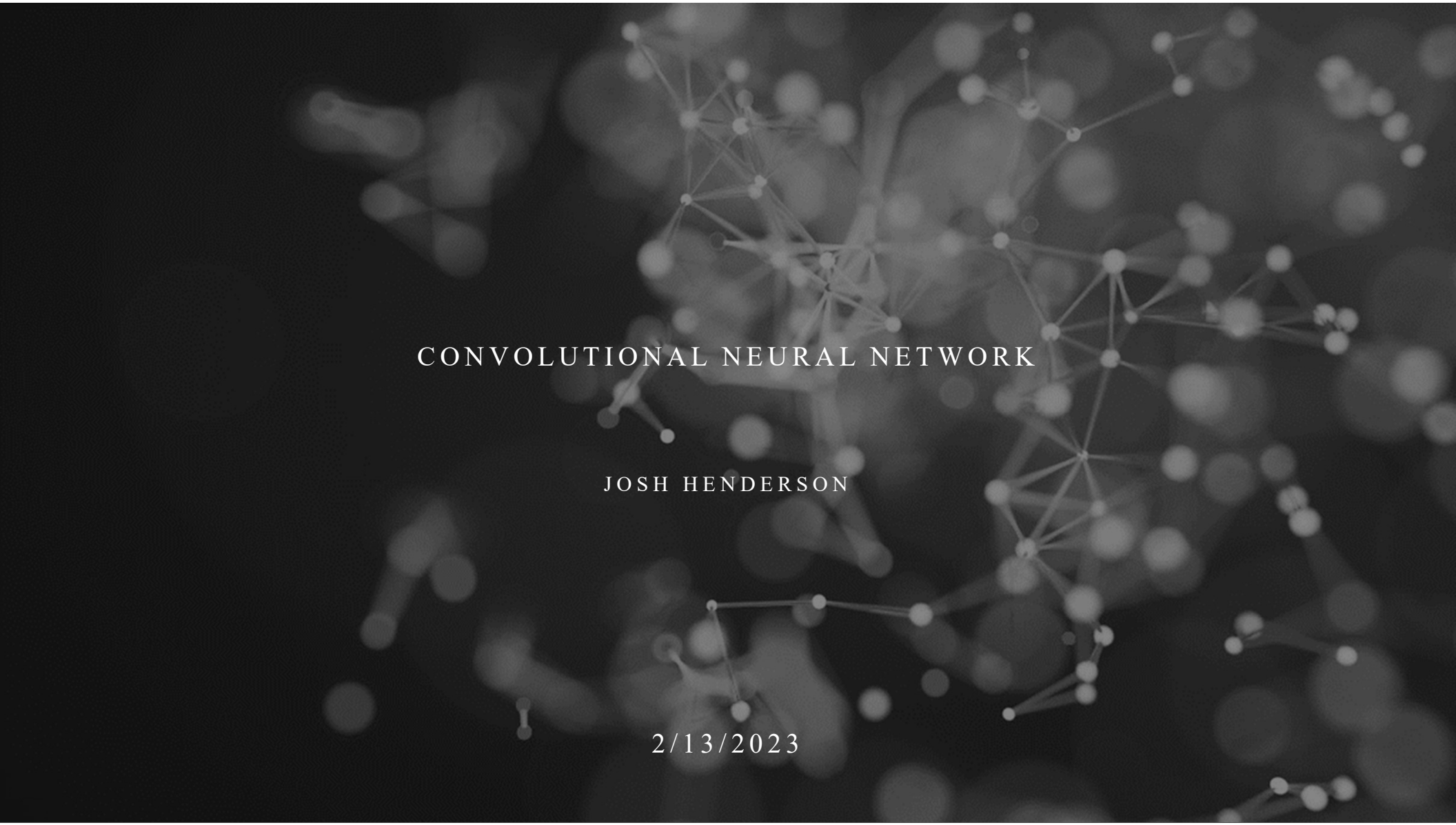

CONVOLUTIONAL NEURAL NETWORK

JOSH HENDERSON

