



Abstract

This project introduces an innovative dual-purpose academic support system designed to enhance both student guidance and educational management. The system employs advanced algorithms to address two critical aspects of academic progression: specialization selection for students and performance-based grouping for educators.

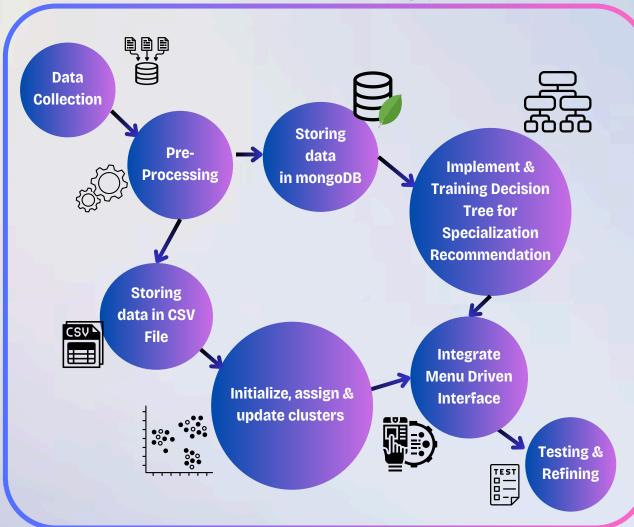
Introduction

- Students in their first year often struggle to select specializations that align with their interests and academic strengths
- This often leads to poor academic choices, affecting career trajectories and overall performance
- We have designed a system to help students make informed specialization decisions based on their preferences and academic performance
- Additionally, our system groups students by performance to provide targeted support and optimize resource allocation.

Problem Statement

- Students often struggle to select appropriate academic specializations that align with their abilities and interests, leading to suboptimal career choices and potential academic underperformance.
- Educators lack efficient tools to identify and address varying levels of student achievement across large and diverse student populations, hindering their ability to provide timely and targeted academic support.

Methodology



Github Repository



Collected and Preprocessed data

Run-Time Results

Enter SAP ID: 500108542

Enter your overall 1st year CGPA: 8.6

Enter Grade for C Programming Language (CPL) (0, A+, A, B+, B, C+, C, D, F): 0

Enter Grade for Data Structures and Algorithms (DSA) (0, A+, A, B+, B, C+, C, D, F): 0

Enter Grade for Python Programming (0, A+, A, B+, B, C+, C, D, F): \(\alpha \)

Enter Grade for Computer Organization and Architecture (CDA) (0, A+, A, B+, B, C+, C, D, F): \(t \)

Enter Grade for Advanced Engineering Mathematics (AEM) (0, A+, A, B+, B, C+, C, D, F): \(c \)

Enter Grade for Physics (0, A+, A, B+, B, C+, C, D, F): \(f \)

Do you like exploring cloud platforms and understanding how they store and process data? (1-5): 3

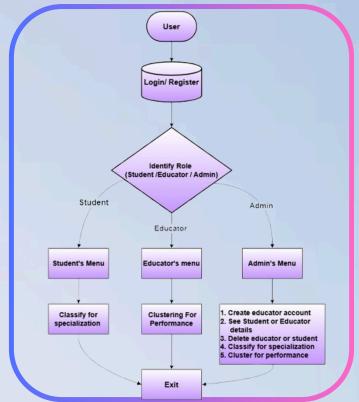
Are you interested in learning how distributed systems process big data across multiple machines? (1-5): 2

Are you interested in creating visual designs, animations, AR, VR or working with game mechanics? (1-5): 3

Have you ever been interested in how game engines, like Unity or Unreal, work behind the scenes? (1-5): 2

Suggested Specialization: Cloud Computing and Virtualisation Technology

Working Architecture



Conclusion

- Offers personalized academic guidance for students, aligning specializations with their performance and preferences while supporting educators in targeted teaching and resource allocation.
- Enhances academic planning, progress tracking, and alignment of aspirations with strengths, fostering a student-centered learning environment.

