Preprocess Data (preprocess.py)

How to Run the Script: -

python3 preporcess.py [data.csv] [PGN] [SA] ["Byte Stream for a Specific SPN"]

Example: python3 firstscript.py KenworthData.csv 65263 0 "B5B6"

Output => preprocesses.csv

What this script does?

- **INPUT:**

    (1) Dataset X (csv format) in the following format

	Abs. Time	Rel. Time	Delta Time	ID	PGN	DA	SA	DLC	B0	B1	B2	B3	B4	B5	B6	B7	Bytes
1	1.54E+09	1.10E-05	1.10E-05	2.17E+08	61444	255	0	8	46	135	135	214	32	0	240	135	2e8787d62000f087
8	1.54E+09	0.00352	0.000976	2.17E+08	61444	255	0	8	46	135	135	206	32	0	240	135	2e8787ce2000f087

In the input file Bi is a byte of data. So, there are 8 bytes that store the message for each packet. PGN describes the information that is stored in these bytes (for example the bytes may store engine speed, wheel speed, etc.). SA is the sender of the message and DA is the receiver of the message. The actual decimal value of the message is calculated using the instructions in the vehicle standard (the SPNandPGN file). The *Bytes* column stores the HEX value of the message.

NOTE: *To run this script without any errors, make sure that dataset.csv file contains Rel. Time and Bytes columns, as this script uses that columns directly to grab the data.*

(2) PGN

(3) SA

(4) The Bytes that we want to convert to binary for that PGN and SA *(e.g "B3B4")*

- **OUTPUT:**

  A csv file *(preprocesses.csv)* in the following format.

id	time	b30	b31	b32	b33	b34	b35	b36	b37	b40	b41	b42	b43	b44	b45	b46	b47
1	1.10E-05	1	1	0	1	0	1	1	0	0	0	1	0	0	0	0	0
8	0.00352	1	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0

Evaluate Data (evaluate.py)

How to Run the Script: -

python3 evaluate.py [preprocessed.csv] [LSBs] [Denoising value *(i.e., 0 or 1)*]

Example: python3 evaluate.py TU36_002_1_61444_0_B3B4.csv "1,2,3,4,5,6,7" 0

Output => evaluate.csv and a plot/graph

Inside the Script: -

Update the following lines in the evaluate.py code depending on the nature (i.e., PGN and SPN) of the data you want to evaluate:

#Hard Code Value

resolution =0.00390625

offset=0

unit="MPa"

NOTE: *This information can be found in the SAE-J1939 standardized protocol for heavy vehicles.*

What this script does?

- **INPUT:**

    (1) Preprocess Dataset X (csv format) in the following format

| id	time	b30	b31	b32	b33	b34	b35	b36	b37	b40	b41	b42	b43	b44	b45	b46	b47
1	1.10E-05	1	1	0	1	0	1	1	0	0	0	1	0	0	0	0	0
8	0.00352	1	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0

NOTE: *To run this script without any errors, make sure that proprocess.csv file contains id and time columns, as this script uses that columns directly to grab the data.*

(2) The LSBs that we want to denoise ***(e.g. "1,2,3,4,5")***

NOTE: *Make sure that there are no trailing commas in the LSBs. This "1,2,3,4,5," would produce error.*

- **OUTPUT:**
  (1) Plot/Graph: -
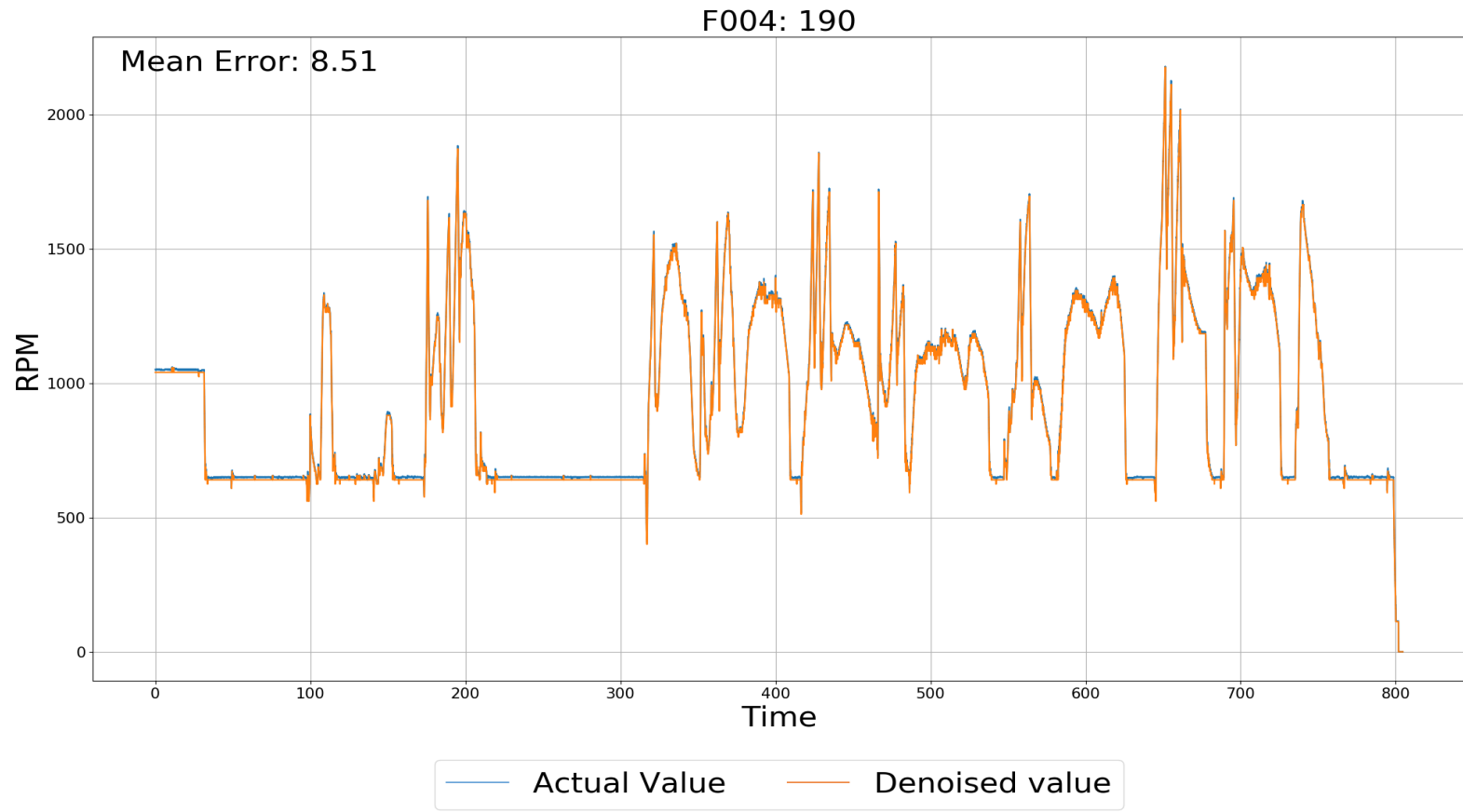
(2) A csv file in the following format: -

id	time	Actual_value	Denoised_value
1	1.10E-05	1050.75	1040
8	0.00352	1050.75	1040