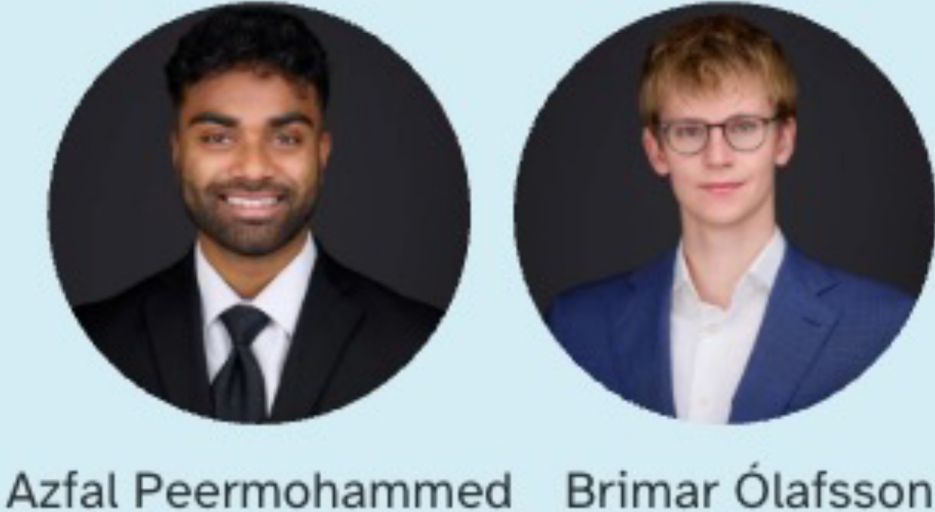


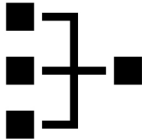
From Logs to Learning: A Cloud-Based Dropout Prediction System

Company Advisors: Haider Shishmahal, Muzzammil Patel

Faculty Advisor: Imran Sayeed

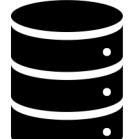


Problem Statement



Decentralized data systems

→



Create System to Monitor

→



Identify students at risk

Deliverables



Centralized Data Infrastructure: Create a data ecosystem where Teach The World Foundation can being to **make decisions based on data**.



Real-Time Monitoring Dashboard: Develop a method to **monitor the organization** in a user friendly manner.



Student Evaluation & Intervention Framework: To create a way to **detect dropouts** based on activity data for stakeholders to intervene.

Data

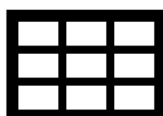
TTWF Data:

Administrative records, including student assessments and attendance, were fragmented across multiple Google Sheets.