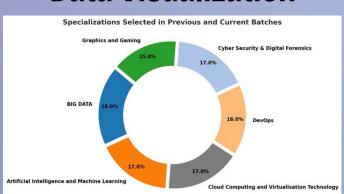
References

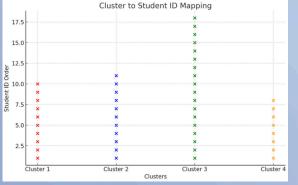
[1] Singh, Samrat, and Vikesh Kumar. "Performance analysis of engineering students for recruitment using classification dat mining techniques." International Journal of Science, Engineering and Computer Technology 3, no. 2 (2013): 31.

[2] Le Quy, Tai, Gunnar Friege, and Eirini Ntoutsi. "A review of clustering models in educational data science toward fairness-aware learning." Educational data science: Essentials, approaches, and tendencies: Proactive education based on empirical big data evidence (2023): 43-94

[3] Bobâlcă, Claudia, Oana Ţugulea, and Cosmina Bradu. "How are the students selecting their bachelor specialization? A qualitative approach." Procedia economics and Finance 15 (2014): 894-902.

Data Visualization





Cluster 1		Final Clusters Af	Final Clusters After 5 Iterations				
		Cluster 1	Cluster 2	Cluster 3	Cluster 4		
S00189707 S00189241 S00189241 S00189240 S00189704 S00189704 S00189704 S00189704 S00189704 S00189704 S00189706 S00189706 S00189706 S00189706 S00189707 S001		1					
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S00131790 S00131730 S00131730 S00131730 S00131730 S00131730 S00131730 S00131507 S001		500108707	500105401	500108261	500083540		
S00097950 S00100951 S00101897		500105642	508107761		1		
S00110973 S00100010 S0010793 S00109793 S00100497 S00102543 S00105042 S00107049 S00105545 S00105042 S00107049 S00105545 S00105043 S00105070 S00107074 S0010844 S00105070 S00107070 S00108401 S00108270 S00107070 S0010824 S00107070 S00107070 S0010724 S0010740 S00107709 S0010740 S00107709 S0010740 S00107709 S0010700 S00107709 S0010700 S00107709 S0010700 S00107000 S0010700 S0010700 S0010700 S0010700 S0010700 S00		500101970	500107156	588181726	1		
S00109730 S00109497 S00102243 S001095042 S001025043 S00105049 S00105040 S0		508093958	508186951		1		
S00135482 S00137546 S00137546 S00135545 S00135545 S00135720 S00137740 S00137547 S00137647 S00137647 S00137647 S00137647 S00137647 S00137647 S00137647 S00137745 S00137745 S00137745 S00137746 S001374676 S00137468 S00					1		
		500109330	508189497		1		
S00108461 S0011607 S0010907 S0010907 S00109027 S00109027 S00109027 S00109021 S00109021 S00109024 S00109024 S00109024 S00109024 S00109024 S00109024 S00109024 S00109024 S00109024 S001090270 S001090270 S001090270 S001090270 S001090270 S001090270 S00109024 S		500105682	500107049	500105545	1		
		50010326	500105700	500110794	1		
\$00102244 \$00004292 \$00107455 \$ \$ \$ \$ \$ \$ \$ \$ \$		500108348	500110607	500109627	1		
		500108601	508083628	500108706	1		
		500102244	508096292	500107615	1		
		1	508082524	500107148	1		
S00002772 S0010401 S0010401 S0010401 S00104001 S0010400 S0010700 S00100842 S0010842 S00108		1	508187769	500093995	1		
		1	1	500107366	1		
Sedionees Sedi		1	1	508082772	1		
		1	1	500106041	1		
500108542		1	1	500109805	1		
The minimum cost achieved in clustering is: 255		1	1	500107098	1		
		1	1	500108342	1		
		The minimum cost achieved in clustering is: 255					