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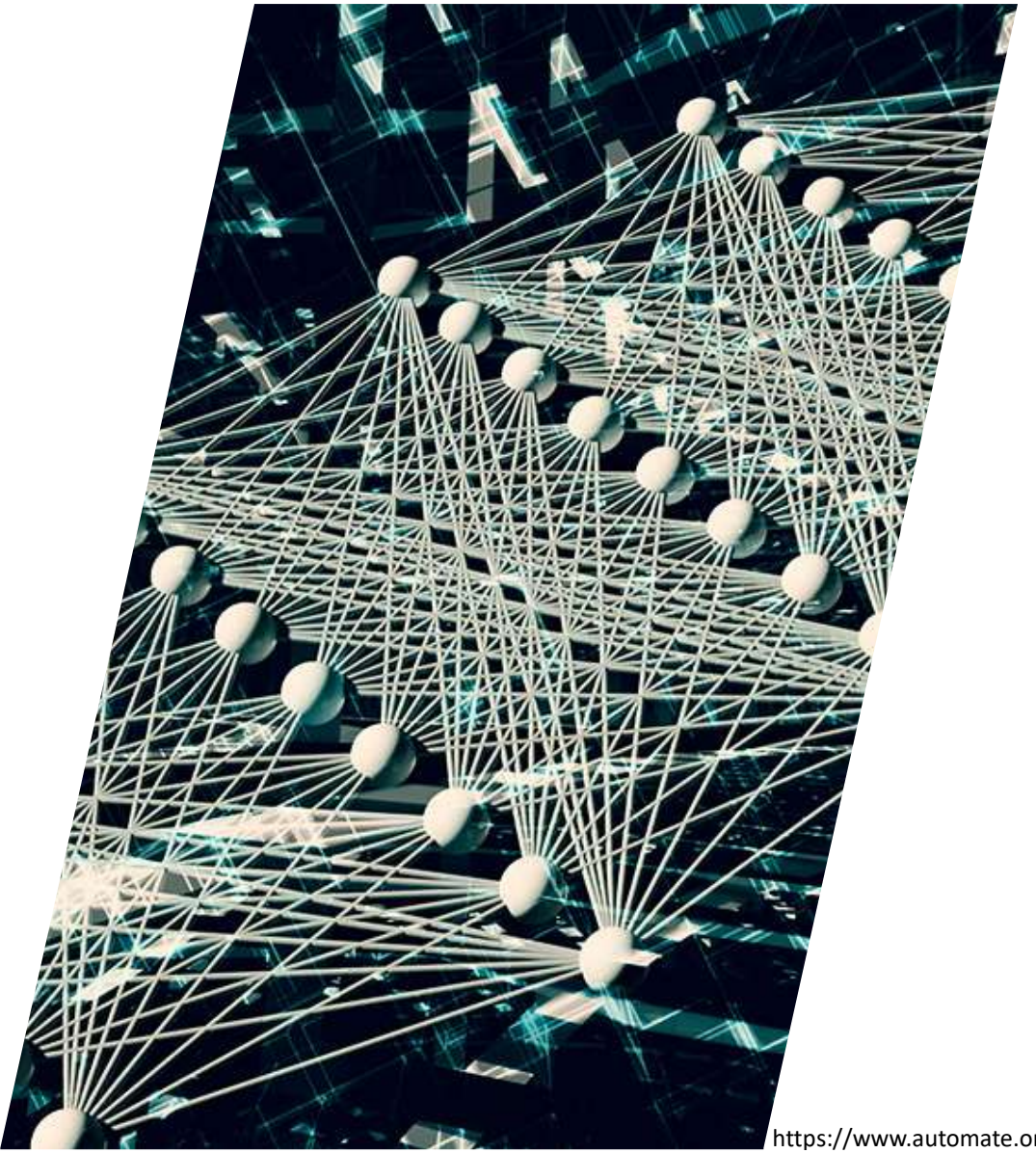
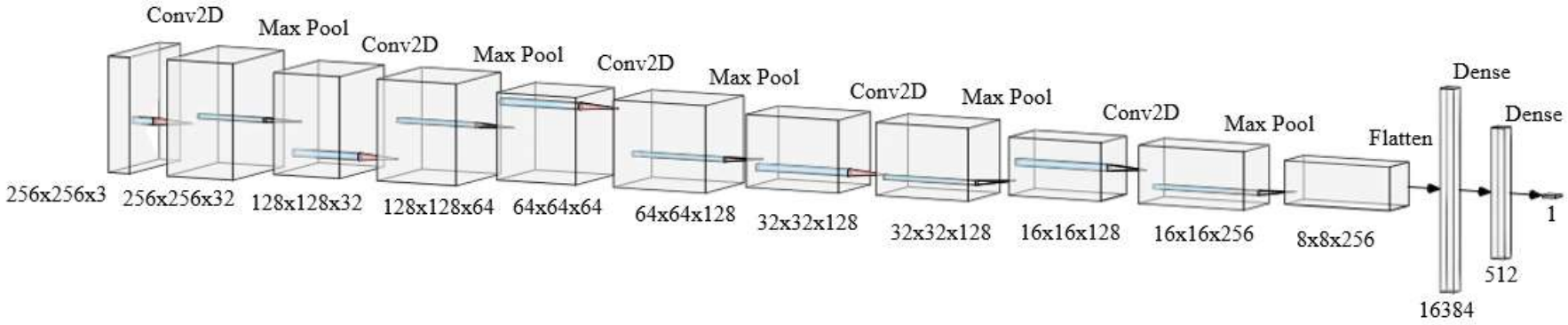


