Video to Skill Tagging using Transcripts under Weak Supervision

Zhe Cui, University of Maryland, College Park  
zcui@umd.edu

Shivani Rao, LinkedIn, Inc.  
sirao@linkedin.com

Challenges

- No true labels for videos.
- The number of skills tagged by Subject Matter Experts (SMEs) is sparse (2-3 per course).
- Existing course level skill labels only cover 2% of the total skills.
- Text features in transcripts are sparse.

Label Augmentation #1

- Course based expansion.
- Based on course similarities. In embedding space each course pair is measured by a similarity metric (kNN kernel).

Visual rep. of courses (PCA and t-SNE)

The skill label is propagated from course (blue) to other courses (red).

Label Augmentation #2

- Skill based expansion.
- Leverage skill graph to increase the labeled training data.

Skill Graph

Clusters: Data Engineering, Poetry, and Commercial Design.

Transfer Learning

Data preprocessing

Courses / Videos

Feature Extraction

Course

Training

Video Scoring

Validation

Scoring

- Preserve confident predictions.

Results – offline metrics

Course to Skill Prediction Precision@K and Recall@K

Results – online A/B testing

- Online A/B testing on LinkedIn Jobs page.
- Job Seekers see courses relevant to jobs based on skills.

- Double jobs to course coverage.
- 4.6% increase in learner engagement

Application: LinkedIn Learning

Task

- Tag videos with skills for LinkedIn Learning for purpose of recommending videos to learners.

Course based expansion.

Based on course similarities. In embedding space each course pair is measured by a similarity metric (kNN kernel).

Candidate Pool Generation

- Skill based expansion.
- Leverage skill graph to increase the labeled training data.

Evaluation

- Evaluate both course to skill and video to skill mappings.
- Over 5k courses and over 100k videos.

Results – online A/B testing

- Double jobs to course coverage.
- 4.6% increase in learner engagement