

Deep Convolutional Neural Networks

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Neural Net Crashcourse

- We want to classify images
- Input: image
- Output: which categories the image belongs to

Seznam.cz applications

- Car advert images



Front



Left Side



**Steering
Wheel**

Seznam.cz applications

- Adult content detection



Porn



Not porn

Seznam.cz applications

- Detect photo rotation
- Email topic classification
- Product category detection
- Basis of other, more complex projects

Other applications

- Handwritten character recognition

A B C D E F G
H I J K L M N O
P Q R S T

A B C D E F G H I J
K L M N O P Q R S T

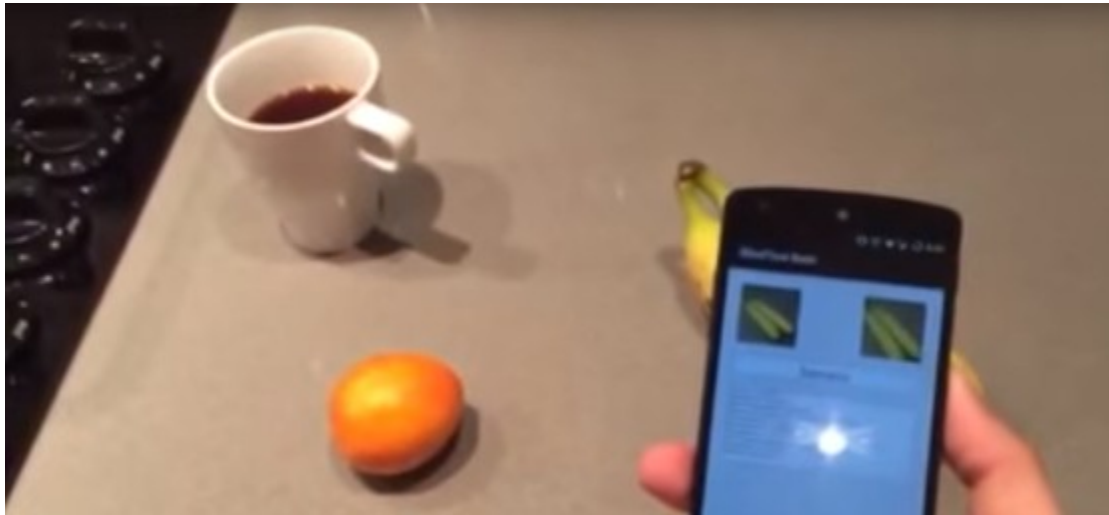
Other applications

- Self-driving cars



Other applications

- Accessibility for blind people ([link](#))