OVERVIEW

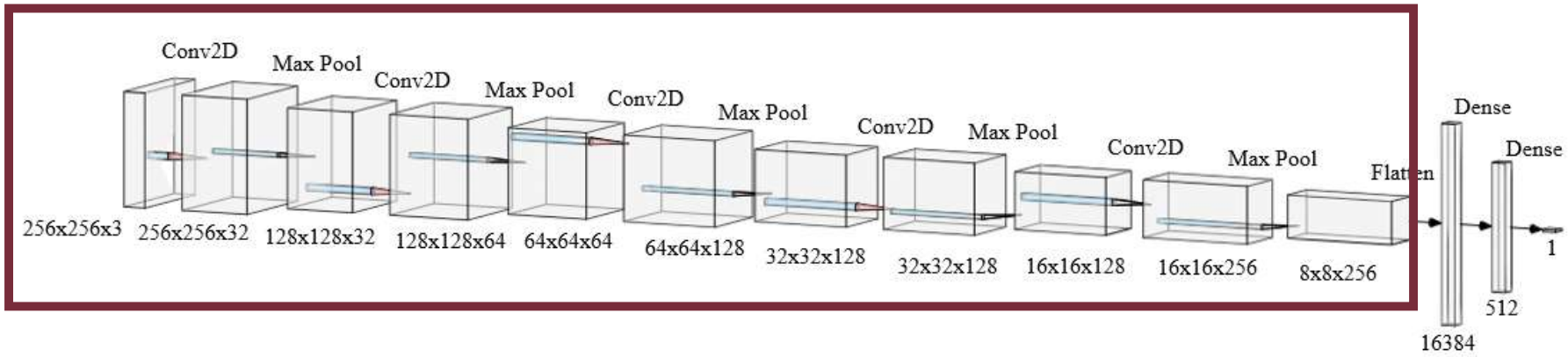
- INTRODUCTION
- MODEL
- PROGRAMMING

https://www.automate.org/blogs/what-is-a-convolutional-neural-network-and-how-is-it-related-to-embedded-vision



MODEL

- Convolution and Pooling (x5): feature extraction and condensation
  - Increasing in filters over time
- Flatten: forms data into a vector
- Dense
  - 1st layer: 2^{14} nodes to 2^{9} nodes (approx. 8.5m parameters)
  - 2nd layer: sigmoid activation gives prediction



