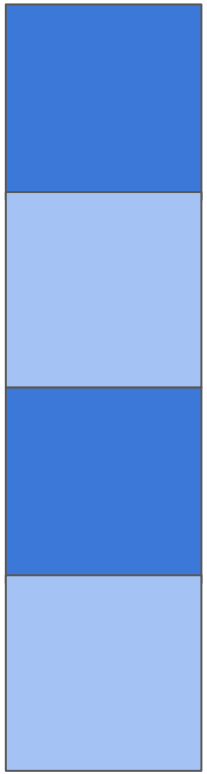
THOUGHT INDUSTRIES

Keep-Me-Engaged

Customized Recommendations to Improve e-Learner Engagement

Lindsay Warrenburg



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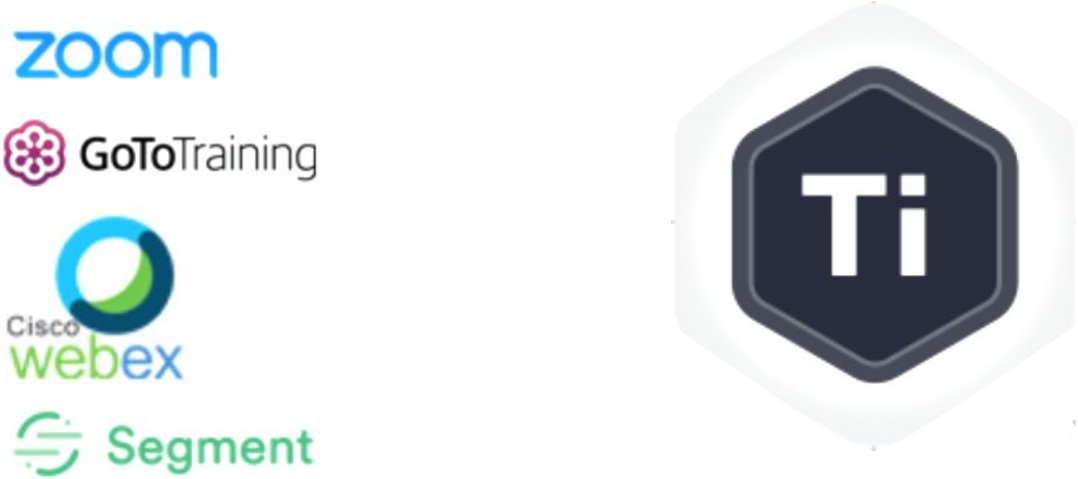
New Tool for Premium Subscribers:

Customized Recommendations



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New Tool for Premium Subscribers:

Customized Recommendations

7,000+
Companies

200,000+
Courses

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Access and Download Data

9.9B data points

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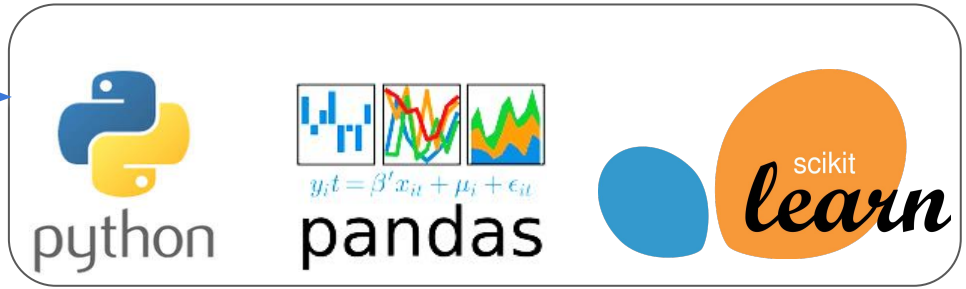

Access and Download Data

9.9B data points

Feature Engineering
Random Forest Regression

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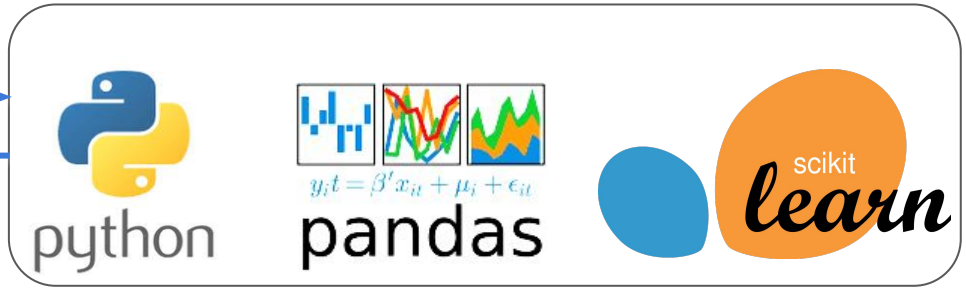
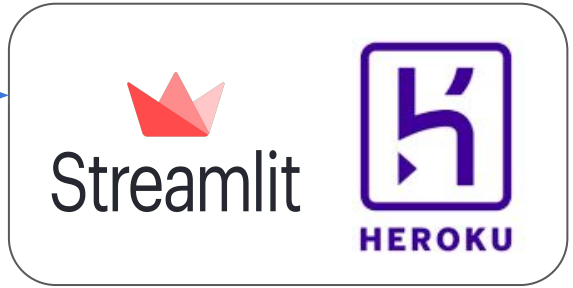
Access and Download Data
9.9B data points



Feature Engineering
Random Forest Regression



Web App Creation

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Learner Engagement

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Learner Engagement

Admin. Features:

Price of Course

Length of Course

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Learner Engagement

Admin. Features:

Price of Course
Length of Course

Learner Features:

Time Spent on Course
Average Quiz Grade

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Learner Engagement

Admin. Features:

Price of Course
Length of Course

Instructor Features:

% of Non-Graded Quizzes
Number of Collaborations

Learner Features:

