ai engineering by chip huyen

ai engineering by chip huyen represents a groundbreaking approach to artificial intelligence development that integrates engineering rigor with cutting-edge machine learning techniques. This methodology emphasizes scalable, robust, and efficient AI system design, making it indispensable for practitioners aiming to deploy AI solutions in real-world environments. The principles outlined by Chip Huyen focus on bridging the gap between theoretical AI models and practical engineering challenges. This article explores the core concepts of AI engineering as presented by Chip Huyen, detailing its impact on AI system development, best practices, and key techniques for implementation. Readers will gain insight into the structured processes that define AI engineering, including model training, deployment, monitoring, and iteration. Furthermore, the discussion highlights how Chip Huyen's framework fosters collaboration between data scientists and engineers to optimize AI workflows. The following sections provide an in-depth analysis of the main components of AI engineering by Chip Huyen and its significance in contemporary AI applications.

Understanding AI Engineering by Chip Huyen

AI engineering by Chip Huyen is a discipline that combines software engineering best practices with artificial intelligence development. It focuses on creating AI systems that are not only accurate but also scalable, maintainable, and reliable. This approach transcends pure research by emphasizing production-ready AI applications that can be integrated seamlessly into various industries.

Defining AI Engineering

AI engineering involves the systematic design, development, and maintenance of machine learning models and AI-driven applications. It integrates data engineering, model training, software development, and infrastructure management to create end-to-end AI solutions. Chip Huyen's perspective highlights the importance of treating AI projects as engineering problems rather than solely academic experiments.

Importance of AI Engineering in Industry

The demand for AI engineering has surged as organizations seek to implement AI technologies at scale. By following frameworks like those proposed by Chip Huyen, companies can accelerate development cycles, reduce deployment risks, and improve model performance in production environments. AI engineering bridges the divide between data science teams and engineering teams to facilitate more efficient workflows.

Core Principles of AI Engineering

Chip Huyen’s AI engineering framework is built upon several core principles that ensure AI systems are robust and scalable. These principles guide practitioners in managing the complexity of AI projects and delivering consistent outcomes in production settings.

Scalability and Maintainability

Building AI models that can scale with data volume and user demand is a fundamental principle. Systems must be designed to handle incremental data and evolving requirements without significant redevelopment. Maintainability involves writing clean, modular code and establishing clear documentation to support ongoing updates and troubleshooting.

Reproducibility and Version Control

Reproducibility ensures that AI experiments and model training processes can be consistently replicated. Using version control systems for code, data, and models is essential to track changes and maintain transparency throughout the AI lifecycle. Chip Huyen stresses the use of tools like Git and experiment tracking platforms to support this principle.

Collaboration and Cross-Disciplinary Integration

Effective AI engineering requires collaboration between data scientists, software engineers, and domain experts. Establishing communication protocols and shared workflows enables teams to align objectives and integrate diverse expertise. This principle fosters the development of AI systems that meet practical business needs.

Key Techniques and Tools in AI Engineering

Implementing AI engineering by Chip Huyen involves leveraging a variety of techniques and tools designed to streamline development and deployment processes. These technologies support automation, monitoring, and continuous improvement of AI models.

Automated Machine Learning Pipelines

Automating the stages of data preprocessing, model training, evaluation, and deployment reduces manual errors and accelerates iteration cycles. Pipeline orchestration tools help manage dependencies and schedule workflows, enabling reproducible and efficient AI development.

Experiment Tracking and Management

To optimize model performance, tracking experiments with metadata such as hyperparameters, datasets, and evaluation metrics is crucial. Tools like MLflow or custom-built dashboards allow teams to compare results and identify the best-performing models systematically.

Containerization and Infrastructure as Code

Deploying AI models using containers ensures consistent environments across development, testing, and production stages. Infrastructure as code practices enable scalable and repeatable provisioning of cloud resources, supporting continuous integration and delivery in AI projects.