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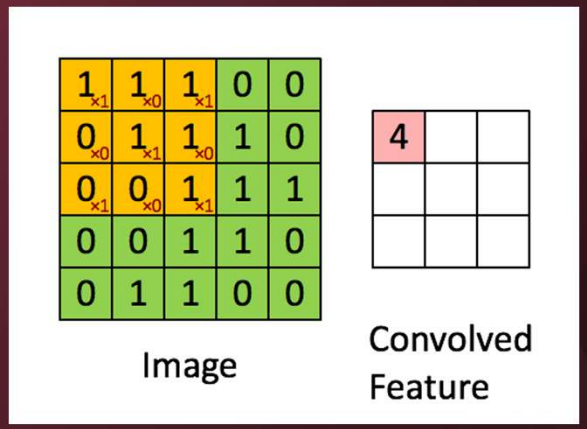
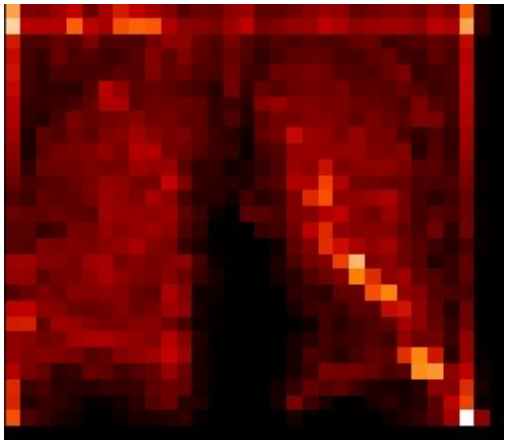
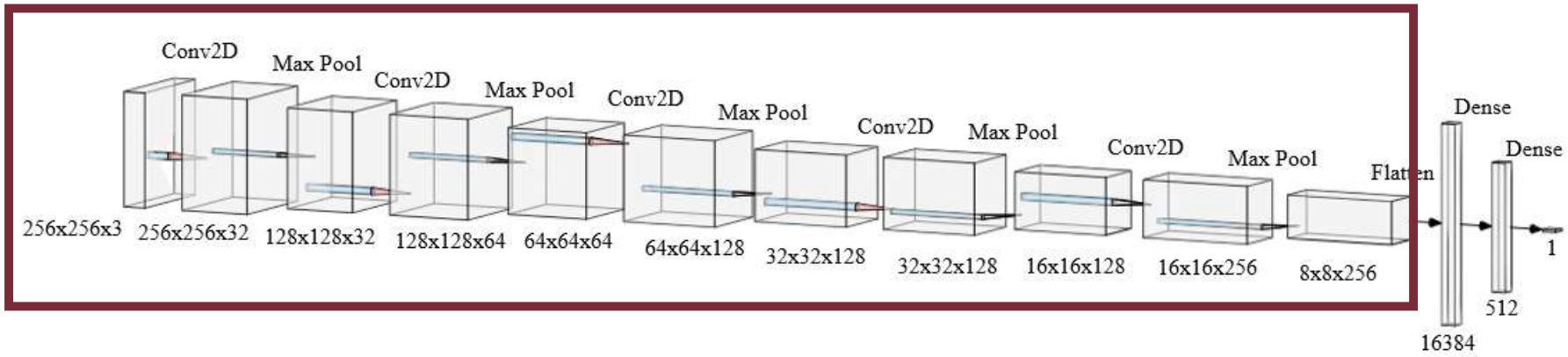


CONVOLUTION & POOLING



- Filters scan an image for features
- ReLU activation is applied
- Feature map is downsized

Convolution GIF: https://towardsdatascience.com/convolutional-neural-networks-from-the-ground-up-c67bb41454e1



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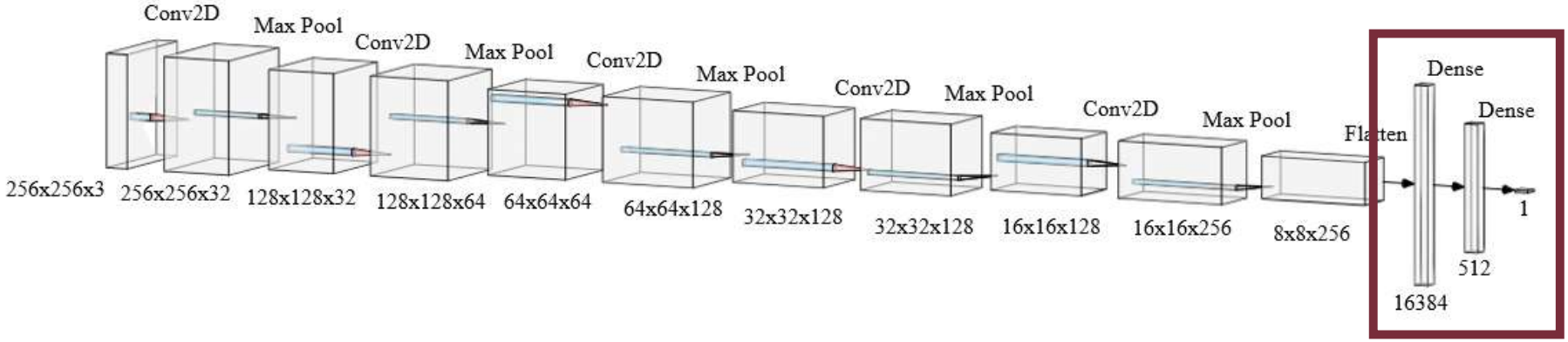

