Birkbeck
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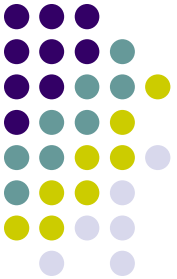
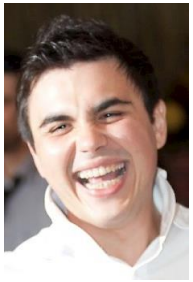


(Concepts of) Machine Learning- Lab 2

George Magoulas with



Cosmin Stamate

Michal Grochmal

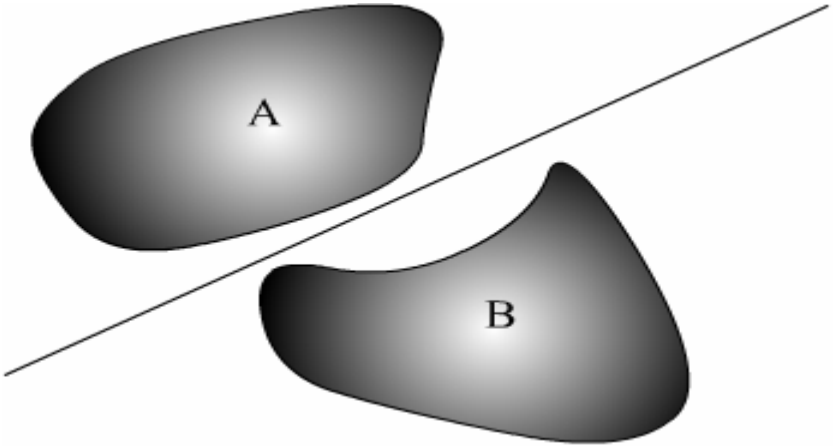
Activities

- Multilayer Networks and classification in Matlab
- Transfer learning with Keras

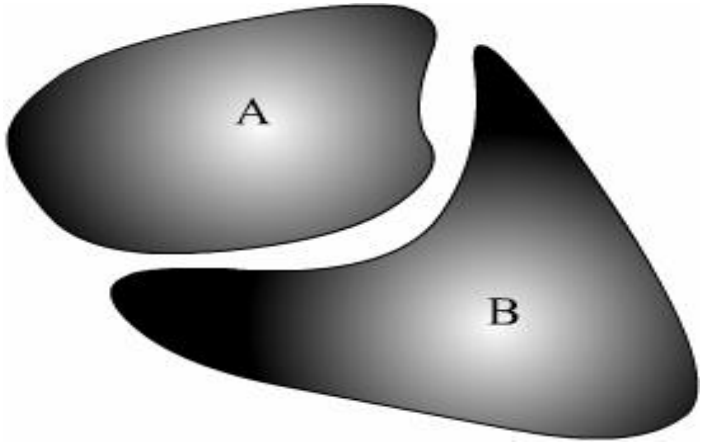
What is a neural network?

Multilayer networks

Non linear separable problems: Training patterns belonging to one output class cannot be separated from training patterns belonging to another class by a straight line, plane or hyperplane.

