RE Meeting -1

Integerization for Matrix Multiplication applications
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Applications of Use of Matrix

- Used in 3D affine transformation.
- Used in image processing applications(Ridge detection,Sharpen,Unsharp,edge detection), control systems, video processing
- Radar signal processing applications(such as tracking)
- Encryption
- Used in optic science to account for refraction and reflection
- Useful in electrical circuits and quantum physics
- Used to solve AC network equations in electrical circuits.
- We can use it for HPC(High performance computing) applications if slight variation is acceptable
- But mostly the examples which I came across use integer matrices.

Need for integerization

- Using integerization technique we use low power circuit design for and help to reduce computation overhead.
- So that we can enable the possibility of integrating signal processing and feature extraction algorithms on board implantable devices.

Current progress

- Did lecture survey of the reference paper Integer Convolutional Neural Network for seizure Detection to get hold of how integerization works.
- Implemented the algorithm in C to take it through HLS flow and generate RTL.
- The generated RTL can be taken through ASIC and FPGA flow for testing.

- MVM -matrix-vector-multiply
- vector dot-products
- discrete cosine transform (DCT)
- Matrix multiplication is a frequently used routine having a wide range of applications including seismic data processing, weather forecasting, structural mechanics, image processing

Doubts

- Is there any circuit or algorithm to which this integerization module should be attached?
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