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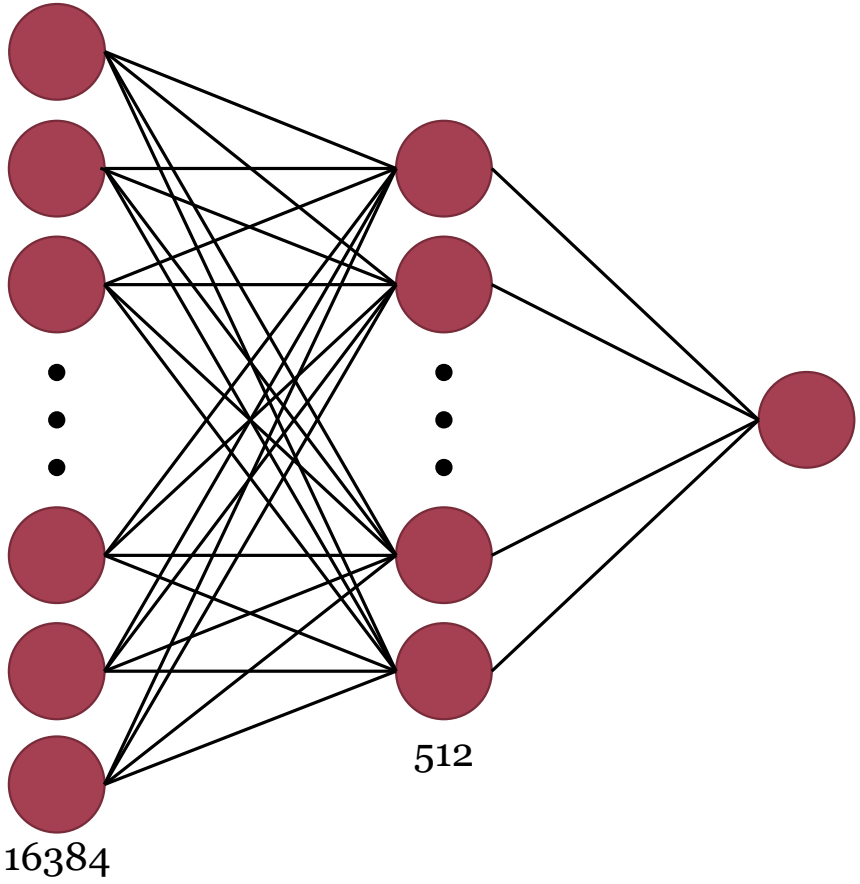
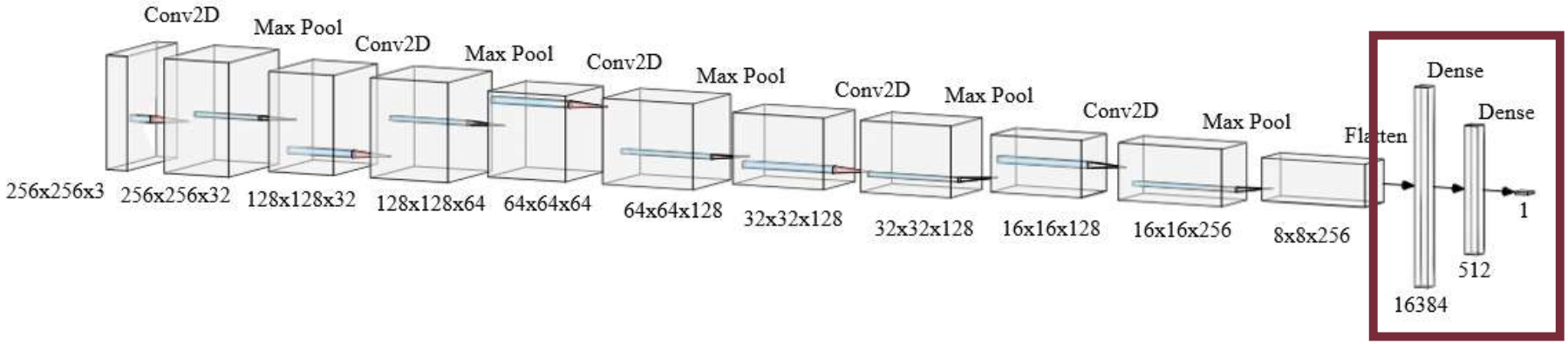
DENSE LAYERS



