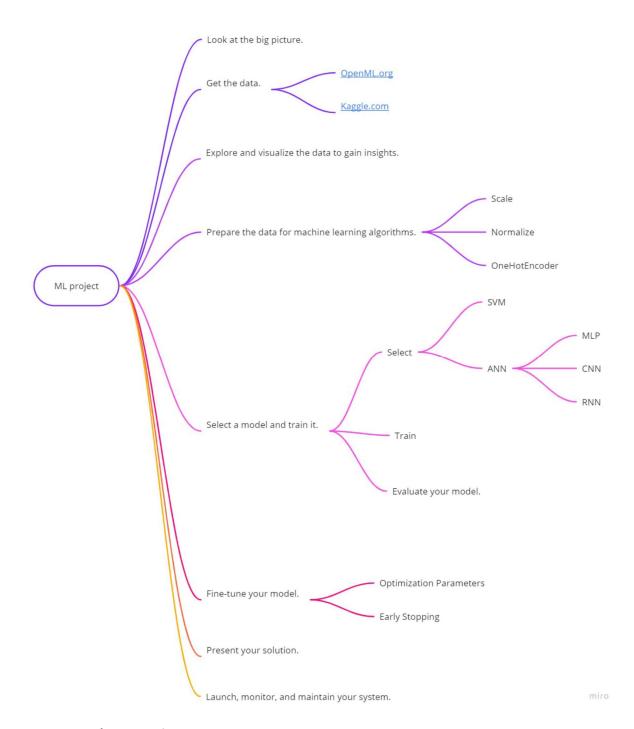


## **Group 1: Activation Functions**

Question: Describe the sigmoid and ReLU activation functions. Explain when you might choose one over the other in a neural network.

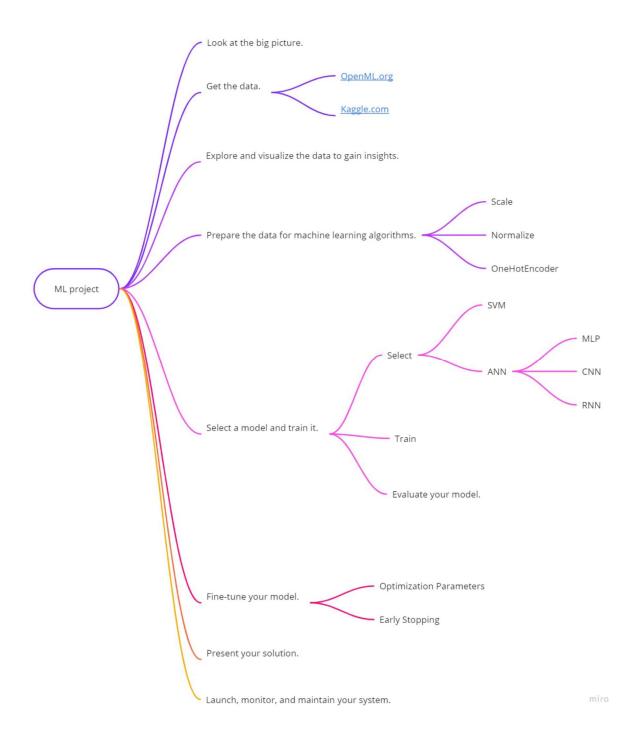
Deep learning Applications: Seminar 3
Group 1: Building a Simple Neural Network
Question: Create a simple feedforward neural network in Keras with one input layer, one hidden layer (with 32 neurons and ReLU activation), and one output layer (with a sigmoid activation function). Write down the model architecture.



**Group 2: Backpropagation** 

Question: Explain the backpropagation algorithm in the context of training a neural network. What is the role of the chain rule in backpropagation?

