ISEC Lisboa

Bachelor's Degree in Aeronautical and Space Sciences
Data Science in Aerospace

ESCOLA DE GESTÃO, ENGENHARIA E AERONÁUTICA

Project - Engine Performance

In this project, you are examining potential imbalances in engine performance, which might indicate maintenance needs or inefficiencies. This research also provides valuable insights into operational reliability and fuel efficiency for aircraft operators.

The data collected[1] requires an analysis of the average fuel consumption rate between the left and right engines from different flights of an Airbus $A321^{neo}$. Data processing and analysis must be made using Python.

Tasks

1. Design a preprocessing phase for data inconsistencies.

2. Describe the obtained sample using descriptive statistical tools.

3. Test the normality of data.

   - *Recommendation:* Use the Kolmogorov-Smirnov test for goodness of fit ⬀ .

4. Conduct comparison tests of the means and variances of the average fuel consumption rate, assuming normality if necessary.

   - *Recommendation:* Compare the expected fuel consumption rate between engines ⬀ and their variances ⬀ . Then, compare each engine's expected fuel consumption rate to the reference (recommended) value of 1425 kilograms per hour ⬀ .

5. Conduct further analysis that you believe could enhance the analysis's value.

6. Prepare a final report[2], with no more than 5 pages that must include the following sections:

   (a) Students' identification (name and number)
   (b) The objectives of the study
   (c) The methods used
   (d) Results and discussion
   (e) Conclusion and recommendations
   (f) References
   (g) Attachments
      - Must include the Python code developed for the analysis

      - When using AI tools, add a section called *Declaration of Use of AI and AI-Enhanced Technologies* with the following statement:

        "During the preparation of this report, the author(s) used [NAME TOOL / SERVICE] to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the present report."

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[1]Data for this project was artificially generated.

[2]Plagiarism will invalidate the project's contribution to the evaluation. Upon submission, authors are required to disclose the use of generative AI in the project's writing. AI tools should be employed solely within the writing process to enhance readability and language proficiency.