BYU SAAS Early Alert Project

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Systematically Identifying Students in Need

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Project Vision

Use current grades and other academic information to confidently predict which freshmen will fail their classes as early in the semester as possible.

Key Components:

- Access to admission, LearningSuite, and Canvas data
- Up-to-date predictions
- Confident predictions (low FP rate)
- Improvement as semester continues

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Use and Applications

- Easily actionable, non-technical output
  - Color scale of severity
- Applicable to other student subpopulations
  - Transfer students
  - Athletes
  - Students with prior academic probation
  - Students in a particular department

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Data Content

- LearningSuite and Canvas
  - Assignments
    - Points possible
    - Included in final grade?
    - Submission times
    - Grading times
  - Courses
    - Total enrolled
    - Instructor ID
    - Section GPA
    - Section time
- Admission Information
  - High School GPA
  - ACT/SAT score
  - AP test scores
- Other
  - Academic Standing
  - Registration information
  - On-campus housing (flag)
  - Campus job (flag)

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Data Organization

Split by:

- Time dependence
- Hierarchies
  - Assignment
  - Student
  - Section
  - Course

- Currently 9 SQL tables:
  - StudentScore (57,487,215x13, 9.11GB)
  - StudentSubmission (5,705,315x7, 511MB)
  - StudentCourses (1,932,201x21, 303MB)
  - Assignments (1,108,327x16, 160MB)
  - StudentTerms (355,148x30, 74.3MB)
  - Students (97,050x33, 19.7MB)
  - StudentAP (97,049x47, 14.8MB)
  - Sections (124,725x15, 13.1 MB)
  - LMS_Courses (63,867x9, 4.46MB)

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Data Cleanup

Illustrative difficulties:

- Recomputing current grades
- Unstandardized use of LearningSuite and Canvas
- Missing data
  - Admission data, Section data, etc.
- Duplications between tables
- Multiple scorings per assignment

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Preliminary Results

- XGBoost
- Per-class prediction
- Failure defined as less than 2.5 class grade (on GPA scale)
  - aka C+ or lower
- 4 levels of risk
  - Red: 0.9 - 1.0
  - Orange: 0.75 - 0.9
  - Yellow: 0.5 - 0.75
  - Green: 0.0 - 0.5

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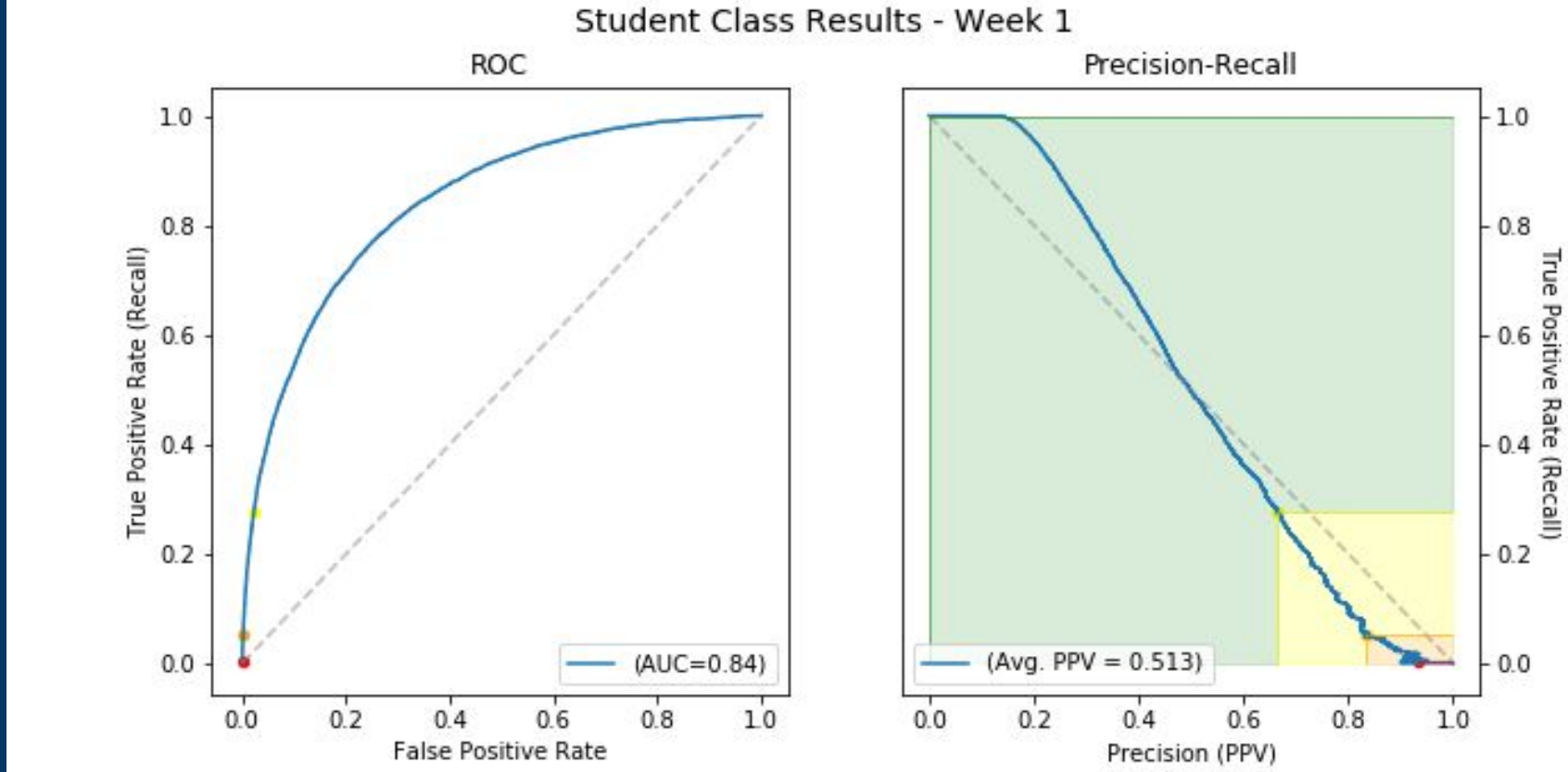
Preliminary ROC and Precision-Recall