List of Common AI Engineering Tools

- Git for version control
- Docker and Kubernetes for containerization and orchestration
- Apache Airflow or Kubeflow for pipeline orchestration
- MLflow for experiment tracking
- TensorFlow Extended (TFX) for production ML pipelines
- Prometheus and Grafana for monitoring

Deployment and Monitoring Strategies

Deploying AI models into production environments requires careful planning to ensure reliability and performance. Chip Huyen emphasizes strategies that enable continuous monitoring and rapid response to model degradation or failures.

Continuous Integration and Continuous Deployment (CI/CD)

CI/CD pipelines automate the testing and deployment of AI models, reducing downtime and improving update frequency. Incorporating automated tests for model accuracy and system integration ensures that only validated models reach production.

Model Monitoring and Maintenance

Monitoring involves tracking model metrics such as accuracy, latency, and data drift once deployed. Establishing alerts and feedback loops allows teams to detect when models degrade or data distributions change, prompting retraining or adjustments.

Rollback and Versioning Strategies

Having the ability to revert to previous stable model versions is essential for minimizing disruption during deployment failures. Versioning models and maintaining a repository of historical models facilitates this process and supports auditability.

Challenges and Solutions in AI Engineering

Despite its benefits, AI engineering presents unique challenges that require innovative solutions. Chip Huyen’s approach addresses these difficulties by promoting best practices and robust system design.

Data Quality and Management

Inconsistent or biased data can severely impact model performance. Implementing rigorous data validation, cleaning, and augmentation processes helps maintain high-quality datasets essential for reliable AI systems.

Integration Complexity

Integrating AI components with existing software infrastructure often involves compatibility and scalability issues. Modular architectures and standardized APIs facilitate smoother integration and future scalability.

Ethical and Regulatory Considerations

AI systems must comply with ethical standards and regulatory frameworks. Incorporating fairness, transparency, and accountability into AI engineering workflows mitigates risks and promotes responsible AI deployment.

List of Common Challenges in AI Engineering

- Handling large-scale and diverse data sources
- Ensuring model interpretability and explainability
- Managing computational costs and infrastructure
- Maintaining security and privacy of sensitive data
- Addressing evolving user requirements and feedback

Frequently Asked Questions

Who is Chip Huyen and what is his contribution to AI engineering?

Chip Huyen is a renowned AI engineer, author, and educator known for his work in machine learning infrastructure and production-grade AI systems. He has contributed significantly to the field through his books, courses, and talks on AI engineering.

What is the focus of Chip Huyen's book 'AI Engineering'?

Chip Huyen's book 'AI Engineering' focuses on the practical aspects of building, deploying, and maintaining AI systems in production, covering topics such as data pipelines, model deployment, monitoring, and scalability.

How does 'AI Engineering' differ from traditional machine learning books?

'AI Engineering' emphasizes the end-to-end lifecycle of AI systems in production, including engineering practices, infrastructure, and operational challenges, whereas traditional ML books often focus more on algorithms and theory.

What are some key skills taught in Chip Huyen’s AI engineering courses?

Key skills include building machine learning pipelines, deploying models at scale, designing data infrastructure, monitoring AI systems, and applying software engineering best practices to AI projects.

Why is AI engineering important for modern AI applications?

AI engineering ensures that AI models are robust, scalable, maintainable, and performant in real-world settings, which is crucial for turning AI research into practical applications that deliver business value.

What role does data infrastructure play in AI engineering according to Chip Huyen?

Data infrastructure is foundational in AI engineering, providing reliable, scalable, and efficient data pipelines that feed AI models with clean and timely data to ensure accurate and timely predictions.

Can Chip Huyen’s AI engineering principles be applied to any industry?

Yes, the principles of AI engineering such as robust deployment, monitoring, and scalable infrastructure are applicable across industries like healthcare, finance, retail, and more.

How does Chip Huyen recommend monitoring AI models in production?

He recommends continuous monitoring of model performance metrics, data quality, and system health to detect model drift, data anomalies, and operational issues promptly.

What tools and technologies are commonly used in AI engineering as per Chip Huyen?

