Implementation of Convolutional Layer in Deep Learning using C

Please design a function to implement the convolutional layer in deep learning using C （not C++) programming language. Convolutional Neural Networks (CNNs) are a popular deep learning technique for image and video processing. The goal of this project is to enable students to improve the efficiency of a program.

Suggested steps

1. Understanding Convolutional Layers: Please learn about convolution operation, kernel size, padding, and strides.
2. Defining Data Structures: You should define a data structure for the input image, kernels, and output feature map. The data is in 3D (width, height, and the number of channels). Even `float16` and `int8` are also popular in deep learning, only `float32` is needed for this project.
3. Implementing Convolution Operation: You can just design a function (surely some other functions can be called by it) that takes an input image, some kernels and other parameters needed.
4. Testing: Test the function, and check if the result is correct.
5. Improve the Efficiency: If you have time, please improve the efficiency of the function. You should provide some statistical data to show its efficiency on 1x1, 3x3 and 5x5 kernels.

The Report

1. The submitted report should contain the design, implementation, and evaluation of the function.
2. Presentation of the project highlighting the key features and results.

Rules:

1. The project report and the source code must be submitted before the deadline. Any submission after the deadline (even by 1 second) will result in **a score of 0**. The deadline is 23:59 on April 22 (**Saturday**).
2. The files should be submitted as report.pdf, xxx.c, yyy.c zzz.h. The files should **NOT** be compressed into one.
3. The score will depend on the quality of both the source code and the report. The report should be easy to understand and provide a clear description of the project, especially the highlights.
4. Attention should be paid to code style. Adequate time is given for code to be written correctly and with good style. Deductions will be made for poor code style. Code style guides, such as

the Google C++ Style Guide (http://google.github.io/styleguide/cppguide.html), can be used as a reference.