CENG5030 Lab 02

Convolution Acceleration

1 Assignments:

Q1 Implement the matrix multiplication using Strassen Algorithm and compare the speed with original $matmul()$ in lab 01. The shape of matrix A is $I \times K$ and the shape of matrix B is $K \times J$. The matrix size setting remains the same as lab 01, the value of I, K, J will be fixed at 256, 512 or 1024.

Q2 Implement a C++ version img2col algorithm from scratch. You may also try the approaches in Section **Useful Materials** to optimize your implementation. The Convolution kernel and input size are as follows:

- batch: 1
- height_feature: 56
- width_feature: 56
- in_channels: 3
- out_channels: 64
- kernel_size: 3
- stride: 1
- padding: 0

Q3 Implement a C++ version from scratch based on the Winograd algorithm and compare the speed with your original im2col implemented in Q2. Please provide analysis on whether or not your implementation improves the speed performance and why.

Useful Materials:

- Strassen Algorithm
- MATLAB im2col
- Making faster
- ConvNets in practice