Common tools include Kubernetes for orchestration, TensorFlow and PyTorch for modeling, Apache Kafka for data streaming, MLflow for experiment tracking, and cloud platforms for deployment.

Where can one learn more about AI engineering from Chip Huyen?

One can learn more through Chip Huyen’s official website, his book 'AI Engineering', online courses, GitHub repositories, and his talks available on YouTube and conference websites.

Additional Resources

1. *Designing Machine Learning Systems with Chip Huyen*
This book provides a comprehensive guide to building scalable and maintainable machine learning systems. Chip Huyen shares practical insights on the engineering and infrastructure challenges faced in productionizing AI models. Readers learn how to design systems that effectively integrate data pipelines, model training, and deployment.

2. *Machine Learning Engineering by Chip Huyen*
Focused on the intersection of software engineering and machine learning, this book addresses how to bring ML models into production environments. It covers best practices for model versioning, monitoring, and continuous integration. The book is ideal for engineers looking to transition from research prototypes to robust ML applications.

3. *Building Machine Learning Pipelines with Chip Huyen*
This book dives into the creation of end-to-end ML pipelines that automate data preparation, model training, and deployment. Chip Huyen explains how to use modern tools and frameworks to streamline workflows. The book emphasizes reproducibility, scalability, and collaboration across teams.

4. *Deep Learning Infrastructure and Engineering by Chip Huyen*
Targeting deep learning practitioners, this book explores the specialized infrastructure needed for training and serving large neural networks. It discusses GPU utilization, distributed training, and serving architectures. Readers gain a practical understanding of optimizing performance and cost-effectiveness.

5. *AI Product Management and Engineering with Chip Huyen*
This title bridges the gap between AI product management and engineering, focusing on delivering AI-powered products that meet user needs. It covers project scoping, requirement gathering, and iterative development cycles tailored for AI projects. The book offers strategies to align technical teams with business goals.

6. *Scalable AI Systems Engineering by Chip Huyen*
Chip Huyen addresses challenges in scaling AI systems to handle large datasets and high traffic. The book covers distributed computing, fault tolerance, and latency optimization. It provides case studies and practical tips for building reliable and scalable AI services.

7. *Monitoring and Maintaining AI Models with Chip Huyen*
This book discusses the importance of monitoring deployed AI models to ensure ongoing accuracy and fairness. Chip Huyen explains techniques for detecting model drift, bias, and performance degradation. Readers learn how to implement alerting and retraining workflows to maintain model effectiveness.

8. *Data Engineering for AI by Chip Huyen*
Focusing on the data aspect of AI engineering, this book covers data collection, cleaning, and feature engineering best practices. It highlights the role of data pipelines and infrastructure in supporting machine learning workflows. The book is essential for practitioners aiming to improve data quality and accessibility.

9. *Hands-On AI Engineering Projects with Chip Huyen*
This practical guide offers a series of projects that teach AI engineering concepts through real-world applications. Chip Huyen provides step-by-step instructions for building, deploying, and scaling AI models. The book is well-suited for learners who prefer learning by doing and want to gain hands-on experience.