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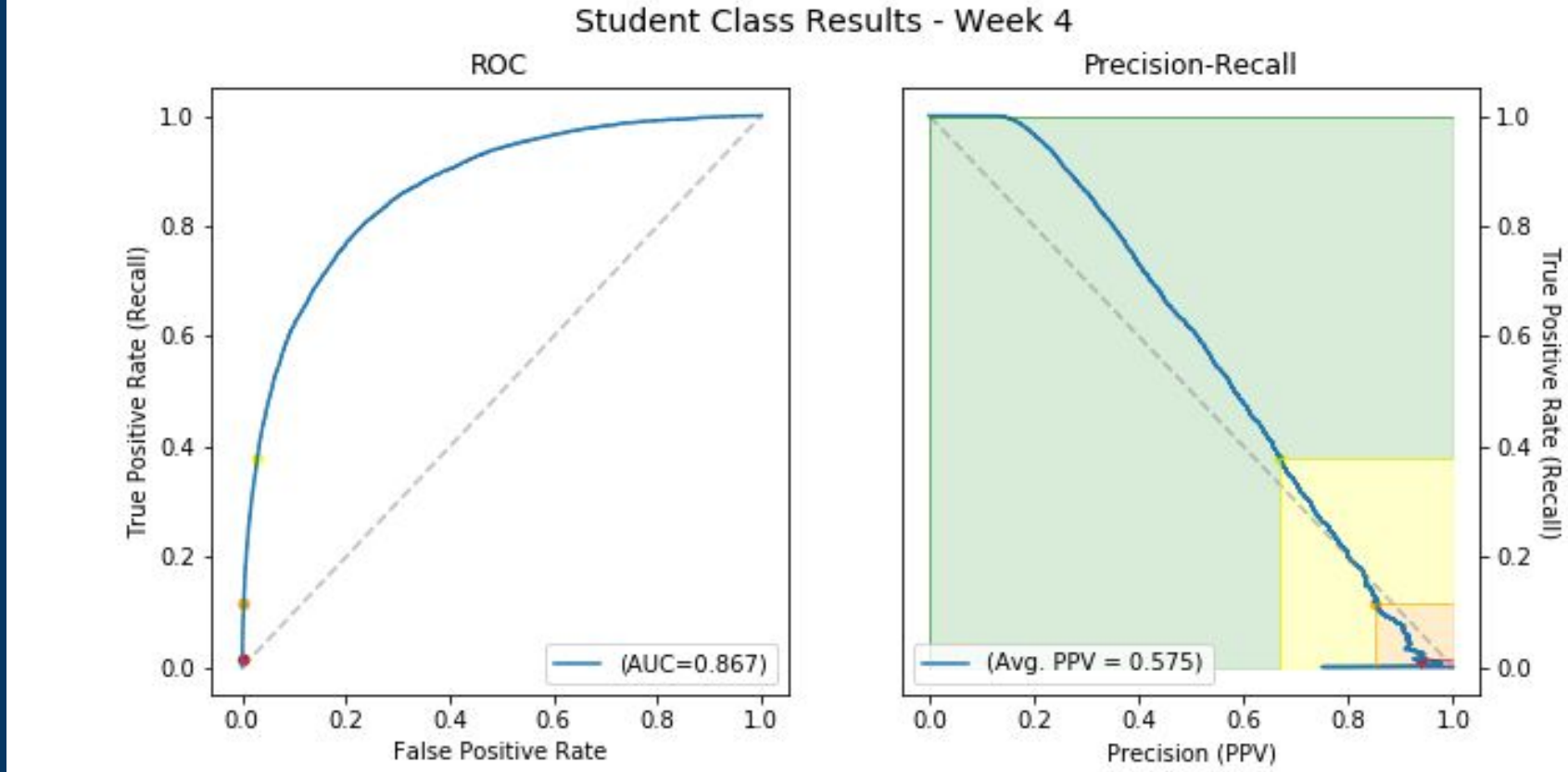

