ECE 522 Final Project

-increased BRAM size to 32467

- increased register address bits

Memory Allocation

Points start at 24576

centroids are loaded into memory directly after points

C program stores number of points, clusters, dimensions in the first three addresses of PN\_BASE\_ADDR.

PL side retrieves those three values first. All other modules use those values.

I chose to perform all operations after the initial random cluster selection on the PL. theres a memory transfer overhead. In order to mitigate that I chose to do as much of the work on the PL as possible or sensible. I could have used the LFSR to determine random points. I would suggest that as future work.

The c program is loop and data dependent heavy, which limits concurency. Optimizations where made where possible.

The Software runtime is 50702 us

Hardware Transfer In time 1091 us

“Hardware Runtime 296 us” probably not going to hold

Hardware Transfer Out time 2193 us

the C program was adapted to run output the software and hardware results side by side.

The sequence that retrieved values from memory did not seem to be working. Values were hard wired to get the system working.

-- We store the raw data in the upper half of memory (locations 4096 to 8191).

**constant** *PN\_BRAM\_BASE* : integer := 24576;

**constant** *PN\_UPPER\_LIMIT* : integer := *PNL\_BRAM\_NUM\_WORDS\_NB*;

-- Kmeans range

**constant** *DIST\_BRAM\_BASE* : integer := 10240;

--constant DIST\_BRAM\_UPPER\_LIMIT : integer := 12288;

**constant** *CLUSTER\_BASE\_ADDR* : integer := 8192;

**constant** *COPY\_CLUSTER\_BASE\_ADDR* : integer := 4096;

--constant CENTROIDS\_BASE\_ADDR : integer := 4096;

**constant** *FINAL\_CLUSTER\_UPPER\_LIMIT* : integer := 4096 / 2;

**constant** *FINAL\_CLUSTER\_BASE\_ADDR* : integer := 0;