```cpp
#pragma once

#define GENE_MAX 32
#define CROSSOVER 16
#define MUTATIONRATE 0.075f
#define ELITISME 4
#define END_ERROR 0.005f

#include <stdint.h>
#include <bitset>
#include <vector>
#include <complex>
#include <valarray>
#include <array>

typedef unsigned char uchar;
typedef unsigned short ushort;

typedef std::complex<double> Complex_t;
typedef std::vector<Complex_t> ComplexVect_t;
typedef std::valarray<Complex_t> ComplexArray_t;
typedef std::vector<uint32_t> iContour_t;

typedef std::bitset<GENE_MAX> Genome_t;
typedef std::pair<std::bitset<CROSSOVER>, std::bitset<GENE_MAX - CROSSOVER>> SplitGenome_t;
typedef std::vector<float> Weight_t;
typedef std::vector<Genome_t> GenVect_t;
typedef struct PopMemberStruct
{
    Weight_t weights;
    GenVect_t weightsGen;
    float Calculated = 0.0;
    float Fitness = 0.0;
} PopMember_t;
typedef std::vector<PopMember_t> Population_t;
typedef std::pair<float, float> MinMaxWeight_t;

typedef struct Predict_struct
{
    uint32_t Category;
```

```
41      float RealValue;
42      float Accuracy;
43      std::vector<float> OutputNeurons;
44  } Predict_t;
45  typedef Predict_t(*NNfunctionType)(ComplexVect_t, Weight_t, Weight_t, uint32_t, uint32_t, uint32_t);
46
47  typedef std::vector<ComplexVect_t> InputLearnVector_t;
48  typedef std::vector<Predict_t> OutputLearnVector_t;
```