Time Spent on Course
Average Quiz Grade

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Learner Engagement

Admin. Features:

Price of Course
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Instructor Features:

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Average Quiz Grade

Website Features:

% Interactive Content
% Videos

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Learner Engagement

Admin. Features:

Price of Course
Length of Course

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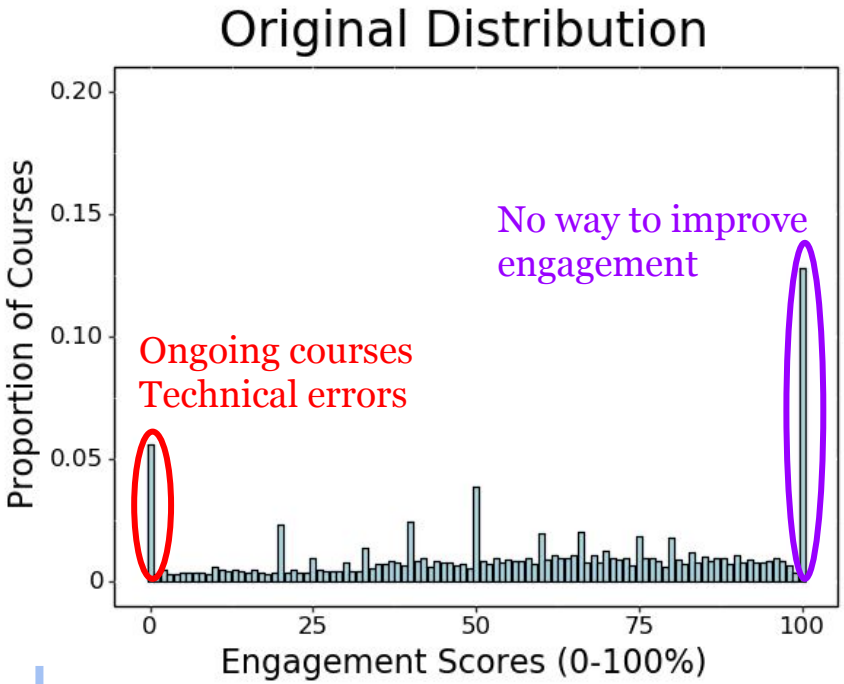
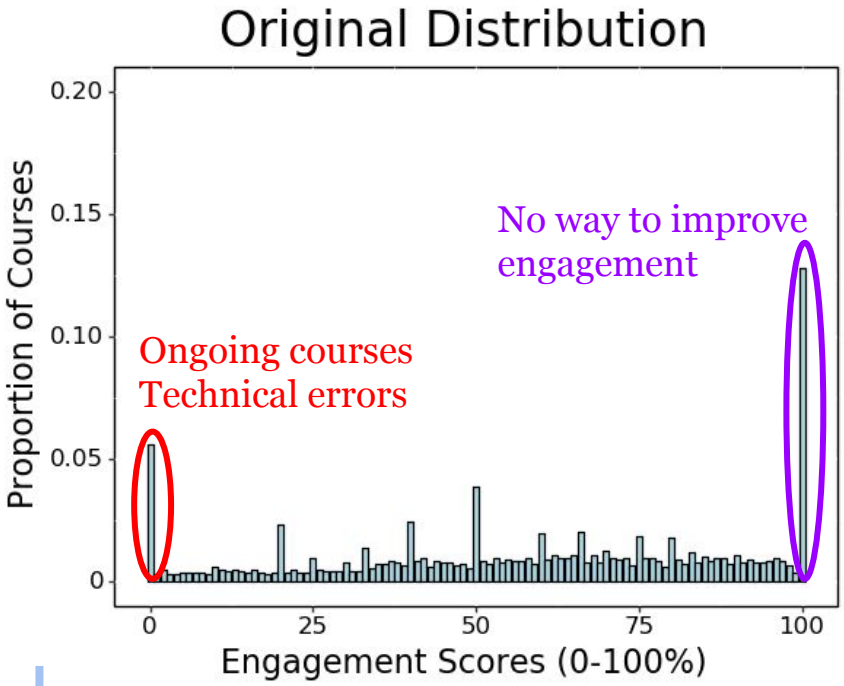
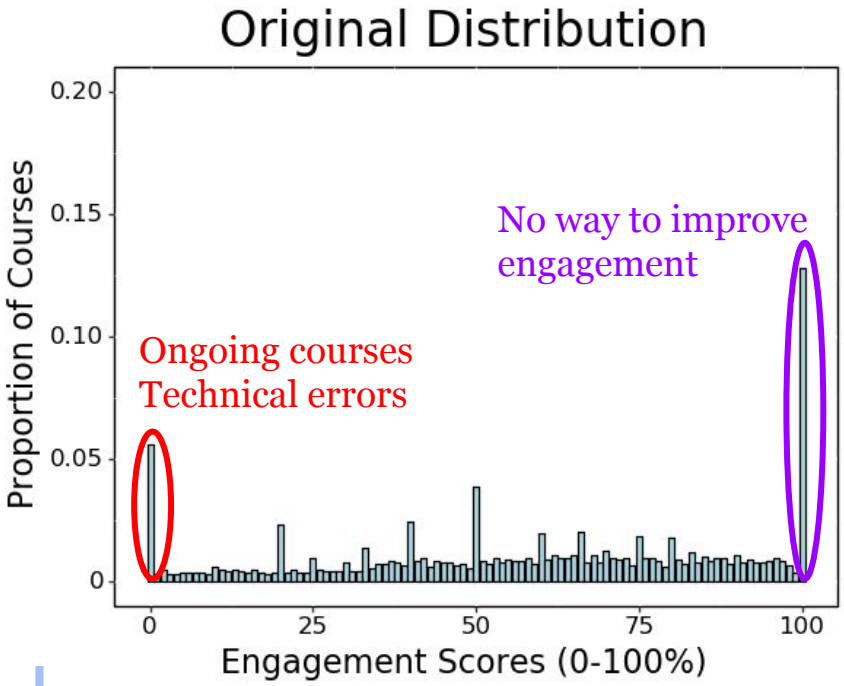
The distribution of Engagement Scores is highly irregular