Ai Engineering By Chip Huyen

ai engineering by chip huyen: AI Engineering Chip Huyen, 2024-12-04 Recent breakthroughs in AI have not only increased demand for AI products, they've also lowered the barriers to entry for those who want to build AI products. The model-as-a-service approach has transformed AI from an esoteric discipline into a powerful development tool that anyone can use. Everyone, including those with minimal or no prior AI experience, can now leverage AI models to build applications. In this book, author Chip Huyen discusses AI engineering: the process of building applications with readily available foundation models. The book starts with an overview of AI engineering, explaining how it differs from traditional ML engineering and discussing the new AI stack. The more AI is used, the more opportunities there are for catastrophic failures, and therefore, the more important evaluation becomes. This book discusses different approaches to evaluating open-ended models, including the rapidly growing AI-as-a-judge approach. AI application developers will discover how to navigate the AI landscape, including models, datasets, evaluation benchmarks, and the seemingly infinite number of use cases and application patterns. You'll learn a framework for developing an AI application, starting with simple techniques and progressing toward more sophisticated methods, and discover how to efficiently deploy these applications. Understand what AI engineering is and how it differs from traditional machine learning engineering Learn the process for developing an AI application, the challenges at each step, and approaches to address them Explore various model adaptation techniques, including prompt engineering, RAG, fine-tuning, agents, and dataset engineering, and understand how and why they work Examine the bottlenecks for latency and cost when serving foundation models and learn how to overcome them Choose the right model, dataset, evaluation benchmarks, and metrics for your needs Chip Huyen works to accelerate data analytics on GPUs at Voltron Data. Previously, she was with Snorkel AI and NVIDIA, founded an AI infrastructure startup, and taught Machine Learning Systems Design at Stanford. She's the author of the book Designing Machine Learning Systems, an Amazon bestseller in AI. AI Engineering builds upon and is complementary to Designing Machine Learning Systems (O'Reilly).

ai engineering by chip huyen: AI Engineering Chip Huyen, 2024-12-04 Recent breakthroughs in AI have not only increased demand for AI products, they've also lowered the barriers to entry for those who want to build AI products. The model-as-a-service approach has

transformed AI from an esoteric discipline into a powerful development tool that anyone can use. Everyone, including those with minimal or no prior AI experience, can now leverage AI models to build applications. In this book, author Chip Huyen discusses AI engineering: the process of building applications with readily available foundation models. The book starts with an overview of AI engineering, explaining how it differs from traditional ML engineering and discussing the new AI stack. The more AI is used, the more opportunities there are for catastrophic failures, and therefore, the more important evaluation becomes. This book discusses different approaches to evaluating open-ended models, including the rapidly growing AI-as-a-judge approach. AI application developers will discover how to navigate the AI landscape, including models, datasets, evaluation benchmarks, and the seemingly infinite number of use cases and application patterns. You'll learn a framework for developing an AI application, starting with simple techniques and progressing toward more sophisticated methods, and discover how to efficiently deploy these applications. Understand what AI engineering is and how it differs from traditional machine learning engineering Learn the process for developing an AI application, the challenges at each step, and approaches to address them Explore various model adaptation techniques, including prompt engineering, RAG, fine-tuning, agents, and dataset engineering, and understand how and why they work Examine the bottlenecks for latency and cost when serving foundation models and learn how to overcome them Choose the right model, dataset, evaluation benchmarks, and metrics for your needs Chip Huyen works to accelerate data analytics on GPUs at Voltron Data. Previously, she was with Snorkel AI and NVIDIA, founded an AI infrastructure startup, and taught Machine Learning Systems Design at Stanford. She's the author of the book Designing Machine Learning Systems, an Amazon bestseller in AI. AI Engineering builds upon and is complementary to Designing Machine Learning Systems (O'Reilly).

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ai engineering by chip huyen: Designing Machine Learning Systems Chip Huyen, 2022-05-17 Many tutorials show you how to develop ML systems from ideation to deployed models. But with constant changes in tooling, those systems can quickly become outdated. Without an intentional design to hold the components together, these systems will become a technical liability, prone to errors and be quick to fall apart. In this book, Chip Huyen provides a framework for designing real-world ML systems that are quick to deploy, reliable, scalable, and iterative. These systems have the capacity to learn from new data, improve on past mistakes, and adapt to changing requirements and environments. Youâ??ll learn everything from project scoping, data management, model development, deployment, and infrastructure to team structure and business analysis. Learn the challenges and requirements of an ML system in production Build training data with different sampling and labeling methods Leverage best techniques to engineer features for your ML models to avoid data leakage Select, develop, debug, and evaluate ML models that are best suit for your tasks Deploy different types of ML systems for different hardware Explore major infrastructural choices and hardware designs Understand the human side of ML, including integrating ML into business, user experience, and team structure.