- Connections between every node
- 1st layer: Connections between features
- 2nd layer: Prediction (sigmoid activation)



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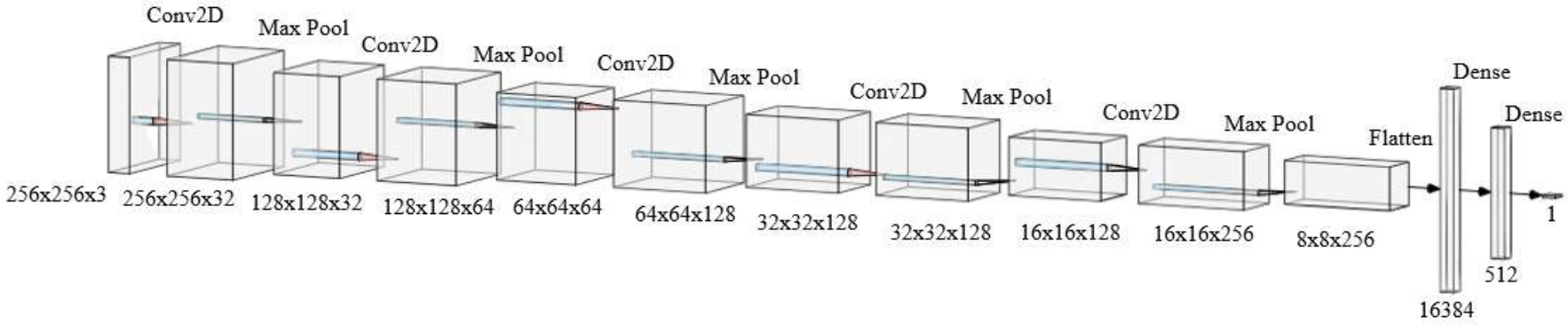

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TIPS I LEARNED WHEN PROGRAMMING

Isolate Functions

Data Loading

Data Balancing

Model Architecture Creation

Interaction and Model Training

Design to Be

Readable

Adaptable

Usable


THANK YOU

BASED ON PREVIOUS WORK IN:

HENDERSON, JOSHUA ELLIOT, “CONVOLUTIONAL NEURAL NETWORK FOR COVID-19 DETECTION IN CHEST X-RAYS” (2022). HONORS THESIS. 254. HTTPS://RED.LIBRARY.USD.EDU/HONORS-THESIS/254

HENDERSON, J., SANTOSH, K. (2023). ANALYZING CHEST X-RAY TO DETECT THE EVIDENCE OF LUNG ABNORMALITY DUE TO INFECTIOUS DISEASE. IN: SANTOSH, K., GOYAL, A., AOUADA, D., MAKKAR, A., CHIANG, YY., SINGH, S.K. (EDS) RECENT TRENDS IN IMAGE PROCESSING AND PATTERN RECOGNITION. RTIP2R 2022. COMMUNICATIONS IN COMPUTER AND INFORMATION SCIENCE, VOL 1704. SPRINGER, CHAM. HTTPS://DOI.ORG/10.1007/978-3-031-23599-3_6

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