

INTEL ONEAPI HACKATHON

Early Warning System for Student Dropouts

A look at the importance of technology in teaching and learning



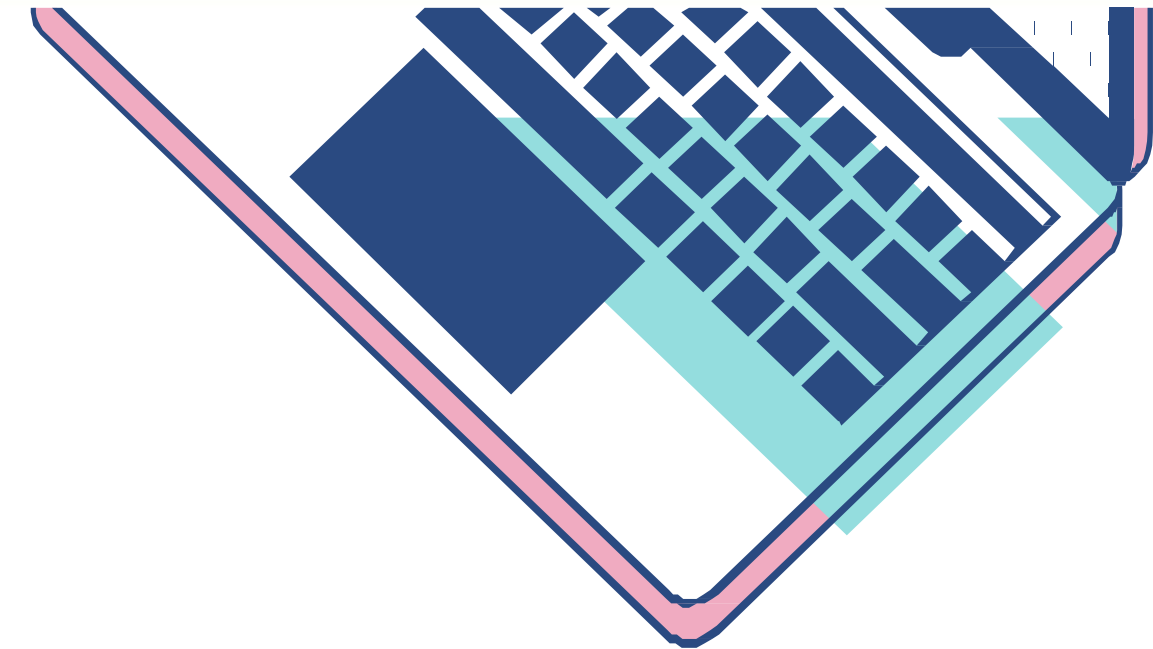
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oneAPI
<HACK>ATHON

BUILD SOLUTIONS TO
UNLOCK THE POTENTIAL OF
HETEROGENEOUS COMPUTING

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Problem Statement : Early Warning System for Student Dropouts using
Intel® AI Analytics Toolkits, its libraries, and SYCL/DPC++ Libraries.



Brief about the Idea problem statement

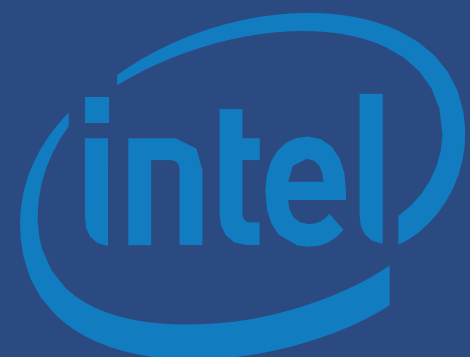


Early student dropout in schools and colleges is a pressing concern that requires immediate attention. It pertains to the premature withdrawal of students from their educational journey before successfully completing their academic programs. This issue has far-reaching implications, adversely affecting the individuals involved as well as society as a whole. By comprehensively examining the underlying causes of early student dropout and devising targeted interventions, it is possible to develop effective strategies that mitigate dropout rates. Addressing this problem is crucial for ensuring educational equity, fostering individual growth, and cultivating a skilled workforce that can contribute positively to the advancement of society.