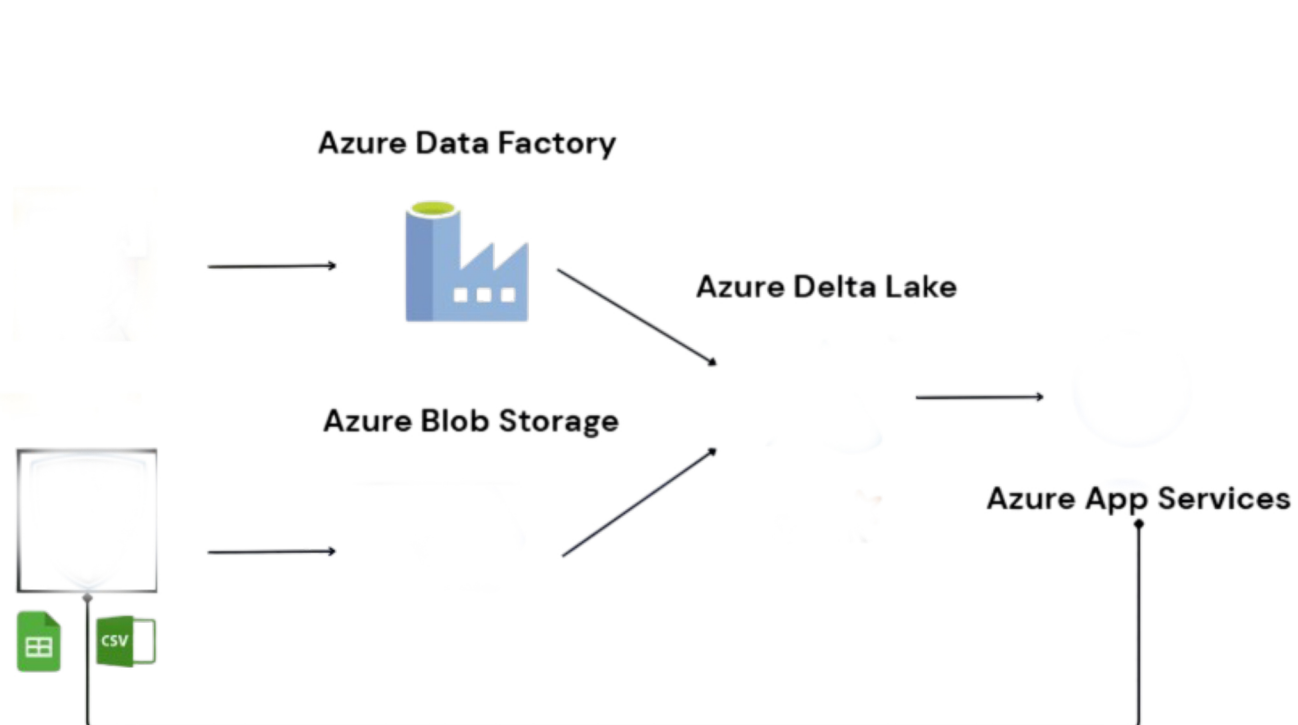
Fragmented data

Granular logs of student interactions with the learning app, including in-app assessment scores and activity logs.



150 Million Rows

Creating an Infrastructure



Creating Indexes

Curriculum Efficiency

Mean(Learning rate, Duration, Prior Knowledge)

Digital Assessment Progress

Completion weight x Completion rate

Engagement Index

Average Session Duration Normalized by time

Dashboard

Global Models + Feature Engineering = Cross Learning



Intuitive Visualizations: Interactive charts and graphs display **student performance**, learning progress, and engagement data at a glance.

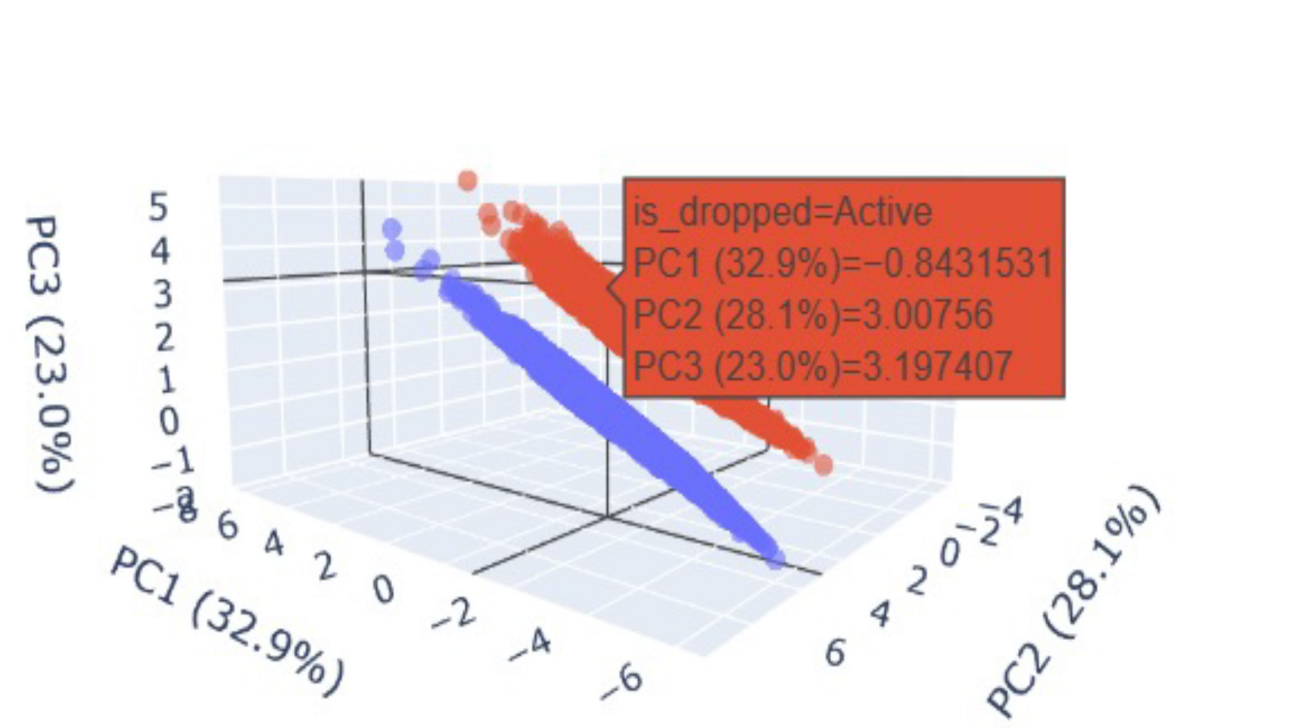


Drill-Down Capabilities: Users can filter data by school, grade, and individual student to **understand performance** at a granular level.

