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| Activity No. 3 | |
| Automation of Statistical Analysis of Signals | |
| **Course Code:** CPE 027 | **Program:** |
| **Course Title:** Digital Signal Processing and Applications | **Date Performed:** |
| **Section:** | **Date Submitted:** |
| **Name/s:** | **Instructor:** |
| **1. Objective:** | |
| This activity aims to introduce the concept of statistical analysis for large-volume signals, such as the mean, standard deviation, noise, and error.This includes programmatically visualizing, calculating, and storing, using a high-level language. | |
| **2. Intended Learning Outcomes (ILOs):** | |
| After completion of this activity the students should be able to:  Develop a program that calculates and visualizes the statistical properties of a given signal dataset. | |
| **3. Discussion :** | |
| 1. How is automation applied in signal processing? 2. Why is automation crucial in signal processing and big data situations? | |
| **4. Resources:** | |
| The activity will require the following software, tools and equipment: | |
| **5. Directions:** | |
| A sensor managed to sample data in 0 to 195 steps. You will be given access to a repository of each sample in the form of CSV files. Use only csv files coming from machine B1. There is a total of 196 sample files, each of those files contain 41,666 data points. Disregard the file labeled: Base Noise.    1. Create a program that can calculate the mean, standard deviation, standard error, for **each** STEP, and consolidate it in a separate (new) csv file.  2. Also, create a program that is able to create and save images showing both the time-series plot, histogram, and the calculated values for each step. This would look similarly like the image below.    Figure 1 - (Left to Right) Plotting of Means Per Step, Histogram of one (1) step, Time-Series of one(1) step. | |
| **6. Procedures** | |
| *\*Document EVERYTHING you did to accomplish this. Discuss why you did those.* | |
| **7. Results(sample)** | |
| *\*Don’t forget to add a link of your ipynb file, csv, and image results.* | |
| **8. Data Analysis** | |
| ***\*****what did you observe in the data?* | |
| **9. Summary and Conclusions** | |
| *\*summarize what you did. What did you find out?* | |
| **10. Learnings and Contributions of each member** | |
| *\*what did you do to contribute to this activity? What new learnings, methods and techniques did you pick up? Describe in detail.* | |