Learning with Curricula

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Some Questions

- What does it mean to learn with curricula?
- Does a curriculum matter?
- What learning algorithm should we use?
- How can we generate a good curriculum?

Curriculum Learning

Motivated by lifelong learning.

- Would a lifelong learner benefit from structuring or sequencing of tasks?
- If so, can we preselect sequences to maximize benefit?

Have taken to calling such structured sequences of tasks *"a curriculum"*.

Curriculum Learning

Definitions

f_i	:	Task i, a mapping from $X \rightarrow Y_i$.
X	:	Domain (the input space).
Y_i	:	Range of task i (the output space).
$\hat{f}_i$	:	Learned approximation to f_i
$P(\hat{f}_i)$	:	Performance metric on $\hat{f}_i$.
$\mathbb{C}$	:	A particular curriculum.
$\hat{f}_i^{\mathbb{C}}$	:	Learned approximation to f_i using $\mathbb{C}$.

- A *curriculum* $\mathbb{C}$ for some set of single-domain tasks $F = \{f_1 \ldots f_n\}$ is a pair $\langle S, R \rangle$.
- S is a sequence of training examples drawn from X, along with training values for one or more of the functions from F.
- R is a set of relations defined over the functions in F.