Team5-parallel-minds

2024 NCHC open hackthon Day1

Team member:

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- What have you accomplished since last week?
  - change python version to c++ version
  - 找到適合做效能比較的測資
  - profile with nvtx
  - try cuda

- What are your goals for this week?
- complete cuda code

Profiling

Stats System View ▾

MPI Event Trace	Time	Total Time	Instances	Avg	Med	Min	Max	StdDev	Range
NVTX GPU Projection Summary	98.9%	329.187 s	50	6.584 s	6.678 s	3.189 s	9.520 s	1.901 s	:fun() calculate fitness
NVTX GPU Projection Trace									
NVTX Push/Pop Range Summary	1.1%	3.807 s	6125000	621 ns	320 ns	79 ns	28.061 ms	20.046 µs	:update firefly position
NVTX Push/Pop Range Trace	0.0%	403.836 µs	1	403.836 µs	403.836 µs	403.836 µs	403.836 µs	0 ns	:write result file
NVTX Range Kernel Summary	0.0%	231.226 µs	49	4.718 µs	4.020 µs	1.490 µs	21.599 µs	3.719 µs	:update best fitness
NVTX Range Summary									
NVTX Start/End Range Summary	0.0%	134.489 µs	1	134.489 µs	134.489 µs	134.489 µs	134.489 µs	0 ns	:pop initialize
Network Devices Congestion	0.0%	4.390 µs	1	4.390 µs	4.390 µs	4.390 µs	4.390 µs	0 ns	:FA() initialize parameter
NvVideo API Summary									
OS Runtime Summary									
OpenACC Summary									

```cpp
vector<double> fun(const vector<vector<double>>& pop) {
    //nvtxRangePushA("fun() calculate fitness");
    vector<double> result;
    for (int i = 0; i < pop.size(); i++) {
        double funsum = 0;
        for (int j = 0; j < D; j++) {
            double x = pop[i][j];
            funsum += x * x - 10 * cos(2 * M_PI * x);
        }
        funsum += 10 * D;
        result.push_back(funsum);
    }
    return result;
    //nvtxRangePop();
}
```

Problems and Solutions

- What problems are you currently facing?

- The performance of the initial CUDA program is not good; we plan to apply CUDA programming best practices to improve its runtime.