



Avowal Data Systems

AI Automation



LEARN



BUILD



PREDICT



SUCCEED

- DATA
- PYTHON
- ALGORITHMS
- MODELS
- INSIGHTS

AI - DEEP LEARNING

CNNs, RNNs, LSTMs – Build Real-World Deep Learning



Deep Concepts Made Simple



Hands-On Projects



Real-World Applications



Performance Optimization



Deploy with Confidence

Trainer
Raju K



INDUSTRY RELEVANT CURRICULUM



PRACTICAL HANDS-ON PROJECTS



REAL-WORLD AI/ML APPLICATIONS



CAREER GROWTH FOCUSED



CERTIFICATION OF COMPLETION



ABOUT THE TRAINER

Raju Kolikapogu

Technical Architect

With over 20 years of experience, I specialize in architecting projects end-to-end and mentoring teams to success. I am also an expert in providing training for both individuals and corporate teams.



MY SKILL SET:



AI Automation:

Master n8n, Make.com, and Generative AI tools—langchain, RAG to streamline your workflows and boost efficiency.



Chatbots:

Master the art of building advanced chatbots w/o voice using VAPI, Voiceflow, BotPress, and Dialogflow to create seamless and engaging user interactions.



Data Analytics:

Harness the power of AI, Machine Learning, and Python to extract meaningful insights from data and drive business decisions, leveraging tools like Airflow, Spark, and Kubeflow for large-scale data handling.



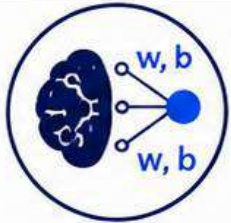
20+
Years of
Experience



Trained
Individuals &
Corporate Teams

Foundations of Neural Nets

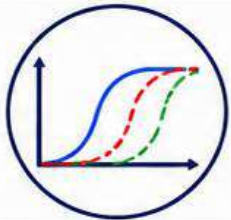
1



From Linear Regression to Perceptrons

The biological inspiration, weights, biases, and the basic Perceptron unit.

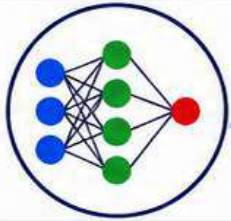
2



Activation Functions (The Gatekeepers)

Why non-linearity matters; Sigmoid, Tanh, and ReLU activation functions.

3



Multi-Layer Perceptrons (MLP)

Connecting units into layers: Input, Hidden, and Output structures.

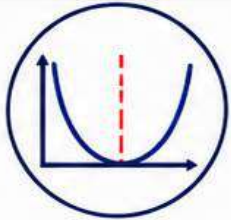
4



The Chain Rule & Backpropagation

How errors travel backward through layers to calculate gradients.

5



Loss Functions & Optimization

Cross-Entropy for classification and Mean Squared Error for regression.



Framework Mastery (TensorFlow & Keras)

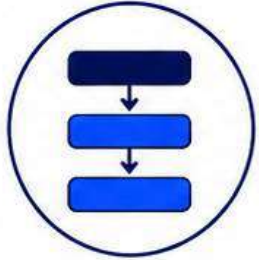
1



Setting up the Deep Learning Kitchen

Introduction to Tensors, GPU vs CPU computation, and environment verification [cite: 21].

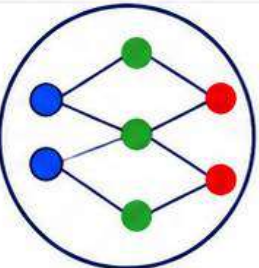
2



Your First Keras Sequential Model

The Keras Sequential API paradigm: adding layers, compiling, and fitting [cite: 21].

3



Keras Functional API

Ai Automation

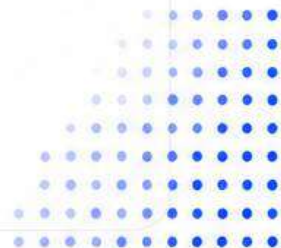
Building non-linear network graphs, multi-input, or multi-output designs.

4



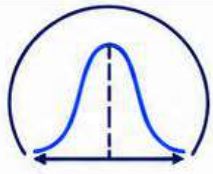
Evaluating & Saving Deep Models

Model history tracking, validation sets, and exporting weights for deployment.



Training & Regularization Mechanics

1



Weight Initialization Styles

Why zero initialization fails;
Understanding Xavier/Glorot and He initialization [cite: 21].

2



The Vanishing Gradient Problem

Why deep networks stop learning
when gradients shrink too close to zero.

