

Sensitivity Analysis Report

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Introduction:

Sensitivity analysis is a crucial technique for assessing the robustness of models or decisions by evaluating how changes in input parameters influence the output. In this report, I conducted a sensitivity analysis on a dataset comprising initial columns: lbat, Vbat, Tbat, cpu, gpu, brightness, and Wifi Tx. The objective was to determine which parameters demonstrate the highest sensitivity, thereby aiding decision-making processes and guiding further investigation.

Approach:

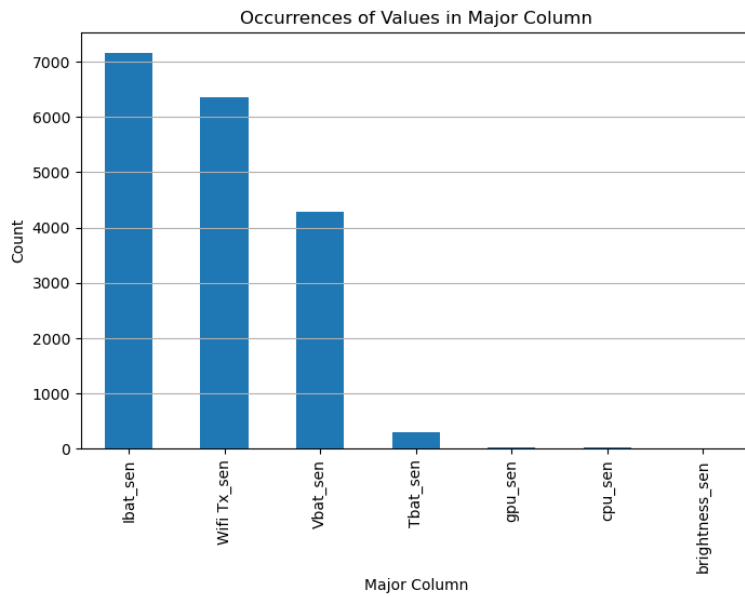
I employed Python code to compute the sensitivity of each column (lbat, Vbat, Tbat, cpu, gpu, brightness, and Wifi Tx) and stored their respective values in lbat_sen, Vbat_sen, Tbat_sen, cpu_sen, gpu_sen, brightness_sen, and Wifi Tx_sen. The suffix "_sen" denotes the sensitivity value of each respective column. Subsequently, I determined the field with the highest sensitivity value and stored it in the "major" field. The value in the "major" column signifies the parameter most sensitive to changes in other column values. Upon obtaining this data in an updated Excel worksheet, I analyzed the occurrence of values in the "major" column to identify parameters with higher sensitivity compared to changes in other values.

Sensitivity Analysis Result Worksheet:

lbat	Vbat	Tbat	cpu	gpu	brightness	Wifi Tx	major	lbat_sen	Vbat_sen	Tbat_sen	cpu_sen	gpu_sen	brightness_sen	Wifi Tx_sen
-16174	4308446	320	1248000	1.8E+08	10	0								
-3967	4310124	320	1440000	1.8E+08	10	0	cpu_sen	8.73E-06	9.81E-06	0	0.012658	0	0	0
-34484	4305547	320	1440000	1.8E+08	10	167	Vbat_sen	2.18E-05	2.68E-05	0	0	0	0	3.61E-08
-34484	4305547	320	1440000	1.8E+08	10	643	Wifi Tx_sen	0	0	0	0	0	0	1.03E-07
-590053	4235204	320	1440000	1.8E+08	10	14589	Vbat_sen	0.000397	0.000411	0	0	0	0	3.01E-06
-170744	4287542	320	1440000	1.8E+08	10	0	Vbat_sen	0.0003	0.000306	0	0	0	0	3.15E-06

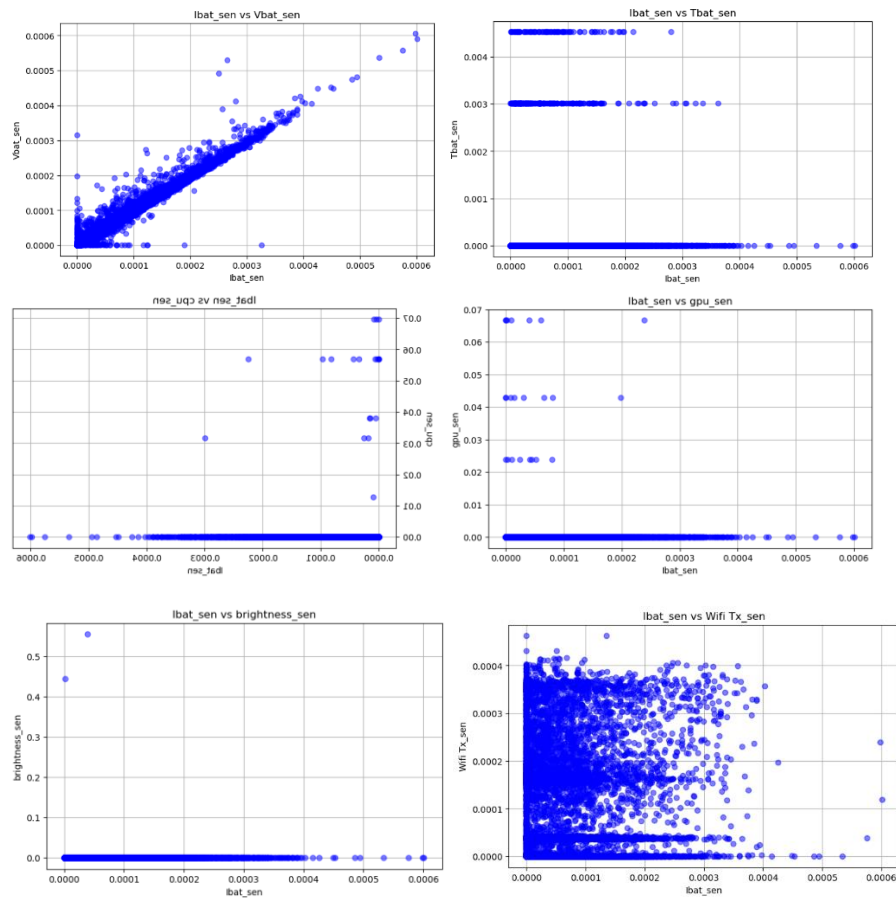
Sensitivity Analysis Result

Bar Graph Explaining Sensitivity:



In the above bar graph, lbat_sen demonstrates higher sensitivity compared to other values in the dataset.

Scatter plotting (lbat sensitivity vs other columns):



Conclusion:

Through this sensitivity analysis, the **current (I_{bat}) emerged as a parameter with significant sensitivity**, providing valuable insights for decision-making and further analysis. By prioritizing parameters with higher sensitivity, such as current (I_{bat}), we can enhance the robustness and reliability of our models or decisions, thereby facilitating more informed and effective actions.