



Student Sleep Pattern.

Strengthening Health Systems for a Healthier Future

Presented by

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COURSE: MIS 311

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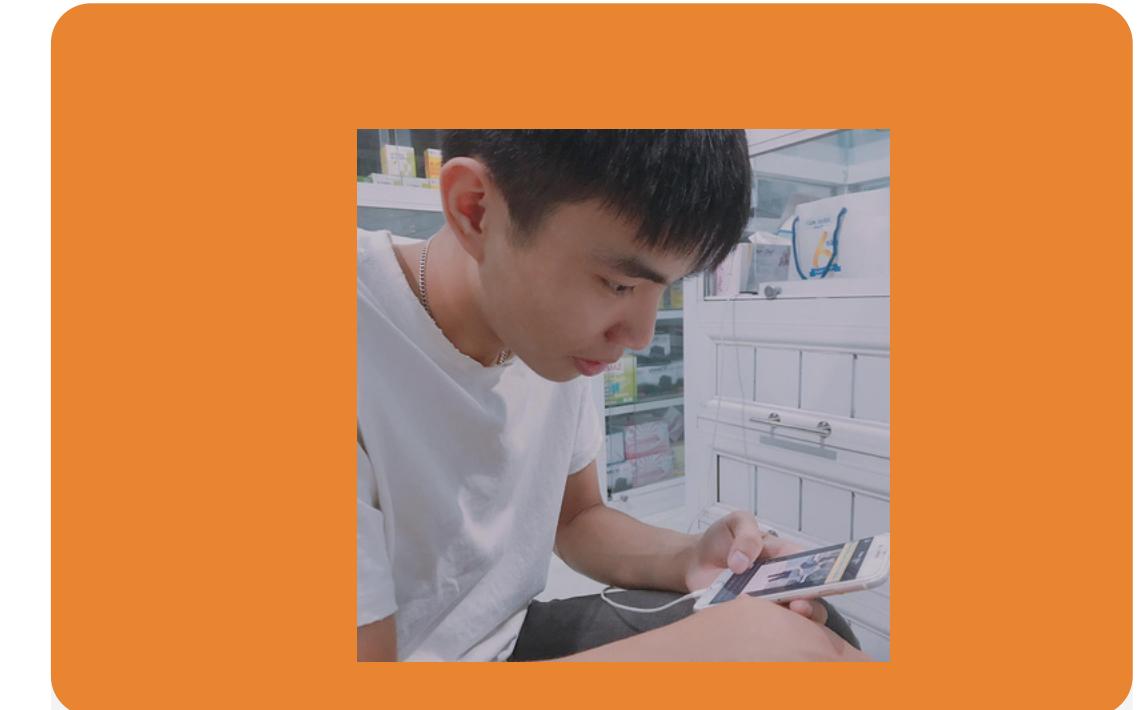
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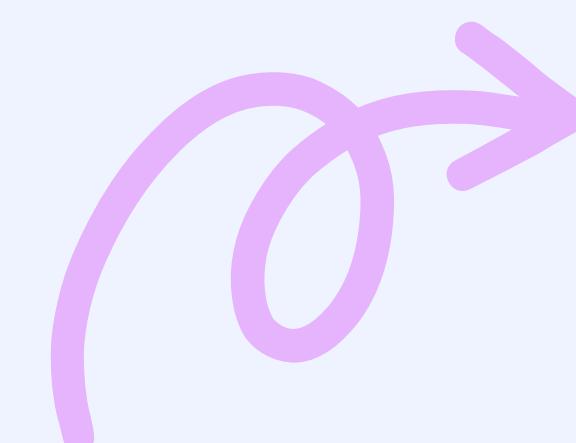
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I. INTRODUCTION

What **lifestyle factors** significantly affect the **quality** of sleep among **EIU** students, and how can these factors be optimized to improve **sleep** and **academic performance**?



Objectives

- To **investigate** and **understand** the relationships between various lifestyle factors and the sleep quality of university students.
- To build a **model** that can estimate a EIU student's sleep quality using their lifestyle factors (e.g., screen time, physical activity, caffeine intake) as predictors.