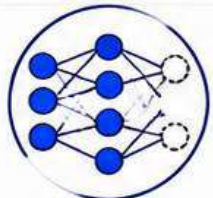
3



Advanced Optimizers

Moving past basic SGD:
Momentum, RMSProp, and the Adam optimizer [cite: 21].

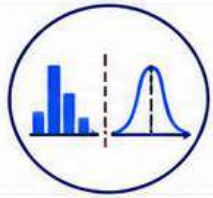
4



Fighting Overfitting with Dropout

Random node deactivation during training steps
to build model redundancy [cite: 21].

5



Batch Normalization

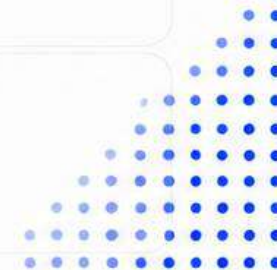
Standardizing hidden layer activations during
training batches for faster convergence [cite: 21].

6



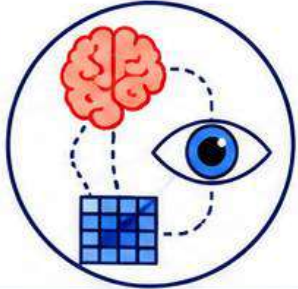
Callbacks & Early Stopping

Monitoring validation trends during training
to save time and stop over-training.



Computer Vision with CNNs

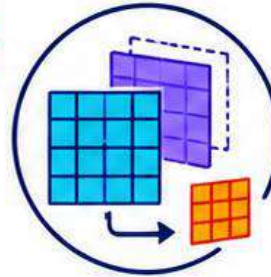
1



Biological Inspiration & Convolutions

How the human visual cortex inspires spatial image filtering [cite: 21].

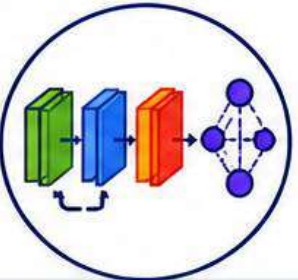
2



Padding, Strides, and Pooling

Controlling output dimensions using padding/strides, and downsampling with Max Pooling.

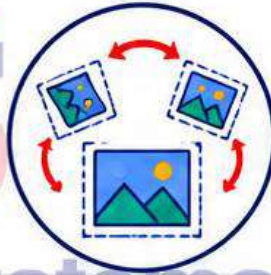
3



Your First Convolutional Neural Network

Putting Convolution, Pooling, Flattening, and Dense layers together into an end-to-end model.

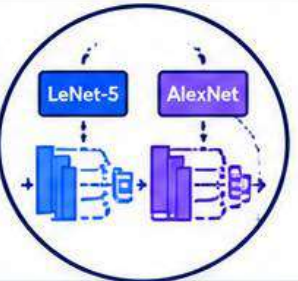
4



Data Augmentation Techniques

Artificially expanding dataset volume using image flips, rotations, and scaling [cite: 22].

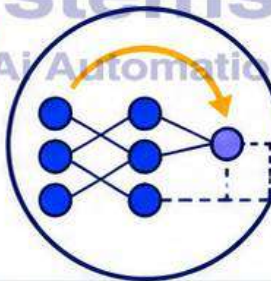
5



Classic Architectures: LeNet & AlexNet

Reviewing historical design shifts: From LeNet-5 to the deep AlexNet design paradigm [cite: 22].

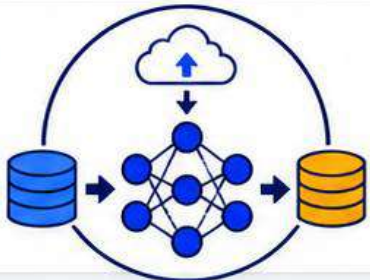
6



Modern Architectures: VGGNet & ResNet

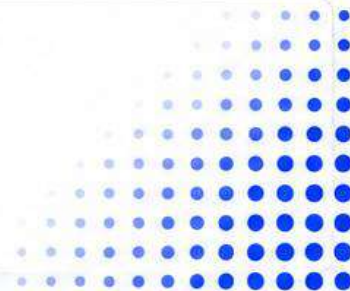
The power of deep stacks (VGG) and solving degradation using Skip Connections / Residual Blocks [cite: 22].

7



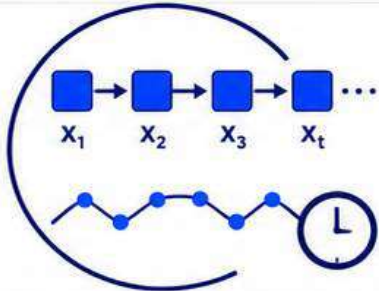
Transfer Learning Mechanics

Leveraging huge pre-trained model backbones (like ImageNet) for custom small tasks [cite: 22].



