

Master in Internet of Things for eHealth

M5. Smart Data Knowledge / Analytics

Deep Learning

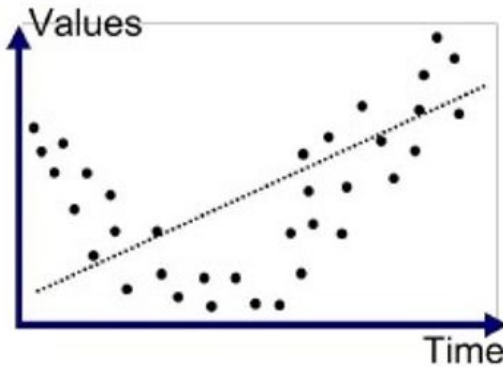
(Fine-tuning and Overfitting)

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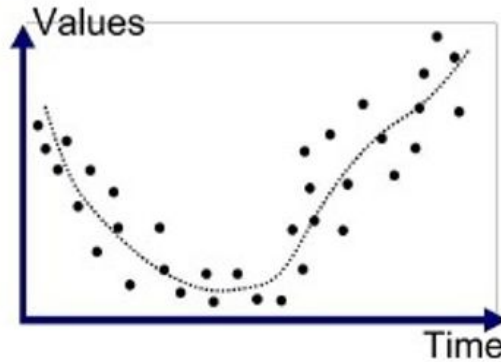
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Problems when training machine learning models

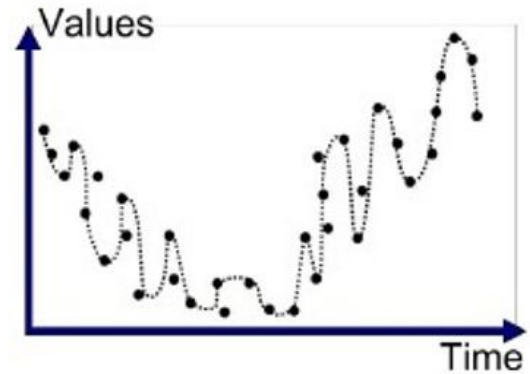
- **Underfitting:** The model is not capable of fitting the (training) data.
- **Overfitting:** The model adapts too much to the training data.



Underfitted



Good Fit/Robust



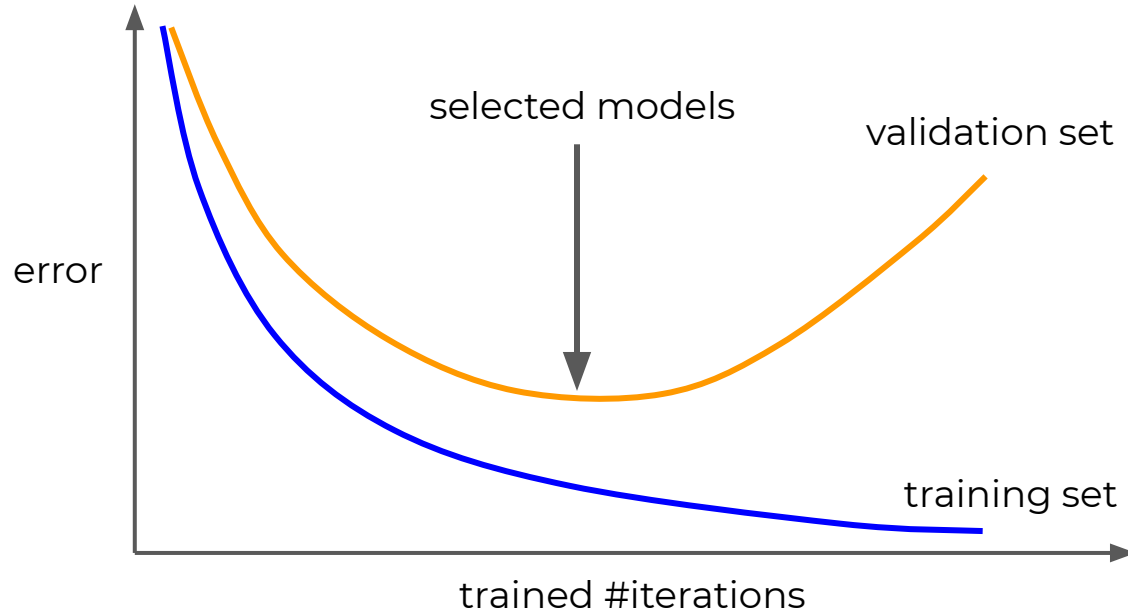
Overfitted

Techniques to avoid them

- **Underfitting:**
 - Increase the polynomial degree (in DL: increase model capacity)
- **Overfitting:**
 - Early stopping
 - Fine-tuning
 - Data Augmentation
 - MC-Dropout

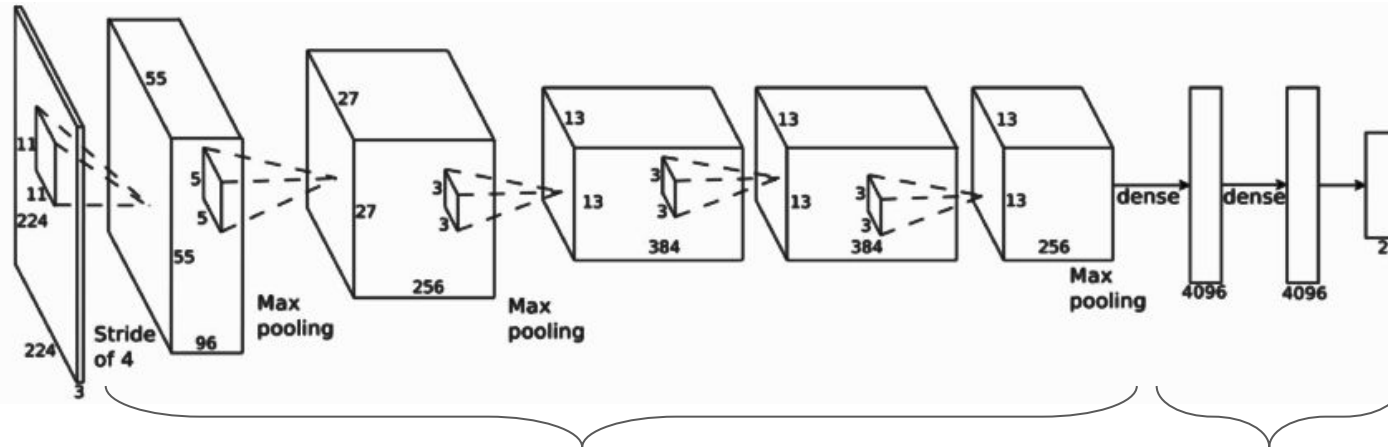
Early Stopping

- Select the model version when error starts to grow in the validation error.



Fine Tuning (Transfer Learning)

- Idea: Use the first pre-trained layers a network with lots of diverse general data and fine-tune the last ones for our task.



(Frozen feature extraction)
Trained with ImageNet
(1000 generic classes x 1000 samples/class)

Fine-tune