Brief background

Dataset is a **synthetically generated** collection of data designed to model the sleep patterns of 500 university students. It was created for educational and research purposes to provide a realistic, yet artificial, basis for statistical analysis and machine learning without involving real individuals.

(Student Sleep Patterns, 2024)





DATA EXPLANATION

The dataset includes 14 variables for each student, covering:

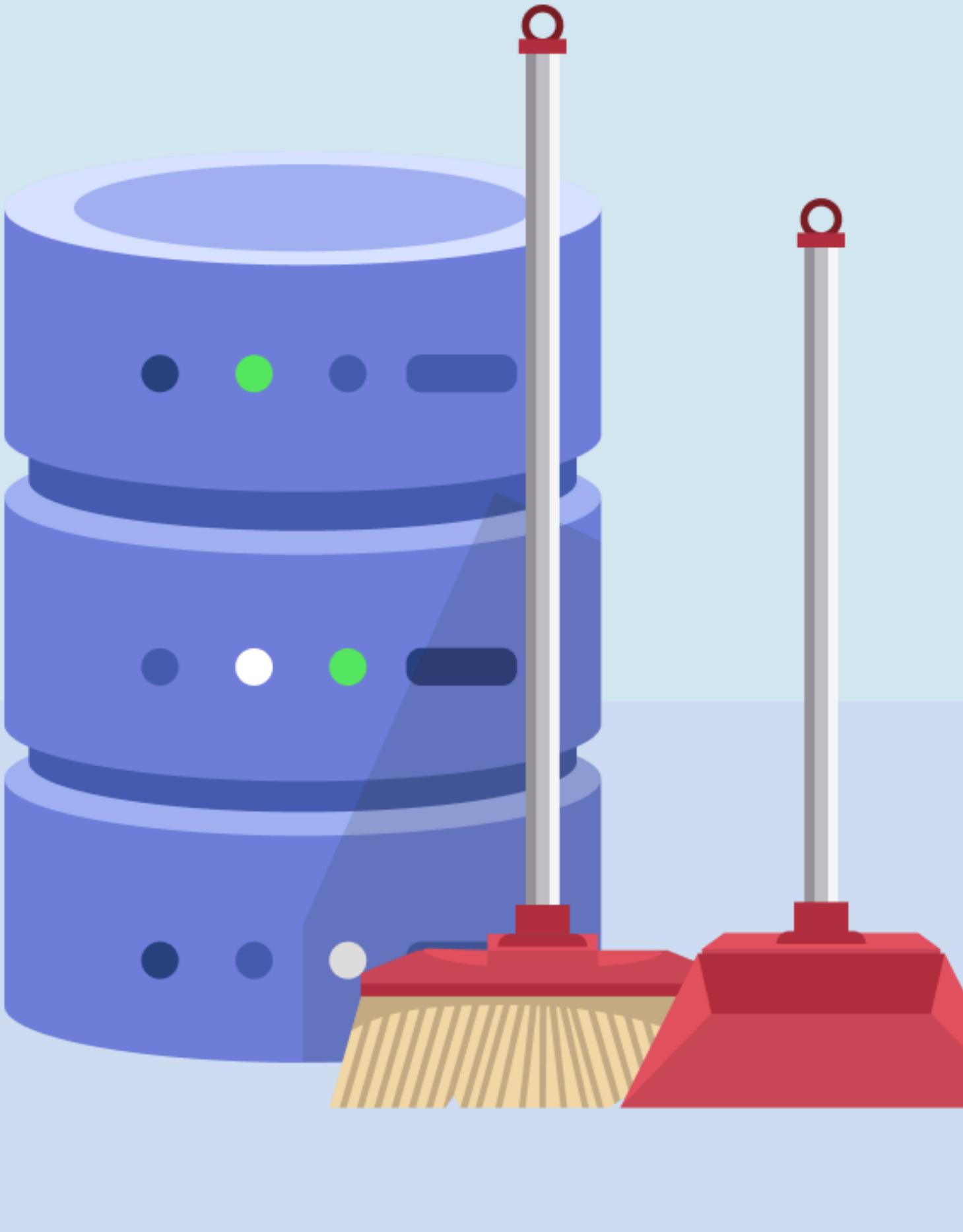
- Demographics: Age, Gender, University Year
- Lifestyle Factors: Study Hours, Screen Time, Caffeine Intake, Physical Activity

Sleep Metrics: Sleep Duration, Sleep Quality (a subjective 1-10 rating), and typical sleep/wake times for both weekdays and weekends.



