

Towards Instructor-based Predictive Learning Analytics with LAGradebook

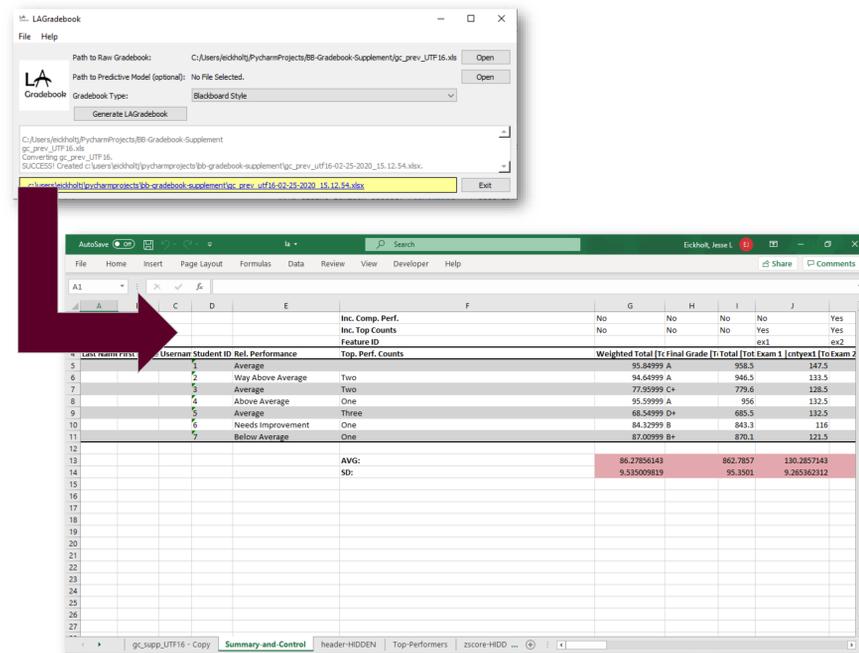
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ABSTRACT: This practitioner poster presents a means to perform instructor-/course-level predictive learning analytics. Predictive learning analytics aims to predict student outcomes and enables instructors to target their interventions to those most in need. The cost and institutional support required by many existing systems for predictive learning analytics may place their adoption outside the reach of many instructors or institutions. To combat this limitation, we have developed an extension to LAGradebook. This extension allows instructors will little modeling knowledge to create and apply predictive models to their courses without the cost or requirement of large, institutional systems.

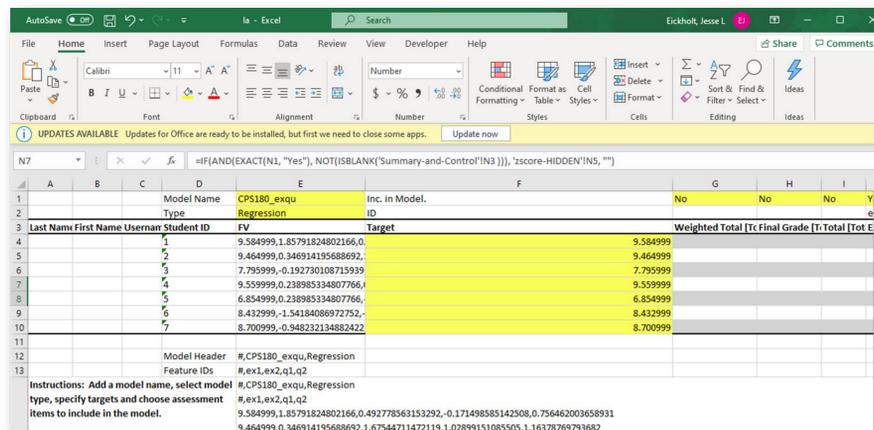
What is LAGradebook?

