

User Manual for SIGDIG Matlab Demo

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1 Introduction

This manual briefly describes how to use the demo Matlab files in Unix system (Matlab R13), but the demo software has also been tested in Windows (Matlab R13). For more information about the methods see [1].

2 Extracting demo files

Extract data files to the desired location:

```
[jkamarai@betelgeuse tmp] tar xzfv smoot_data.tar.gz
data1/
data1/rikki37_tyhjakuorma.dat
data1/rikki38_tyhjakuorma.dat
data1/ehja42_tyhjakuorma.dat
data1/ehja43_tyhjakuorma.dat
data1/rikki36_tyhjakuorma.dat
data1/ehja41_tyhjakuorma.dat
data1/ehja40_tyhjakuorma.dat
data2/
...
...
```

and extract code files to the desired location:

```
[jkamarai@betelgeuse tmp] tar xzfv smoot_demo.tar.gz
./code/base/Contents.p
./code/base/gfcheckfilter.p
./code/base/gfcheckfilter2.p
./code/base/gfcreatefilter.p
./code/base/gfcreatefilter2.p
./code/base/gfcreatefilterf.p
./code/base/gfcreatefilterf2.p
```

```
./code/base/gfcreateinformationdiagram2.p
./code/base/gfdemo01.p
...
...
```

3 Executing demo

Start Matlab:

```
[jkamarai@betelgeuse jkamarai] Matlab -nojvm
```

Move to the directory where files were extracted and launch start-script:

```
>> cd tmp
>> start
```

```
f =
```

```
1
```

```
>>
```

4 Loading data and finding discriminative information

You may now load “normal” and “damaged” data files (or several of them). You may, for example, use files provided to be downloaded. Load for example files *ehja40_tyhjakuorma.dat* (normal) and *rikki36_tyhjakuorma.dat* (damaged). These files are measurements from stator currents of motors with no load (see [1] for more details). After adding the files you may display the data, or more precisely, the mean frequency component of both data sets (they both contain 40 distinct measurements). See Fig. 1.

By pressing button **Go!** you may find the regions of discriminative information. The parameters can be changed and as a results you will receive the most discriminative frequencies (Fig. 2).

The loaded data can now be used to classify new samples. Press **Classify** to open classifier module. To the classifier module you must again give a file to classify (**Add file**). You may use for example the file *ehja41_tyhjakuorma.dat* which should be from normal condition measurements and you may select the most discriminative frequency (270 Hz in Fig. 2) or several of them. The classification result is shown in Fig. 3. From the result it is obvious that all measurements were classified correctly as normal and also the classification confidences are particularly high.

References

- [1] J. Ilonen, J.-K. Kamarainen, T. Lindh, J. Ahola, H. Kälviäinen, and J. Partanen. Diagnosis tool for motor condition monitoring. *IEEE Trans. on Industry Applications*, 2005. in press.

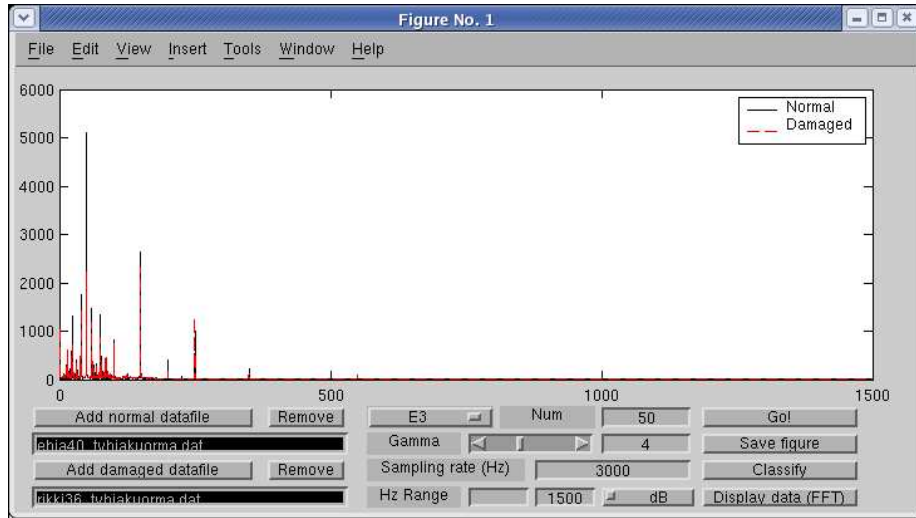


Figure 1: Displaying data.