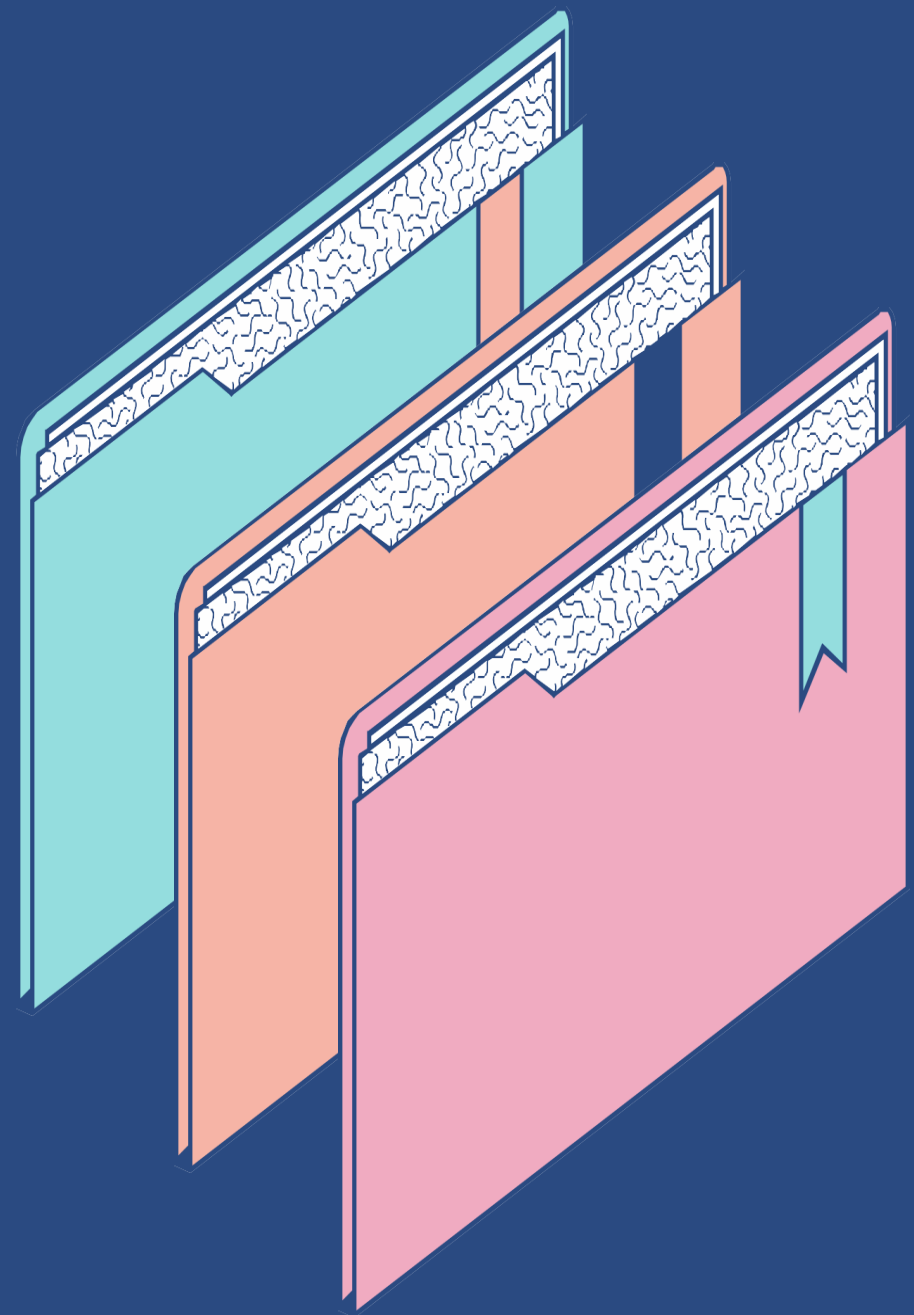
OUR SOLUTION

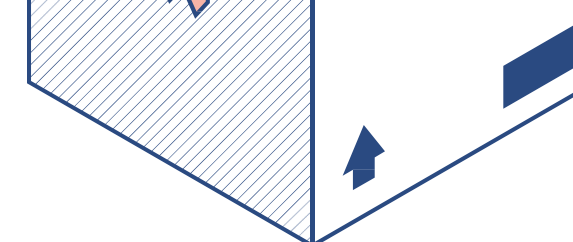
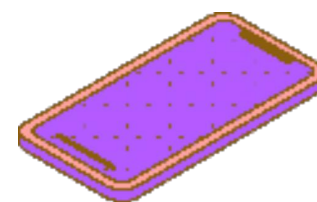
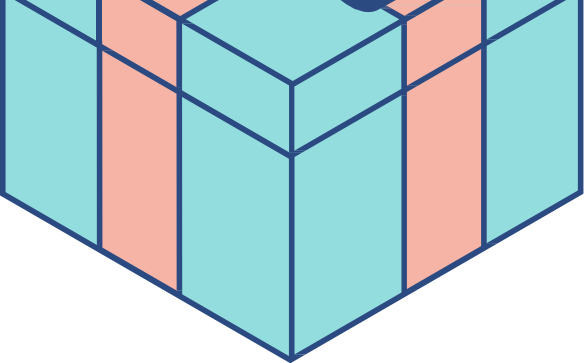
The idea is to develop an early warning system for student dropouts using Intel® AI Analytics Toolkits, its libraries, and SYCL/DPC++ Libraries. The system will use machine learning algorithms to identify students who are at risk of dropping out of school. The system will be scalable, cost friendly and innovative, and it will help improve student retention rates and promote equitable access to quality education. The COVID-19 pandemic has highlighted the need for such a system, as student dropouts have become a major challenge faced by the education sector which in turn results in various other problems like drug addiction, poverty and many more. By leveraging the power of Intel® AI Analytics Toolkits and its libraries, we can develop a solution that can help address this challenge and hopefully solve it for greater good.



The libraries used in the project:

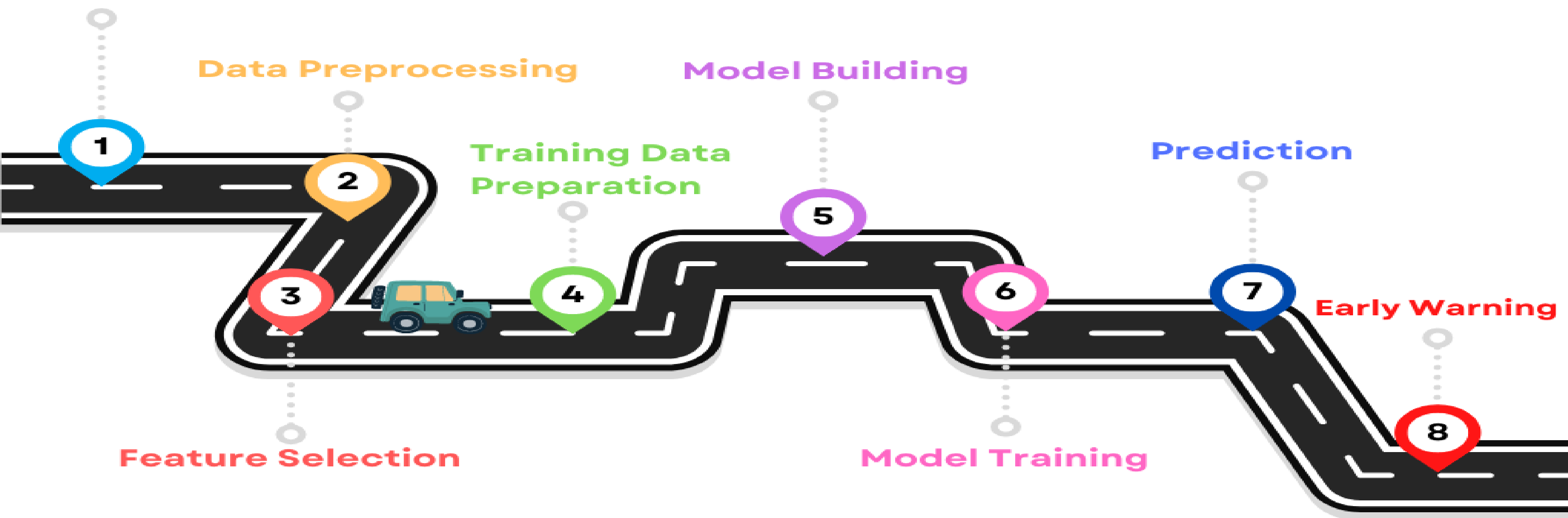
1. Intel® Math Kernel Library (Intel® MKL): This library provides optimized mathematical functions for deep learning, matrix operations, and vector math. It helps in optimizing the code for Intel architectures.
2. Intel® Data Analytics Acceleration Library (Intel® DAAL): This library provides algorithms and methods for data preprocessing, machine learning, and big data analysis. It helps in improving the performance of the code for Intel architectures.
3. Intel® Distribution of OpenVINO™ toolkit: It is an open-source toolkit that provides a comprehensive solution to deploy and optimize deep learning models across different Intel architectures, including CPUs, GPUs, and FPGAs.
4. Intel® oneAPI Threading Building Blocks (Intel® oneAPI TBB): This library provides a high-level abstraction for parallelism and concurrency. It enables the development of parallel applications with a focus on performance, scalability, and ease of use.
5. Intel® oneAPI Deep Neural Network Library (Intel® oneDNN): This library provides optimized routines for deep learning, including convolutional neural networks (CNNs), recurrent neural networks (RNNs), and others. It helps in accelerating the inference performance of the deep learning models.
6. Intel® oneAPI Analytics Library (Intel® oneDAL): This library provides algorithms and methods for data analytics, machine learning, and big data analysis. It helps in improving the performance of the code for Intel architectures.