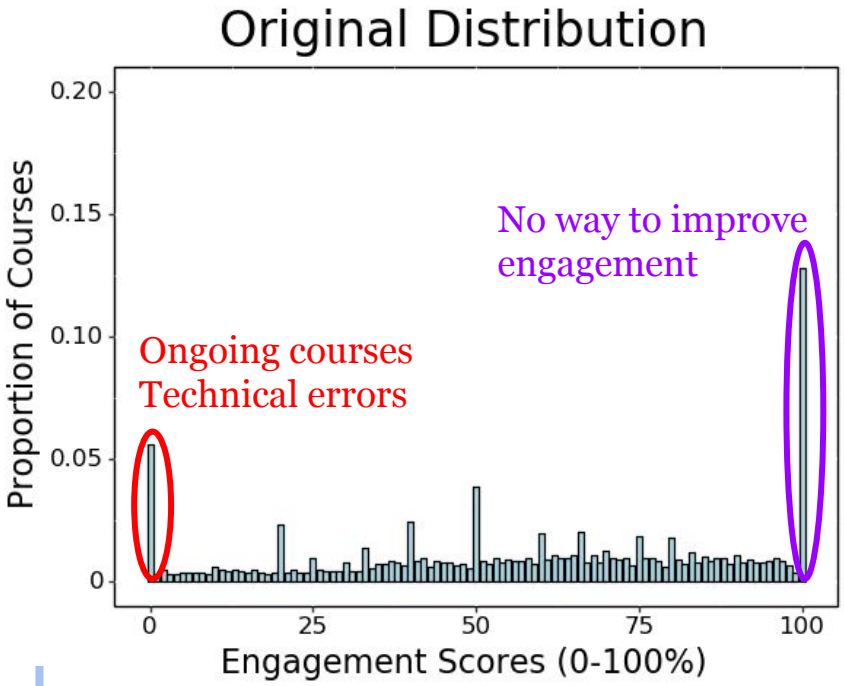
Scope of Keep-Me-Engaged

- Help course developers with Engagement Scores of 1-99% understand current engagement scores



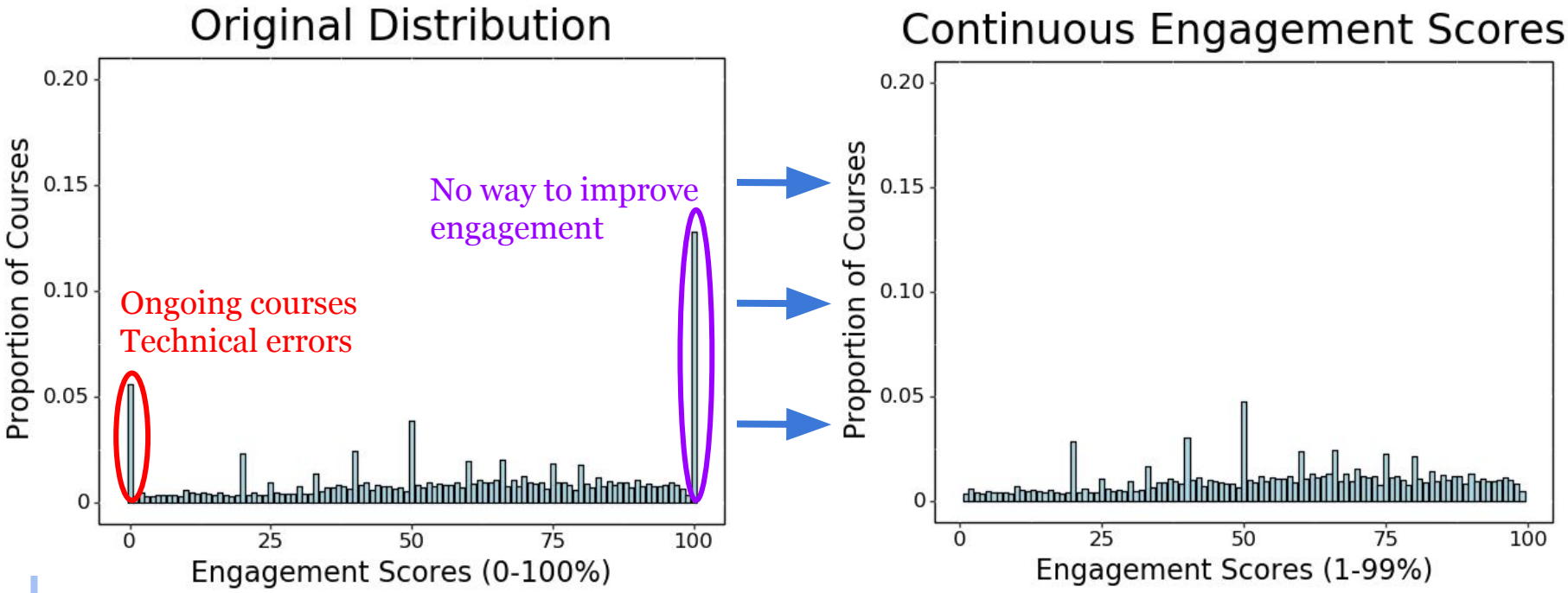
Scope of Keep-Me-Engaged

- Help course developers with Engagement Scores of 1-99% understand current engagement scores
- Learn how to improve engagement scores for future iterations of the course (e.g., next semester)