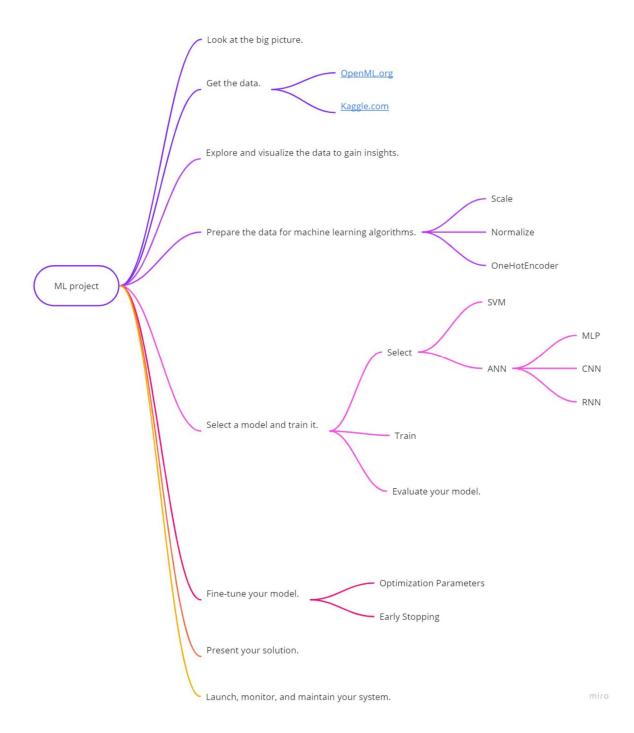
Deep learning Applications: Seminar 3
Group 2: Compiling a Model
Question: Define the compilation steps for a neural network in Keras. Include the optimizer, loss function, and evaluation metric. Explain the role of each component.



**Group 3: Overfitting** 

Question: Define overfitting in the context of deep learning. Describe two techniques to mitigate overfitting.

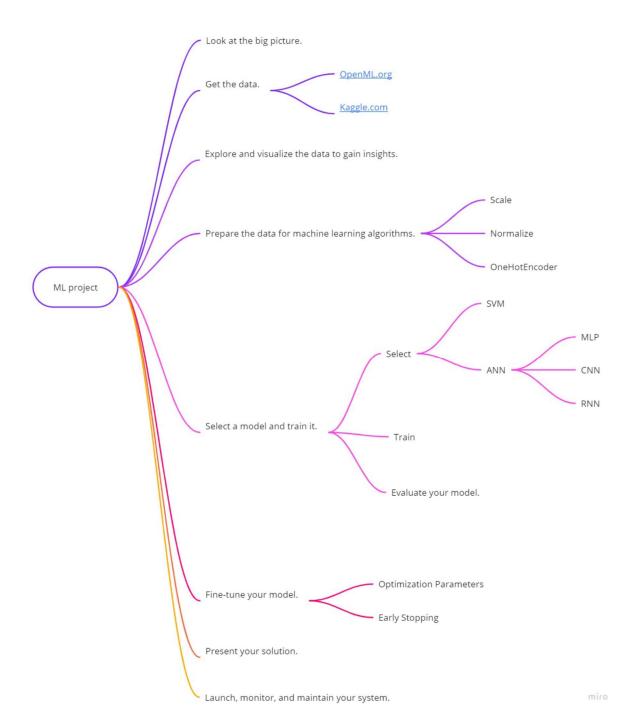
Deep learning Applications: Seminar 3
Group 3: Model Training
Question: Describe the steps involved in training a neural network in Keras. Include concepts like epochs, batch size, and validation data.



**Group 4: Convolutional Neural Networks (CNNs)** 

Question: Explain the concept of convolution in Convolutional Neural Networks (CNNs). Why are CNNs particularly well-suited for image recognition tasks?

