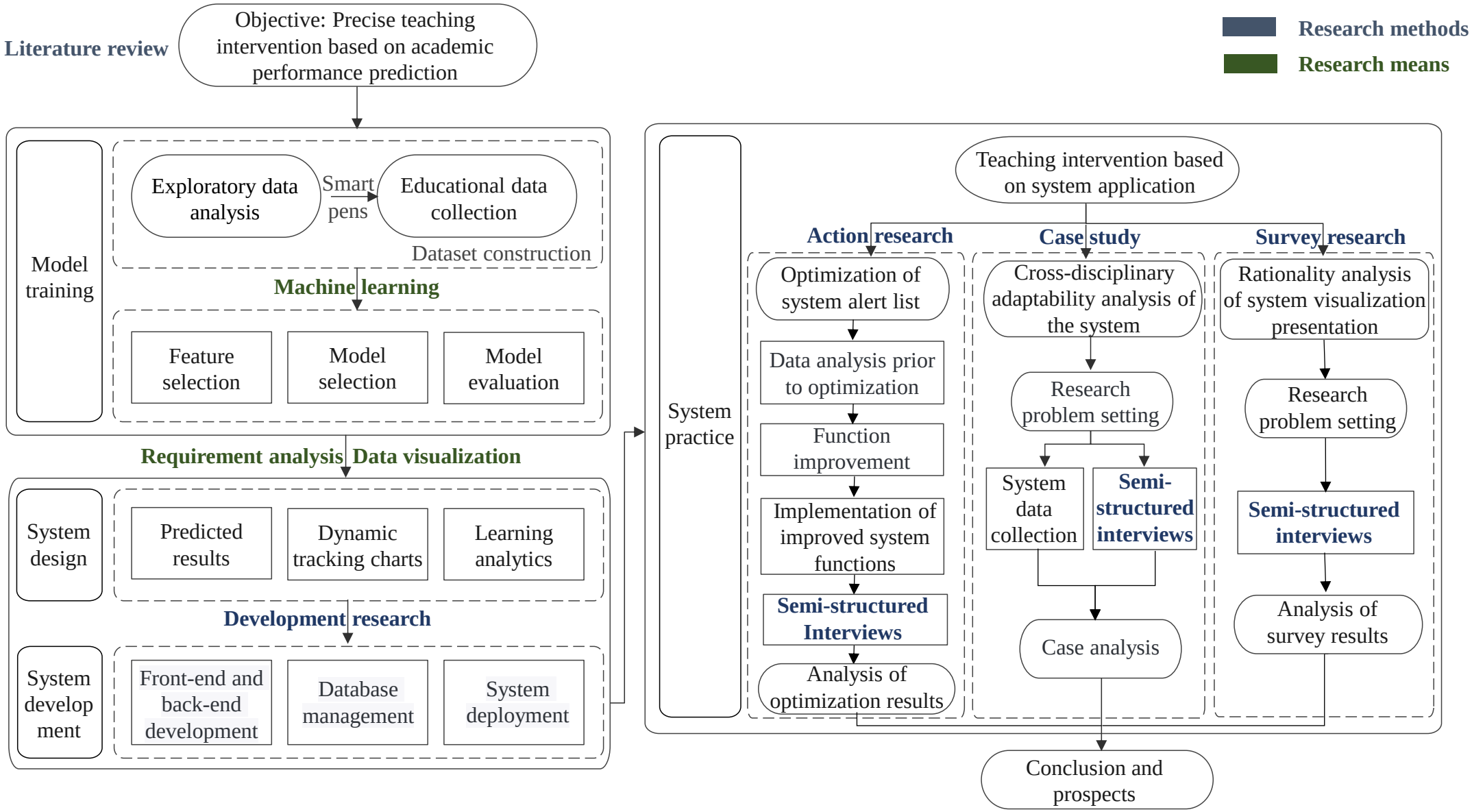
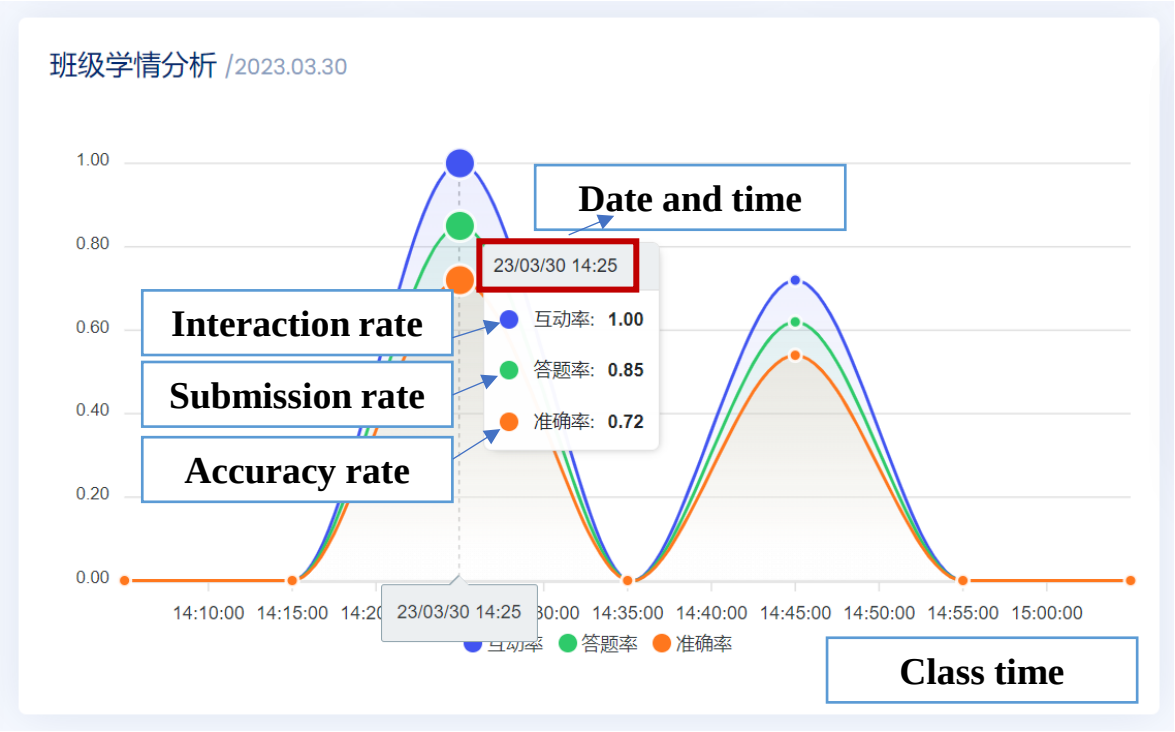
Research on the development and application of junior high school academic performance prediction system based on accompanying classroom data



