CALVADOS Validation and Evaluation Manual

pmdtechnologies ag – 2019-08-20

Execute validation

- In order to do a validation, you need:
  - CALVADOS software installation (in this case the script validate_plane_run.py and its dependencies is used)
  - A raw data file of 20 depth images recorded in a Validation Box at a given validation distance (*.rds file format)
  - The corresponding calibration file (*.zwetschge or *.jgf file format)
  - The processing parameters (*.json file format) for the depth computation library built into the CALVADOS software which must be suitable for the recorded data (frequencies and number frequencies) and use case

- The validation is executed by running a command of the following structure (separated by whitespaces) in a command line interface:

  python.exe | validate_plane_run.py | set of arguments

0000-0000-0000-0000: corresponding imager serial number

Execute validation cont'd

- Required arguments:
  - --jgf_file *path_to_calibration_file**0000-0000-000-0000.jgf* (file suffix could be different)
  - --file_mask *path_to_validation_box_folder**0000-0000-000-0000_VAL*.rds
  - --output_folder *path_to_output_folder*
  - --processing_parameter_config *path_to_processing_config**processing_config.json*
  - --expected_distance 0.5 (true distance of Validation Box in m)
  - *--apply_test (apply limits given in processing_config.json)*
- Optional arguments:
  - --spreadsheet (results are stored as spreadsheet in *path_to_output_folder*)
  - --spreadsheet_avg (mean amplitudes, mean depth data and point cloud are stored as csv in path_to_output_folder)
  - --roi "x_1, y_1, x_2, y_2" ($x_2 > x_1$ long side of imager, $y_2 > y_1$ short side of imager)

- Example call of the validation tool in a command line interface (e.g. cmd):

```
"C:\Program Files\pmdtechnologies_ag\pmd_Calibration_and_Validation_Software\envs\python37\python.exe" "C:\Program Files\pmdtechnologies_ag\pmd_Calibration_and_Validation_Software\scripts\validate_plane_run.py" --jgf_file "D:\calibration_files\0000-0000-000-0000.zwetschge" --file_mask "C:\data\0000-0000-000-0000_VAL.rds" --output_folder "C:\results" --processing_parameter_config "C:\configuration_files\processing_config_8060mhz.json" --expected_distance 0.5 --spreadsheet --apply_test
```

0000-0000-0000-0000: corresponding imager serial number

Execute validation cont'd

- validate_plane can also be started with a batch file:
  - Create an empty batch file called validate_plane_run.bat at a location of choice
  - Open validate_plane_run.bat in a text editor
  - Enter the function and argument call like on previous slide
  - Save and close the file
  - Run validate_plane_run.bat by double clicking or by calling within a command line interface
  - Alternative: use the bat file created during installation in installation path and adapt arguments as needed

File example:

```
REM bat file for doing validation with CALVADOS
@echo off
setlocal
"C:\Program Files\pmdtechnologies_ag\pmd_Calibration_and_Validation_Software\envs\python37\python.exe" "C:\Program Files\pmdtechnologies_ag\pmd_Calibration_and_Validation_Software\scripts\validate_plane_run.py" --jgf_file "D:\calibration_files\0000-0000-000-0000.zwetschge" --file_mask "C:\data\0000-0000-000-0000_VAL.rds" --output_folder "C:\results" --processing_parameter_config "C:\configuration_files\processing_config_8060mhz.json" --expected_distance 0.5 --spreadsheet --apply_test
```

Execute performance evaluation

- In order to do a performance evaluation, you need:
  - CALVADOS software installation (in this case the script cdd_metric_run.py and its dependencies is used)
  - Raw data files of 25 depth images recorded at several distances (typically ranging from 20cm to 400cm) recorded on LTS (*.rds file format); files need to be in a folder called 0000-0000-0000-0000_LTS with 0000-0000-0000-0000 being the module serial number; tool can do batch analysis of several folders/modules
  - The corresponding calibration file (*.zwetschge or *.jgf file format)
  - The processing parameters (*.json file format) for the depth computation library built into the CALVADOS software which must be suitable for the recorded data (frequencies and number frequencies) and use case

- The performance evaluation is executed by running a command of the following structure (separated by whitespaces) in a command line interface:

  python.exe | cdd_metric_run.py | set of arguments

0000-0000-0000-0000: corresponding imager serial number

Execute performance evaluation cont'd

- Required arguments:
  - --jgf_file *path_to_calibration_file_collection*.jgf* (file suffix could be different)
  - --file_mask *path_to_lts_data_collection\<serial>_LTS\performance_eval_data*.rds*.
  - --output_folder *path_to_output_folder*
  - --processing_parameter_config *path_to_processing_config\processing_config.json*
  - --wall_fit_position 600 (distance where wall fit for determination of mounting and LTS installation uncertainty is done [mm], 600 is default)
  - --*spreadsheet* *(generates xlsx sheets containing results in tabular view and plots)*

- Optional arguments:
  - --roi "x_1, y_1, x_2, y_2" ($x_2 > x_1$ long side of imager, $y_2 > y_1$ short side of imager)

- Example call of the performance evaluation tool in a command line interface (e.g. cmd):

```
"C:\Program Files\pmdtechnologies_ag\pmd_Calibration_and_Validation_Software\envs\python37\python.exe" "C:\Program Files\pmdtechnologies_ag\pmd_Calibration_and_Validation_Software\scripts\cdd_metric_run.py" --jgf_file "D:\calibration_files\*.zwetschge" --file_mask "C:\data\<serial>_LTS\performance_eval_data*.rds" --output_folder "C:\results" --processing_parameter_config "C:\configuration_files\processing_config_8060mhz.json" --wall_fit_position 600 --spreadsheet
```

<serial>: wildcard for in tool regex search, do not change!

Execute validation cont'd

- A performance evaluation can also be started with a batch file:
  - Create an empty batch file called cdd_metric_run.bat at a location of choice
  - Open cdd_metric_run.bat in a text editor
  - Enter the function and argument call like on previous slide
  - Save and close the file
  - Run cdd_metric_run.bat by double clicking or by calling within a command line interface
  - Alternative: use the bat file created during installation in installation path and adapt arguments as needed

File example:

```
REM bat file for doing validation with CALVADOS
@echo off
setlocal
"C:\Program Files\pmdtechnologies_ag\pmd_Calibration_and_Validation_Software\envs\python37\python.exe" "C:\Program Files\pmdtechnologies_ag\pmd_Calibration_and_Validation_Software\scripts\cdd_metric_run.py" --jgf_file "D:\calibration_files\*.zwetschge" --file_mask "C:\data\<serial>_LTS\performance_eval_data*.rds" --output_folder "C:\results" --processing_parameter_config "C:\configuration_files\processing_config_8060mhz.json" --wall_fit_position 600 --spreadsheet
```