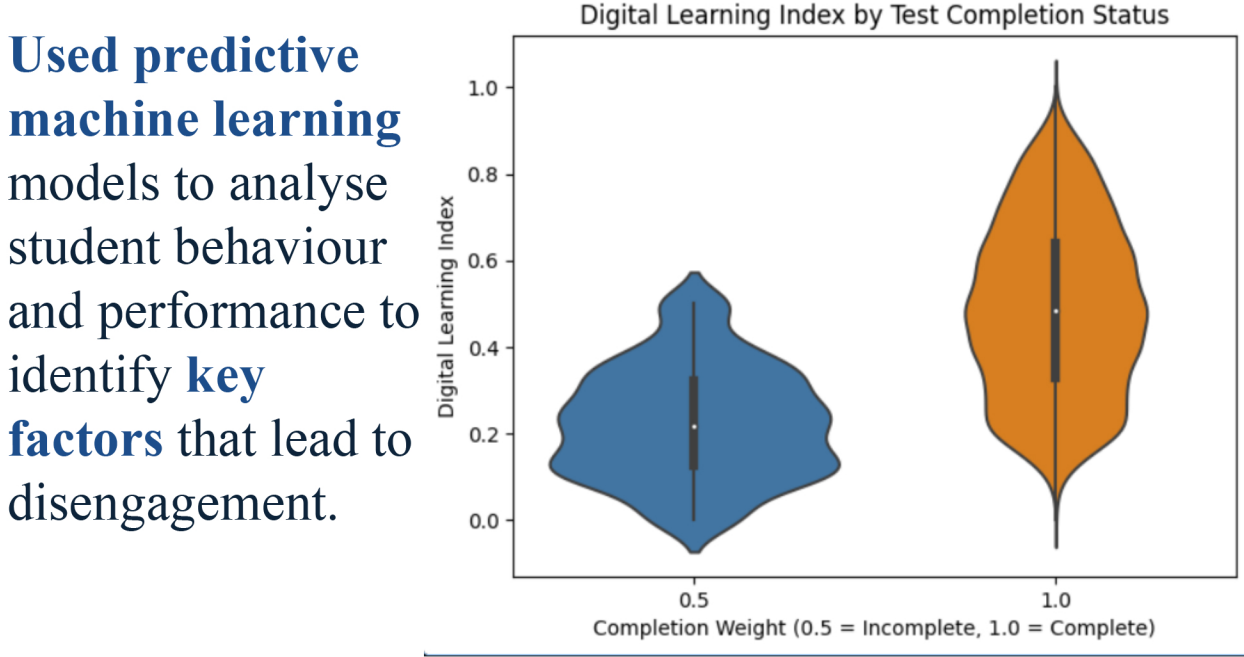


Early Warning System: The dashboard highlights students **flagged as "at-risk"** by our predictive models, enabling timely and targeted interventions.

Developing an Intuition



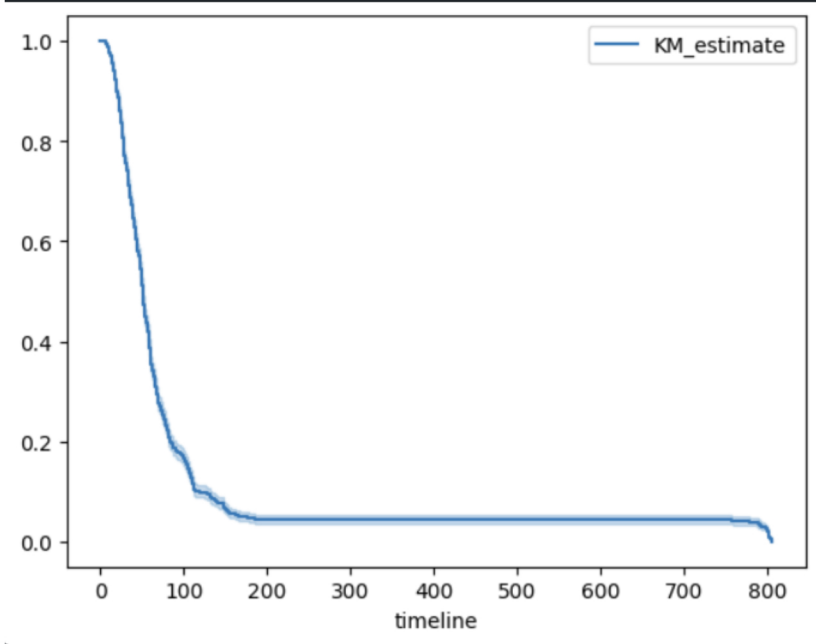
Machine Learning



Survival Analysis

Allows us to answer not just **if** a student will drop out, but **when** that is most likely to occur.

