SLEEP HEALTH ANALYSIS WITH AI SUPPORT

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PROJECT OVERVIEW

- **Objective**: Analyze sleep health dataset and generate AI-powered insights.
- **Approach**: Combine EDA + LLM (IBM Granite 3.3-8B).
- **Tools**: LangChain, Replicate, Python (Pandas, Seaborn, Matplotlib)

DATASET INFO

- **Dataset**: Sleep Health and Lifestyle Dataset
- **Source**: Kaggle (https://www.kaggle.com/datasets/uom190346a/sleep-health-and-lifestyle-dataset)
- **Rows**: 374 | Columns: 13
- **Target**: `Sleep Disorder` (`Normal`, `Insomnia`, `Sleep Apnea`)

EDA

1. Sleep Disorder Distribution
→ Countplot shows majority of entries are labeled as "Normal"

2. Correlation Heatmap
→ Strong relationships between:
    - `Stress Level` & `Quality of Sleep` (negative)
    - `Sleep Duration` & `Sleep Disorder`

3. Scatter Plot
→ Clear negative trend between `Stress Level` and `Quality of Sleep`.

AI ANALYSIS WITH IBM GRANITE

A. INSIGHT AND RECOMMENDATION

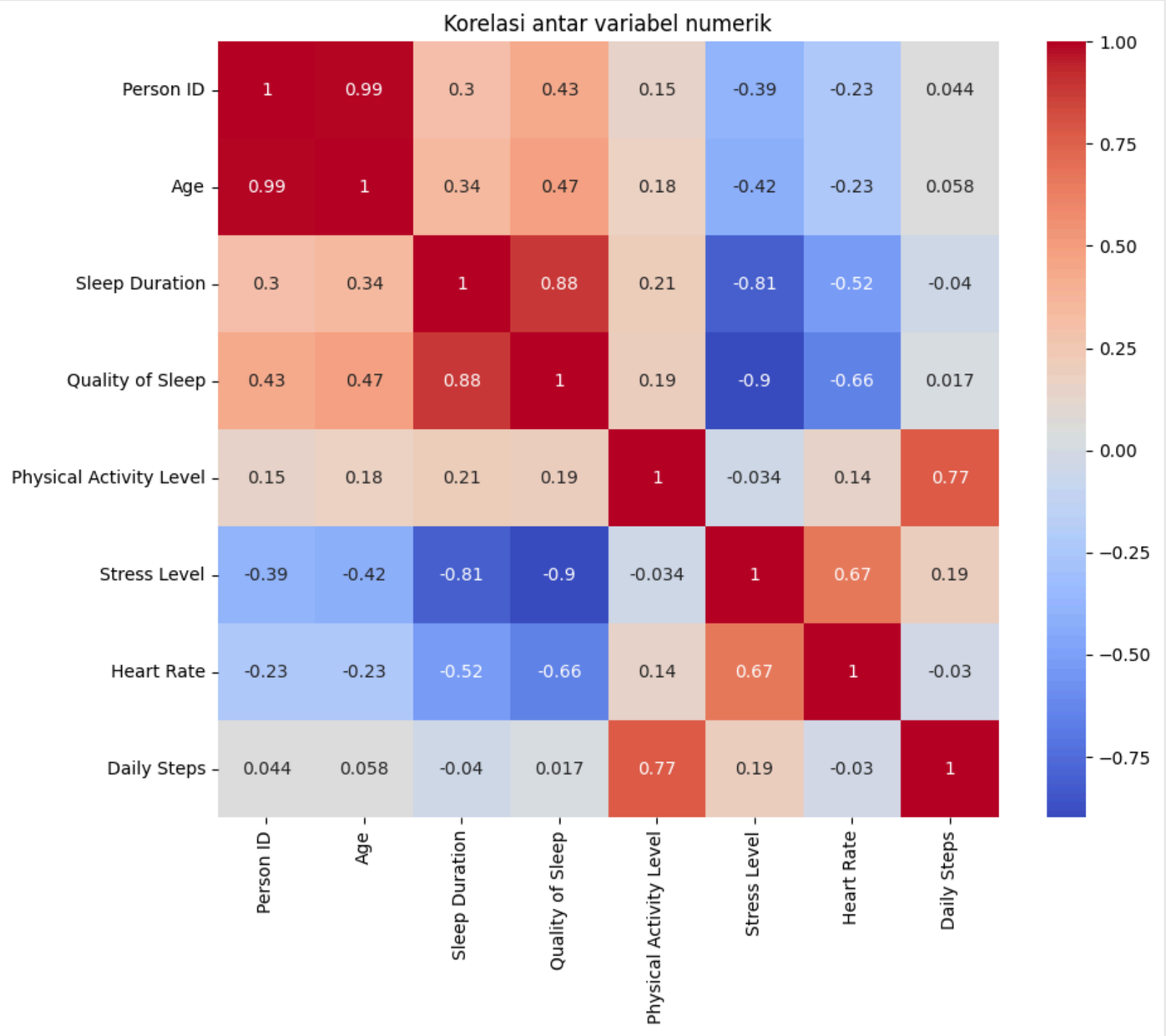
Insights:

- Higher stress = lower sleep quality.
- Insomnia linked with short sleep duration.
- Active individuals sleep better.

Recommendations:

- Sleep at least 7–8 hours.
- Manage stress through relaxation.
- Exercise regularly.

HEATMAP


Korelasi antar variabel numerik
Person ID
Age
Sleep Duration
Quality of Sleep
Physical Activity Level
Stress Level
Heart Rate
Daily Steps
1 0.99 0.3 0.43 0.15 -0.39 -0.23 0.044
0.99 1 0.34 0.47 0.18 -0.42 -0.23 0.058
0.3 0.34 1 0.88 0.21 -0.81 -0.52 -0.04
0.43 0.47 0.88 1 0.19 -0.9 -0.66 0.017
0.15 0.18 0.21 0.19 1 -0.034 0.14 0.77
-0.39 -0.42 -0.81 -0.9 -0.034 1 0.67 0.19
-0.23 -0.23 -0.52 -0.66 0.14 0.67 1 -0.03
0.044 0.058 -0.04 0.017 0.77 0.19 -0.03 1
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75

SCATTERPLOT

CONCLUSION

- The analysis revealed that stress level, sleep duration, and quality of sleep are the most significant factors influencing sleep disorders.
- Individuals with high stress and short sleep duration are more likely to suffer from insomnia or sleep apnea.
- Physically active individuals tend to have better sleep quality and lower risk of disorders.
- By combining EDA and AI-powered analysis (IBM Granite), we were able to uncover deeper insights and generate practical health recommendations.
- This project highlights how AI can enhance human decision-making in analyzing lifestyle and health data efficiently.

RECOMMENDATION

- Manage Stress Actively

→ Practice relaxation techniques such as deep breathing, meditation, or light exercise to reduce stress levels.

- Maintain Consistent Sleep Duration

→ Aim for 7–8 hours of sleep per night to support cognitive function and overall health.

- Increase Physical Activity

→ Engage in regular physical activity like walking, yoga, or cycling to improve sleep quality.

- Use Data & AI for Health Monitoring

→ Leverage technology and AI tools to monitor sleep trends, identify risks, and get personalized recommendations.

ROLE OF AI IN THE PROJECT

1. Used IBM Granite 3.3-8B model via LangChain.
2. AI supported:
   - Statistical summarization
   - Correlation insight generation
   - Recommendation crafting
   - Visual analysis interpretation

THANK YOU