Sequence Modeling with RNNs & LSTMs

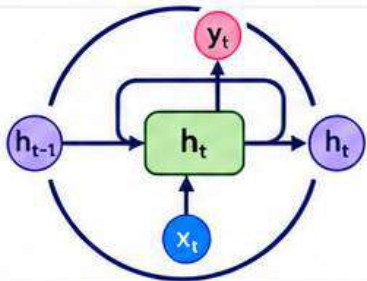
1



Why Order Matters (Sequential Data)

Moving from fixed-size vectors to time-series sequences and tracking state over time [cite: 22].

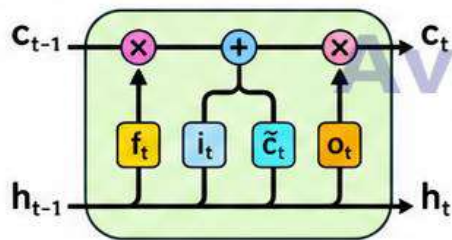
2



Recurrent Neural Networks (RNN)

The architectural loop of a basic Recurrent Neural Network cell [cite: 22].

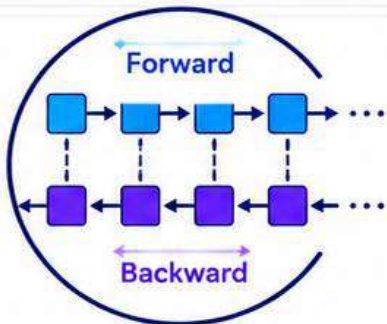
3



The Long Short-Term Memory (LSTM) Cell

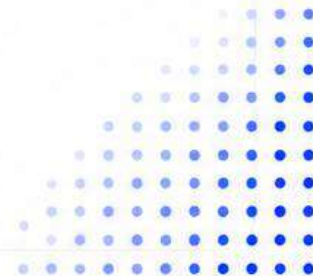
How the Forget, Input, and Output gates solve long-range dependency problems [cite: 22].

4



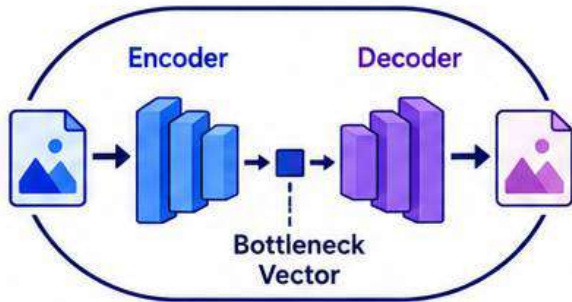
Gated Recurrent Units (GRU) & Bidirectional Networks

A streamlined variant of LSTM (GRU) and reading sequences from both left-to-right and right-to-left [cite: 22].



Advanced Paradigms & Capstone Project

1



Encoder-Decoder Foundations

Mapping an input sequence or image into a bottleneck vector, and expanding it back out [cite: 22].

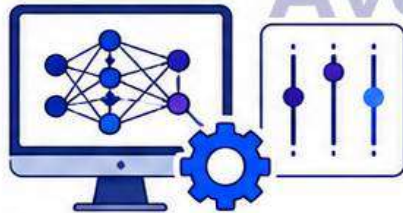
2



Capstone Project: Setup & Exploration

Defining a project goal using a custom non-tabular dataset (e.g., classifying specialized real-world objects).

3



Capstone Project: Model Engineering

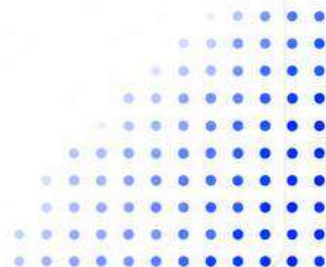
Building, adjusting, and fine-tuning an advanced deep network setup using regularization tools.

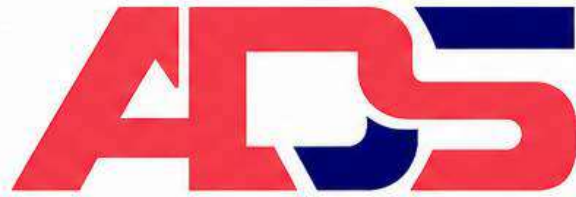
4



Capstone Project: Evaluation & Deployment

Compiling model performance reports, calculating confusion matrices, and exporting final weights [cite: 17, 21].





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