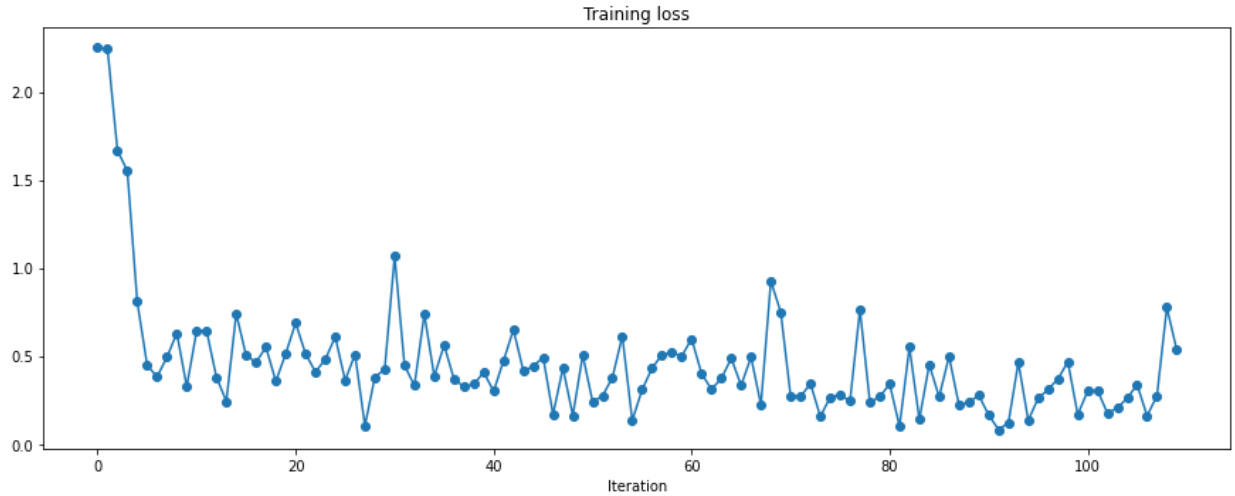
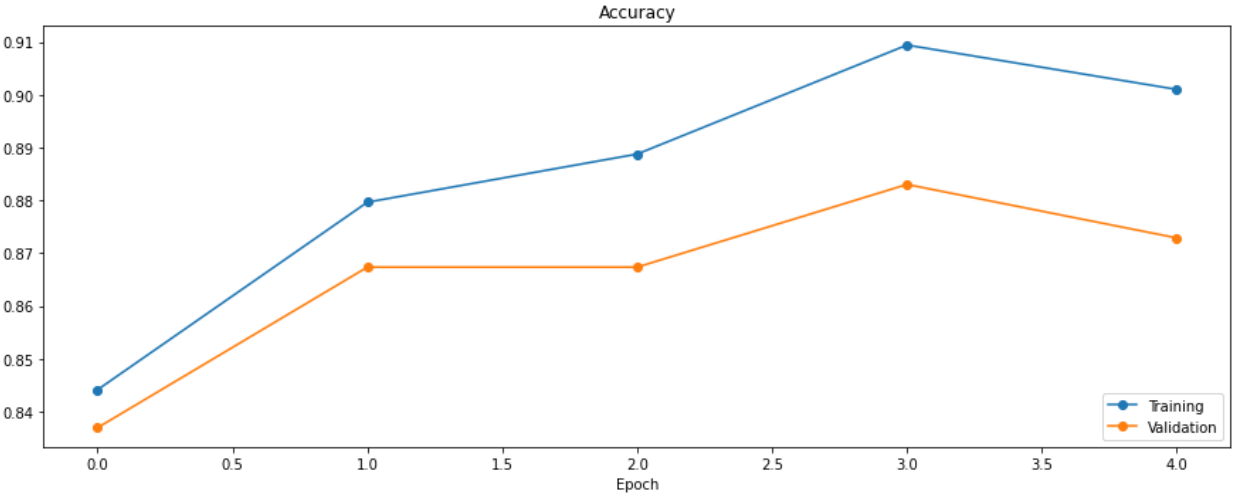