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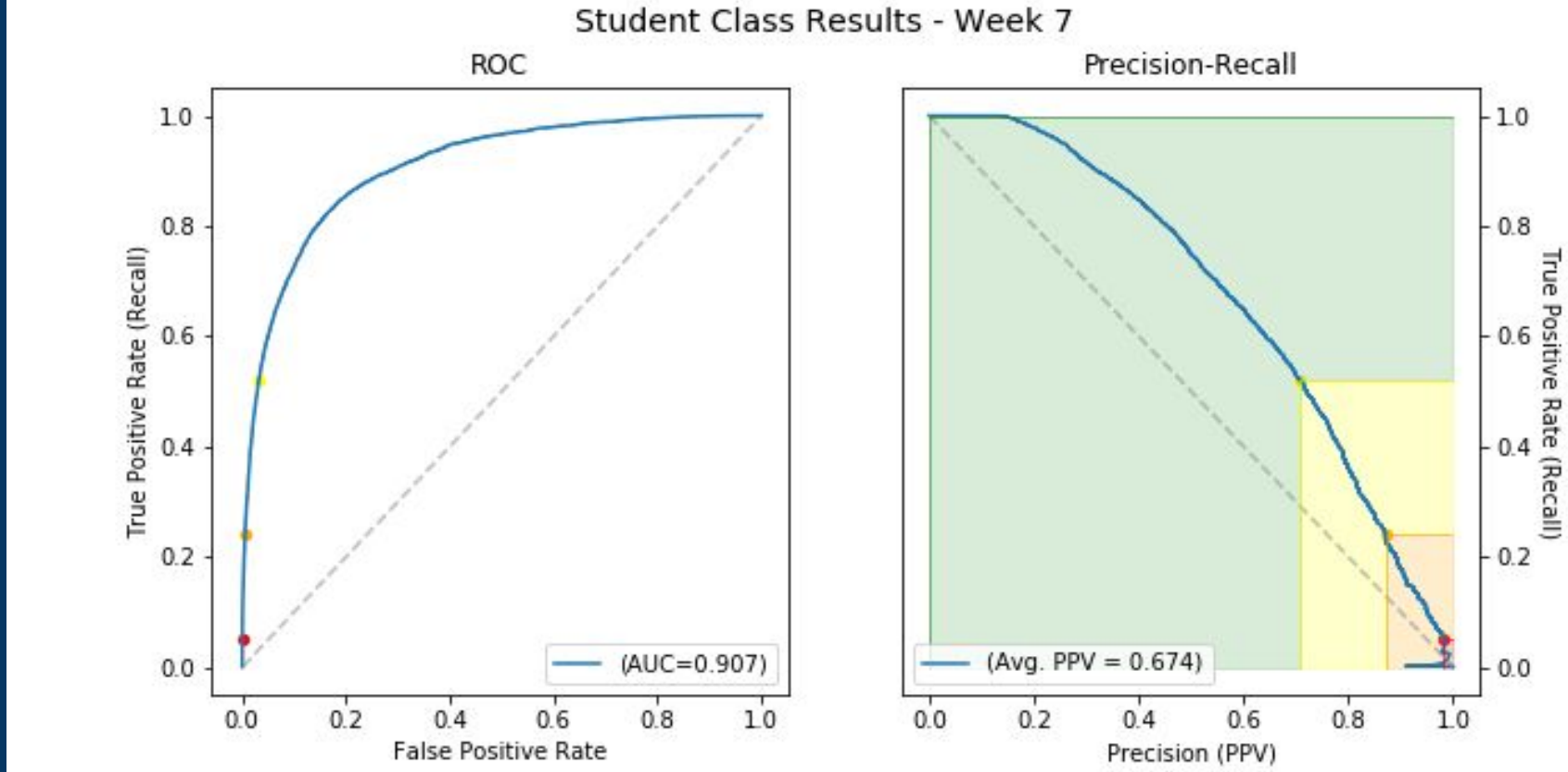