banana



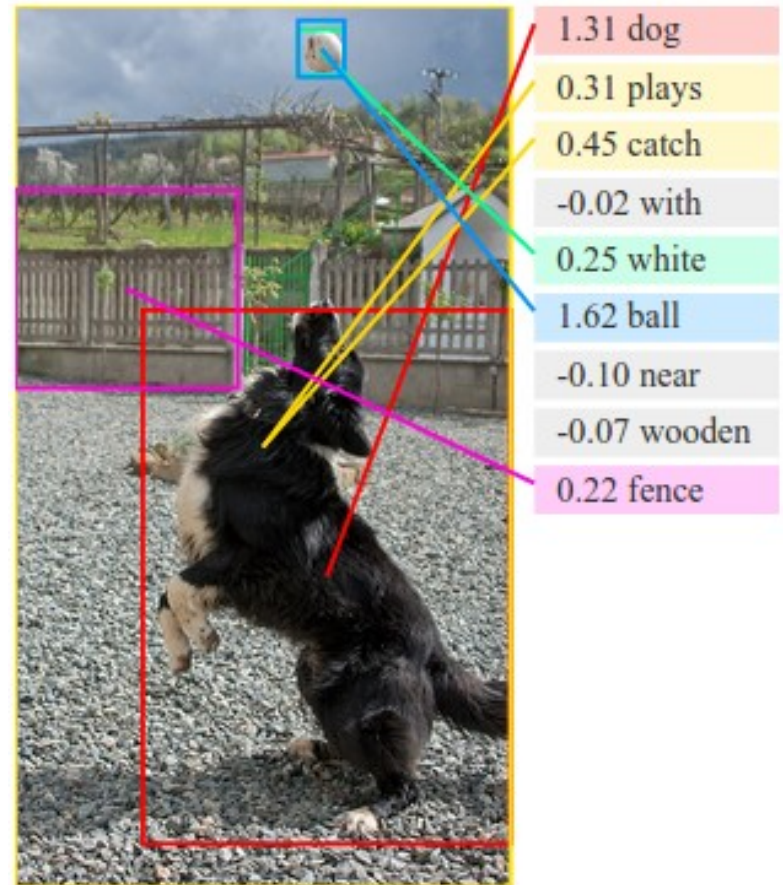
orange

Part of bigger systems

- Generate image description ([link](#))



"man in black shirt is playing guitar."



Part of bigger systems

- Generate art ([link](#))



Part of bigger systems

- Playing games ([link](#))

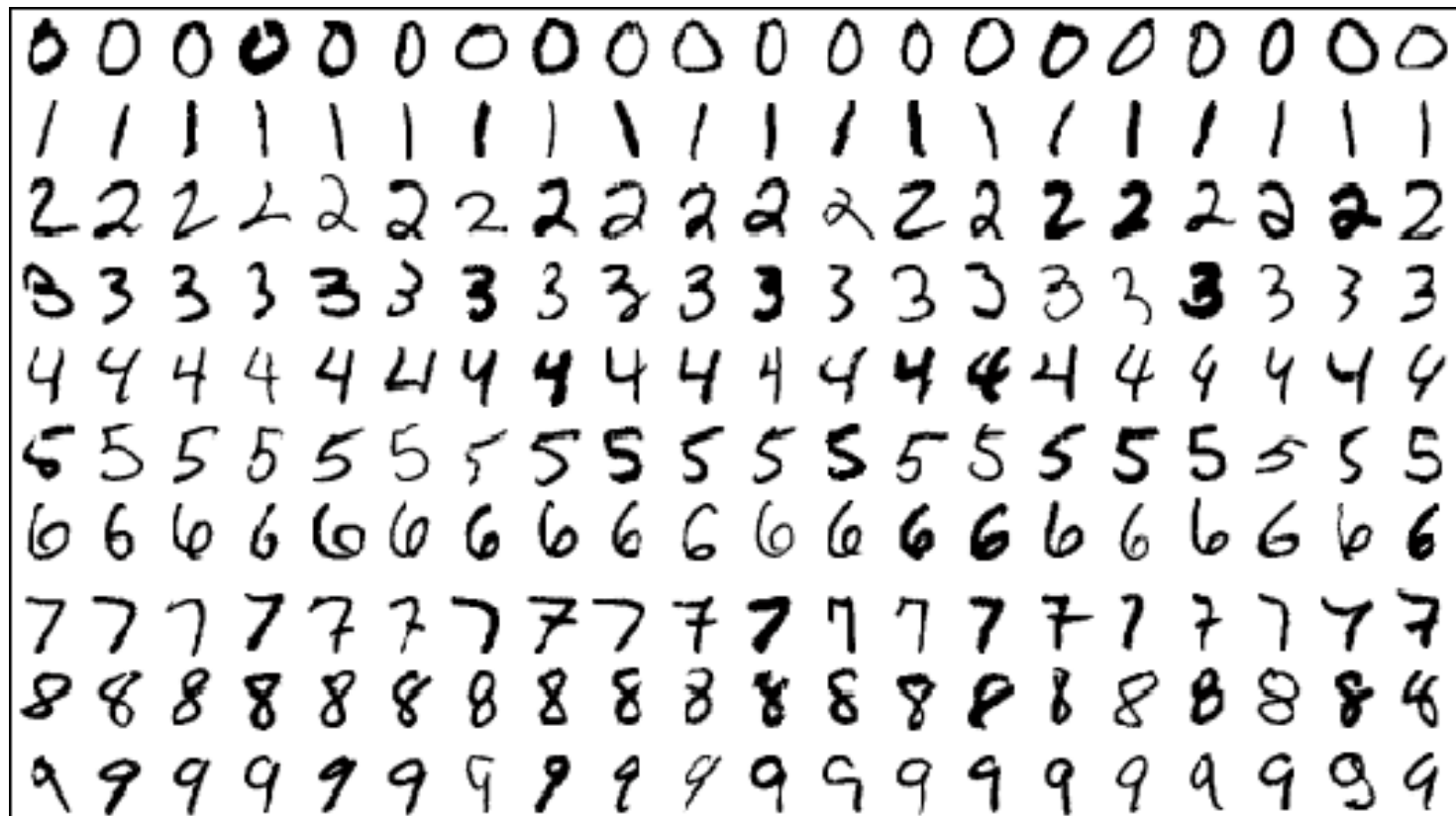


Summary

- Image \rightarrow class / category
- Direct application
- Part of a bigger system