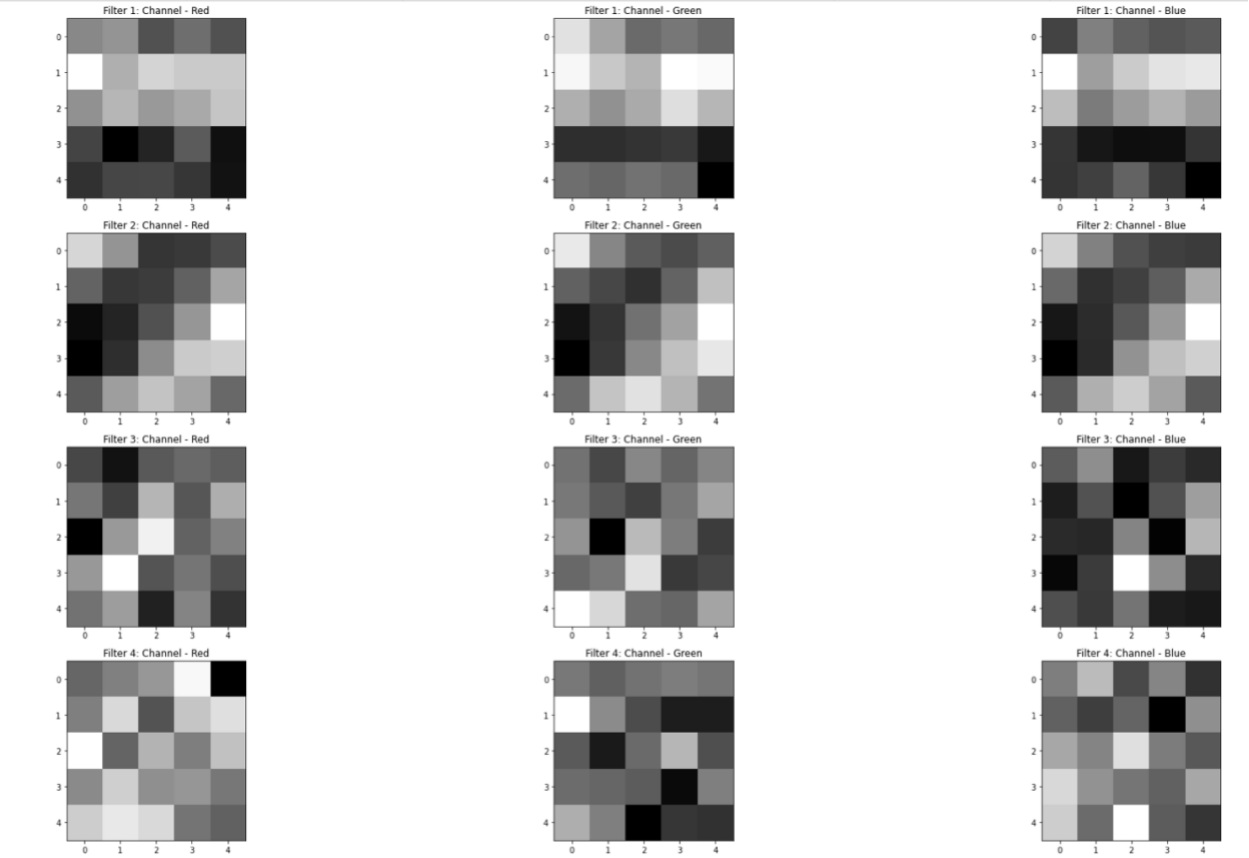
CSCI 566 – Assignment 1

