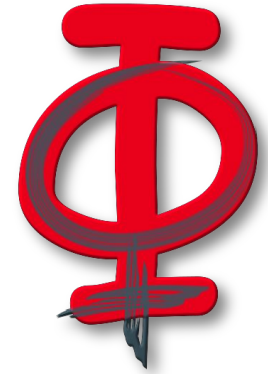


# Machine Learning



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2019 Hamburg

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Universität Hamburg  
DER FORSCHUNG | DER LEHRE | DER BILDUNG



CLAUSSEN SIMON | STIFTUNG

EXZELLENZCLUSTER  
QUANTUM UNIVERSE

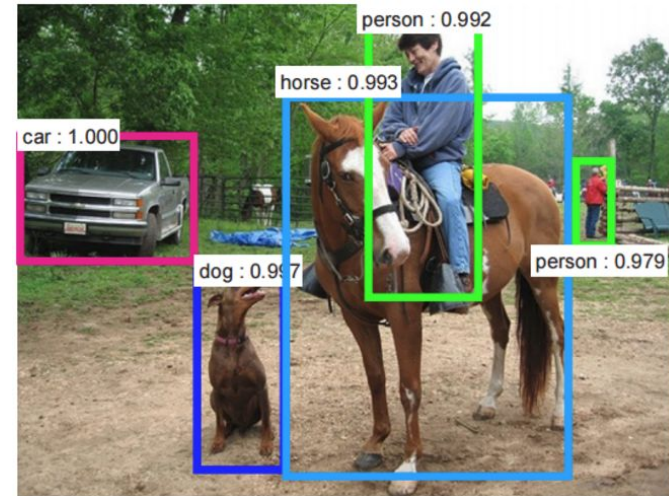


# What is machine learning?



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- training a computer to perform a task
  - e.g. predicting scores, recognizing images
- categorizing based on data



# Why is it important?



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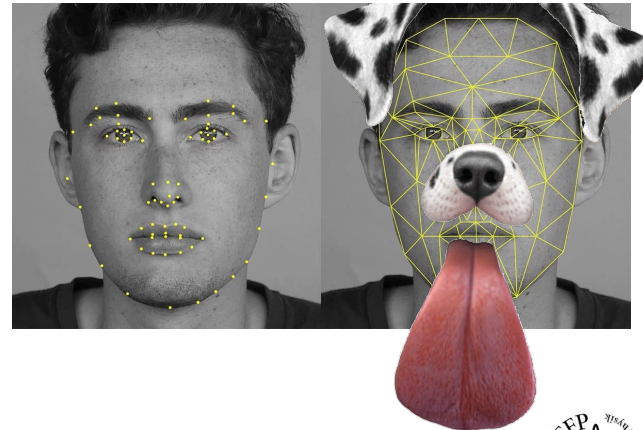
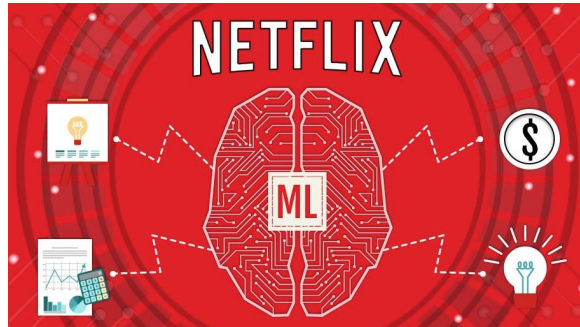
- ability to handle complex problems
- process a large amount of data
- accurate
- efficient

# ML in daily life



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- Netflix
  - Recognizes preferences to make good recommendations
- Snapchat
  - Detects face and uses filters to add features

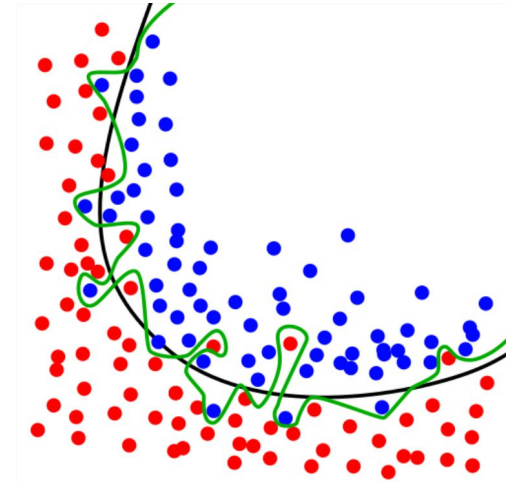


# How does it work?



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- computer uses model to identify patterns in data
- which line splits the data in a better way?