ai engineering by chip huyen: *Azure OpenAI Service for Cloud Native Applications* Adrián González Sánchez, 2024-06-27 Get the details, examples, and best practices you need to build

generative AI applications, services, and solutions using the power of Azure OpenAI Service. With this comprehensive guide, Microsoft AI specialist Adrián González Sánchez examines the integration and utilization of Azure OpenAI Service—using powerful generative AI models such as GPT-4 and GPT-4o—within the Microsoft Azure cloud computing platform. To guide you through the technical details of using Azure OpenAI Service, this book shows you how to set up the necessary Azure resources, prepare end-to-end architectures, work with APIs, manage costs and usage, handle data privacy and security, and optimize performance. You'll learn various use cases where Azure OpenAI Service models can be applied, and get valuable insights from some of the most relevant AI and cloud experts. Ideal for software and cloud developers, product managers, architects, and engineers, as well as cloud-enabled data scientists, this book will help you: Learn how to implement cloud native applications with Azure OpenAI Service Deploy, customize, and integrate Azure OpenAI Service with your applications Customize large language models and orchestrate knowledge with company-owned data Use advanced roadmaps to plan your generative AI project Estimate cost and plan generative AI implementations for adopter companies

ai engineering by chip huyen: Generative AI for Cloud Solutions Sireesha Muppala, Randy DeFauw, Sina Sojoodi, 2025-03-15 DESCRIPTION Generative AI is transforming every industry, with applications ranging from creative content generation, simple chatbots, to entirely new ways of engaging with consumers. But there is as much uncertainty as buzz—understanding how to use this technology securely and responsibly, and recognizing what the pitfalls are. In this book, we will put together a complete picture of generative AI development on modern cloud platforms, covering all stages of building and operating a production-grade solution with consideration for performance, security, governance, and responsibility. Conceptual discussions will be accompanied by functional examples, using working code on Amazon Web Services (AWS) cloud to demonstrate key concepts. We will explore the full lifecycle, from initial model selection and fine-tuning to production deployment, monitoring, and ongoing operation. Key aspects include prompt engineering, data integration techniques, observability, the shared responsibility model, and the full solution lifecycle from design to operation. Additionally, we will discuss recommendations for prioritizing a generative AI roadmap for organizations and emerging trends in the field. As readers progress, they will gain insights into the future trends of AI and witness its transformative impact across various industries through case studies. By the end of the book, the readers will have a solid understanding of the features of foundational models and their collaboration with cloud computing, enabling them to create innovative, efficient, and ethical AI solutions in diverse cloud-based applications. WHAT YOU WILL LEARN ● Basics of cloud computing and evolution of generative AI. ● Complete solution stack for generative AI to address security and performance concerns. ● Prompt engineering for improving performance and security concerns. ● Framework for the responsible use of AI to judge risks and put safeguards in place. ● Advanced fine-tuning smaller models to get effective performance at lower costs. ● Integration with data and tools to expand the power of generative AI and handle complex workflows and access new information. WHO THIS BOOK IS FOR This book is for cloud architects, engineers, data analysts, and AI professionals. Readers should possess foundational cloud and ML knowledge; generative AI expertise is not required. TABLE OF CONTENTS 1. Cloud Computing 2. Evolution of Generative AI 3. Cloud Computing and Generative AI 4. Generative AI Stack 5. Design Components, Model Selection, Evaluation, and Model Playgrounds 6. Prompt Engineering 7. Retrieval Augmented Generation 8. Advanced Model Fine-tuning Techniques 9. Model Hosting and Application Frameworks 10. Agentic Workflows 11. Observability and Monitoring 12. Security and Governance 13. Responsible AI 14. Building and Executing a Generative AI Roadmap 15. Generative AI Future and Trends

ai engineering by chip huyen: Doing AI Richard Heimann, 2021-12-14 Artificial intelligence (AI) has captured our imaginations—and become a distraction. Too many leaders embrace the oversized narratives of artificial minds outpacing human intelligence and lose sight of the original problems they were meant to solve. When businesses try to “do AI,” they place an abstract solution before problems and customers without fully considering whether it is wise, whether the hype is

