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## Big Data Analysis Using PySpark

Section: 61s

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## Introduction:

In this project, we delve into the realm of big data analysis using PySpark, exploring a sports logging dataset to uncover hidden patterns and insights. Leveraging PySpark's scalability and efficiency.

## Problem 1:

The relationship between the intensity of an exercise with the individuals' sleep quality

- Research question:

What insights can be derived when studying the impact of physical activity on sleep?

- Relevant references :

[1] B. A. Dolezal, E. V. Neufeld, D. M. Boland, J. L. Martin, and C. B. Cooper, "Interrelationship between sleep and exercise: A systematic review," *Advances in Preventive Medicine*, <https://www.hindawi.com/journals/apm/2017/1364387/> (accessed Mar. 21, 2024).

[2] D. Pacheco and Dr. A. Singh, "How can exercise affect sleep?," *Sleep Foundation*, <https://www.sleepfoundation.org/physical-activity/exercise-and-sleep> (accessed Mar. 21, 2024).

[3] M. A. Alnawwar et al., "The Effect of Physical Activity on Sleep Quality and Sleep Disorder: A Systematic Review," *PubMed central*, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10503965/#:~:text=Moreover%2C%20studies%20have%20found%20that,improved%20sleep%20quality%20%5B19%5D>. (accessed Mar. 20, 2024).

## Problem 2:

Impacting of screen time before bedtime on individual's sleep

- Research Question:

How does the duration of screen time impact the quality of sleep? Is there any clear patterns emerges regarding the association between screen usage before bedtime and sleep outcomes overall?

- Relevant references :

[4] L. Hale et al., "Youth Screen Media Habits and sleep: Sleep-friendly screen behavior recommendations for clinicians, educators, and parents," *Child and adolescent psychiatric clinics of North America*, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5839336/> (accessed Mar. 21, 2024).

### **Problem 3:**

Analysing the connection between caffeine use and irregular sleep patterns.

- **Research Question:**

To what degree do sleep disturbances as reported in the sleep.json file correlate with the quantity and timing of caffeine intake, as described in the caffeine.json file? What trends show up around the effects of caffeine on various dimensions of the length and quality of sleep?

- **Relevant references:**

[5] HP, C.I. "Coffee, caffeine, and sleep: A systematic review of epidemiological studies and randomized controlled trials. [5] " *Sleep Medicine Reviews*. Available at: <https://pubmed.ncbi.nlm.nih.gov/26899133/> (Accessed: 21 March 2024)

### **Problem 4:**

Investigating the connection between daily stress levels and variations in sleep patterns.

- **Research Question:**

How do daily stress levels, as indicated in the stress.json file, correlate with changes in sleep quality and duration recorded in the sleep.json file? What insights can be gained regarding the influence of stress on different aspects of sleep?

- **Relevant references:**

[6] A. D. Alotaibi, F. M. Alosaimi, A. A. Alajlan, and K. A. Bin Abdulrahman, "The relationship between sleep quality, stress, and academic performance among medical students," *J. Family Community Med.*, vol. 27, no. 1, pp. 23-28, Jan. 2020. doi:10.4103/jfcm.JFCM\_132\_19.[Online].Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6984036/>[Accessed: March 21, 2024].

### **Problem 5:**

The relationship between daily stress levels and variations in sleep patterns.

- Research Question:

What insights can be derived regarding the influence of stress on sleep?

- Relevant references :

[7] J. R. Anderson, A. L. Carroll, A. Azcarate-Peril, et al., "Insights into the Impact of Stress on Sleep Patterns: A Systematic Review," *Frontiers in Neurology*, vol. 10, article no. 201, 2019. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7045300/>. [Accessed: March 21, 2024].