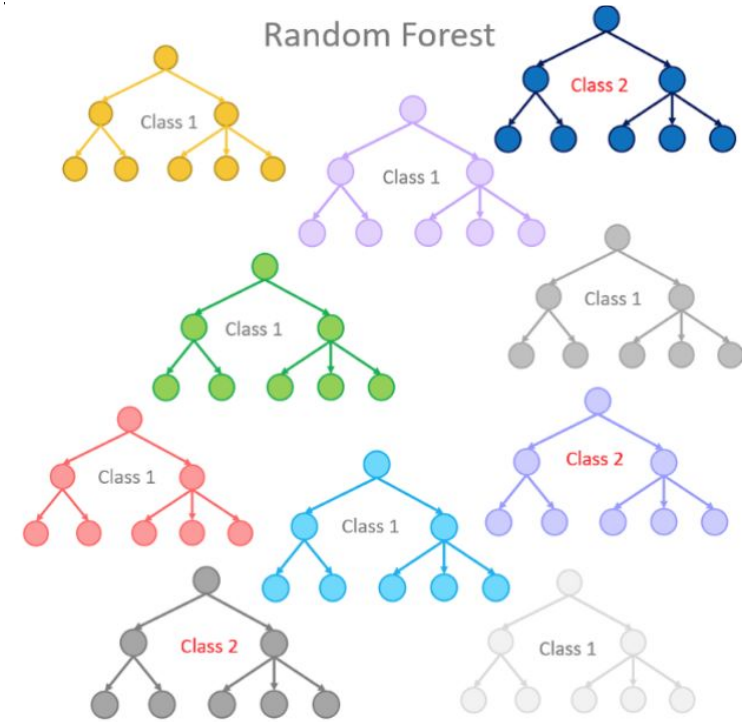


Scope of Keep-Me-Engaged

- Help course developers with Engagement Scores of 1-99% understand current engagement scores
- Learn how to improve engagement scores for future iterations of the course (e.g., next semester)
- *Not aimed at predicting engagement scores of a brand new course*


Original Distribution
Proportion of Courses
0.20
0.15
0.10
0.05
0
No way to improve engagement
Ongoing courses
Technical errors
0
25
50
75
100
Engagement Scores (0-100%)
Continuous Engagement Scores
Proportion of Courses
0.20
0.15
0.10
0.05
0
0
25
50
75
100
Engagement Scores (1-99%)

Predicting User Engagement Scores

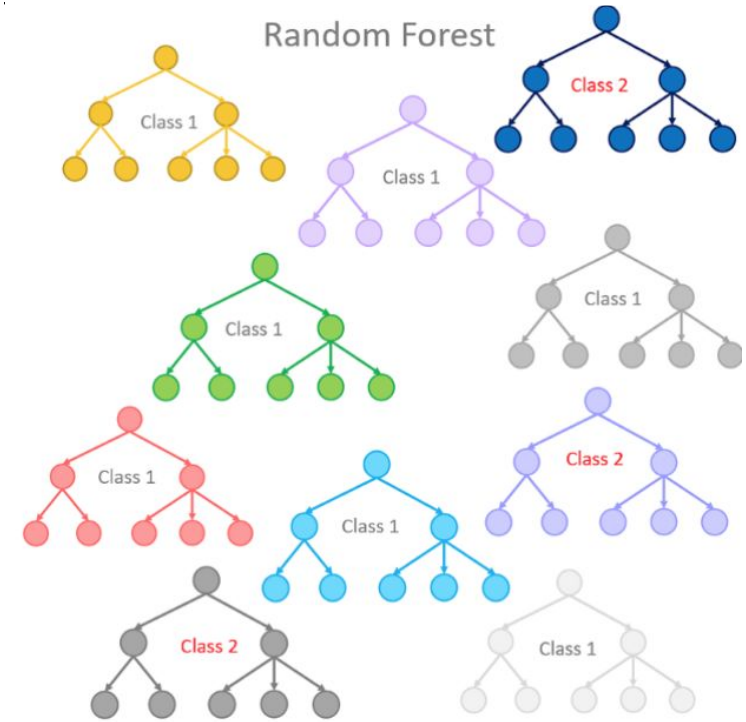


Random Forest Regression

$R^2 = 0.62$

Train:Test split = 80:20

Predicting User Engagement Scores



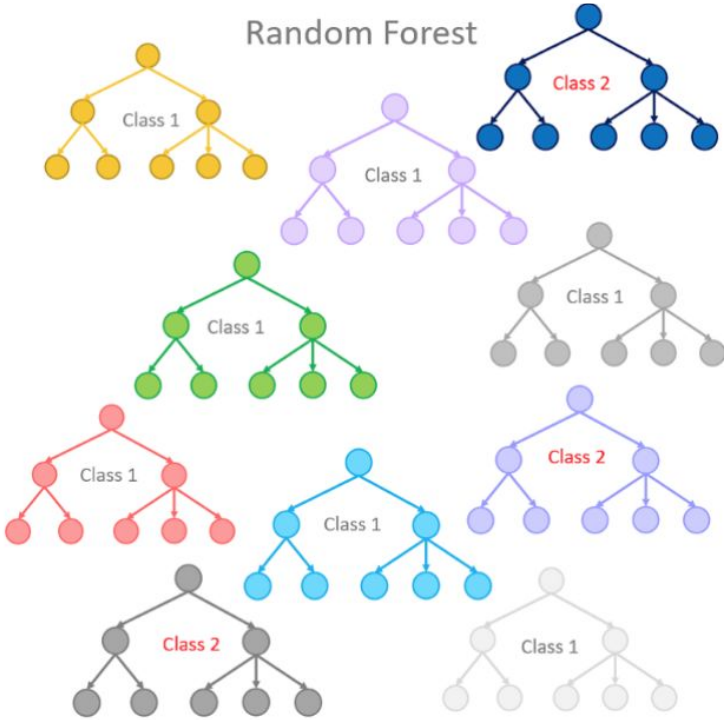
Random Forest Regression

$R^2 = 0.62$

Linear Regression (log)