Cox Proportional Hazards Model

$$h(t|X) = h_0(t) \cdot \exp(X^T \beta)$$


Computer Vision

POC automatic attendance tracking using **CCTV footage**

Identifys and counts students unsig YOLOv8



Impact and Reflection

Our work has laid the foundation for a data-driven future at TTWF, moving the organization from fragmented data to a **unified ecosystem** that empowers staff and improves student outcomes.

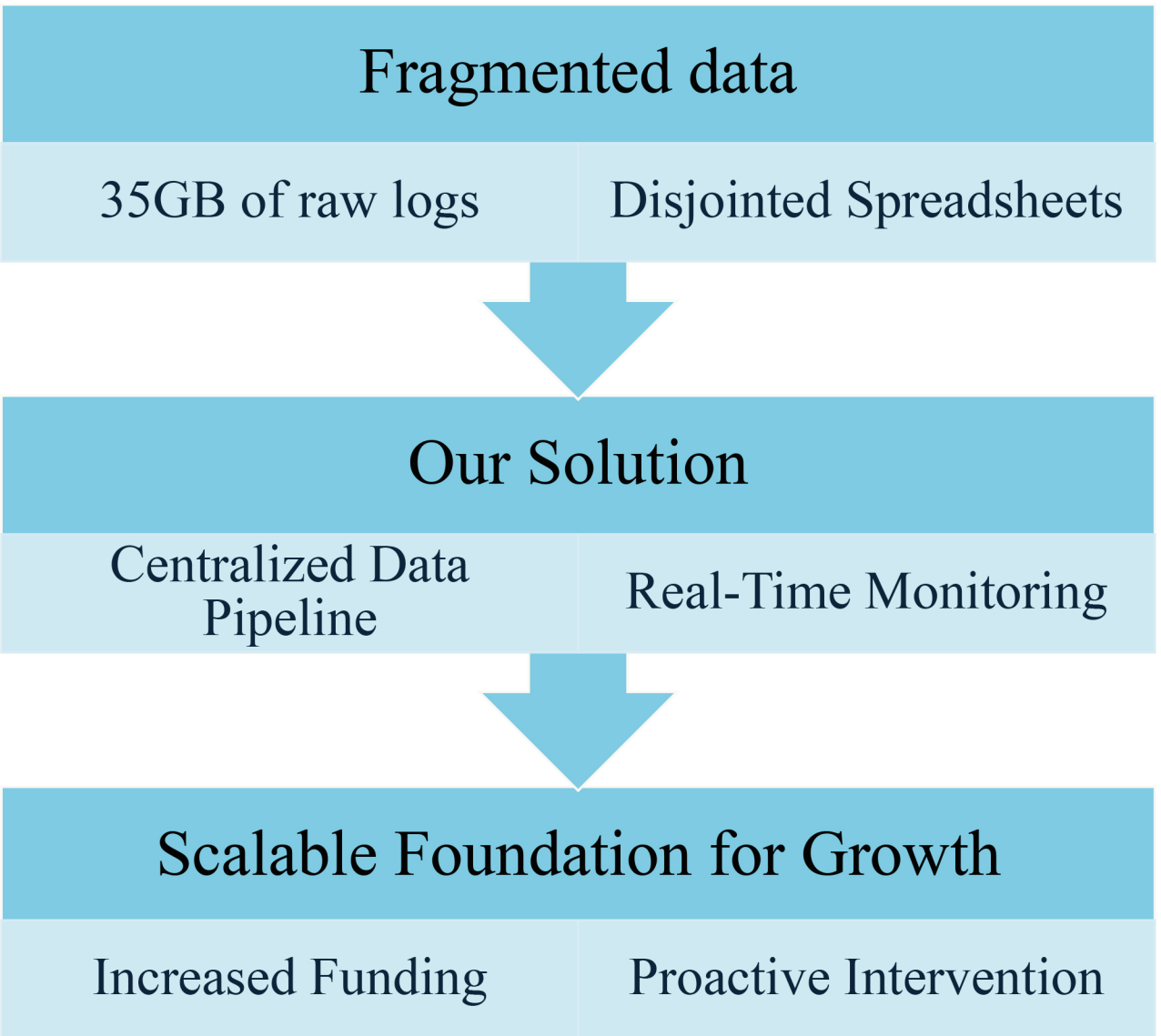
Our real-time monitoring dashboard **centralizes key metrics** from more than

20.000

Students across

140

Schools all around Pakistan



Next Steps

Deploy Predictive Alerts: Integrate the dropout model into the dashboard for **proactive staff intervention**.

Pilot Attendance Tracking: Test the computer vision **attendance system** in a pilot program.

Launch a Chatbot: Build a RAG-powered chatbot for staff to query the **knowledge base**.

Expand the Data Pipeline: Add new data sources to the **centralized database** for a more comprehensive view.