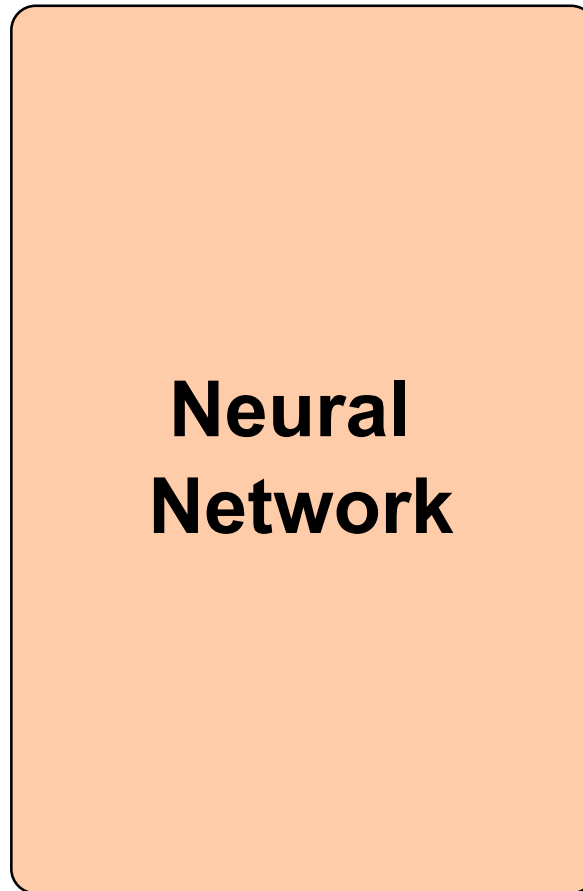
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- Tutorial Example: handwritten digits



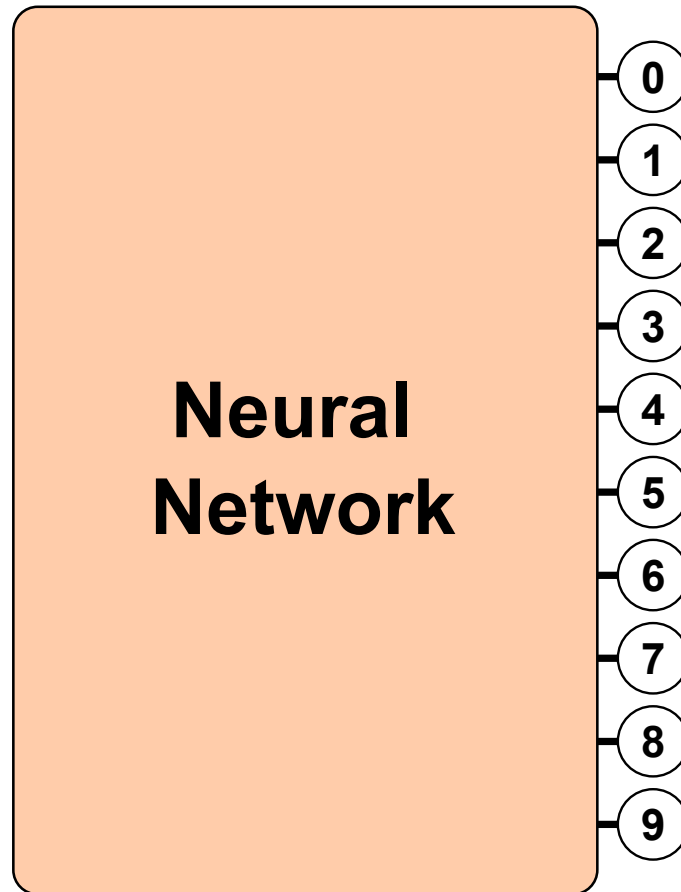
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- Tutorial Example: handwritten digits



