**SigProcOpenPython - User’s Guide**

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**Contents**

Introduction 1

ChangeLog 1

How to run SigProcOpenPython 1

Configuration file (--paramfile) 2

Installation structure 4

Installation Guide 4

How to create models 6

# Introduction

SigProcOpenPython (SigProcOP) is the add-on of Safibra OptiGuard product with the ability to add the user defined function prepared in python.

The user defined function has a general form Y = f(x1, x2, … xn), where xi represents an input value coming from a defined SigProc device/sensor with a given timestamp.

SigProcOpenPython works as follows:,

* Listens for incoming packets from different devices/sensors packets SigProc, parses them and stores the data in the internal “collection buffer”
* When the stored data in the collection buffer are identified to hold all xi input values (based on the f() function definition), the processing of the value Y is done and the Y value is sent to the defined device/sensor

# ChangeLog

v1.0

* Initial version

# How to install and run SigProcOpenPython – Main steps

The main steps to install and run SigProcOpenPython are as follows (for details for each step, see below):

* Create python3 environment with needed packages
* Install SigProcOpenPython
* Prepare SigProcOpenPython json configuration file
* Prepare the f() function
* Run SigProcOpenPython

## Create python3 environment with needed packages

SigProcOpenPython can be run at any server with python 3 available. The instructions in this chapter expect Centos 7 server and Anaconda python installation. For other environment, appropriate changes needed to be done.

A specific user expected for the installation and SigProcOpenPython usage, ‘ml’ expected here.

*Installation steps:*

# Download and install miniconda

cd ~ ; mkdir -p Downloads

cd ~/Downloads

wget <https://repo.anaconda.com/miniconda/Miniconda3-latest-Linux-x86_64.sh>

sh Miniconda3-latest-Linux-x86\_64.sh

# read and accept licence (yes)

# install to default /home/ml/miniconda3 location

# confirm "installer" to initialize Miniconda3 (yes)

# relogin as ml

# update miniconda

conda update conda

# create python environment named "spop"

conda create -n spop pip python=3.8 pandas dill

# activate python envionment spop

conda activate ml

## Install SigProcOpenPython

login as ml user

# download SigProcOpenPython from appropriate git repository

cd ~

git clone [https://github.com/marsal64/SigProcOpenPython.git](https://github.com/marsal64/optiguardml.git)

# regenerate new fresh models

cd ~/SigProcOpenPython/SigProcOpenPython/helpers

python create\_models.py

# verify if everything works (in --debug mode)

cd ~/SigProcOpenPython && python ogmlrun.py --debug

## Prepare SigProcOpenPython json configuration file

## Prepare the f() function

## Run SigProcOpenPython

## How to run SigProcOpenPython

After the installation (see below), the system starts automatically, even after the server is restarted.

The status can be verified by:

systemctl status SigProcOpenPython.service

SigProcOpenPython can be also manually run as follows (login as ml user) using the preparatory steps:

sudo systemctl stop SigProcOpenPython.service

cd ~/SigProcOpenPython

conda activate ml

Then can be run either in standard mode

python ogmlrun.py

or in debug mode:

python ogmlrun.py --debug

Additionally, other parameters can be used for ogmlrun.py as follows:

usage: ogmlrun.py [-h] [--paramfile PARAMFILE] [--debug] [--rundir RUNDIR]

[--nolog] [--mode MODE] [--port PORT]

optional arguments:

-h, --help show this help message and exit

--paramfile PARAMFILE

.json file with parameters.

--debug If present, runs in debug mode.

--rundir RUNDIR If present, does cd to the given directory. If not

present, it runs in the directory when the runogml.py

script is present.

--nolog If present, disables logging.

# Configuration file (--paramfile)

Here is an example of the configuration file for SigProcOpenPython with comments:

|  |  |
| --- | --- |
| { |  |
| "name": "SigProcOpenPython", | Name used for logging |
| "description": "configuration for ObjectSense\_01", | Comment - description |
|  |  |
| "maxdblines": 10000, | Maximum number of internal “collection database” messaging buffer where data are collected together by timestamps to form a dataset for mm and offsetx\_abs calculation. If exceeded, some values will be discarded |
| "dbsectoerase": 60, | In seconds. If any measurement coming from input channel is older than dbsectoerase seconds, it is discarded as obsolete |
| "dbmaintainsec": 60, | The interval after which the database messaging buffer is processed to find obsolete measurement data |
| "maxdatabuf": 1000000, | Size of the internal input messages streaming buffer in bytes |
|  |  |
| "listen": { |  |
| "ip": "10.23.18.161", | IP address where SigProcOpenPython listens |
| "port": 5555 | Port where SigProcOpenPython listens |
| }, |  |
|  |  |
| "inputs": [ |  |
| {"name": "ch1", |  |
| "fromdevice": "ProcessGuard\_15", | Measurement 1 device id |
| "fromsensor": "os\_01" | Measurement 1 sensor id |
| }, |  |
| {"name": "ch2", |  |
| "fromdevice": "ProcessGuard\_15", | ... |
| "fromsensor": "os\_02" | ... |
| }, |  |
| {"name": "ch3", |  |
| "fromdevice": "ProcessGuard\_15", | ... |
| "fromsensor": "os\_03" | ... |
| }, |  |
| {"name": "ch4", |  |
| "fromdevice": "ProcessGuard\_15", | ... |
| "fromsensor": "os\_04" | ... |
| }, |  |
| {"name": "ch5", |  |
| "fromdevice": "ProcessGuard\_15", | ... |
| "fromsensor": "os\_05" | ... |
| }, |  |
| {"name": "ch6", |  |
| "fromdevice": "ProcessGuard\_15", | ... |
| "fromsensor": "os\_06" | ... |
| }, |  |
| {"name": "ch7", |  |
| "fromdevice": "ProcessGuard\_15", | ... |
| "fromsensor": "os\_07" | ... |
| }, |  |
| {"name": "ch8", |  |
| "fromdevice": "ProcessGuard\_15", | Measurement 8 device id |
| "fromsensor": "os\_08" | Measurement 8 sensor id |
| } |  |
| ], |  |
|  |  |
| "model\_1": { |  |
| "modelfile": "models/model\_mm.ml", | File with the model for mm |
| "modelname": "SigProcOpenPython model mm" | Model comment |
| }, |  |
|  |  |
| "model\_2": { |  |
| "modelfile": "models/model\_offsetx\_abs.ml", | File with the model for offsetx\_abs |
| "modelname": "SigProcOpenPython model offsetx\_abs" | Model comment |
| }, |  |
|  |  |
| "output\_1": |  |
| {"ip": "10.23.18.73", | IP where SigProcOpenPython is sending output 1 (mm) |
| "port": 5555, | Port where SigProcOpenPython is sending output 1 (mm) |
| "device": "python", | Device id for output 1 (mm) |
| "sensor": "result\_01" | Sensor id for output 1 (mm) |
| }, |  |
|  |  |
| "output\_2": |  |
| {"ip": "10.23.18.73", | IP where SigProcOpenPython is sending output 2 (offsetx\_abs) |
| "port": 5555, | Port where SigProcOpenPython is sending output 1 (offsetx\_abs) |
| "device": "python", | Device id for output 1 (offsetx\_abs) |
| "sensor": "result\_02" | Sensor id for output 1 (offsetx\_abs) |
| } |  |
| } |  |

# Installation structure

/home/ml/SigProcOpenPython/

├── logs

│   └── SigProcOpenPython\_run.log # run log

├── models # directory for models preparation

│   ├── DataRaw.csv # standard input file for models creation

│   ├── model\_mm.ml # standard model file for mm

│   └── model\_offsetx\_abs.ml # standard model file for offsetx\_abs

├── ogmlrun.py # main run code for SigProcOpenPython

├── SigProcOpenPython

│   ├── functionality.py # helper functionality code for SigProcOpenPython

│   ├── helpers # directory with helpers functionality

│   ├── \_\_init\_\_.py

│   └── \_\_pycache\_\_

├── SigProcOpenPython.json # main configuration file

├── README.md

└── run\_ogml.sh # run script called by systemd

# Installation Guide

**# add to systemd**

#create new file /lib/systemd/system/SigProcOpenPython.service with contents:

[Unit]

Description=SigProcOpenPython service

After=network-online.target

[Service]

Type=simple

User=ml

WorkingDirectory=/home/ml/SigProcOpenPython

ExecStart=/bin/bash run\_ogml.sh

TimeoutStartSec=0

[Install]

WantedBy=multi-user.target

Alias=SigProcOpenPython.service

**# enable the service, start, verify status**

sudo systemctl daemon-reload

sudo systemctl enable SigProcOpenPython.service

sudo systemctl restart SigProcOpenPython.service

sudo systemctl status SigProcOpenPython.service

**# stop the service**

sudo systemctl stop SigProcOpenPython.service

# How to create models

Warning: don’t do this without exactly knowing what you are doing.

Steps:

* Place file with as /home/ml/SigProcOpenPython/models/DataRaw.csv
* cd /home/ml/SigProcOpenPython/SigProcOpenPython/helpers
* python createmodels.py

Two files are then created in /home/ml/SigProcOpenPython/models/ directory

Possible parameters to be used with createmodels.py:

usage: create\_models.py [-h] [--fromraw] [--rawsubdir RAWSUBDIR]

[--offsubdir OFFSUBDIR] [--chanfname CHANFNAME]

[--startmm STARTMM] [--speed SPEED]

[--testsplit TESTSPLIT] [--randomseed RANDOMSEED]

[--debug] [--inputdata INPUTDATA] [--rundir RUNDIR]

[--modeltype MODELTYPE] [--from\_mm FROM\_MM]

[--to\_mm TO\_MM] [--filemodel\_1 FILEMODEL\_1]

[--filemodel\_2 FILEMODEL\_2] [--mode MODE]

[--port PORT]

OptgiGuartdML create model

optional arguments:

-h, --help show this help message and exit

--fromraw Create RawData.csv from non-mm raw data subdirectories

--rawsubdir RAWSUBDIR

Subdirectory under rundir with raw data subfolders

--offsubdir OFFSUBDIR

Regex to match subdirectory name

--chanfname CHANFNAME

Regex to match channel in file name in subdirectory

--startmm STARTMM Starting value of mm for the first position

--speed SPEED Speed in mm/s

--testsplit TESTSPLIT

Percentage of test, 0.3 means 30 percent of data used

for testing

--randomseed RANDOMSEED

Random seed

--debug If present, does some more detailed profiling and

graphs

--inputdata INPUTDATA

File name of input data

--rundir RUNDIR If present, does cd to the given directory. If not

present, it runs in the directory when the script is

present.

--modeltype MODELTYPE

Model type. Try slower but more precise alternative:

ExtraTreesRegressor

--from\_mm FROM\_MM Drop from mm from input data

--to\_mm TO\_MM Drop to mm from input data

--filemodel\_1 FILEMODEL\_1

Filename for model 1 (mm)

--filemodel\_2 FILEMODEL\_2

Filename for model 2 (offsetx\_abs)

--mode MODE Internal parameter used only by pydev

--port PORT Internal parameter used only by pydev