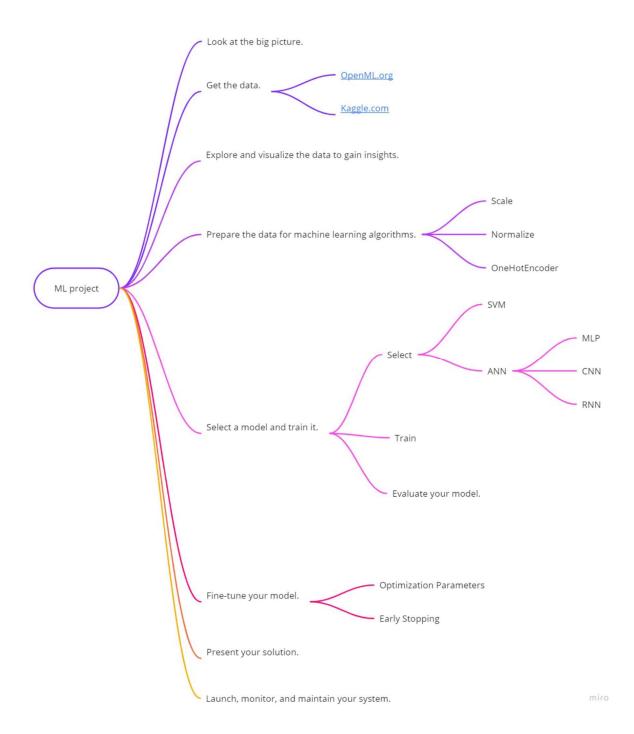
Deep learning Applications: Seminar 3
Group 4: Data Preprocessing
Question: Explain the importance of data preprocessing in deep learning. Provide examples of common preprocessing techniques used in Keras.



**Group 5: Recurrent Neural Networks (RNNs)** 

Question: Describe the architecture and purpose of Recurrent Neural Networks (RNNs). Provide an example of a real-world application where RNNs are beneficial.

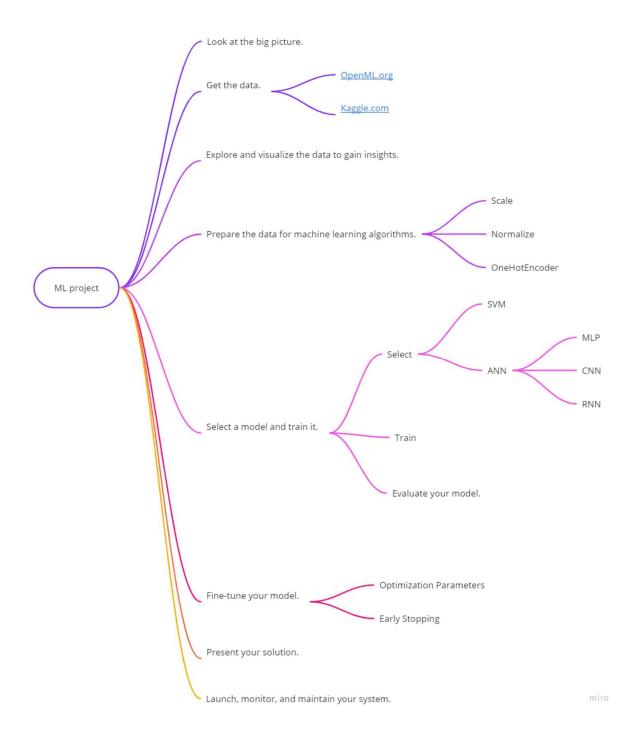
Deep learning Applications: Seminar 3
Group 5: Regularization
Question: Describe the concept of regularization in deep learning. Explain how dropout and L2 egularization can be implemented in Keras.



**Group 6: Gradient Descent** 

Question: Explain the gradient descent optimization algorithm. What is the learning rate, and how does it affect the convergence of gradient descent?