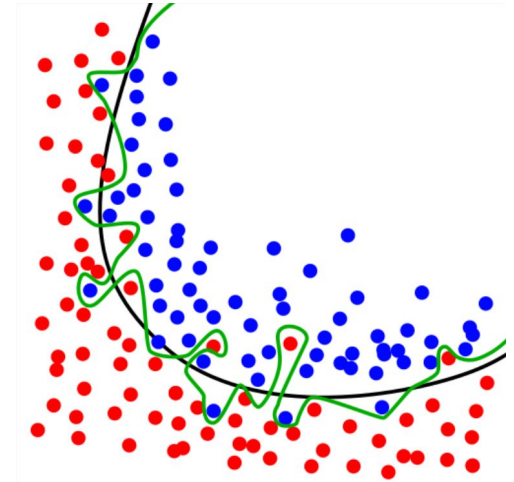


# How does it work?



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- computer uses model to identify patterns in data
- which line splits the data in a better way?
  - green line is accurate but too specific
    - won't fit a different data set
  - black line is generalized
    - good compromise even with a new data set

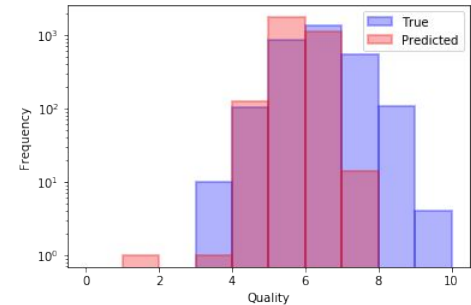
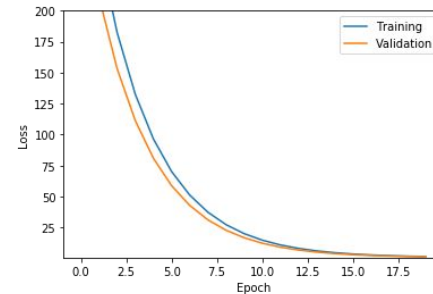
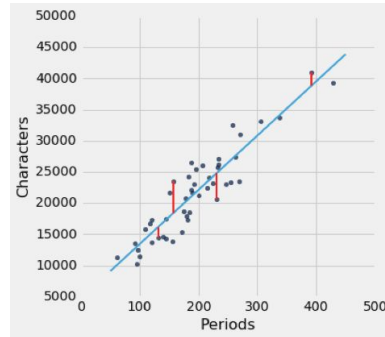
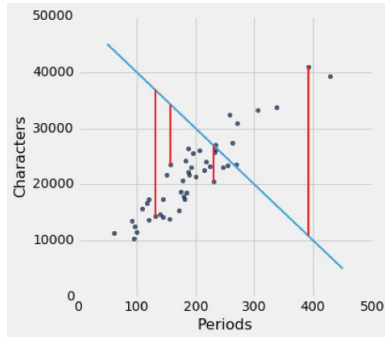


# What did we do?



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- predicting wine quality
  - eleven features (e.g. pH level, acidity) combined to predict the quality
  - minimize difference between prediction and true value



# What did we do?



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- recognizing dog and cat pictures
  - computer learns relationship between pixels and classifies accordingly

