# Multitask learning using ELMo word embedding with Simple embedding techniques (CPU relabeled)

ELMo embeddings with simple embedding techniques (max, ave, concat) into simple multitask learning model. All the parameter setting is the same with previous.

**Note:** CPU is relabeled to 0-9 by the following mapping table. In this way, we can conduct experiment on all 5 classes.

Description Label

Intel Celeron/ADM A (0, 2GHz) 0

Intel Celeron/ADM A ([2, 3)GHz 1

Intel Celeron/ADM A ([3, )GHz 2

Intel i3 (0, 2.4) GHz 3

Intel i3 [2.4, ) GHz 4

Intel i5 (0, 2] GHz 5

Intel i5 (2, 3) GHz 6

Intel i5 [3, ) GHz 7

Intel i7 (0, 2] GHz 6

Intel i7 (2, 3] GHz 7

Intel i7 [3, ) GHz 8

Others 9

|  |  |
| --- | --- |
|  | MLP |
| Pointwise average of word embedding  (ave) | cur\_sent\_embd\_type: ave  cur\_exp\_param: cpu  ncdg:  0.3333333333333333  0.5232774674115456  0.6019968221402007  0.6476206582668302  0.6805028535759724  precision:  0.3333333333333333  0.2616387337057728  0.21601489757914338  0.18482309124767227  0.16312849162011173  recall:  0.3333333333333333  0.5232774674115456  0.6480446927374302  0.7392923649906891  0.8156424581005587  cur\_exp\_param: gpu  ncdg:  0.590316573556797  0.8528864059590316  0.90105795139  0.9234043201050838  0.9306223629778224  precision:  0.590316573556797  0.4264432029795158  0.3097454996896338  0.24348230912476723  0.19813780260707636  recall:  0.590316573556797  0.8528864059590316  0.9292364990689013  0.9739292364990689  0.9906890130353817  cur\_exp\_param: ram  ncdg:  0.6536312849162011  0.8175046554934823  0.8844748527999508  0.9105456163008818  0.9193676687008957  precision:  0.6536312849162011  0.40875232774674114  0.3078833022967101  0.24394785847299813  0.19925512104283055  recall:  0.6536312849162011  0.8175046554934823  0.9236499068901304  0.9757914338919925  0.9962756052141527  cur\_exp\_param: hd  ncdg:  0.4655493482309125  0.7392923649906891  0.8015628993282821  0.839737945883217  0.852570022101419  precision:  0.4655493482309125  0.36964618249534453  0.27932960893854747  0.22858472998137802  0.1888268156424581  recall:  0.4655493482309125  0.7392923649906891  0.8379888268156425  0.9143389199255121  0.9441340782122905  cur\_exp\_param: screen  ncdg:  0.7355679702048417  0.8789571694599627  0.9259537991487126  0.9380580822027162  0.9444741203118172  precision:  0.7355679702048417  0.43947858472998136  0.31781502172563625  0.24441340782122906  0.1985102420856611  recall:  0.7355679702048417  0.8789571694599627  0.9534450651769087  0.9776536312849162  0.9925512104283054 |
| Pointwise maximum of word embedding  (max) | cur\_exp\_param: cpu  ncdg:  0.36685288640595903  0.547486033519553  0.6250304725059893  0.665067716453848  0.6819098164902377  precision:  0.36685288640595903  0.2737430167597765  0.22346368715083798  0.18761638733705774  0.1579143389199255  recall:  0.36685288640595903  0.547486033519553  0.6703910614525139  0.750465549348231  0.7895716945996276  cur\_exp\_param: gpu  ncdg:  0.6350093109869647  0.8566108007448789  0.9118318406291598  0.9285916171654726  0.9309976314563854  precision:  0.6350093109869647  0.42830540037243947  0.31471135940409684  0.24441340782122906  0.19664804469273742  recall:  0.6350093109869647  0.8566108007448789  0.9441340782122905  0.9776536312849162  0.9832402234636871  cur\_exp\_param: ram  ncdg:  0.6983240223463687  0.8230912476722533  0.8865366977520656  0.9135385599494584  0.9223606123494722  precision:  0.6983240223463687  0.41154562383612664  0.3078833022967101  0.24441340782122906  0.19962756052141528  recall:  0.6983240223463687  0.8230912476722533  0.9236499068901304  0.9776536312849162  0.9981378026070763  cur\_exp\_param: hd  ncdg:  0.41899441340782123  0.7616387337057728  0.8051106161678661  0.8376990705440299  0.8577491896349702  precision:  0.41899441340782123  0.3808193668528864  0.27684667908131594  0.2239292364990689  0.18845437616387337  recall:  0.41899441340782123  0.7616387337057728  0.8305400372439479  0.8957169459962756  0.9422718808193669  cur\_exp\_param: screen  ncdg:  0.74487895716946  0.88268156424581  0.9308531096767786  0.9457506888201679  0.9505627174019935  precision:  0.74487895716946  0.441340782122905  0.3196772191185599  0.24720670391061453  0.2  recall:  0.74487895716946  0.88268156424581  0.9590316573556797  0.9888268156424581  1.0 |
| The concatenation of the pointwise average and maximum of word embedding  (concat) | cur\_sent\_embd\_type: concat  cur\_exp\_param: cpu  ncdg:  0.33519553072625696  0.527001862197393  0.6010215539571727  0.6513008835661114  0.6721530074206893  precision:  0.33519553072625696  0.2635009310986965  0.21477343265052762  0.186219739292365  0.15865921787709497  recall:  0.33519553072625696  0.527001862197393  0.6443202979515829  0.74487895716946  0.7932960893854749  cur\_exp\_param: gpu  ncdg:  0.6089385474860335  0.8472998137802608  0.9072205166334165  0.9183937009909584  0.9272157533909722  precision:  0.6089385474860335  0.4236499068901304  0.31409062693978895  0.24115456238361266  0.19702048417132215  recall:  0.6089385474860335  0.8472998137802608  0.9422718808193669  0.9646182495344506  0.9851024208566108  cur\_exp\_param: ram  ncdg:  0.6964618249534451  0.8361266294227188  0.8972222480180935  0.9186375180367155  0.9250535561458163  precision:  0.6964618249534451  0.4180633147113594  0.31098696461824954  0.24394785847299813  0.19813780260707636  recall:  0.6964618249534451  0.8361266294227188  0.9329608938547486  0.9757914338919925  0.9906890130353817  cur\_exp\_param: hd  ncdg:  0.46368715083798884  0.7411545623836127  0.8034250967212057  0.833220255007984  0.8524683693352869  precision:  0.46368715083798884  0.37057728119180633  0.27995034140285535  0.22486033519553073  0.1888268156424581  recall:  0.46368715083798884  0.7411545623836127  0.839851024208566  0.8994413407821229  0.9441340782122905  cur\_exp\_param: screen  ncdg:  0.7355679702048417  0.888268156424581  0.9305651231444559  0.946393800984307  0.9520078343297703  precision:  0.7355679702048417  0.4441340782122905  0.31843575418994413  0.2467411545623836  0.2  recall:  0.7355679702048417  0.888268156424581  0.9553072625698324  0.9869646182495344  1.0 |