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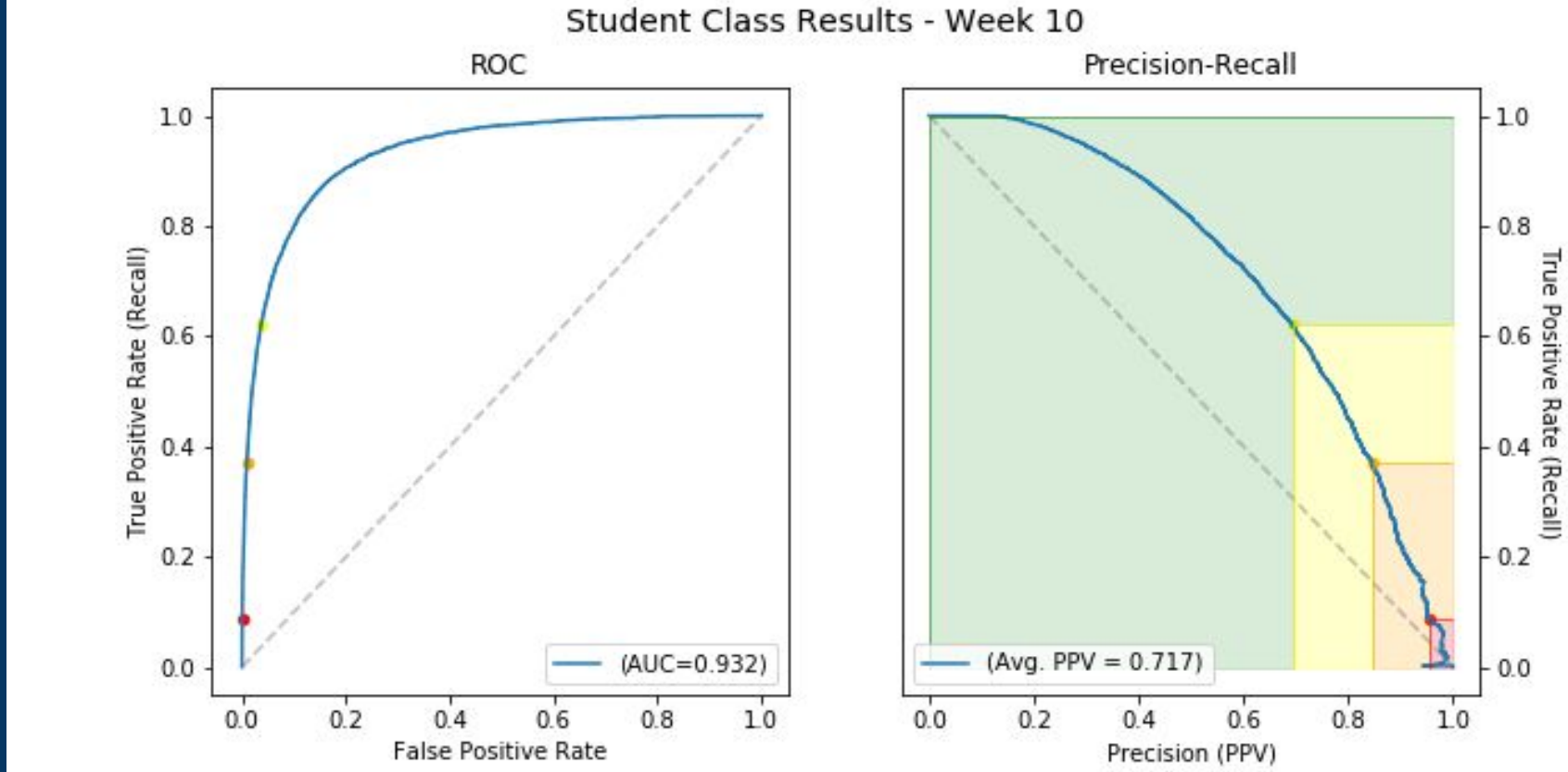

