

Read me file: implementation of "One-fault-shot learning for fault severity estimation of gears that addresses differences between simulation and experimental signals and transfer function effect"

The codes in this directory implement the demonstration on the experimental dataset of the study:

Matania, O., Bachar, L., Khemani, V., Das, D., Azarian, M. H., & Bortman, J. "One-fault-shot learning for fault severity estimation of gears that addresses differences between simulation and experimental signals and transfer function effects." *Advanced Engineering Informatics*, Vol. 56 101945 (2023).

<https://doi.org/10.1016/J.AEI.2023.101945>

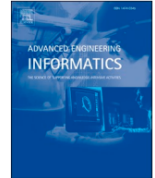
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Full length article



One-fault-shot learning for fault severity estimation of gears that addresses differences between simulation and experimental signals and transfer function effects

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The experimental dataset consists of measured signals [see Fig. 5(c), Fig. 8 and Table 1] and simulated dataset [see Fig. 5(a) and Fig. 8].

You can run the codes using Matlab by two steps:

1. Download data.zip file from:

<https://drive.google.com/drive/folders/1214stu5R2wGPK48mEesyaguQu1HzabdR>

and extract its data. Set the right path in the main.m file:

```
52 % ----- %
53 % Section 1: Set the directory path of the data and the processed data
54 % ----- %
55
56 data_dic_path = 'C:\data\one_fault_shot_learning_for_gear_severity_estimation\data' ;
57 processed_data_dic_path = 'C:\data\one_fault_shot_learning_for_gear_severity_estimation\processed_data' ;
58
```

2. Run main.m file.

You can also set the speed (15 or 30) and load (5 or 10) in main.m file:

```
59 % ----- %
60 % Section 2: Set the parameters
61 % ----- %
62
63 rotating_speed = 15 ; % rps. Possible speeds: 15rps, 30rps.
64 system_load = 10 ; % Nm. Possible loads: 5Nm, 10Nm.
65
66 % Set 1 for use the operation, 0 to not
67 use_RMS_normalization = 1 ;
68 mitigate_varied_gain_phase = 1 ;
```

You can use the codes and data for any academic purposes; however, you are requested to cite:

[1] Matania, O., Bachar, L., Khemani, V., Das, D., Azarian, M. H., & Bortman, J. "One-fault-shot learning for fault severity estimation of gears that addresses differences between simulation and experimental signals and transfer function effects." *Advanced Engineering Informatics*, Vol. 56 101945 (2023).

<https://doi.org/10.1016/J.AEI.2023.101945>

If you use the code of ACS you need to cite also:

[2] Matania O, Klein R, Bortman J. "Novel approaches for the estimation of the spectrum background for stationary and quasi-stationary signals." *Mech Syst Signal Process*, Vol. 167 (2022).

<https://doi.org/10.1016/j.ymssp.2021.108503>.

[3] Matania O, Klein R, Bortman J. "Algorithms for spectrum background estimation of non-stationary signals." *Mech Syst Signal Process*, Vol. 167 (2022).

<https://doi.org/10.1016/j.ymssp.2021.108551>

If you use the code for propagation the signals via the estimated transfer function you should cite:

[4] Matania O, Klein R, Bortman J. "Transfer Across Different Machines by Transfer Function Estimation." *Front Artif Intell*, (2022).

<https://doi.org/10.3389/FRAI.2022.811073>.

For any question do not hesitate to send an email to Omri Matania in omrimatania@gmail.com.