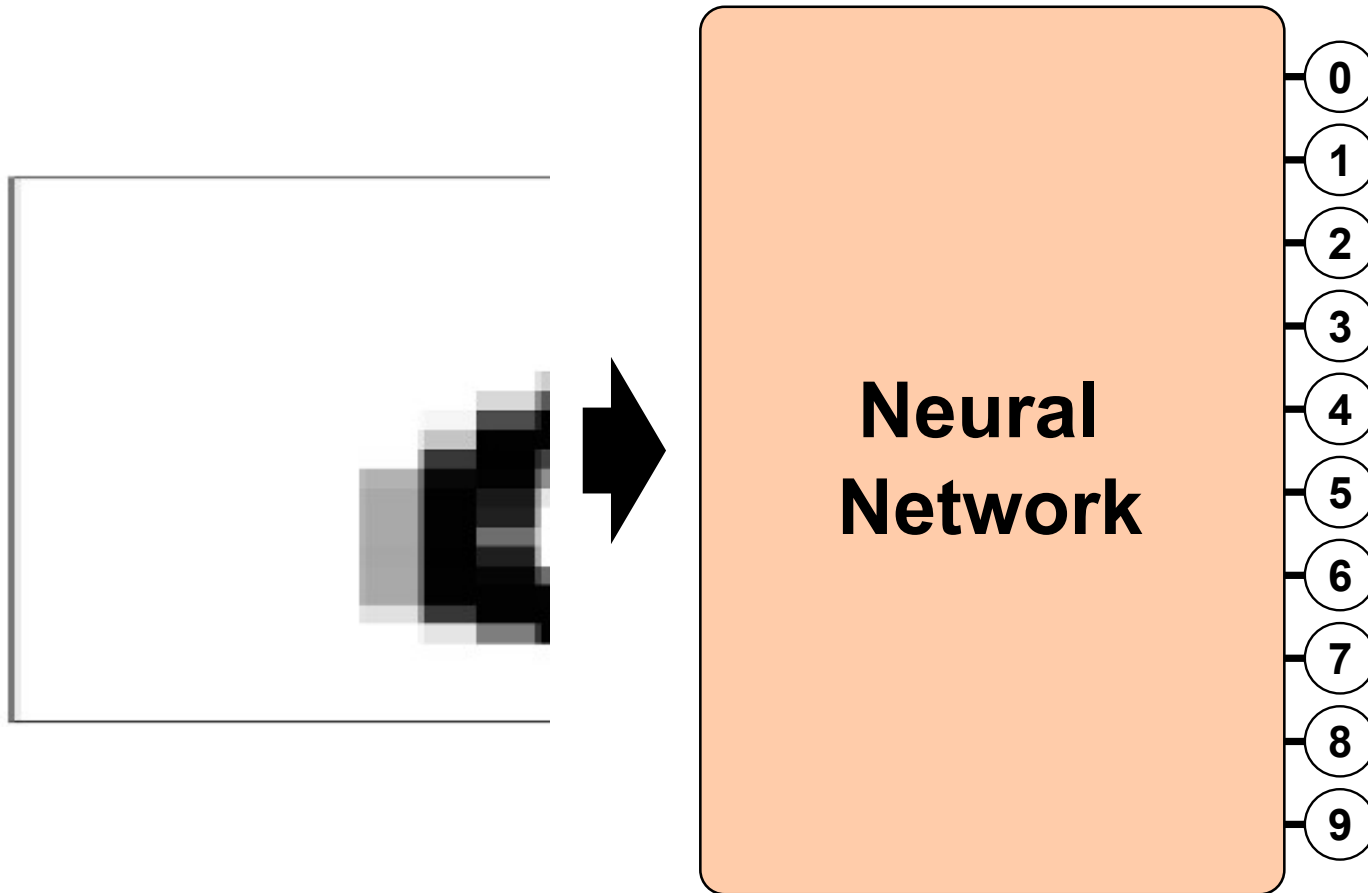
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- Tutorial Example: handwritten digits