DATA EXPLANATION

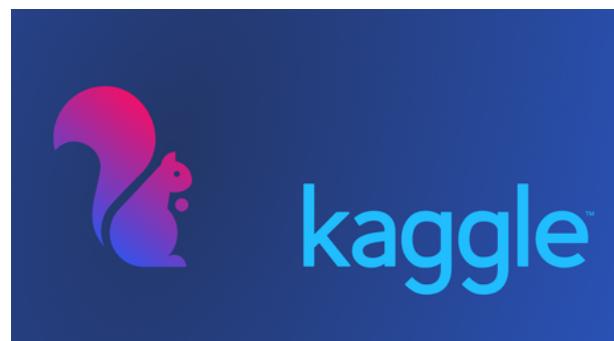
Variable	Description
Student_ID	Unique identifier for each student.
Age	Age of the student in years.
Gender	Gender of the student ('Male', 'Female', 'Other').
University_Year	The student's current year of university.
Sleep_Duration	Total hours of sleep per night.
Study_Hours	Average hours spent studying per day.
Screen_Time	Average hours on screens (non-study) per day.
Caffeine_Intake	Average caffeinated beverages consumed per day.
Physical_Activity	Average minutes of physical activity per day.
Sleep_Quality	Subjective sleep quality rating (1-10).
Weekday_Sleep_Start	Typical time a student sleeps on weekdays (24h format).
Weekend_Sleep_Start	Typical time a student sleeps on weekends (24h format).
Weekday_Sleep_End	Typical time a student wakes on weekdays (24h format).
Weekend_Sleep_End	Typical time a student wakes on weekends (24h format).



