Motivation

Low-Dimensional Feature Learning with Kernel Construction

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WWW data: millions of features / many tasks
- learning tasks unknown beforehand
- impossible to keep all data on disk
- necessity of a learning-oriented summary

Semi Supervised Feature Learning Challenge
- **task:** learn a dimension reduction $10^6 \rightarrow 100$
- given mostly unlabeled instances
- **evaluation:** linear classifier ranking performance
- more details on poster of D. Sculley
**Low-Dimensional Feature Learning with Kernel Construction**

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1 – Use Rankboost to make data separable

- RankBoost optimizes AUC with a combination of weak rankers \( h_t \)

- Weak learners as new features: \( \Phi(x) = (\alpha_1 h_1(x), \ldots, \alpha_T h_T(x)) \)

- Provides an explicit kernel \( K(x_1, x_2) = \langle \Phi(x_1); \Phi(x_2) \rangle \)

2 – Use obtained kernel for low dim. embedding [Balcan et al. 2004]

- Sample pivots from dataset \( p_1, \ldots, p_d \)

- Summary of \( x \) is \( [K(x, p_1), \ldots, K(x, p_d)] \)

- Also tested with other similarity functions