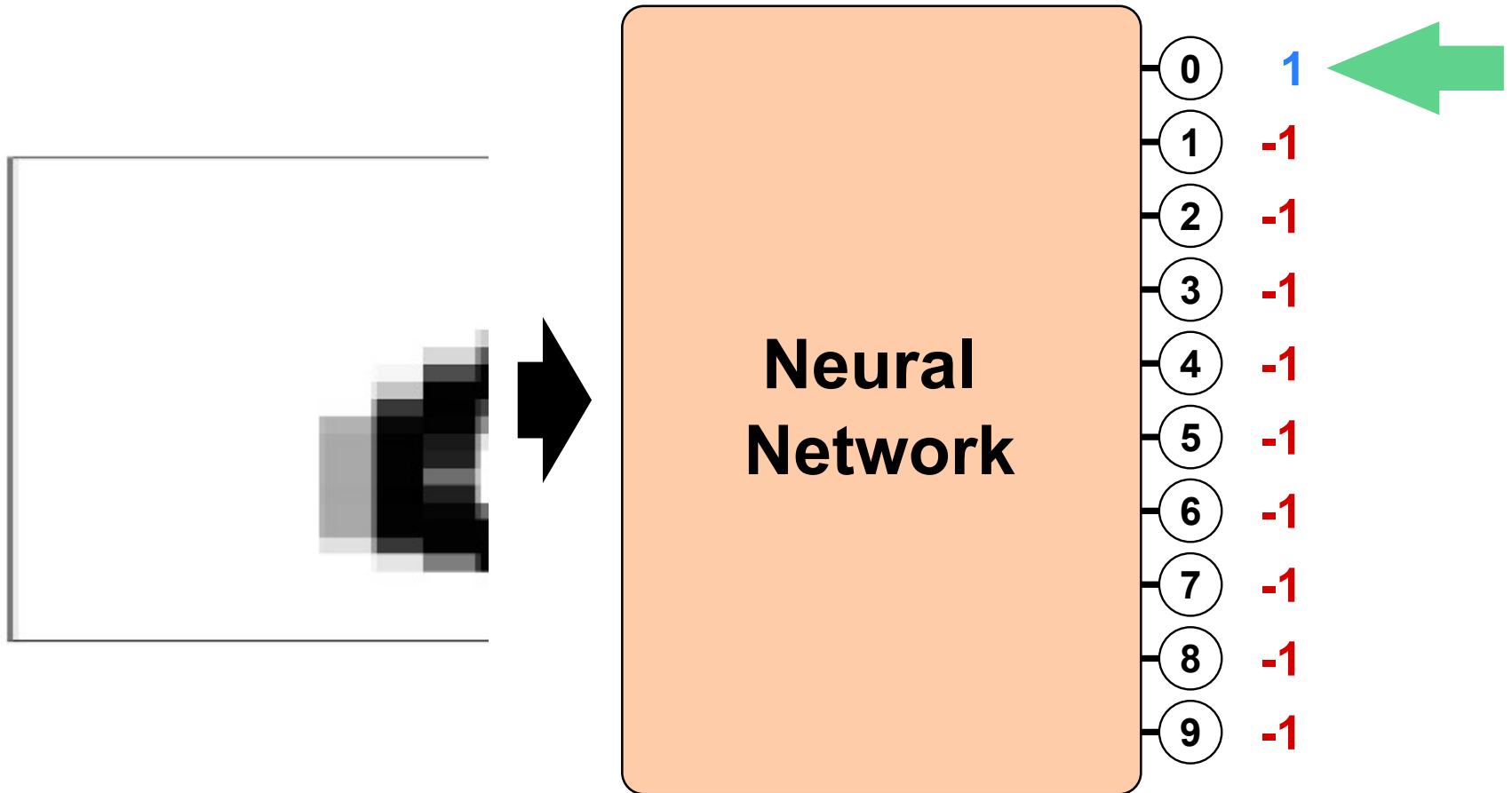
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- Tutorial Example: handwritten digits