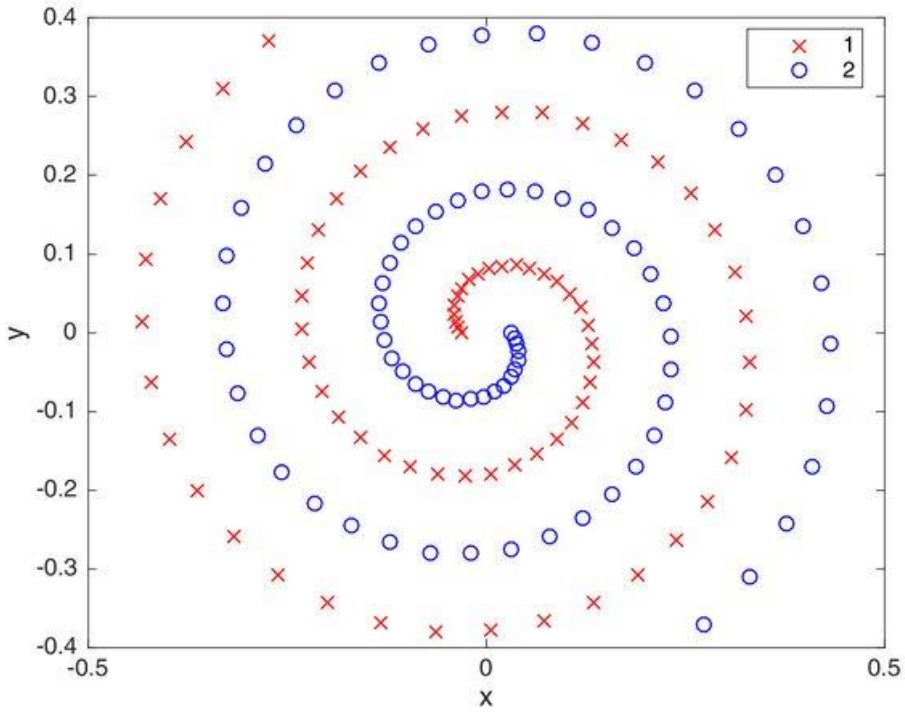


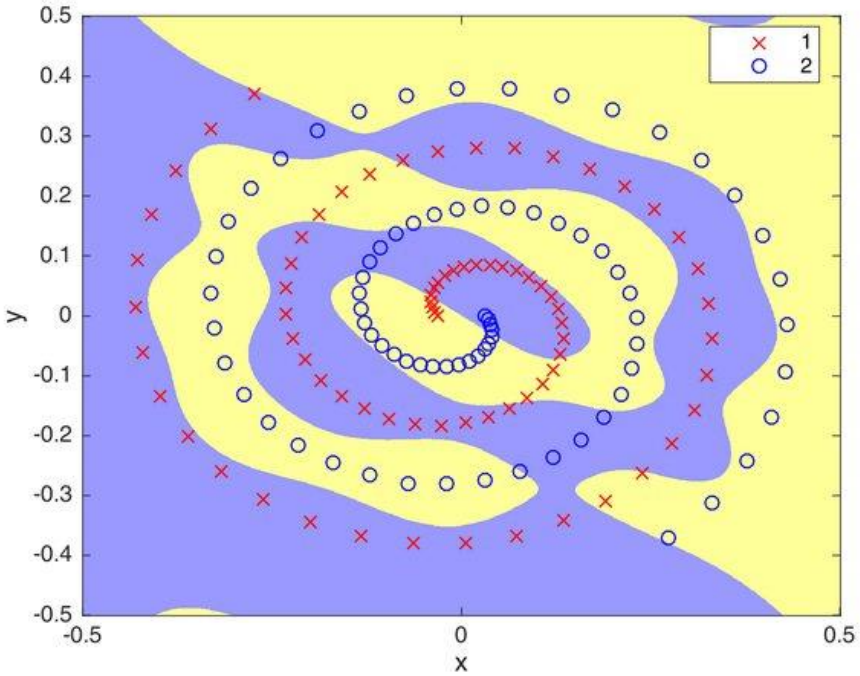
Linear separable



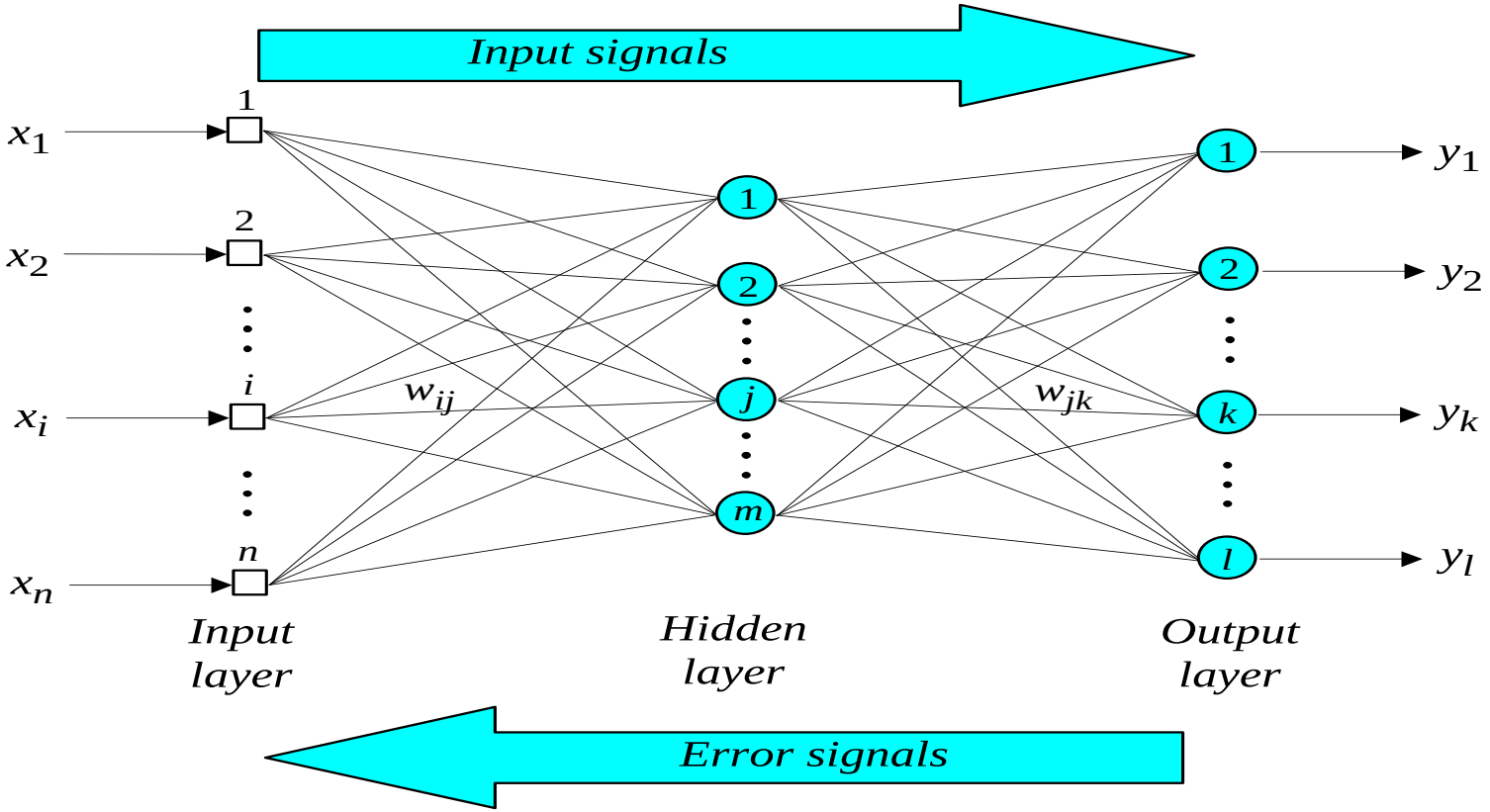
