KODE KARBON

ML ENGINEER ROAD MAP 2024

Persistence Forever

MARCH 2024

CRAFTED FOR

YouTube

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Kode karbon

kodekarbon@gmail.com

Why ML Engineer?

HOW WE WORK

Machine Learning Solutions.

ML engineers leverage machine learning techniques to solve complex problems and build intelligent systems that can make predictions, automate tasks, and extract insights from data.

ML engineers work by gathering and preprocessing data, selecting appropriate machine learning models, training and optimizing these models, and deploying them into production environments.

DATA

INNOVATE

WHAT WE DO

Optimize

ML engineers optimize machine learning models by fine-tuning hyper dparameters, improving feature selection, addressing data imbalance, and employing optimization algorithms.

Empower

ML engineers empower with data-driven decisions, task automation, efficiency gains, and innovative solutions.

Table of Contents

2024 RoadMap

Intro

2025 (The Goal)

4. Projects and Portfolio
- Linear Regression, Classification
- Sentiment Analysis (NLP)
- Object Detection
- MLOps

3. Advanced Skills
- Deep Learning Frameworks
- Hyper dparameter Tuning
- Transfer Learning

2. Intermediate Skills
- Deep Learning Algorithms (CNN, RNN)
- Natural Language Processing (NLP)
- Computer Vision

2024 (The Start)

1. Foundational Skills
- Mathematics
- Programming
- Data Engineering

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FOUNDATION

BASICS

MARCH - APRIL

MATHEMATICS

Probability: Understand event likelihood for predicting outcomes. **Statistics**: Grasp data analysis methods for informed decisions. **Linear Algebra:** Comprehend matrix operations for multi-dimensional data. **Calculus**: Learn calculus for optimizing models and algorithms.

PROGRAMMING

Python: Master Python programming language, widely used in machine learning for its simplicity, versatility, and extensive libraries. **OOPS** in python.

DATA ENGINEERING

Data Preprocessing: Cleanse and enhance raw data for analysis. **Data Cleaning**: Ensure data reliability and accuracy. **Feature Engineering**: Extract insights, optimizing models.

Intermediate Skills

May - August

Deep Learning Algorithms:

Neural Networks: Gain expertise in the fundamental components of deep learning models, facilitating intricate pattern recognition and decision-making.

Convolutional Neural Networks (CNNs): Excel in image processing duties, delivering cutting-edge outcomes in image classification and object detection.

Recurrent Neural Networks (RNNs): Grasp the essentials of processing sequential data, essential for tasks such as time series analysis and natural language processing.

Transformers: Investigate attention mechanisms for managing sequential data, transforming tasks like machine translation and text generation.

Natural Language Processing (NLP):

Word Embeddings: Represent words numerically to capture semantic relationships, improving model understanding of textual data.

Attention Mechanisms: Focus on relevant parts of input sequences, enhancing model performance in tasks like machine translation and text summarization.

Sequence-to-Sequence Models: Enable tasks requiring input-output sequences of varying lengths, such as language translation and speech recognition.

Computer Vision:

Image Classification: Categorize images for medical diagnosis, etc.

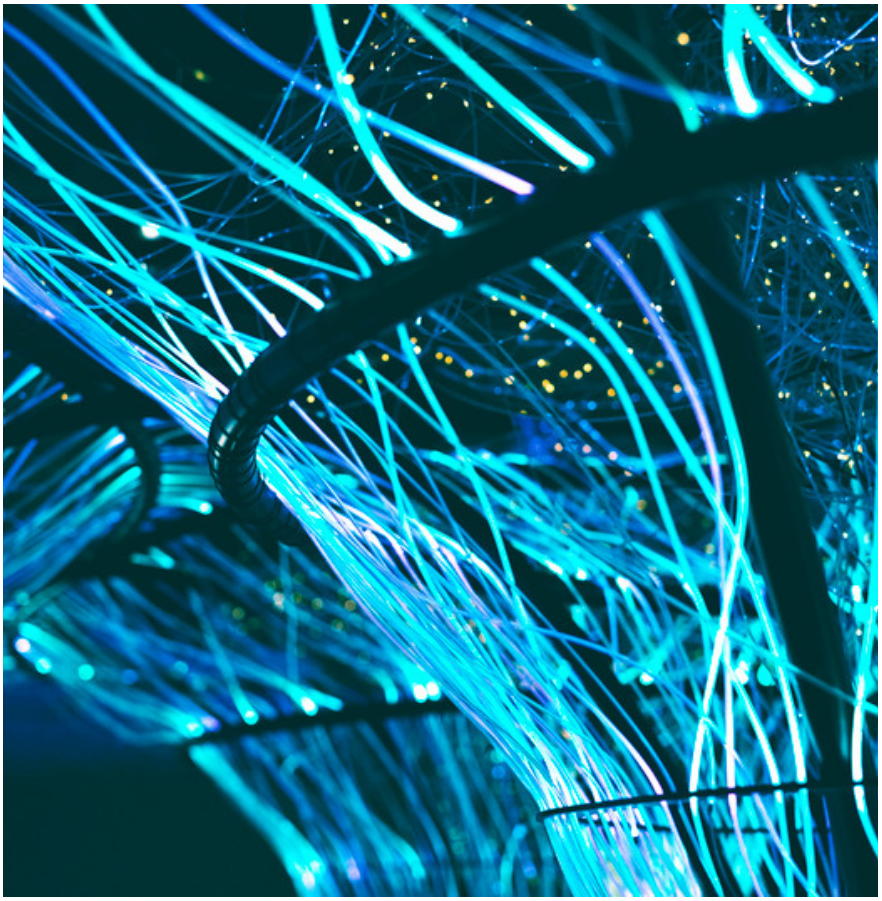
Object Detection: Locate objects for surveillance, AR.

