel']
['system' 'network' 'module' 'modules' 'neural']
['point' 'space' 'function' 'set' 'problem']]
Iter 100/10000 (38.79 s). Logjoint: -3297137.

```
# K=50, alpha=100, beta=0.1
[['action' 'learning' 'expert' 'states' 'agent']
 ['structure' 'network' 'signal' 'evidence' 'generalization']
 ['level' 'system' 'algorithm' 'input' 'parameter']
 ['weight' 'network' 'neural' 'gradient' 'classification']
 ['system' 'function' 'weight' 'network' 'risk']
 ['function' 'hmm' 'set' 'mlp' 'model']
 ['layer' 'network' 'training' 'learning' 'input']
 ['hand' 'decision' 'model' 'network' 'step']
 ['delay' 'network' 'task' 'neighbor' 'head']
 ['method' 'neural' 'network' 'input' 'form']
 ['stimulus' 'model' 'fig' 'mean' 'algorithm']
 ['function' 'solution' 'algorithm' 'learning' 'problem']
 ['noise' 'learning' 'function' 'theory' 'concept']
 ['phase' 'hidden' 'channel' 'network' 'input']
 ['spike' 'cell' 'robot' 'orientation' 'learning']
 ['output' 'eye' 'network' 'system' 'set']
 ['signal' 'information' 'model' 'network' 'task']
 ['neuron' 'threshold' 'segment' 'synapse' 'chain']
 ['model' 'system' 'function' 'point' 'algorithm']
 ['control' 'forward' 'motor' 'model' 'output']
 ['average' 'distribution' 'data' 'algorithm' 'function']
 ['potential' 'controller' 'synaptic' 'model' 'neuron']
 ['learning' 'unit' 'field' 'visual' 'set']
 ['unit' 'cross' 'weight' 'component' 'order']
 ['region' 'set' 'markov' 'algorithm' 'training']
 ['rules' 'examples' 'output' 'algorithm' 'model']
 ['bit' 'memory' 'cortical' 'network' 'bias']
 ['network' 'distance' 'representation' 'sound' 'space']
 ['mixture' 'model' 'network' 'likelihood' 'hidden']
 ['frequency' 'spatial' 'net' 'visual' 'attractor']
 ['map' 'data' 'gaussian' 'model' 'case']
 ['output' 'character' 'training' 'input' 'network']
 ['dynamic' 'input' 'visual' 'current' 'auditory']
 ['network' 'data' 'training' 'matrix' 'field']
 ['word' 'context' 'system' 'user' 'variables']
 ['log' 'distribution' 'parameter' 'density' 'face']
 ['network' 'input' 'parameter' 'data' 'capacity']
 ['network' 'function' 'unit' 'output' 'activation']
 ['sequence' 'network' 'operator' 'examples' 'distribution']
 ['cell' 'circuit' 'chip' 'policy' 'source']
 ['point' 'network' 'hidden' 'contour' 'model']
 ['image' 'object' 'images' 'view' 'model']
 ['training' 'learning' 'neural' 'function' 'input']
 ['data' 'step' 'set' 'posterior' 'algorithm']
 ['motion' 'direction' 'block' 'velocity' 'input']
 ['set' 'network' 'space' 'bayesian' 'problem']
 ['classifier' 'tree' 'class' 'rbf' 'training']
 ['layer' 'input' 'neuron' 'network' 'neural']
 ['set' 'kernel' 'method' 'weight' 'algorithm']
 ['filter' 'model' 'bound' 'error' 'analysis']]
Iter 50/10000 (29.95 s). Logjoint: -4635061.99
```

K=50, alpha=0.1, beta=500
[['magnetic' 'correlation' 'processing' 'evidence' 'projection']
 ['bat' 'trial' 'potential' 'event' 'firing']
 ['synaptic' 'david' 'channel' 'point' 'processing']
 ['chain' 'john' 'population' 'dynamic' 'neuron']
 ['wire' 'grammar' 'circuit' 'syllable' 'polynomial']
 ['clause' 'utility' 'packet' 'network' 'motor']
 ['control' 'stress' 'iiii' 'decision' 'prediction']
 ['dendritic' 'insect' 'neuron' 'science' 'flower']
 ['neuron' 'tree' 'motion' 'modular' 'noise']
 ['robot' 'function' 'stress' 'routing' 'sample']
 ['vowel' 'clause' 'dynamic' 'data' 'contour']
 ['routing' 'fig' 'penalty' 'bound' 'examples']
 ['sample' 'adaptation' 'insect' 'iiii' 'subject']
 ['mean' 'simulation' 'average' 'character' 'graph']
 ['legal' 'processing' 'speaker' 'sound' 'function']
 ['test' 'form' 'dynamic' 'hidden' 'group']
 ['interconnection' 'magnetic' 'source' 'information' 'action']
 ['neural' 'contrast' 'power' 'car' 'chain']
 ['robot' 'eeg' 'current' 'parameter' 'matrix']
 ['syllable' 'transformation' 'average' 'number' 'neural']
 ['forward' 'examples' 'element' 'cortical' 'approximation']
 ['wavelet' 'learning' 'rotation' 'cortex' 'field']
 ['song' 'vowel' 'speaker' 'object' 'clustering']
 ['michael' 'sequence' 'space' 'spatial' 'current']
 ['group' 'analysis' 'learning' 'number' 'system']
 ['erp' 'subscriber' 'trial' 'ica' 'eeg']
 ['cue' 'subject' 'disparity' 'action' 'chess']
 ['gaussian' 'risk' 'cell' 'sound' 'component']
 ['iiii' 'eeg' 'block' 'trial' 'movement']
 ['model' 'algorithm' 'data' 'learning' 'function']
 ['part' 'dfa' 'hand' 'system' 'fig']
 ['signature' 'gain' 'eye' 'regression' 'field']
 ['noise' 'threshold' 'potential' 'weight' 'form']
 ['terminal' 'model' 'signal' 'phase' 'prediction']
 ['string' 'model' 'examples' 'representation' 'solution']
 ['student' 'component' 'theory' 'unit' 'approximation']
 ['node' 'circuit' 'grammar' 'tree' 'center']
 ['sheet' 'field' 'number' 'layer' 'sensor']
 ['light' 'hand' 'motif' 'bound' 'contour']
 ['critic' 'codebook' 'actor' 'convergence' 'head']
 ['insect' 'neuron' 'synapses' 'component' 'center']
 ['sensor' 'fig' 'spike' 'theory' 'constraint']
 ['convolution' 'expert' 'algorithm' 'distribution' 'target']
 ['sound' 'pan' 'source' 'storage' 'frequency']
 ['stress' 'movement' 'region' 'cell' 'structure']
 ['wire' 'cortex' 'synapses' 'node' 'function']
 ['network' 'model' 'input' 'learning' 'function']
 ['option' 'images' 'population' 'stress' 'color']
 ['movement' 'trial' 'softassign' 'forward' 'iiii']
 ['iiii' 'iii' 'region' 'development' 'fig']]
Iter 52/10000 (32.93 s). Logjoint: -3596253.03

```
# K=3, alpha=0.1, beta=0.1
[['model' 'function' 'algorithm' 'learning' 'data']
 ['network' 'input' 'unit' 'neural' 'weight']
 ['model' 'neuron' 'cell' 'system' 'input']]
Iter 30/10000 (29.69 s). Logjoint: -3279242.31
```