II. Data Source Flowchart

Data origin

Flowchart

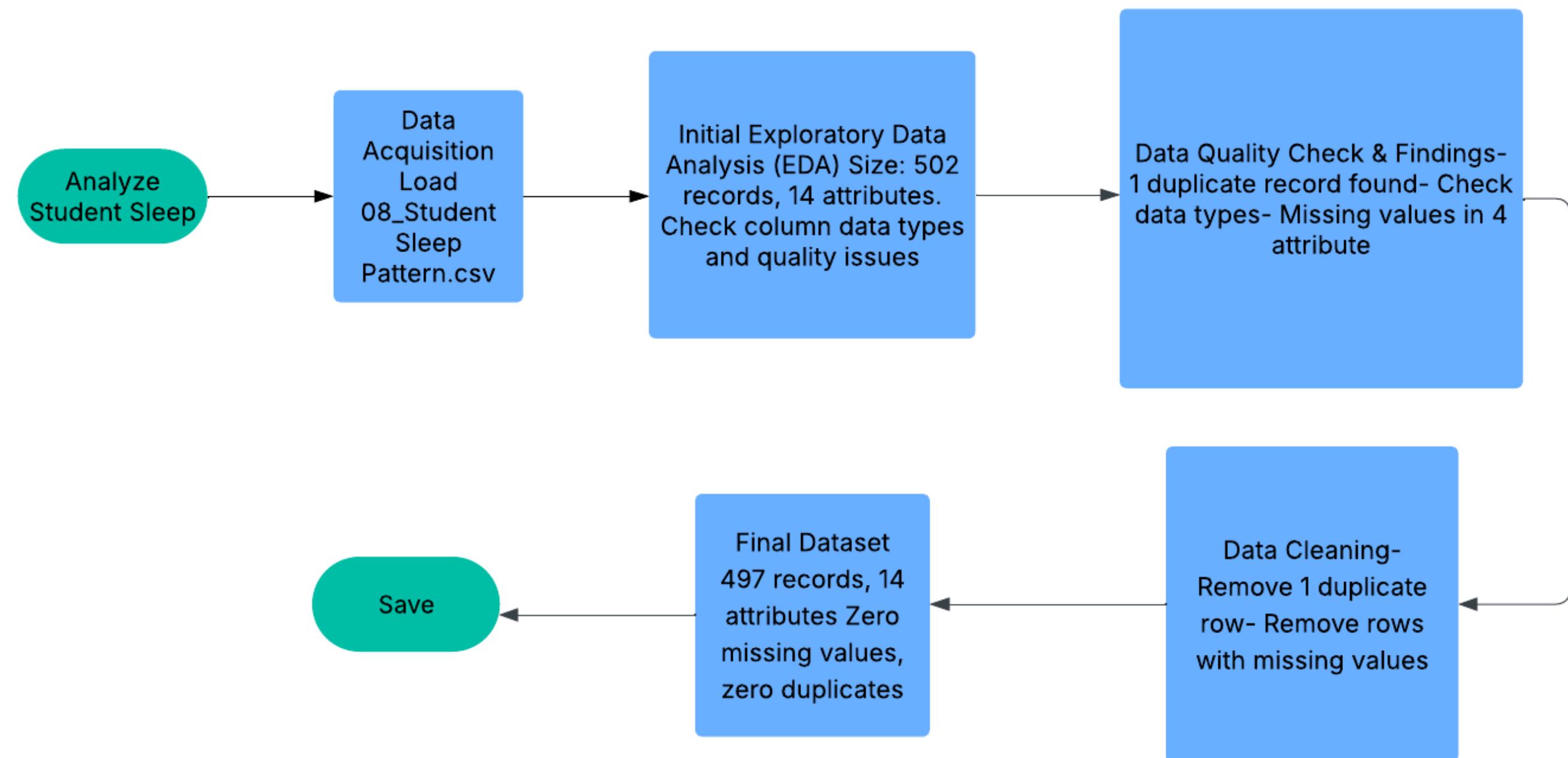


Data origin

Kaggle is an online community and platform for data scientists and machine learning practitioners. The data is synthetic, meaning it was **artificially generated** and does **not** represent real individuals. But, follows realistic distributions and relationships to provide a **useful basis for analysis and modeling**.

used by data science practitioners, educators, and researchers for skill development, academic instruction, and algorithmic testing

FLOWCHART TO PREPARE THE DATA



III. DATA TO INSIGHTS – ANALYSE THE DATA





The Descriptive Statistics

	Sleep_Duration	Study_Hours	Screen_Time	Caffeine_Intake	Physical_Activity	Sleep_Quality
Mean	6.47	5.98	2.53	2.46	62.25	5.36
Median	6.50	6.05	2.60	2.00	61.50	5.00
Mode	4.10	10.40	3.60	2.00	53.00	1.00
Standard Deviation	1.49	3.48	0.86	1.68	35.14	2.97
Minimum	4.00	0.10	1.00	0.00	0.00	1.00
Maximum	9.00	12.00	4.00	5.00	120.00	10.00
Count	500.00	500.00	500.00	500.00	500.00	500.00
Confidence Level(95.0%)	0.13	0.31	0.08	0.15	3.09	0.26

- **Alarming Sleep Quality:** The most frequent Sleep_Quality score reported by students is 1 out of 10 (Mode = 1), signaling a critical problem in student wellness.
- **Severe Sleep Deprivation:** The most common Sleep_Duration is a mere 4.1 hours (Mode = 4.1), indicating a state of chronic fatigue among a large portion of the student body.





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- **Intense Academic Load:** A significant student group studies for 10.4 hours daily (Mode = 10.4), pointing to immense academic pressure as a potential driver for sleep loss.
- **Caffeine as a Coping Mechanism:** Students consistently consume ~2 caffeinated drinks per day (Mean, Median & Mode ≈ 2), likely as a necessary tool to combat daily exhaustion.