$R^2 = 0.16$

Predicting User Engagement Scores



Random Forest Regression

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Linear Regression (log)

$R^2 = 0.16$

Ridge Regression (log)

$R^2 = 0.16$

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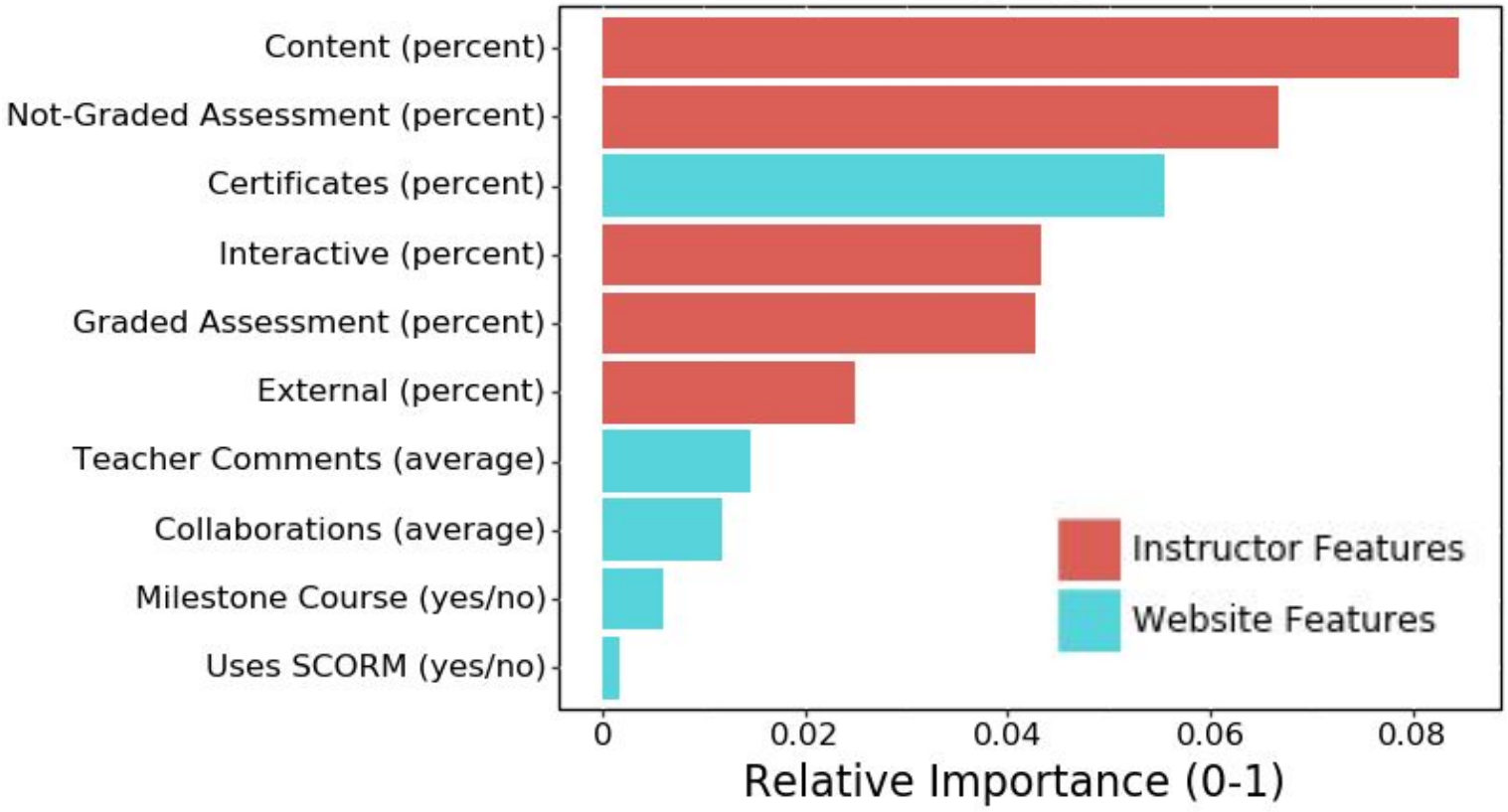
Feature Importance for User Engagement



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Interactive *Keep-Me-Engaged* Tool

https://keep-me-engaged.herokuapp.com/

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Thought Industries will use this feature as part of their Premium Package

