

Topics to cover (Reading list)

Reading list for the class (to appear in future reading assignments)

Improving the Q-matrix (skill to item mapping) from data:

Koedinger, K. R., McLaughlin, E. A., & Stamper, J. C. (2012). **Automated Student Model Improvement** (<http://files.eric.ed.gov/fulltext/ED537201.pdf>). *International Educational Data Mining Society*.

Lindsey, R. V., Khajah, M., & Mozer, M. C. (2014). **Automatic discovery of cognitive skills to improve the prediction of student learning** (<http://papers.nips.cc/paper/5554-automatic-discovery-of-cognitive-skills-to-improve-the-prediction-of-student-learning.pdf>). In *Advances in neural information processing systems* (pp. 1386-1394).

Desmarais, M. (2010). **Conditions for effectively deriving a q-matrix from data with non-negative matrix factorization** (http://educationaldatamining.org/EDM2011/wp-content/uploads/proc/edm2011_paper35_full_Desmarais.pdf). In *Educational Data Mining 2011*.

Representation learning:

linear:

Adrian Colyer (2016) The Amazing Power of Word Vectors (**blog** (<https://blog.acolyer.org/2016/04/21/the-amazing-power-of-word-vectors/>))

Mikolov, T., Sutskever, I., Chen, K., Corrado, G. S., & Dean, J. (2013). **Distributed representations of words and phrases and their compositionality** (<http://papers.nips.cc/paper/5021-distributed-representations-of-words-and-phrases-and-their-compositionality>). In *Advances in neural information processing systems* (pp. 3111-3119).

Mikolov, T., Yih, W. T., & Zweig, G. (2013, June). **Linguistic regularities in continuous space word representations** (<http://www.aclweb.org/anthology/N13-1#page=784>). In *hlt-Naacl* (Vol. 13, pp. 746-751). Chicago

Pardos, Z.A., Dadu, A. (2017) **Imputing KCs with Representations of Problem Content and Context** (<http://dl.acm.org/citation.cfm?id=3079689>) [**alt link (no paywall** (http://people.ischool.berkeley.edu/~zp/papers/UMAP_kc_prediction.pdf))]. In *Proceedings of the 25th Conference on User Modeling, Adaptation and Personalization (UMAP'17)*. Bratislava, Slovakia. ACM. Pp. 148-155.

Bolukbasi, T., Chang, K. W., Zou, J. Y., Saligrama, V., & Kalai, A. T. (2016). **Man is to computer programmer as woman is to homemaker? Debiasing word embeddings** (<http://papers.nips.cc/paper/6228-man-is-to-computer-programmer-as-woman-is-to-homemaker-debiasing-word-embeddings.pdf>). In *Advances in Neural Information Processing Systems*(pp. 4349-4357).

non-linear:

Piech, C., Bassen, J., Huang, J., Ganguli, S., Sahami, M., Guibas, L. J., & Sohl-Dickstein, J. (2015). **Deep knowledge tracing** (<http://papers.nips.cc/paper/5654-deep-knowledge-tracing.pdf>). In *Advances in Neural Information Processing Systems* (pp. 505-513).

Response: Khajah, M., Lindsey, R. V., & Mozer, M. C. (2016). **How deep is knowledge tracing?** (<https://arxiv.org/pdf/1604.02416.pdf>). *arXiv preprint arXiv:1604.02416*.

Pardos, Z.A., Tang, S., Davis, D., Le, C.V. (2017) **Enabling Real-Time Adaptivity in MOOCs with a Personalized Next-Step Recommendation Framework** (<http://dl.acm.org/citation.cfm?id=3051471>). In *Proceedings of the Fourth Conference on Learning @ Scale (L@S '17)*. ACM. Pages 23-32.

Wang, L., Sy, A., Liu, L., Piech, C. (2017) **Learning to Represent Student Knowledge on Programming Exercises Using Deep Learning** (http://educationaldatamining.org/EDM2017/proc_files/papers/paper_129.pdf). In *Proceedings of the 10th International Conference on Educational Data Mining*. Pp 324-329. Wuhan, China.

Ganin, Y., & Lempitsky, V. (2015). **Unsupervised domain adaptation by backpropagation** (http://sites.skoltech.ru/sites/compvision_wiki/static_pages/projects/grl/). In *International Conference on Machine Learning* (pp. 1180-1189).

Maaten, L. V. D., & Hinton, G. (2008). **Visualizing data using t-SNE** (<http://www.jmlr.org/papers/volume9/vandermaaten08a/vandermaaten08a.pdf>). *Journal of Machine Learning Research*, 9(Nov), 2579-2605.

Hinton, G. E., & Salakhutdinov, R. R. (2006). **Reducing the dimensionality of data with neural networks** (<https://pdfs.semanticscholar.org/7d76/b71b700846901ac4ac119403aa737a285e36.pdf>). *science*, 313(5786), 504-507.