Activity 4: Mentor Matching & Intervention Recommendations

1. Objective

The objective of this activity is to translate machine learning-based student segmentation into actionable mentoring interventions. The system connects ML insights with real-world academic support mechanisms.

2. Input Data

The system uses two primary datasets:

• Student Dataset:
- Academic Scores
- Student Risk Index (SRI)
- ML-Based Cluster Labels (At-Risk, High Performer, Career-Confused)

• Mentor Dataset (mentors.csv):
- Mentor ID
- Expertise (Academic / Wellness / Career)
- Maximum Student Capacity
- Current Assigned Load

3. End-to-End Workflow

Step 1: Student Segmentation (From Previous Activity)

Students are clustered using K-Means into three categories: At-Risk, High Performers, and Career-Confused.

Step 2: Cluster to Intervention Mapping

Each cluster is mapped to a specific mentor expertise and intervention type:
- At-Risk → Wellness Mentor → Wellness + Academic Support
- High Performer → Academic Mentor → Advanced Mentorship
- Career-Confused → Career Mentor → Career Guidance & Skill Mapping

Step 3: Intelligent Mentor Assignment

For each student, the system:
1. Filters mentors based on required expertise.
2. Checks mentor availability (Current_Load < Max_Students).
3. Assigns the mentor with the lowest current workload.
4. Updates mentor workload dynamically.

Step 4: High-Risk Alert Generation

Students classified as At-Risk with high SRI scores trigger an 'Immediate Intervention Required' alert. This simulates an early warning system for proactive support.

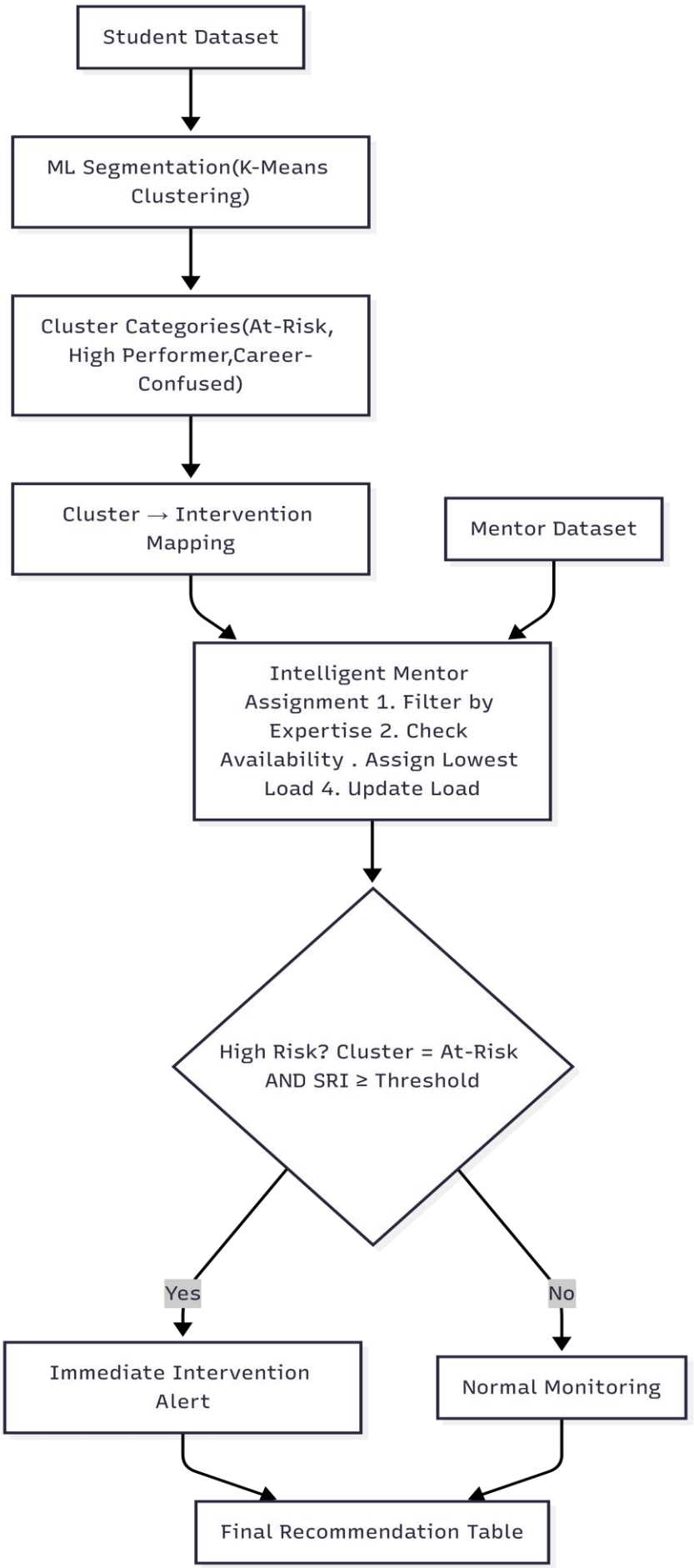
Step 5: Final Recommendation Table

The final output includes:
- Student ID
- Cluster Label
- Recommended Mentor Type
- Assigned Mentor
- Suggested Intervention
- Alert Status

4. System Impact

This system demonstrates a complete AI-driven decision support workflow:
Data Collection → ML Segmentation → Insight Extraction → Intervention Mapping → Mentor Allocation → Alert Generation.

It ensures scalable, fair, and proactive student mentoring.


Student Dataset
ML Segmentation(K-Means Clustering)
Cluster Categories(At-Risk, High Performer,Career-Confused)
Cluster → Intervention Mapping
Mentor Dataset
Intelligent Mentor Assignment 1. Filter by Expertise 2. Check Availability . Assign Lowest Load 4. Update Load
High Risk? Cluster = At-Risk AND SRI ≥ Threshold
Yes
No
Immediate Intervention Alert
Normal Monitoring
Final Recommendation Table