Nonlinear separable

Example of non-linear separable problem





Three-layer back-propagation neural network

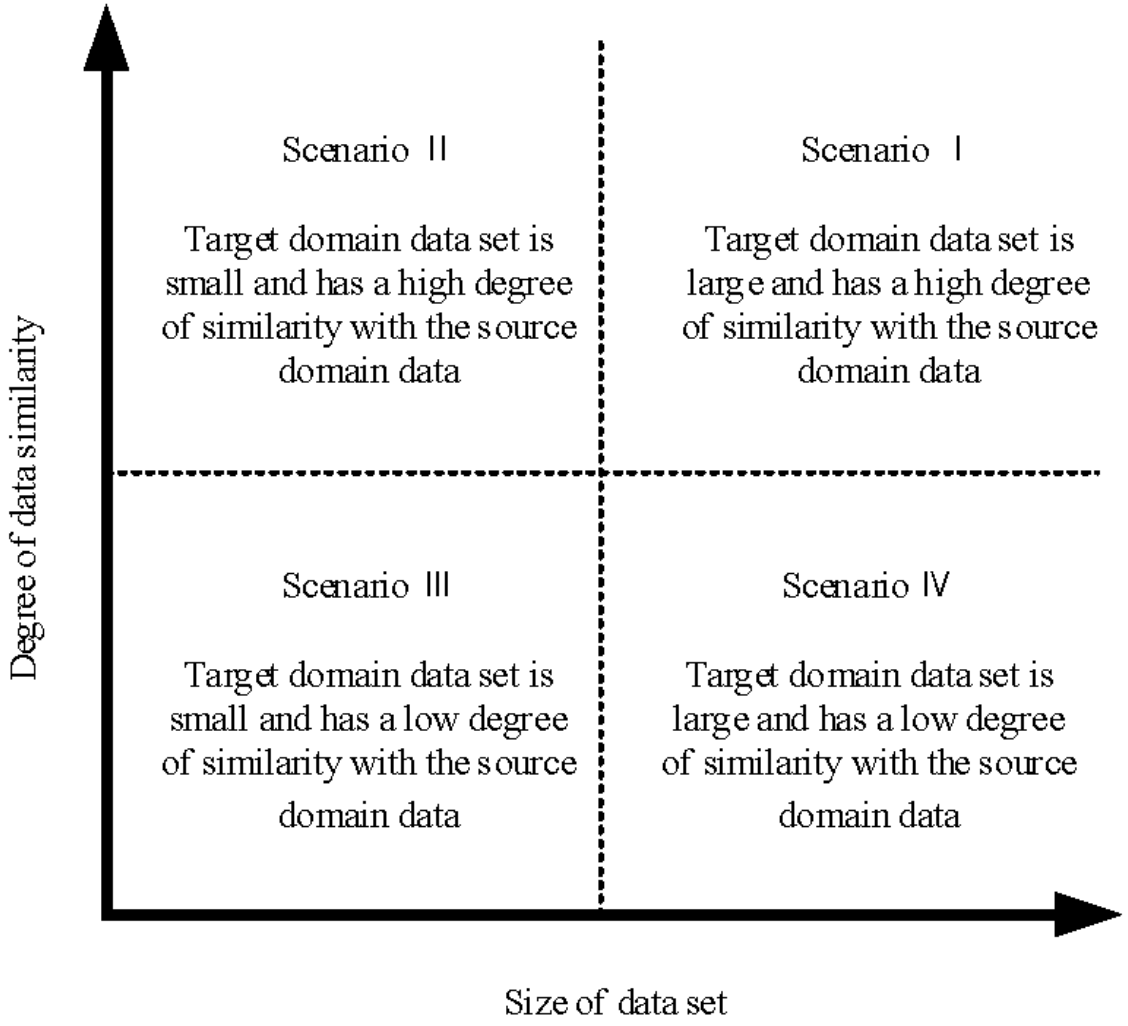


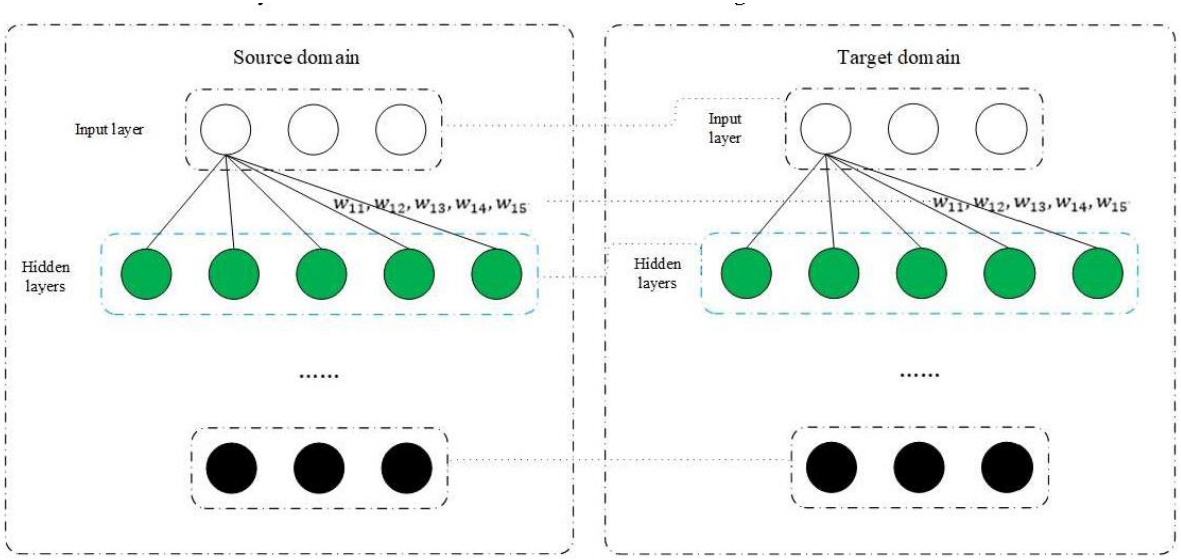
For the gradients, Keras implements Automatic differentiation-