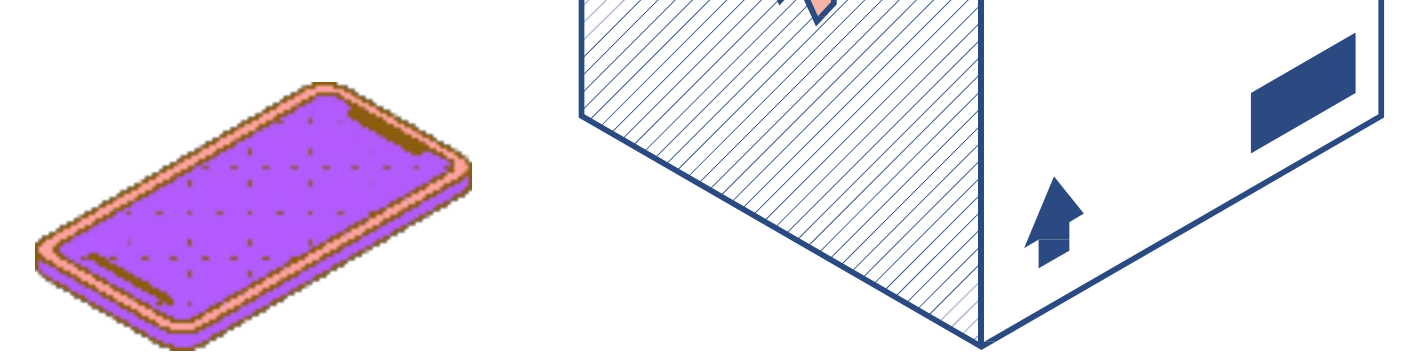


Process & Architecture Flowchart

Data Collection



TECH STACK:



Model tracking and optimization:

Model serving and web app development :

MLflow

One API

Neptune.ai

Django

Wandb

FastAPI

Comet.ml

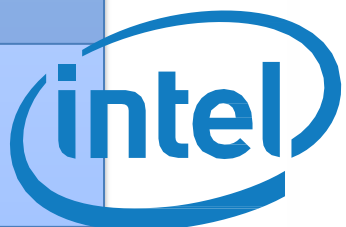
Streamlit

Tensorboard

AWS Lambda

Google Collab

Flask



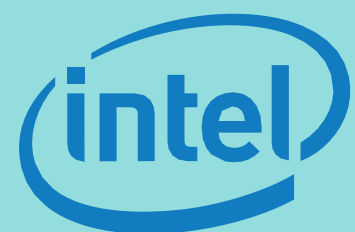


RESULTS

- Implementation of an Early Warning System for Student Dropouts using Intel® AI Analytics Toolkits, focusing on unique aspects of oneAPI, leads to positive outcomes. Early identification of at-risk students through advanced data analytics and machine learning algorithms enables timely interventions and support.
- Personalized interventions based on individual student needs can be developed using the unified and scalable programming model of oneAPI. Predictive analytics and data-driven decision making help educational institutions make informed choices regarding intervention strategies, resource allocation, and curriculum adjustments.
- Seamless integration of Intel® AI Analytics Toolkits into existing systems enhances collaboration, efficiency, and streamlines data processing.
- Continuous improvement and scalability are possible through the flexibility of oneAPI, enabling the system to evolve, incorporate new data sources, and adapt interventions.
- The result is a reduction in dropout rates, improved student retention, and increased success in schools and colleges.

Ultimately, this solution helps create a supportive educational environment that identifies and addresses the needs of at-risk students, leading to better outcomes and a more skilled workforce for society.





GRAPH BASED ON OUR RESULTS

