

Course Level Analysis Result

Course: **PSY_X**

Prediction on Term: 202209

- **Part 1: Course-Level Analysis & Performance in Training Set**
- **Part 2: Analysis Results (Youden Index Tunned Cut-Off)**
- **Part 3: Model Interpretability - Key Predictors for Course GPA**
- **Part 4: Intervention (Require Instructor Feedback)**
 - Expected Date of returning the intervention Result & Feedback in 1 Month

Part 1: Course-Level Analysis & Performance in Training Set

This project aims to use academic records provided by the CIO (Chief Information Office) and the assessment grades before week 7 provided by the course lecturer(s) to develop predictive models of students' academic performance in each target Course at the University. (About LASSO Regression Model: [1.1. Linear Models — scikit-learn 1.1.2 documentation](#))

Objective: To develop a predictive model for the early identification of students at academic risk (Course GPA <2.33) within the Course.

Model Performance on Training Dataset:

- Robust R^2 value of 0.72, MSE (mean square error) = 0.19
- For Classification: No missed detections, successfully identifying all 9 at-risk students in the training set (See Figure 1 Below).

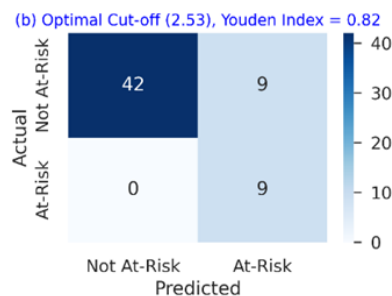


Fig 1. Confusion matrix for model performance in training set

Part 2: Analysis Results (with the Youden Index Tunned Cut-Off)

Course code	PSY_X
Prediction Target	Course Grade
Total No. of Students	30
Youden Index Tunned Cut-Off	2.53
Predicted No. of At-Risk Students	8

Statistics of Numerical Features					
	TGPA.Prev	CGPA.Prev	Scholarship.Prev	Mdl_ts	Midterm Quiz
Mean	2.87	3.09	0.10	3.21	60.83
Min	0.68	1.23	0.00	0.00	13.00
Max	2.88	3.55	2.00	9.00	97.00
Std	0.78	0.44	0.32	3.01	9.67

Ratios of Categorical Features			
Gender = Male	Local =1	SenYrEntr = 1	Hostel.Curr = 1
37%	81%	51%	46%

At-Risk Students (Prediction Grades) – In Another Excel file: [course_code]_202209_pred_result.xlsx

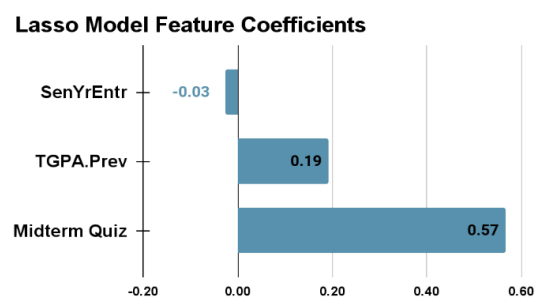
Part 3: Model Interpretability - Key Predictors for Course GPA

Fig 2. Key Predictors for Course GPA

The larger the coefficient (the more extended the bar), the more impact this indicator will play in course grade prediction.

- **Midterm Quiz:** With a positive coefficient of 0.57, it is the most important predictor of the course GPA. A one-point increase in the midterm quiz score corresponds to an average GPA increase of 0.57 points.
- **TGPA.Prev:** It is the second most influential predictor with a positive coefficient of 0.19. A one-point increase in the previous term's GPA results in a 0.19-point increase in the course GPA.
- **SenYrEntr:** With a negative coefficient of -0.03, senior-year entry students (SenYrEntr = 1) have, on average, a course GPA that is 0.03 points lower than first-year entry students (SenYrEntr = 0).

Part 4: Interventions

This section deals with interventions implemented after the model identified at-risk students. Please provide us with information about interventions that help improve the academic performance of at-risk students. For reference, our timeline for the intervention procedure that we have planned out is provided below. Figure 3.0 is the timeline for intervention

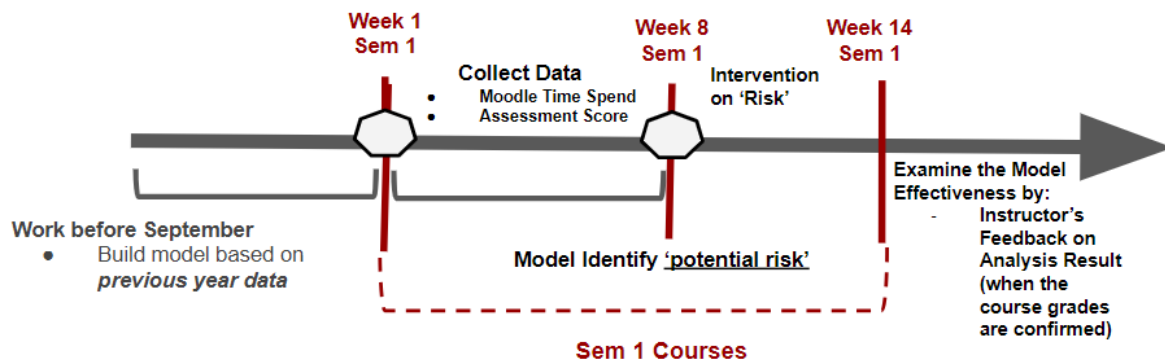


Fig 3.0: Intervention Timeline

4a. Which intervention strategies did you implement to provide targeted areas of academic support to students?

- ☐ Provide academic advising to individual students identified as potentially at-risk.
- ☐ Provide extra learning materials to at-risk students.
- ☐ Arrange for peer tutors or a TA for this course.
- ☐ Organize supplementary classes for this course.
- ☐ Other: _____

4b. Do you think the intervention can help the at-risk student?

4c. Do students score higher than the predicted scores after intervention?

Appendix: Feedback on Analysis Results

Please indicate your level of agreement with the following analysis results for this the analysis:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Result					
The list of At-Risk students (in Excel)	1	2	3	4	5
Main predictors for the course grade (in part 3)	1	2	3	4	5

Any comment on our result in 'The list of At-Risk students'?

Any comment on our result in Main predictors for the course grade?