https://en.wikipedia.org/wiki/Automatic_differentiation

Survey paper: Automatic Differentiation in Machine Learning

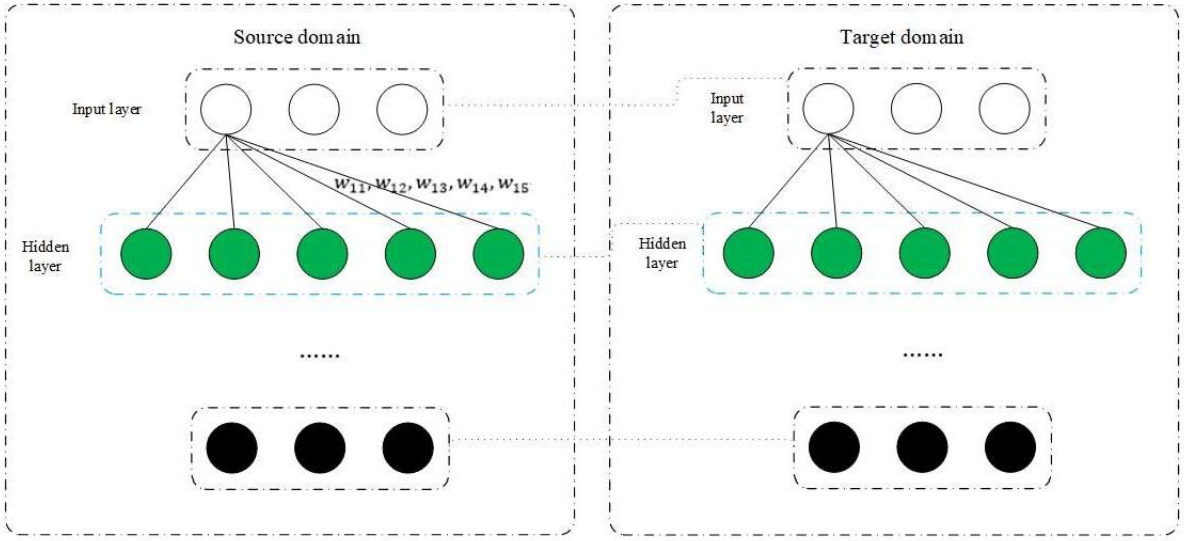
Transfer learning



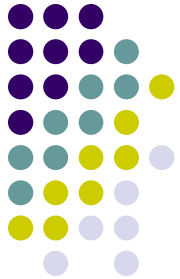


Transfer network structure and weights

Transfer network structure and initiliase weights



Pretrained models for images



- VGGNET : Introduced by Simonyan and Zisserman in their 2014 paper, Very Deep Convolutional Networks for Large Scale Image Recognition.
- RESNET : First introduced by He et al. in their 2015 paper, Deep Residual Learning for Image Recognition
- INCEPTION: The “Inception” micro-architecture was first introduced by Szegedy et al. in their 2014 paper, Going Deeper with Convolutions
- XCEPTION: Xception was proposed by François Chollet, the creator of the Keras library