The Pivot Table

University_Year	Average of Sleep_Duration
1st Year	6.51
2nd Year	6.56
3rd Year	6.49
4th Year	6.31
Grand Total	6.47

University_Year	Average of Sleep_Quality
1st Year	5.23
2nd Year	5.32
3rd Year	5.55
4th Year	5.34
Grand Total	5.36

- Sleep duration remains relatively stable for the first three years, hovering around 6.5 hours.
- There is a significant decline for 4th-Year students, whose average sleep duration falls to 6.31 hours.
- Sleep quality shows a clear upward trend from 1st Year (5.23) to 2nd Year (5.32), reaching its highest point in the 3rd Year (5.55).
- While the quality for 4th-Year students drops to 5.34, it is still notably higher than that of first-year students.

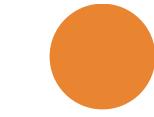
The Pivot Table

Gender	Average of Sleep Duration
Female	6.531927711
Male	6.358064516
Other	6.549324324
Grand Total	6.4724
Gender	Average of Sleep Quality
Female	5.554216867
Male	5.102150538
Other	5.472972973
Grand Total	5.362

- All groups are getting, on average, around 6.5 hours of sleep per night.
- While all groups sleep for roughly the same amount of time, male students report a sleep quality that is approximately 8-9% lower than their female and other counterparts.



Correlation



	<i>Sleep_Duration</i>	<i>Study_Hours</i>	<i>Screen_Time</i>	<i>Caffeine_Intake</i>	<i>Physical_Activity</i>	<i>Sleep_Quality</i>
<i>Sleep_Duration</i>	1					
<i>Study_Hours</i>	-0.011092417	1				
<i>Screen_Time</i>	0.067933632	-0.040333944	1			
<i>Caffeine_Intake</i>	-0.01453127	0.032473216	0.052428353	1		
<i>Physical_Activity</i>	-0.009222976	-0.048420693	-0.035868335	-0.027348132	1	
<i>Sleep_Quality</i>	-0.015639029	0.058707629	0.009410629	-0.006271513	-0.014115973	1

All the correlation coefficients between lifestyle factors and sleep outcomes are extremely close to zero. There is no meaningful linear relationship between these factors.

- It's not true that students who study more necessarily sleep less.
- It's not true that students with more screen time have predictably worse sleep quality.
- It's not true that more physical activity leads to better sleep quality.



Regression



- A negative Adjusted R-squared is a definitive sign of a very poor model. It means that the model is worse at predicting the outcome than simply using the mean (or average) of Sleep_Quality.

Adjusted R Square
-0.00603653

	<i>Coefficients</i>	<i>P-value</i>
Intercept	5.256552498	0.00
Sleep_Duration	-0.032168808	0.720626167
Study_Hours	0.050210393	0.192025325
Screen_Time	0.044773835	0.774004391
Caffeine_Intake	-0.016582876	0.834624533
Physical_Activity	-0.000946382	0.803402034

- Every single P-value is substantially greater than the standard 0.05 threshold.
 ==> We fail to reject the null hypothesis for every variable.
 - All coefficients are similarly close to zero.
 ==> This means that even a large change in one of these behaviors (like studying for many more hours) would result in a predicted change in sleep quality that is practically meaningless.

IV. CONCLUSION

Key Findings on Student Sleep

Widespread Poor Sleep: with very low self-reported sleep quality and an average sleep duration (6.47 hours) below the recommended amount.

No Correlation with Lifestyle Factors

Identification of Vulnerable Groups: 4th-year students experience a drop in sleep duration, and male students report significantly lower sleep quality compared to others.

Ineffective Predictive Model: predict sleep quality based on lifestyle factors was a failure (R^2 of 0.4%), these variables cannot be used to reliably estimate a student's sleep quality.





IV. CONCLUSION

Actionable recommendations



- **Gather Real, EIU-Specific Data:** identify the actual root causes of poor sleep among EIU students, such as academic stress, financial pressure, or dorm conditions.
- **Provide Targeted Support for Vulnerable Groups:** programs and workshops for the students most affected— 4th-year students and male students.
- **Promote a Balanced Campus Environment**

REFERENCE

Student sleep patterns. (2024, October 14). *Kaggle*.

<https://www.kaggle.com/datasets/arsalanjamal002/student-sleep-patterns>



Thank You.