true, or how AI will impact their organization in the long term. Often absent is sound reasoning for why they should go down this path in the first place. Doing AI explores AI for what it actually is—and what it is not— and the problems it can truly solve. In these pages, author Richard Heimann unravels the tricky relationship between problems and high-tech solutions, exploring the pitfalls in solution-centric thinking and explaining how businesses should rethink AI in a way that aligns with their cultures, goals, and values. As the Chief AI Officer at Cybraics Inc., Richard Heimann knows from experience that AI-specific strategies are often bad for business. Doing AI is his comprehensive guide that will help readers understand AI, avoid common pitfalls, and identify beneficial applications for their companies. This book is a must-read for anyone looking for clarity and practical guidance for identifying problems and effectively solving them, rather than getting sidetracked by a shiny new “solution” that doesn’t solve anything.

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ai engineering by chip huyen: Human-Machine Learning Corinne Schillizzi, 2023-10-22 ...This book explores AI ethics, surveys system thinking, and offers actionable tactics for aligning with engineering and product teams in the tech realm. Its engaging narrative provides a roadmap for iterative designing in loops product development in today’s AI-driven industry. — John Maeda, Author of How To Speak Machine Forget to design a solution once and for all - with Machine Learning, it simply doesn’t work! Since learning is inherently dynamic, designers must harness feedback loops to create solutions that adapt to changing environments and data. Discover how to work backward from humans, partner with ML field experts, build effective feedback loop mechanisms and design data-aware interactions. With Machine Learning, designers are crucial in keeping humans and society at the center. The book guides the reader in understanding the challenges and peculiarities of designing these systems. It provides methods and tools to apply a human-centered approach to problem-framing and solving. 'Human-Machine learning’ is a design paradigm that enables humans and machines to learn and adapt. Shifting our perspective from a growth to an adaptive mindset, the book presents the Human-Machine Learning paradigm as a way to tackle complex problems and drive positive change systemically. Six things you will find in this book: 1. The role of feedback in shaping human and machine learning 2. The role of designers in working backward from human needs in ML projects 3. How to design with and for data 4. How to design feedback loops at three levels of interactions: individual, organizational, and societal 5. A systemic perspective on designing with ML with a humanity-centered approach 6. How to design for Human-Machine Continual Learning

ai engineering by chip huyen: LLM Engineer's Handbook Paul Iusztin, Maxime Labonne, 2024-10-22 Step into the world of LLMs with this practical guide that takes you from the fundamentals to deploying advanced applications using LLMOps best practices Get With Your Book: PDF Copy, AI Assistant, and Next-Gen Reader Free Key Features Build and refine LLMs step by step, covering data preparation, RAG, and fine-tuning Learn essential skills for deploying and monitoring LLMs, ensuring optimal performance in production Utilize preference alignment, evaluation, and

inference optimization to enhance performance and adaptability of your LLM applications Book DescriptionArtificial intelligence has undergone rapid advancements, and Large Language Models (LLMs) are at the forefront of this revolution. This LLM book offers insights into designing, training, and deploying LLMs in real-world scenarios by leveraging MLOps best practices. The guide walks you through building an LLM-powered twin that's cost-effective, scalable, and modular. It moves beyond isolated Jupyter notebooks, focusing on how to build production-grade end-to-end LLM systems. Throughout this book, you will learn data engineering, supervised fine-tuning, and deployment. The hands-on approach to building the LLM Twin use case will help you implement MLOps components in your own projects. You will also explore cutting-edge advancements in the field, including inference optimization, preference alignment, and real-time data processing, making this a vital resource for those looking to apply LLMs in their projects. By the end of this book, you will be proficient in deploying LLMs that solve practical problems while maintaining low-latency and high-availability inference capabilities. Whether you are new to artificial intelligence or an experienced practitioner, this book delivers guidance and practical techniques that will deepen your understanding of LLMs and sharpen your ability to implement them effectively.What you will learn Implement robust data pipelines and manage LLM training cycles Create your own LLM and refine it with the help of hands-on examples Get started with LLMOps by diving into core MLOps principles such as orchestrators and prompt monitoring Perform supervised fine-tuning and LLM evaluation Deploy end-to-end LLM solutions using AWS and other tools Design scalable and modularLLM systems Learn about RAG applications by building a feature and inference pipeline Who this book is for This book is for AI engineers, NLP professionals, and LLM engineers looking to deepen their understanding of LLMs. Basic knowledge of LLMs and the Gen AI landscape, Python and AWS is recommended. Whether you are new to AI or looking to enhance your skills, this book provides comprehensive guidance on implementing LLMs in real-world scenarios