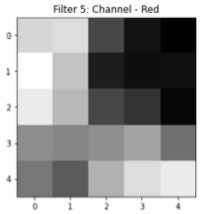
1. Training loss / accuracy curves for CNN training

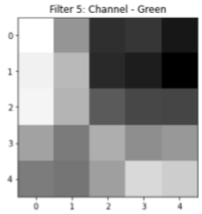




2. Visualization of convolutional filters




Filter 5: Channel - Red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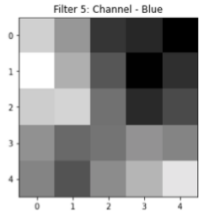
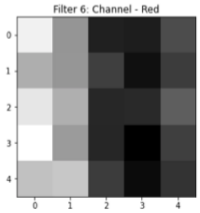
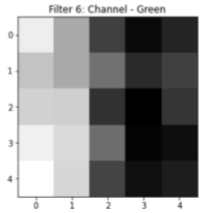

Filter 5: Channel - Blue


Filter 6: Channel - Red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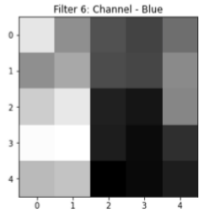
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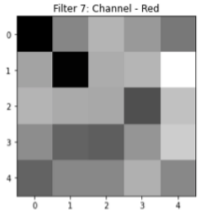
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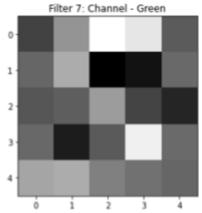
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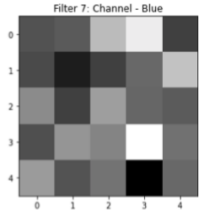
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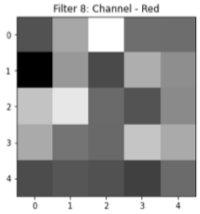
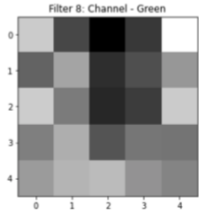
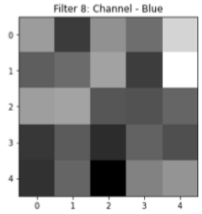

Filter 8: Channel - Red


Filter 8: Channel - Green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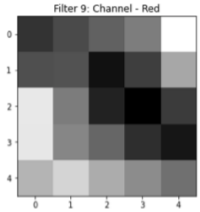
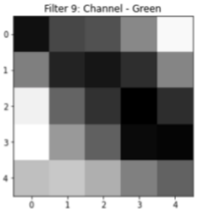

Filter 9: Channel - Red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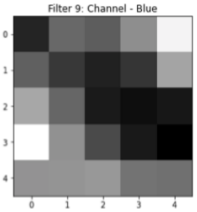
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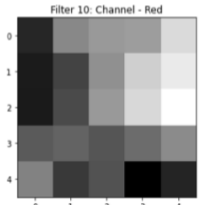
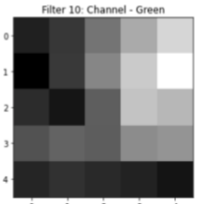

Filter 10: Channel - Red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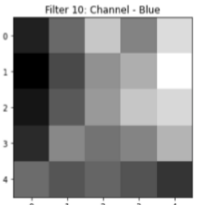
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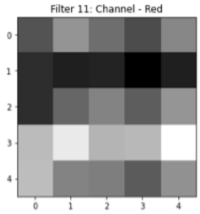
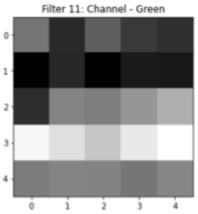
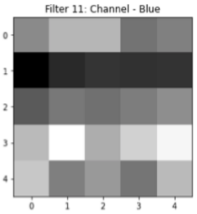

Filter 11: Channel - Red


Filter 11: Channel - Green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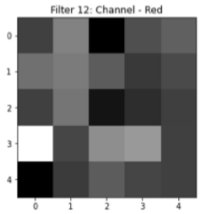
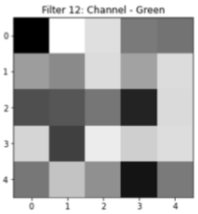