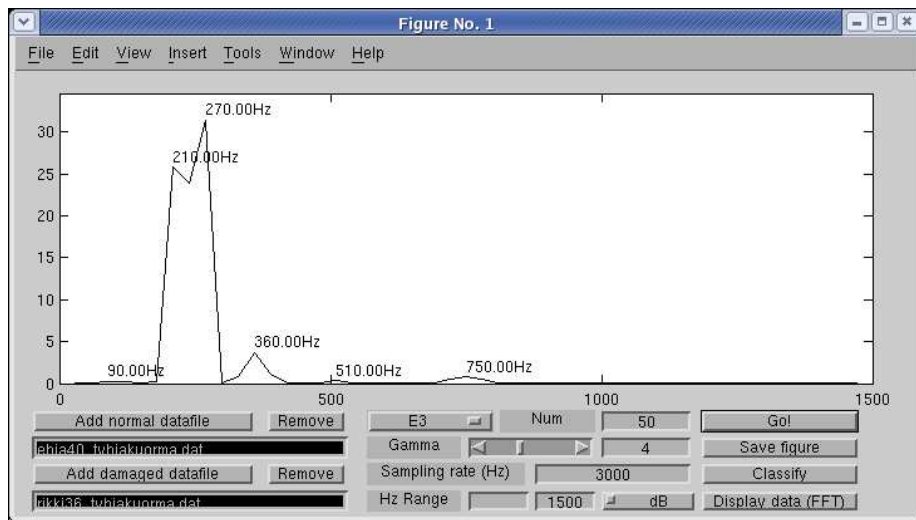


Figure 2: Finding discriminative frequencies.

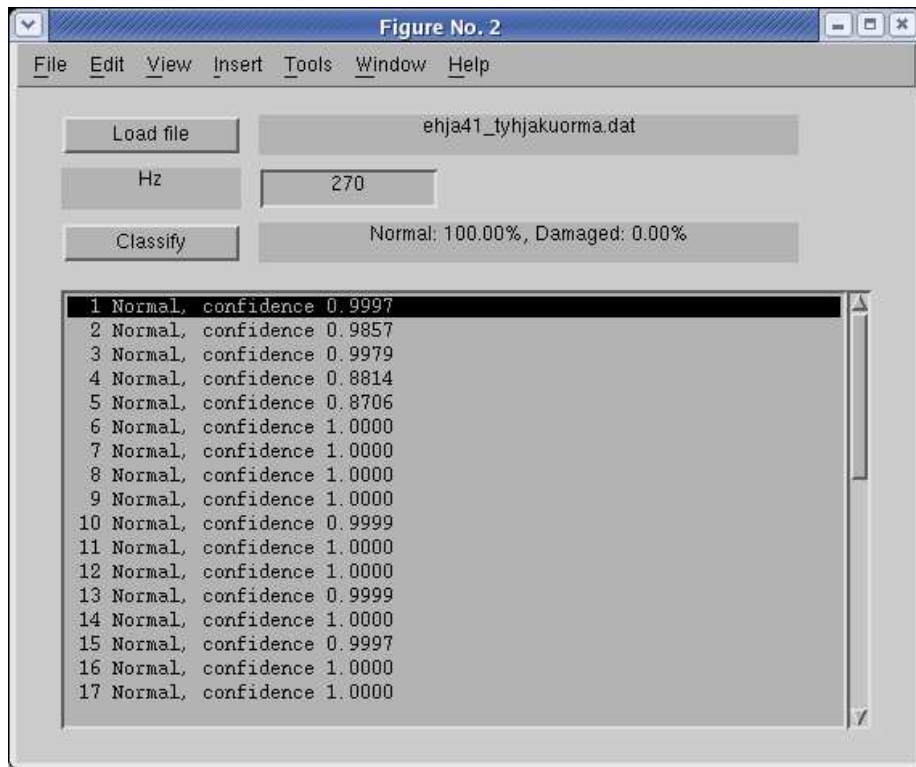


Figure 3: Finding discriminative frequencies.