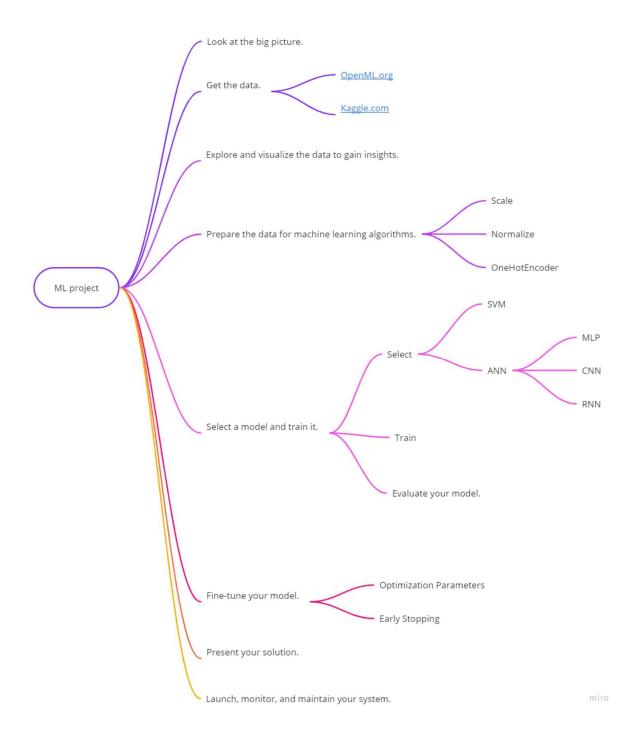
Deep learning Applications: Seminar 3 **Group 6: Early Stopping** Question: What is early stopping, and why is it used in deep learning? Describe how you can implement early stopping in Keras.



**Group 7: Batch Normalization** 

Question: Explain the concept of batch normalization in neural networks. What are the benefits of using batch normalization?

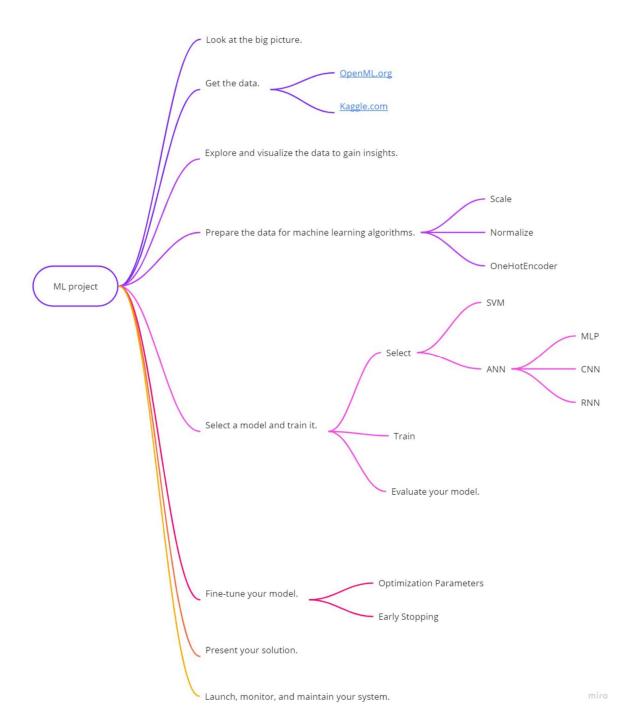
Deep learning Applications: Seminar 3
Group 7: Model Evaluation
Question: Explain how to evaluate a trained neural network model in Keras using test data. Mention the evaluation metric commonly used for classification tasks and another metric for regression tasks



**Group 8: Vanishing Gradient Problem** 

Question: What is the vanishing gradient problem in deep learning? How does it affect training in deep neural networks, and what activation functions can help mitigate it?

Deep learning Applications: Semina	r 3	
Group 8: Model Saving and Loading	9	
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Question: Describe how to save a tr	ained neural network model in Keras to a file. Also, explain how	N
	ained neural network model in Keras to a file. Also, explain how	~
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**Group 9: Transfer Learning** 

Question: Define transfer learning in deep learning. Describe a scenario where transfer learning can be effectively applied, and explain the benefits.

Deep learning Applications: Seminar 3
Group 9: Hyperparameter Tuning
Question: What are hyperparameters in deep learning, and why is tuning them important? Explain how hyperparameter tuning can be performed in Keras.

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**Group 10: Dropout** 

Question: Explain the dropout regularization technique in deep learning. How does dropout work, and why is it used?

Deep learning Applications: Seminar 3
Group 10: Transfer Learning
Question: Define transfer learning and explain how it can be applied using pre-trained models in Keras. Provide an example of a pre-trained model in Keras.
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