Homepage/Class performance analysis

Interactive charts

Class performance interactive charts



- The x-axis is the class time, the y-axis values from 0 to 1 denote average interaction, submission, and accuracy rates.
- Hover over a point to display the corresponding date, time, and values.

Individual tracking interactive charts

- The x-axis is the class day; the y-axis corresponds to the student's fluency ranking.
- By hovering over a point, reveal interactive information about the class time and fluency.

Explanation of misclassifications

- The RF model showcased the utmost robustness among six ML techniques, achieving 91.99% accuracy and a 91.92% weighted f1 score.
- Our target label considered the next class's fluency rank (A: Top 10, B: 11-40, C: 40+), with the current class fluency as a key input feature. Most misclassifications emerged around grade boundary thresholds (A/B, B/C). Thus, we applied a Chi-square goodness-of-fit test for further scrutiny.
- The test confirmed significant differences in prediction error rates between boundary and non-boundary students (p-value <<0.01).

System upgrades

Alert list

Fluency ranking charts

Thus, we enhanced our system alert lists to include student learning trends and fluency ranking charts, aiding teachers in spotting potential boundary rank misclassification.

"Learning Trend" refers to the fluctuation in-class fluency ranking: shifts over 10 are highly volatile, 6-10 are moderately variable, and within 5 indicates stability.