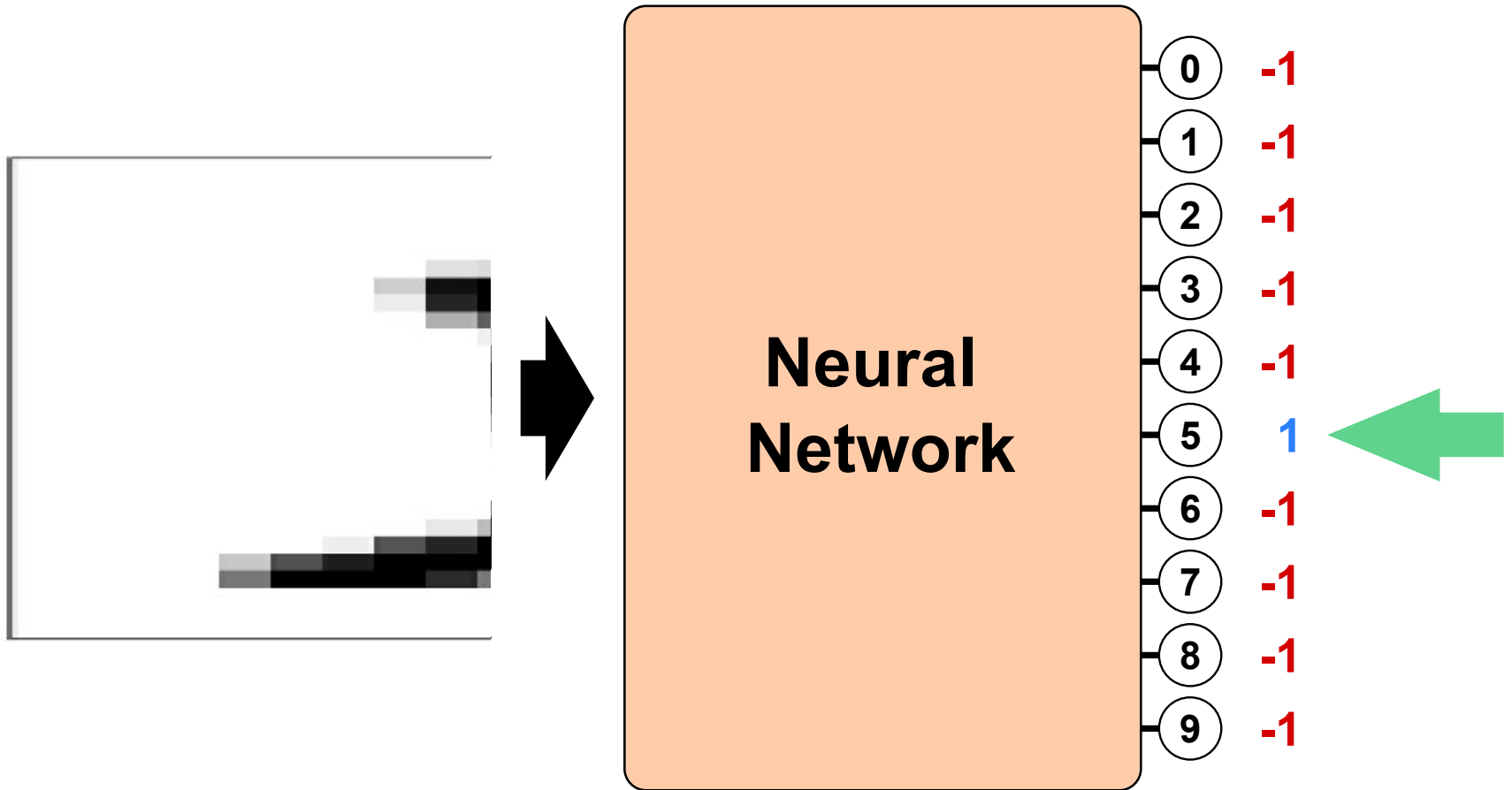
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- Tutorial Example: handwritten digits



Neural Net Crashcourse

- Tutorial Example: handwritten digits



Neural Net Crashcourse

- Neural network interactive example

Final Convolution Filters



Summary

- Fully-connected layers
- Convolutional layers
- Normalization
- Backpropagation of errors

- **Visualization**

- deepvis from Jason Yosinsky ([video](#))
- keras-js
- tensorflow playground
- ConvnetJS demo

Summary

- Image classification applications
- Fully-connected and Convolutional layers
- Visualization

Thanks & Questions