1. INTRODUCTION

OpenNN is a software library written in C++ for advanced analytics. It implements neural networks, the most successful machine learning method.

- The main advantage of OpenNN is its high performance.
- This library outstands in terms of execution speed and memory allocation. It is constantly optimized and parallelized in order to maximize its efficiency.
- Some typical applications of OpenNN are business intelligence (customer segmentation, churn prevention. . .), health care (early diagnosis, microarray analysis. . .) and engineering (performance optimization, predictive maitenance. . .).

The documentation is composed by tutorials and examples to offer a complete overview about the library.

- The documentation can be found at the official OpenNN site.
- CMakeLists.txt are build files for CMake, it is also used by the CLion IDE.
- The .pro files are project files for the Qt Creator IDE, which can be downloaded from its site. Note that OpenNN does not make use of the Qt library.

OpenNN is developed by Artelnics, a company specialized in artificial intelligence.

2. PROJECTS

2.1. Examples

2.1.1. simple function regression

type:

```
./simple_function_regression
```

2.1.2. simple pattern recognition

type:

```
./simple_pattern_recognition
```

2.1.3. airfoil self noise

type:

```
./airfoil_self_noise
```

2.1.4. airline passengers

type:

```
./airline_passengers
```

2.1.5. breast cancer

type:

```
./breast_cancer
```

2.1.6. iris plant

type:

```
./iris_plant
```

2.1.7. logical operations

type:

```
./logical_operations
```

2.1.8. pima indians diabetes

type:

```
./pima_indians_diabetes
```

2.1.9. urinary inflammations diagnosis

type:

```
./urinary_inflammations_diagnosis
```

2.1.10. yacht hydrodynamics design

type:

`./yacht_hydrodynamics_design`

2.1.11. yacht hydrodynamics production

type:

`./yacht_hydrodynamics_production`

2.1.12. leukemia

type:

`./leukemia`

2.1.13. pollution forecasting

type:

`./pollution_forecasting`

2.1.14. temperature forecasting

type:

`./temperature_forecasting`

2.1.15. mnist

type:

`./mnist`

2.2. Neural Turing Machine

2.2.1. PU

type:

`./PU`

3. WORKFLOW

3.1. Hardware

3.1.1. MSP430 GNU C/C++

3.1.2. OpenRISC GNU C/C++

3.1.3. RISC-V GNU C/C++

type:

```
sudo apt install autoconf automake autotools-dev curl python3 libmpc-dev \
libmpfr-dev libgmp-dev gawk build-essential bison flex texinfo gperf \
libtool patchutils bc zlib1g-dev libexpat-dev
```

type:

```
git clone --recursive https://github.com/riscv/riscv-gnu-toolchain

cd riscv-gnu-toolchain

./configure --prefix=/opt/riscv-elf-gcc
sudo make

./configure --prefix=/opt/riscv-elf-gcc
sudo make linux

./configure --prefix=/opt/riscv-elf-gcc --enable-multilib
sudo make linux
sudo make report-linux
```

3.2. Software

type:

```
rm -rf build
mkdir build
cd build

cmake ..
make
```

4. CONCLUSION