LAGradebook is a standalone application that ingests raw, student assessment data in the form of a tab separated file (e.g., a gradebook dump from a learning management system) and creates a rich Excel spreadsheet. The spreadsheet supports a number of interactive, comparative analytics (e.g., relative overall performance or by assessment item, top performance counts). **This tool can be adopted by an individual instructor at the course level.**



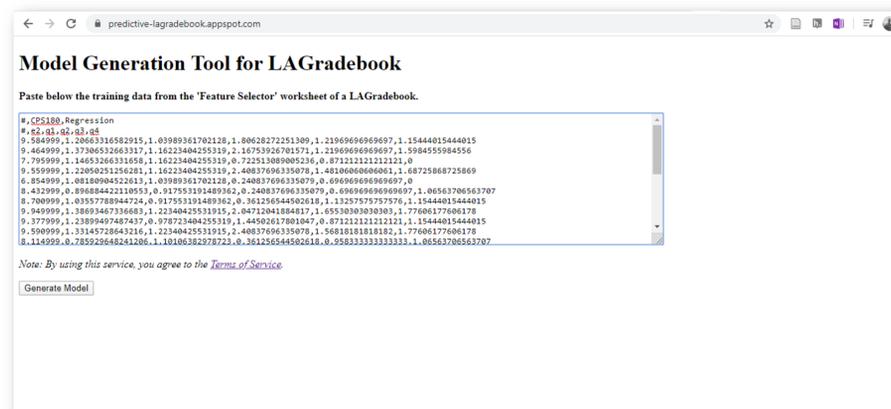
Feature Selection and Generation

Through a worksheet in the LAGradebook, assessment items can be selected and identified as features. Embedded logic in the worksheet populates a cell with the packaged target and feature data. This data can then be copied and provided to a simple web service for model creation.



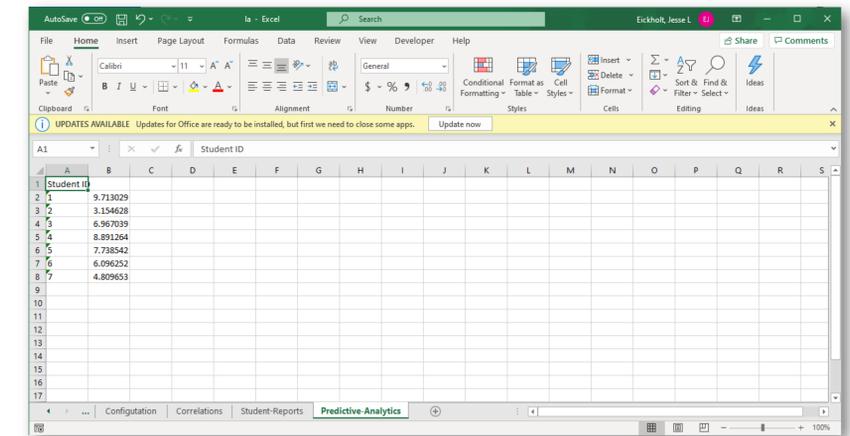
Model Generation

A very simple model (i.e., two fully connected hidden layers, each with five nodes and one output layer with a real valued output) is generated using SciKit-Learn. The architecture of the model and training procedure is fixed. This means that no machine learning experience is needed to use this extension to LAGradebook. The drawback is that the model size, architecture and number of features should be selected are small. To characterize the performance of the model, subsamples of the training data are used to build several models and performance is evaluated on held out data.



Application of a Model

The course specific model can be provided along with a raw gradebook when a LAGradebook is generated. An additional worksheet is created with the prediction for each student.



Overall Workflow

1. At the end of a course offering, use the correlation worksheet of LAGradebook to identify early to mid-term assessment items that highly correlate with the final grade (or other target assessment item).
2. Provide a feature id for each of the identified early to mid-term assessment items.
3. Select the assessment items as features and provide a target on the feature generation worksheet.
4. Use the webservice to create a model.
5. Administer the same or similar assessment items in a subsequent offering of the course.
6. Map assessment items to feature ids and regenerate the LAGradebook, providing model as additional input.

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This work was supported in part by a sabbatical fellowship from the College of Science and Engineering at Central Michigan University.