



CERN Summer Student Programme

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Project title:

ROOT Storage of Deep Learning Models in TMVA

Period:

June 14th → September 10th



So far..

- Exploring:
 - ONNX format
 - ONNX API
 - ROOT's CMake organization
- GoogleTests
 - Manual test + Autocompilation
 - Automating operator tests

<https://github.com/fsossai/SOFIE-GTest>



Manual Tests

- C++ file has to be written by hand
- Expected results are precompiled

```
TestSOFIECustom.cxx
#include "Linear_16.hxx"
#include "Linear_16.ref.hxx"

#include "Linear_32.hxx"
#include "Linear_32.ref.hxx"

#include "Linear_64.hxx"
#include "Linear_64.ref.hxx"

#include "gtest/gtest.h"
```

Manual Tests



```
namespace Linear_64_TestRefOutputs {  
float result[] = {  
-0.30755, -0.289056, -0.743735, 0.223954, -0.00694226, 0.477888,  
-0.275195, -0.292608, -0.179046, 0.607654, -0.30755, -0.289056,  
-0.743735, 0.223954, -0.00694226, 0.477888, -0.275195, -0.292608,  
-0.179046, 0.607654, -0.30755, -0.289056, -0.743735, 0.223954,  
-0.00694226, 0.477888, -0.275195, -0.292608, -0.179046, 0.607654,  
-0.30755, -0.289056, -0.743735, 0.223954, -0.00694226, 0.477888,  
-0.275195, -0.292608, -0.179046, 0.607654, -0.30755, -0.289056,  
-0.743735, 0.223954, -0.00694226, 0.477888, -0.275195, -0.292608,  
-0.179046, 0.607654, -0.30755, -0.289056, -0.743735, 0.223954
```

Linear_64.ref.hxx



Automated Tests

- Based on ONNX tests:

<https://github.com/onnx/onnx/tree/master/onnx/backend/test/case/node>

- .onnx file are created automatically
- GTests are created automatically



Future work

- Benchmarks
- Profiling
- Parallelism (?)