Segmentation with CNNs: Classify pixels for medical imaging, scene understanding.

Common Points

Complex architectures, debugging neural networks, and dealing with over fitting/under fitting. Deconstruct concepts, provide hands-on exercises, and real-world applications. Enhances performance, efficiency, scalability, revolutionizing industries.

ADVANCED SKILLS IN AI & DL



DL FRAME WORKS

TensorFlow: Discover Google's strong open-source tool, praised for its ability to scale and flexibly deploy deep learning models. **PyTorch:** Explore Facebook's lively framework, loved for its user-friendly design and intuitive interface, favored by researchers and practitioners for quick prototyping and experimentation.

Keras: Use the high-level neural networks API, which provides simplicity and modularity while smoothly integrating with TensorFlow and Theano.

HYPERPARAMETER TUNING:

Fine-tune hyperparameters such as learning rate, batch size, and regularization strength to boost model performance, improving accuracy and convergence rates.

TRANSFER LEARNING

Utilize pre-trained models to kickstart model training and adjust them for new tasks, cutting down training time and data needs while achieving top-notch outcomes.

GENERATIVE MODELS

Generative Adversarial Networks (GANs): Develop models to produce fresh data samples, transforming fields such as image synthesis, data augmentation, and artistic creation.

Variational Autoencoders (VAEs): Acquire latent representations of data, facilitating tasks like image restoration, anomaly detection, and unsupervised learning.

PROJECTS AND PORTFOLIO

LIST OF PROJECTS

Project 1: Linear Regression, Classification

Implement linear regression to predict continuous outcomes and logistic regression for binary classification tasks. Assess model performance and interpret coefficients to gain insights into variable relationships.

Project 2: Image Classification with CNNs

Utilize Convolutional Neural Networks (CNNs) to classify images into multiple categories. Preprocess image data, define CNN architecture, train the model, and evaluate its performance using metrics like accuracy and precision.

Project 3: Sentiment Analysis with NLP

Perform sentiment analysis on textual data using Natural Language Processing (NLP) techniques. Preprocess text data, employ techniques like word embeddings and recurrent neural networks, and classify sentiment polarity (positive/ negative) using machine learning algorithms.

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kodekarbon@gmail.com

LIST OF PROJECTS

Project 4: Object Detection with YOLO

Implement the You Only Look Once (YOLO) algorithm for real-time object detection in images or videos. Preprocess input data, set up the YOLO model architecture, train the detector on annotated datasets, and assess its precision and recall performance.

Project 5: Reinforcement Learning Agent

Develop a reinforcement learning agent to acquire optimal strategies in changing environments. Establish the problem, craft the agent utilizing algorithms such as Q-learning or Deep Q-Networks (DQN), train the agent by engaging with the environment, and assess its performance as time progresses.

Project 6: Kaggle Competitions

Engage in Kaggle competitions to employ machine learning and deep learning techniques on real-world datasets. Collaborate with peers, experiment with different models and algorithms, and aim for top rankings by achieving competitive performance metrics.

Future of Machine Learning

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Kode karbon

kodekarbon@gmail.com

March 23

Project organizer.

Project Name:	**Date:**
Project Description:	
Objectives:	**Action Plan:** ✓ ✓ ✓ ✓ ✓ ✓ ✓
Version 1 Output :	
Version 2 Output :	

March 2023

Brain storming.

Brainstorming is a creative problem-solving technique that involves generating a large number of ideas in a short amount of time. The key to successful brainstorming is to suspend judgment and criticism of ideas during the initial idea generation phase. This allows for a free flow of ideas and avoids limiting creativity.
Brainstorming can be a powerful tool for generating innovative solutions and fostering team collaboration.

My Goal:

Stop Doing:

Do less of:

Keep doing:

Do more of:

Start doing:

Notes: