Mlchip Fourth Report

(Machine Learning Intelligent Chip Design)

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完成日期 (June 21, 2024)

一、Simulation results

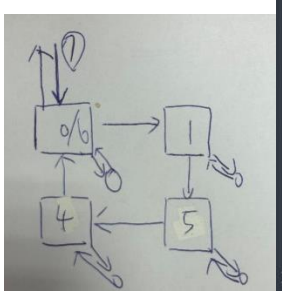
成功將資料送進 router 及 core 進行運算，並傳回 controller 進行結果打印。

```
ALL data Form CW3 is received
cw3_packet.size() 663552
ALL data Form CB3 is received
cb3_packet.size() 384
ALL data Form CW4 is received
cw4_packet.size() 884736
ALL data Form CB4 is received
cb4_packet.size() 256
ALL data Form CW5 is received
cw5_packet.size() 589824
ALL data Form CB5 is received
 DONE FOR ALL CONV LAYER READING !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
cb5_packet.size() 256
ALL data from FC1W is rececived
fc_w1_packet.size() 37748736
ALL data from FC1B is rececived
fc_b1_packet.size() 4096
ALL data from FC2W is rececived
fc_w2_packet.size() 16777216
ALL data from FC2B is rececived
fc_b2_packet.size() 4096
ALL data from FC3W is rececived
fc_w3_packet.size() 4096000
ALL data from FC3B is rececived
It's second RUN
fc_b3_packet.size() 1000
 pic_packet.size() 150528
 cw1_packet.size() 23232
 cw2_packet.size() 307200
 cw3_packet.size() 663552
 cw4_packet.size() 884736
 cw5_packet.size() 589824
core0 complete1 at time 612514190 ns
output5_f_from_r0.size() 43264
core1 complete at time 612946860 ns
output5_f_from_r1.size() 43264
core5 complete at time 613379530 ns
output5_f_from_r5.size() 9216
core4 complete at time 613471720 ns
finalOutput_from_r4.size() 9216
 fc_w1_packet 37748736
 fc_w2_packet.size() 16777216
 fc_w3_packet.size() 4096000
Top 1 class: Egyptian cat - Value: 16.8256
Top 2 class: plastic bag - Value: 12.1464
Top 3 class: tabby - Value: 11.6603
Top 4 class: lynx - Value: 11.5326
Top 5 class: fox squirrel - Value: 11.1001
core0 complete2 at time 613563910 ns
fcOutput3 in Controller 1000
Top 1 class: Egyptian cat - Value: 16.8256
Top 2 class: plastic bag - Value: 12.1464
Top 3 class: tabby - Value: 11.6603
Top 4 class: lynx - Value: 11.5326
Top 5 class: fox squirrel - Value: 11.1001
^Z
Suspended
22:59 mlchip081@ee21[~/hw4_s]$
```

二、程式細節

1. Router and NI

設計的核心理念為讓 Router 盡可能的簡單、簡潔，因此使用四個 Router，並且固定每個 Router 資料流的方向。資料流分為兩種，第一種為 controller 傳送資料到 Router 時，第二種為傳送完後，Router 0 的 out_flit[4]會分別接上來自不同方向的資料。




```
void run() {
    out_req[0].write(true);
    out_req[1].write(true);
    out_req[2].write(true);
    out_req[3].write(true);
    out_req[4].write(true);
    out_ack[0].write(true);
    out_ack[1].write(true);
    out_ack[2].write(true);
    out_ack[3].write(true);
    out_ack[4].write(true);
    sc_lv<34>  receive_data = in_flit[0].read();
    sc_lv<2> first_two_bits = receive_data.range(33, 32);
    if (first_two_bits==3 && first_turn == true) {
        first_turn = false;
        cout << "It's second RUN" <<endl;
    }
    if (router_ID==0) {
        if (first_turn) {
            out_flit[4].write(in_flit[0].read());
        } else {
            out_flit[4].write(in_flit[1].read());
        }
        out_flit[3].write(in_flit[4].read());
        out_flit[0].write(in_flit[4].read());
    }
    if (router_ID==1) {
        out_flit[4].write(in_flit[2].read());
        out_flit[1].write(in_flit[4].read());
    }
    if (router_ID==5) {
        out_flit[4].write(in_flit[0].read());
        out_flit[2].write(in_flit[4].read());
    }
    if (router_ID==4) {
        out_flit[4].write(in_flit[3].read());
        out_flit[0].write(in_flit[4].read());
    }
}
```

2. What is the depth of the buffer?

在 Controller 及 router 上，我的 buffer 長度皆為 1，為即收即送，能夠節省執行時間。在 core 上，我根據不同參數的長度，再將資料存入不同的 packet 當中。

3. Challenges faced

最大的問題為執行時間太長，尤其是在讀 FC 的參數時，因此需要練習更精準地打印資訊，將資料經過每個路徑的資料大小都準確地打印出來