Customized recommendations for

30,000+ courses

600+ companies

INSIGHT

Lindsay Warrenburg

PATH
GROW BOLDLY

Market Research • Data Visualization • B2B Data

Penn
University of Pennsylvania

Ohio State

Music • Cognition & Perception • Emotion

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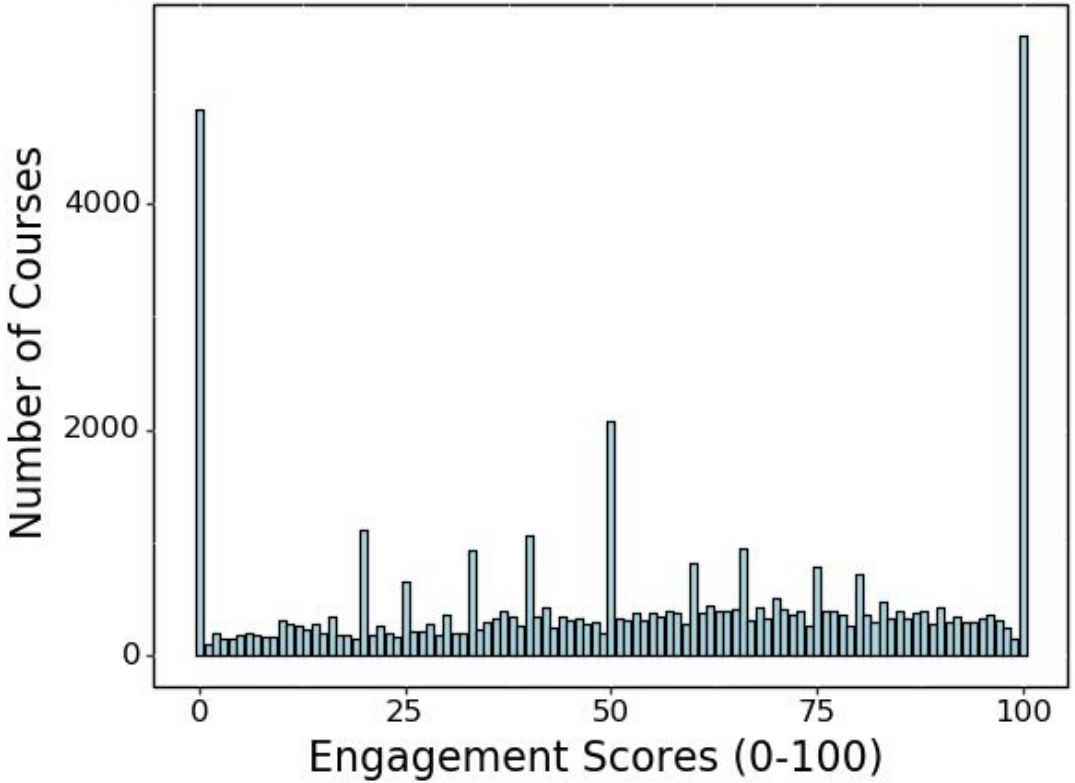
Engagement Across All Course Types



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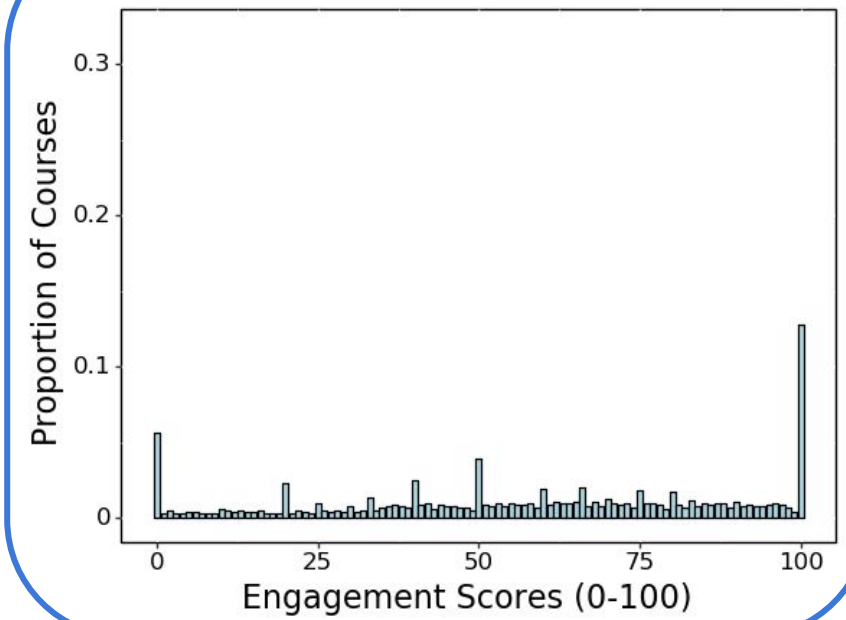
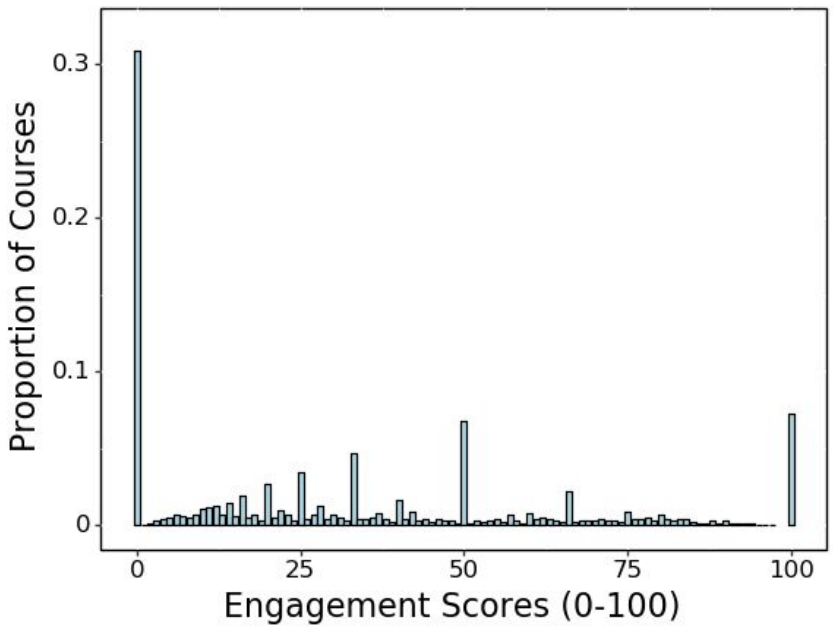
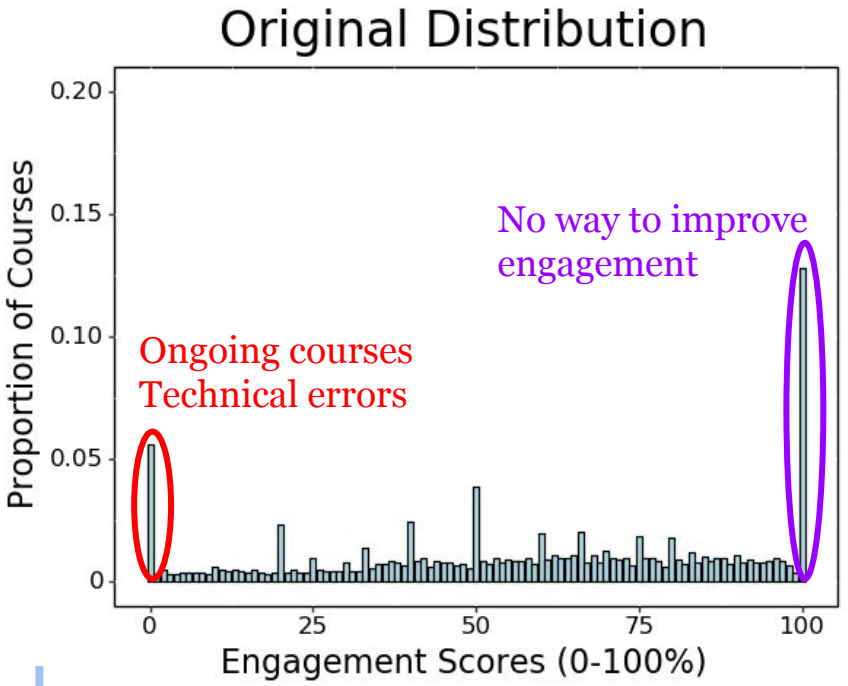
Online Courses



