Guide

1 Program compilation and use of parameters

There is a *Makefile* file to build the project. Running the following order in a Unix shell the program should be compiled:

```
make POPULATION_SIZE=PS  N_FEATURES=NF  N_OBJECTIVES=NO
N_INSTANCES=NI
```

Where:

- **PS** is the number of individuals of the population. The population size must be 4 or higher.
- **NI** is the number of instances to use (rows) of the database. This number must be between 2 and the total number of instances of the database.
- **NO** is the number of objective functions. By default, the program is developed for two objective functions. To use only one or more than two, it is necessary to modify the "evaluation" module.
- **NF** is the number of features to use (columns) of the database. This number must be between 2 and the total number of features of the database.

The executable file, named *hpmoonSeq* will be generated in the "*bin*" folder. For running it, in the shell the next order must be executed:

```
./bin/hpmoonSeq config.xml
```

Where *config.xml* is the necessary configuration file for the correct performance of the program and located in the root folder of the project.

Also, the *Makefile* file contains a rule to generate *Doxygen* documentation in the *"doc/html"* folder. This can be done by running the following command:

```
make documentation
```

Finally, the files and documents generated when compiling the project can be deleted. There are two types of cleaning depending on the content to be deleted. The command:

```
make clean
```

Deletes the following contents:

- **Binary files**
- **.o files**
- **~ files**
- **.a libraries**
- **Hidden files**
- **Hypervolume project of Fonseca.** This project generates the necessary library for calculating the hypervolume.

For a complete cleaning, run the following command:

```
make eraseAll
```

Which will remove the same content as the previous command and also the following content:

- *gnuplot* **files.**
- **Documentation files** generated by *Doxygen*.

gnuplot files contain the fitness of the individuals in the first Pareto front and the necessary source code for the *gnuplot* program. If the user would generate a graph using *gnuplot* and the source code generated by the program, it will also be deleted when using this command.

2   The XML configuration file

The XML configuration file is required to run the program as well as the parameters used in the *make* command. The parameters of the XML file are read and used at runtime while the parameters used in the *make* command are read and used at compile time to avoid dynamic memory. The parameters are:

- *DataBaseName* is the database filename.
- *NGenerations* is the number of generations to generate (iterations of the program).
- *MaxFeatures* is the maximum number of features initially set to "1". The value must be 1 or higher.
- *TournamentSize* is the number of individuals competing in the tournament. The value must be 2 or higher.
- *CrossDistribution* is the value of the crossover distribution and its value must be 0 or higher. It is not currently used but it could be used in the future if the real-coded crossover is implemented.
- *MutDistribution* is the value of the mutation distribution and its value must be 0 or higher. Like the *CrossDistribution* parameter, it's not currently used but it could be used in the future if the real-coded crossover is implemented.

- **DataName** is the name of the file which will contain the fitness of the individuals in the first Pareto front.
- **PlotName** is the name of the file which will contain the *gnuplot* code for data display.
- **ImageName** is the name of the file which will contain the image data (graphic) after using the *gnuplot* command to generate it.

The following table summarizes the restrictions of input parameters. The parameters passed to the *make* command are shown in uppercase. In lowercase, the parameters found in the XML configuration file.

PARAMETER	RANGE
POPULATION_SIZE	4 <= *PS*
N_INSTANCES	2 <= *NI* <= Number of instances of the DB
N_OBJECTIVES	*NO* = 2
N_FEATURES	2 <= *NF* <= Number of features of the DB
DataBaseName	-
NGenerations	0 <= *NG*
MaxFeatures	1 <= *MaxF*
TournamentSize	2 <= *TS*
CrossDistribution	0 <= *CD*
MutDistribution	0 <= *MD*
DataName	-
PlotName	-
ImageName	-

Table 1. Range of values for the parameters.