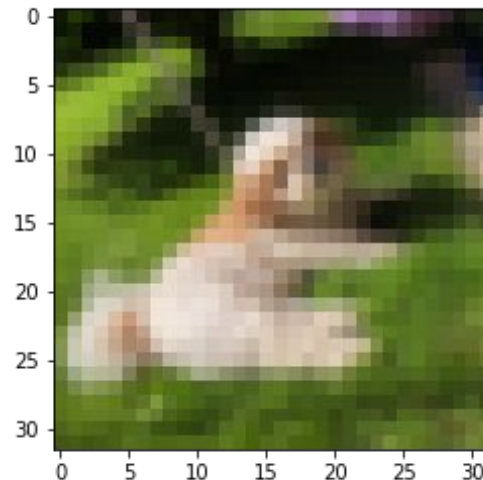
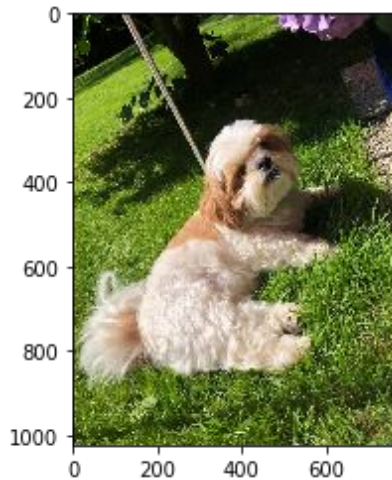


# What did we do?



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- recognizing dog and cat pictures
  - computer learns relationship between pixels and classifies accordingly



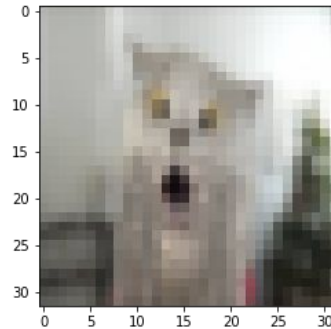
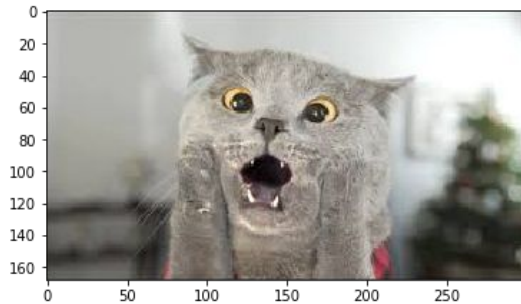
cat	dog
0.21	0.79

# What did we do?



Physik-Projekt-Tage  
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- recognizing dog and cat pictures
  - computer learns relationship between pixels and classifies accordingly



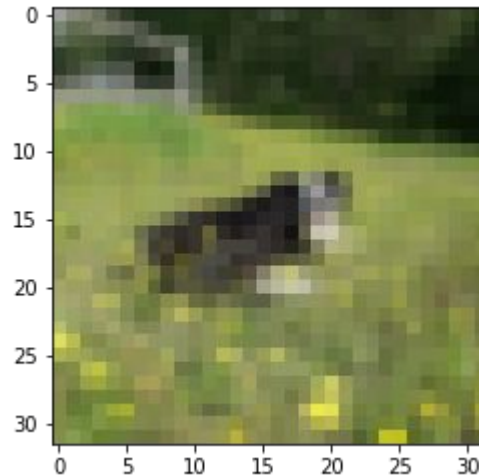
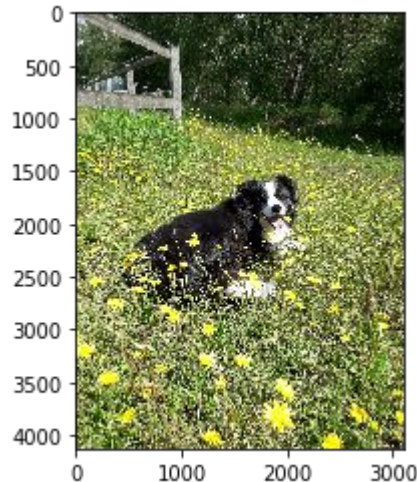
cat	dog
0.79	0.21

# What did we do?



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- recognizing dog and cat pictures
  - computer learns relationship between pixels and classifies accordingly



cat	dog
0.62	0.38



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# THANK YOU!