Filter 12: Channel - Red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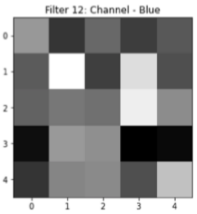
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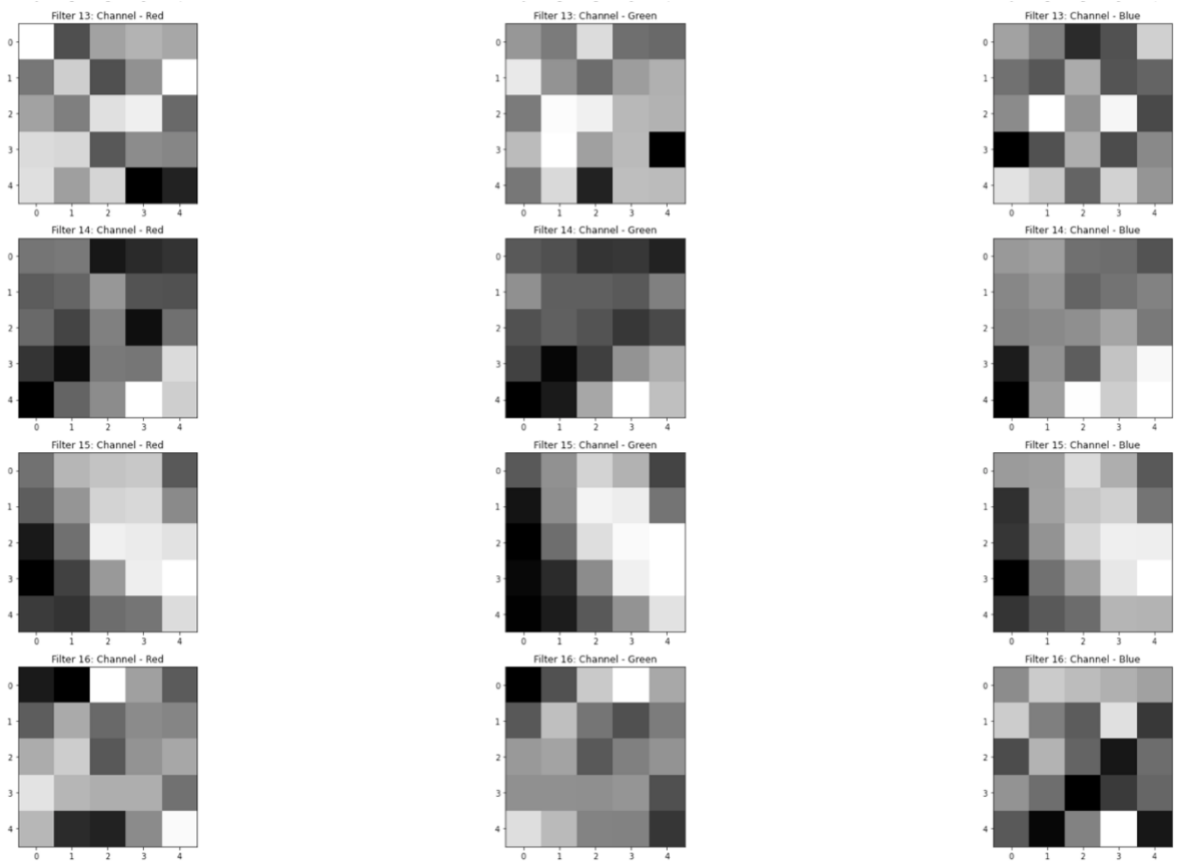
Filter 13: Channel - Red
Filter 13: Channel - Green
Filter 13: Channel - Blue
Filter 14: Channel - Red
Filter 14: Channel - Green
Filter 14: Channel - Blue
Filter 15: Channel - Red
Filter 15: Channel - Green
Filter 15: Channel - Blue
Filter 16: Channel - Red
Filter 16: Channel - Green
Filter 16: Channel - Blue

3. Answers to inline questions about convolutional filters

Inline Question: Comment below on what kinds of filters you see. Include your response in your submission [5pts]

As can be seen from the filters above, the first convolutional layer learns certain representations from the data provided. The first convolutional layer of the SmallConvolutionalNetwork has 16 filters with 3 channels each.

While it is a bit difficult to interpret the filters - we can still observe a few line detection filters in the plot. For instance, filters 2 and 9 look like line detectors since they have a light background with a dark diagonal line-like structure in the middle.

A few filters also resemble some edge detectors. For instance, filter 5 and 6 seem similar to vertical edge detectors and filter 11 looks similar to a horizontal edge detector. Filter 4 and 7 seem to be detecting individual points. Given the number of iterations and epochs that this model has currently been trained on, I believe there's still scope left for the model to show better filter visualizations as it learns more from the data and detects more patterns.

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