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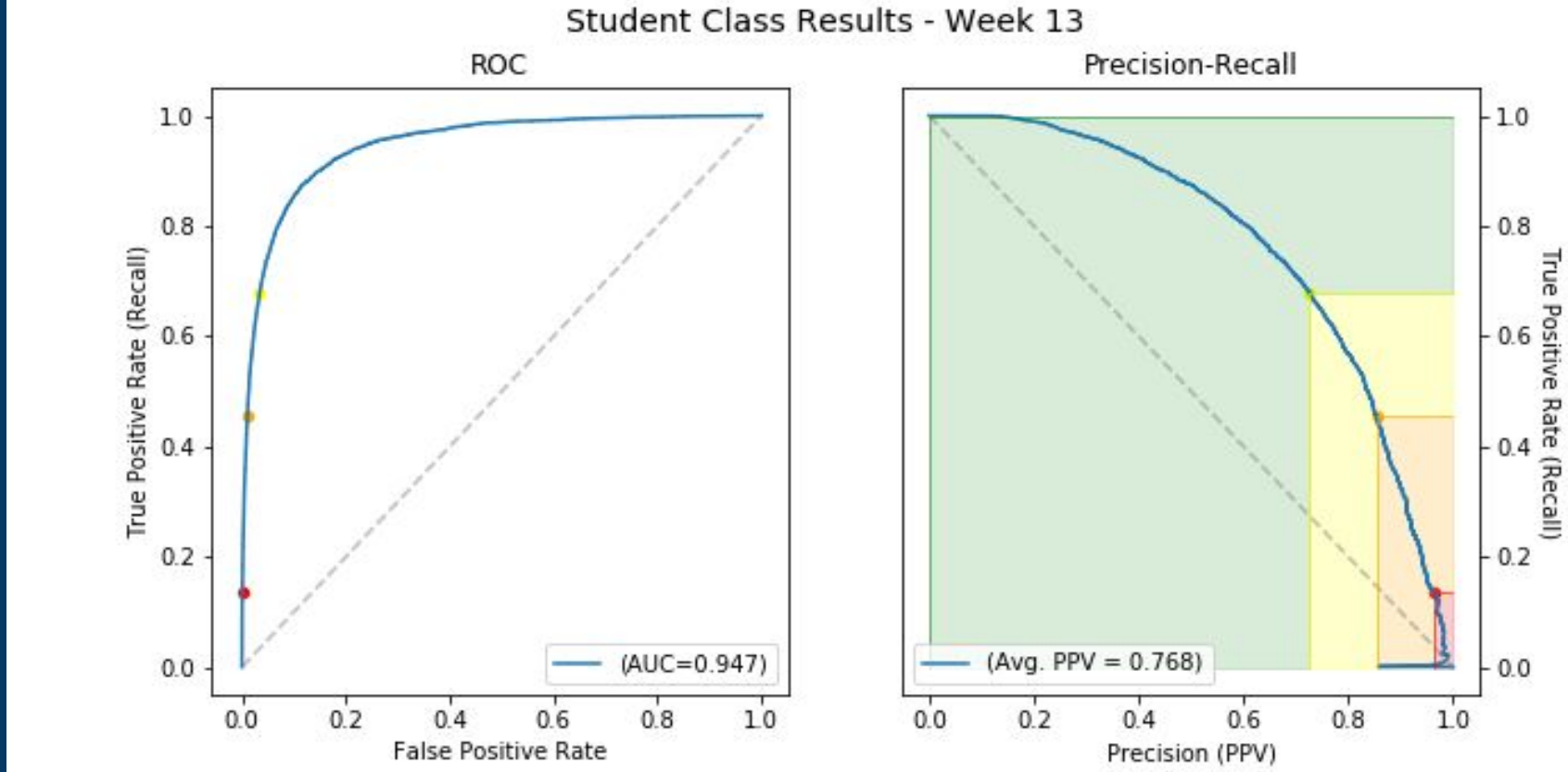

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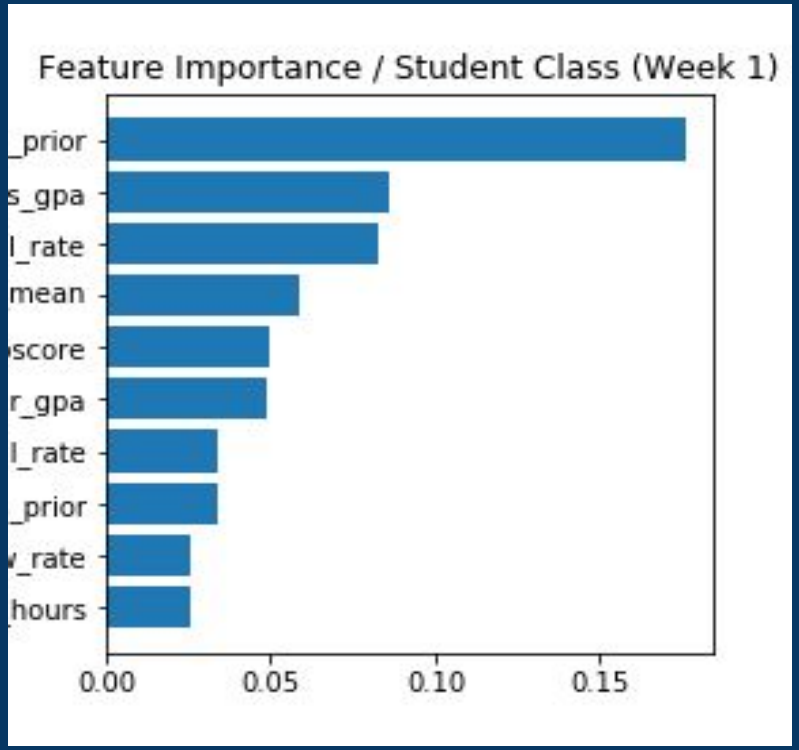