Articles & Videos

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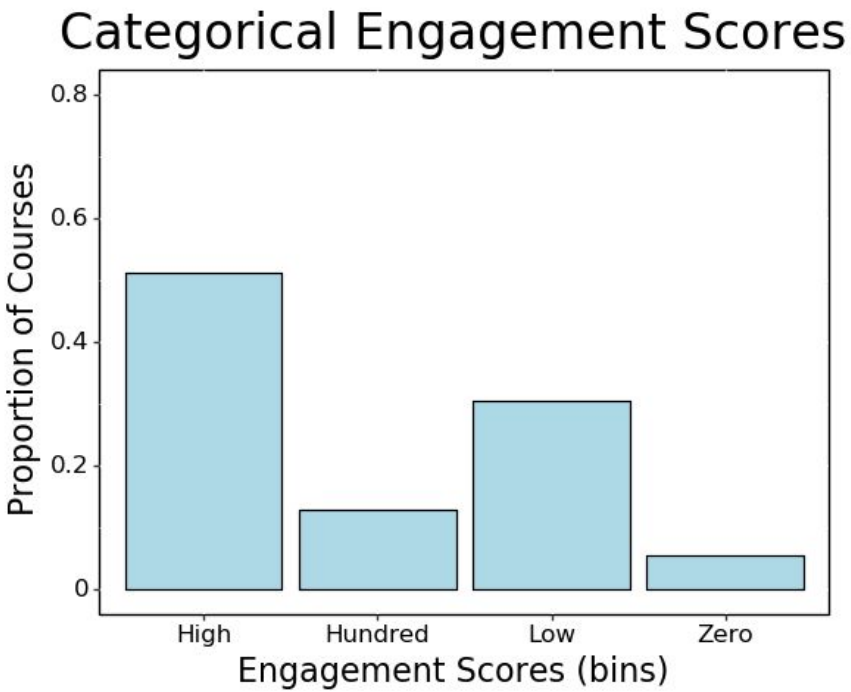
Categorical Engagement Scores
Proportion of Courses
0.8
0.6
0.4
0.2
0
High
Hundred
Low
Zero
Engagement Scores (bins)

Missing Values

- **Delete some courses with missing values**
  - ➢ *Example*: Courses that are missing our target (Engagement Scores)

- **Replace missing values with 0**
  - ➢ *Example*: No value for Number of Collaborations = no collaborations

- **Combine multiple features into one summary feature when only half the courses use SCORM at all**
  - ➢ *Example*: Average SCORM score, % SCORMs completed, % API SCORM, % Shareable SCORM ⇒ “Uses SCORM yes/no”

- **Fill in missing values with the median value**
  - ➢ *Example*: Average quiz grade

