

Name:

Radek Cichra

Certificate of completion of Chaos Camp 2024 / Vol. 2

Algorithms & Data Structures for C++, Part 2 | Machine Learning

Algorithms and Data Structures for C++, Part 2

20 hours

- Special linear data structures. Tiered vector, skip list.
- Non-linear data structures. Trees, DFS and BFS. Binary ordered tree. When we can use it and when to avoid it.
- How to fix the broken tree? Balanced trees. DSW algorithm for balancing.
- Self-balancing trees. Red-Black tree. AVL tree.
- Shared access to the tree. Parallel building and searching in a BST. B-trees.
- More on trees – Prefix trees. Automata.
- Interval trees. Dynamic Order Statistics.
- Regular trees with higher dimension. KD-trees. BVH.
- More on probabilities and statistics. Monte Carlo and Las Vegas algorithms.
- Final project demo.

Machine Learning

16 hours

- Introduction to Machine Learning: Overview of AI and Machine Learning; Types of Generative Models; Applications of Generative AI; Practice.
- Introduction to PyTorch: Tensors, Variables, and Operations; Notebooks; Building a Simple Model in PyTorch.
- Deep Dive into PyTorch: Advanced PyTorch Concepts; Building Complex Models in PyTorch; PyTorch Model Training and Evaluation.
- Introduction to LLMs: GPT / ChatGPT; Prompt engineering, LLMs for problem solving; Using the OpenAI API, functions, costs; Practice.
- Introduction to MLOps: Vertex AI pipelines; MLFlow; Connecting Vertex AI pipeline to MLFlow; Practice.
- ML for Computer Vision: Image classification, segmentation and object detection; Diffusion models; Practice.
- Hands-on Project: Custom Model Training and Fine-tuning.
- Project Presentation and Course Wrap-up.

Assoc. Prof. Petar Armyanov, Ph.D.
Mentor, C++ Algorithms & Data Structures

Lyubomir Koev
Mentor, C++ Algorithms & Data Structures

Assistant Professor Filip Andonov
Mentor, Machine Learning

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