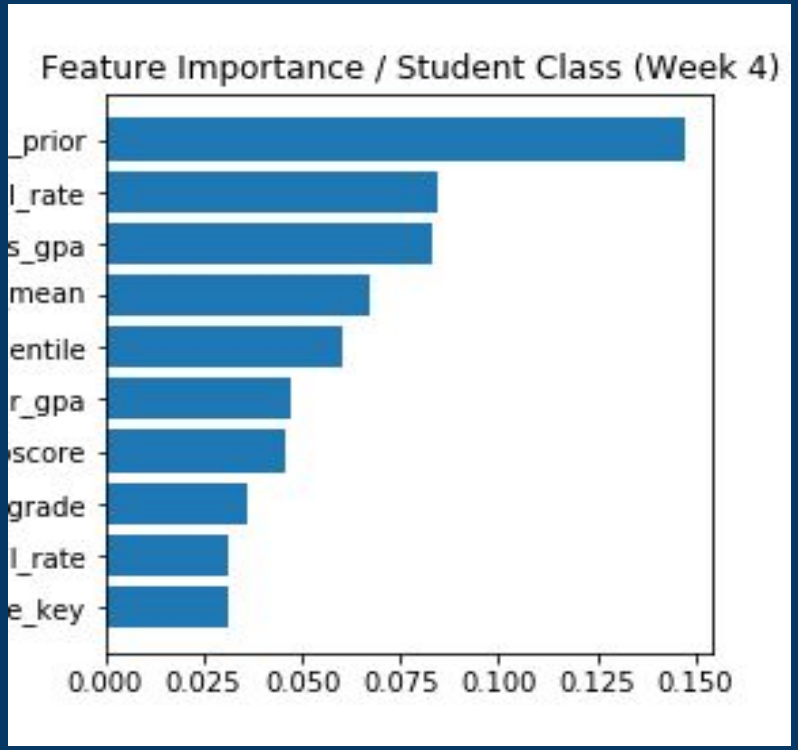

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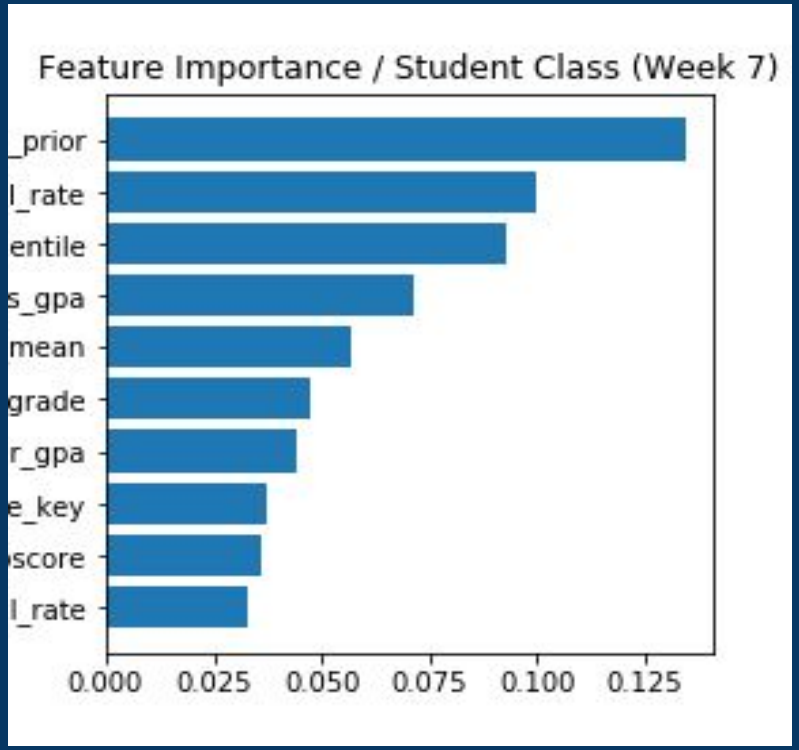

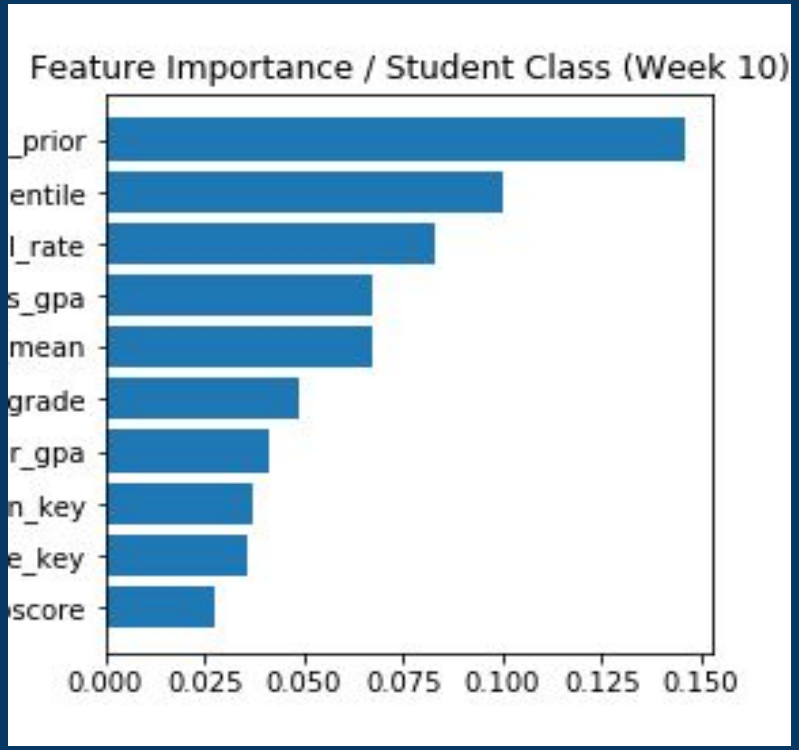

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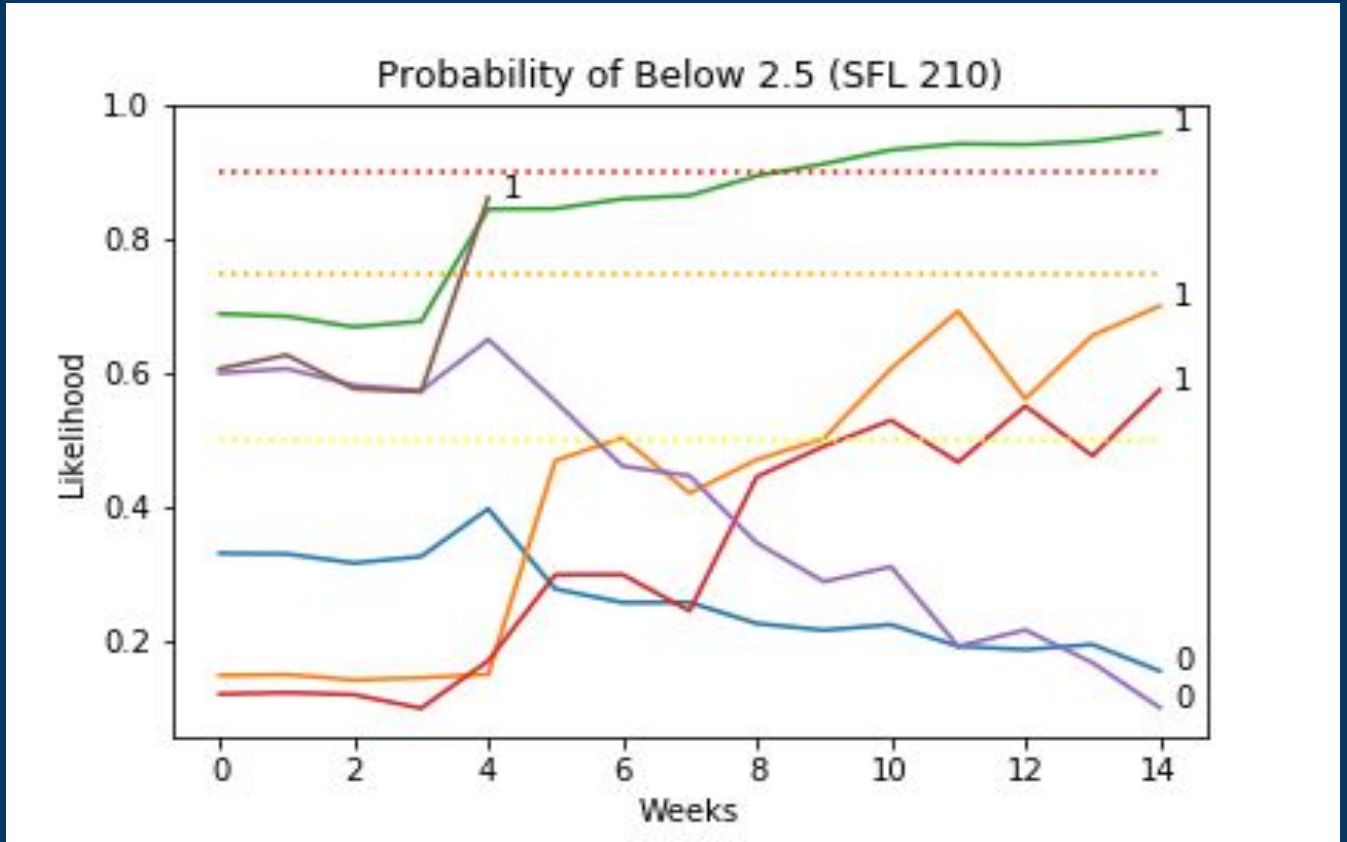

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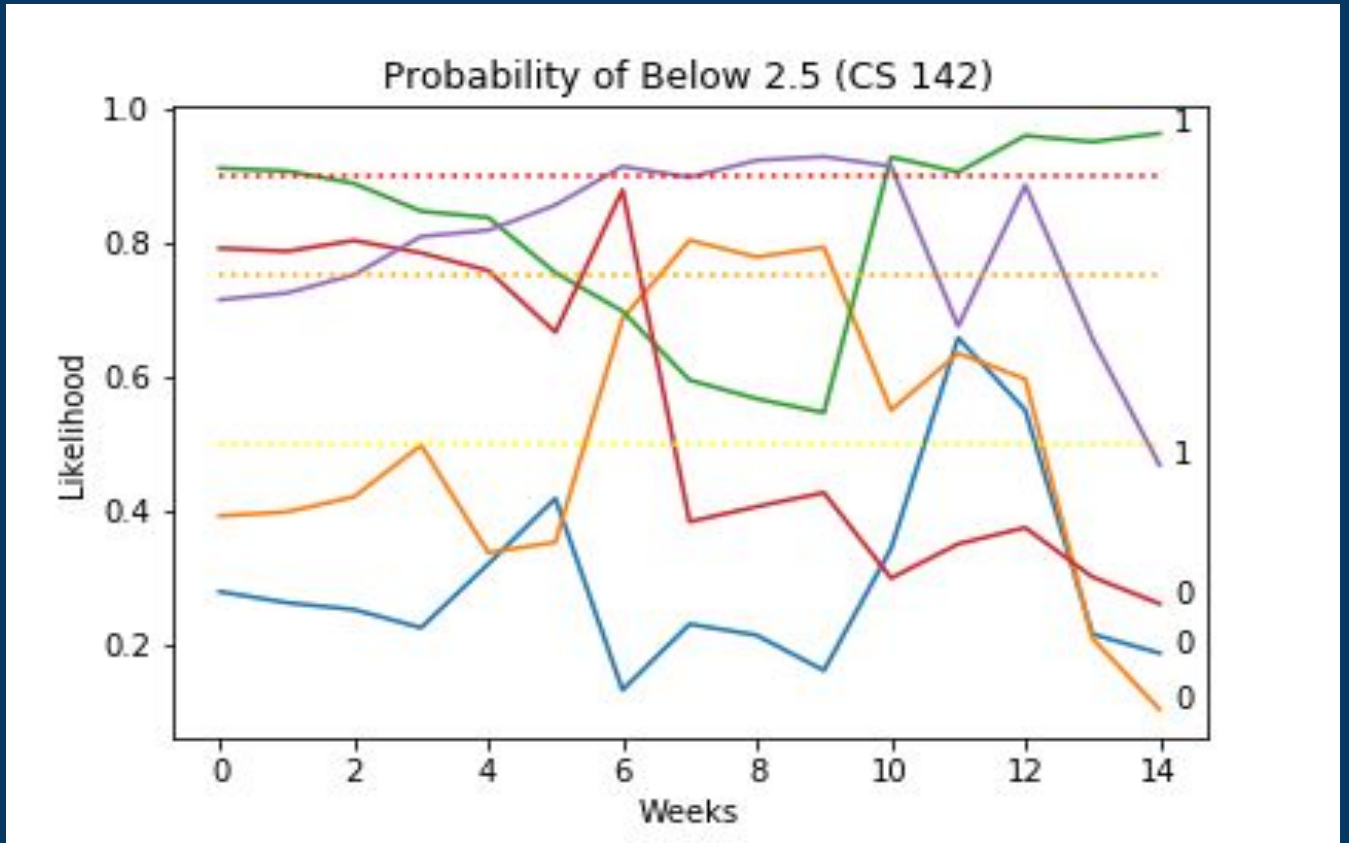

Thank you!

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Questions?

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