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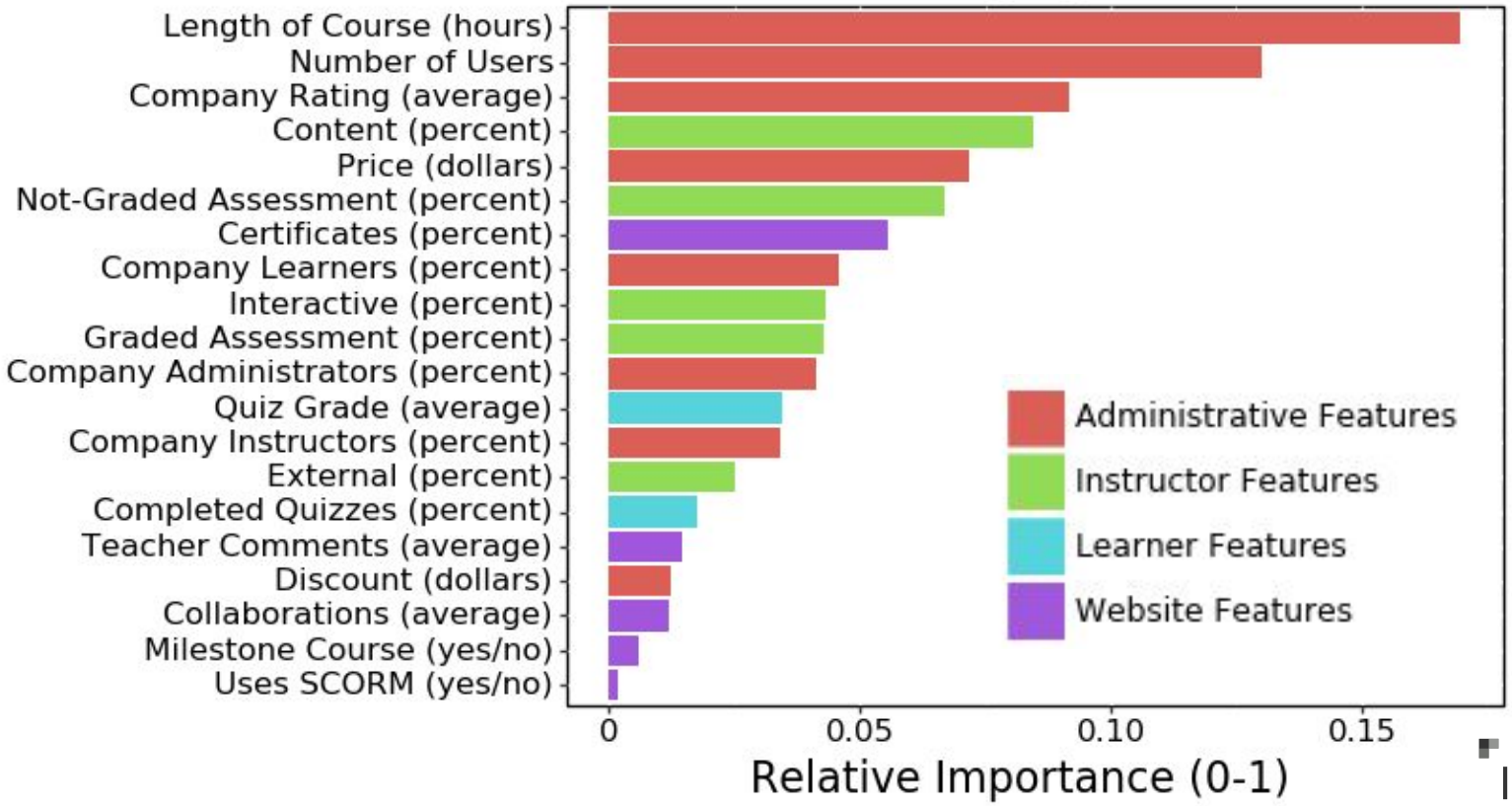
Feature Importance for User Engagement



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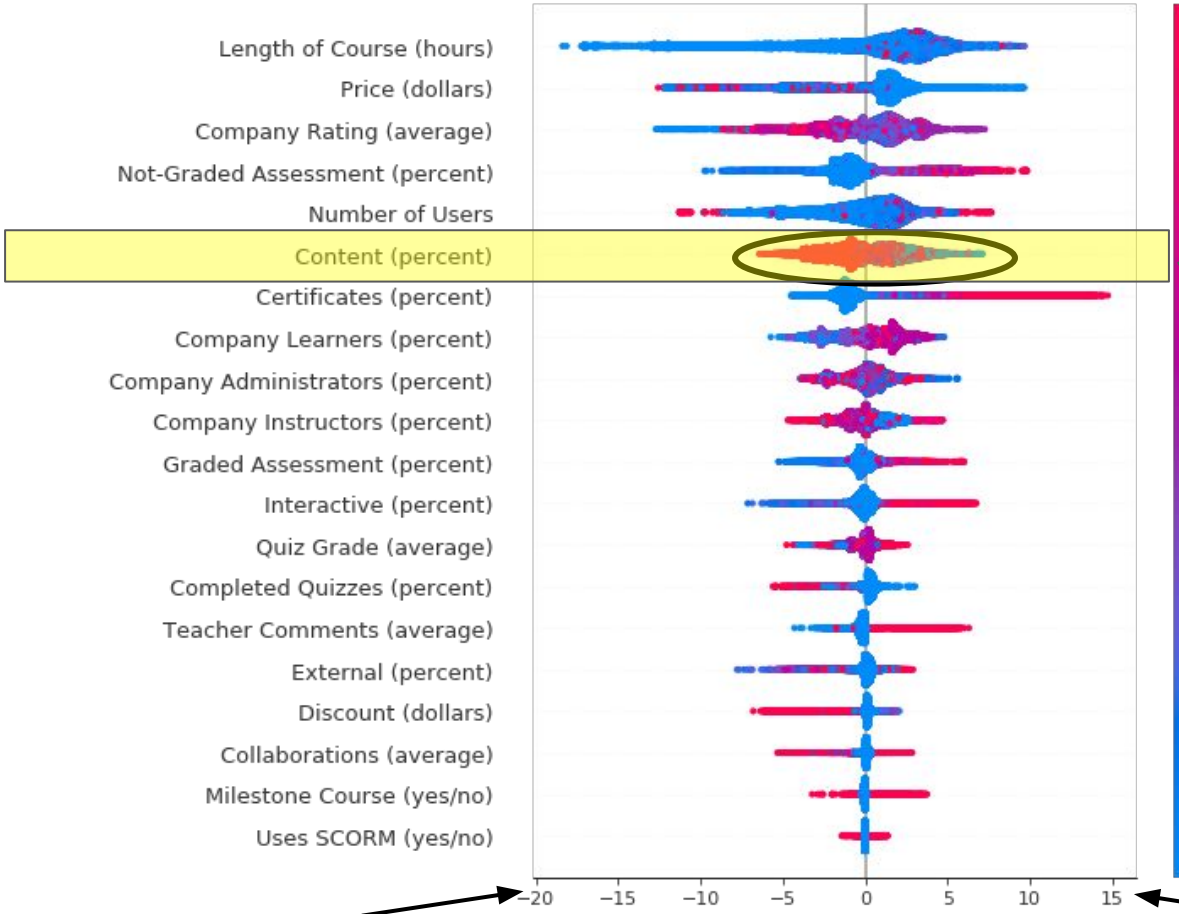

High Engagement Scores

Decreasing content results in *higher* engagement scores

Low Engagement Scores

***Low* Variable Value (shap score)**

***High* Variable Value (shap score)**