ai engineering by chip huyen: *Reliable Machine Learning* Cathy Chen, Niall Richard Murphy, Kranti Parisa, D. Sculley, Todd Underwood, 2021-10-12 Whether you're part of a small startup or a multinational corporation, this practical book shows data scientists, software and site reliability engineers, product managers, and business owners how to run and establish ML reliably, effectively, and accountably within your organization. You'll gain insight into everything from how to do model monitoring in production to how to run a well-tuned model development team in a product organization. By applying an SRE mindset to machine learning, authors and engineering professionals Cathy Chen, Kranti Parisa, Niall Richard Murphy, D. Sculley, Todd Underwood, and featured guest authors show you how to run an efficient and reliable ML system. Whether you want to increase revenue, optimize decision making, solve problems, or understand and influence customer behavior, you'll learn how to perform day-to-day ML tasks while keeping the bigger picture in mind. You'll examine: What ML is: how it functions and what it relies on Conceptual frameworks for understanding how ML loops work How effective productionization can make your ML systems easily monitorable, deployable, and operable Why ML systems make production troubleshooting more difficult, and how to compensate accordingly How ML, product, and production teams can communicate effectively

ai engineering by chip huyen: *Building LLMs for Production* Louis-François Bouchard, Louie Peters , 2024-05-21 "This is the most comprehensive textbook to date on building LLM applications - all essential topics in an AI Engineer's toolkit. - Jerry Liu, Co-founder and CEO of LlamaIndex (THE BOOK WAS UPDATED ON OCTOBER 2024) With amazing feedback from industry leaders, this book is an end-to-end resource for anyone looking to enhance their skills or dive into the world of AI and develop their understanding of Generative AI and Large Language Models (LLMs). It explores various methods to adapt foundational LLMs to specific use cases with enhanced accuracy, reliability, and scalability. Written by over 10 people on our Team at Towards AI and curated by experts from Activeloop, LlamaIndex, Mila, and more, it is a roadmap to the tech stack of the future. The book aims to guide developers through creating LLM products ready for production, leveraging the potential of AI across various industries. It is tailored for readers with an intermediate

knowledge of Python. What's Inside this 470-page Book (Updated October 2024)? - Hands-on Guide on LLMs, Prompting, Retrieval Augmented Generation (RAG) & Fine-tuning - Roadmap for Building Production-Ready Applications using LLMs - Fundamentals of LLM Theory - Simple-to-Advanced LLM Techniques & Frameworks - Code Projects with Real-World Applications - Colab Notebooks that you can run right away Community access and our own AI Tutor Table of Contents - Chapter I Introduction to Large Language Models - Chapter II LLM Architectures & Landscape - Chapter III LLMs in Practice - Chapter IV Introduction to Prompting - Chapter V Retrieval-Augmented Generation - Chapter VI Introduction to LangChain & LlamaIndex - Chapter VII Prompting with LangChain - Chapter VIII Indexes, Retrievers, and Data Preparation - Chapter IX Advanced RAG - Chapter X Agents - Chapter XI Fine-Tuning - Chapter XII Deployment and Optimization Whether you're looking to enhance your skills or dive into the world of AI for the first time as a programmer or software student, our book is for you. From the basics of LLMs to mastering fine-tuning and RAG for scalable, reliable AI applications, we guide you every step of the way.

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