ROADMAP

TIME FRAME: 2 YEAR

Year 1: Skill Building & Small Projects

Focus on strengthening core skills in programming, algorithms, AI/ML, and software development. This year is all about deep learning and consistent practice through books, problem-solving, and projects.

Phase 1: Python Mastery & Problem-Solving

Duration: 3-4 months
Goal: Deepen your understanding of Python, data structures, algorithms, and problem-solving skills through focused learning and practice.
Resources:

- **Python**: Finish "Python Crash Course" by Eric Matthes
- **Problem-Solving**: Keep practicing on LeetCode (daily) and focus on fundamental concepts such as:
    - Arrays, strings, linked lists, stacks, queues, hashmaps, recursion, dynamic programming, etc.
- **Books**:
    - "Grokking Algorithms" by Aditya Bhargava (for visual and practical understanding of algorithms)
    - "Fluent Python" by Luciano Ramalho (for in-depth Python knowledge)

Key Activities:

- Solve at least one LeetCode problem daily.
- Build small projects that challenge your Python and problem-solving skills, such as:
    - A custom calculator
    - CGPA calculator
    - Basic data visualizations using Matplotlib or Seaborn

Phase 2: Data Structures, Algorithms & Competitive Programming

Duration: 3-4 months
Goal: Strengthen your understanding of data structures and algorithms, focusing on solving more complex problems efficiently.
Resources:

- **Books**:
    - "Introduction to Algorithms" by Thomas H. Cormen (CLRS) – for deep algorithmic knowledge
    - "Elements of Programming Interviews in Python" by Adnan Aziz, Tsung-Hsien Lee

- **Online Resources**: Continue LeetCode, Codeforces, and other competitive programming platforms

Key Activities:

- Focus on solving intermediate and advanced problems on LeetCode, particularly around:
    - Dynamic programming, graphs, trees, and more complex algorithms.
- Try to implement algorithms from scratch for deeper understanding.
- Work on intermediate-level Python projects like:
    - An expense tracker with visualization
    - A data scrapper with API integration
    - A CLI-based tool for a specific task

Phase 3: Machine Learning & AI Foundations

Duration: 4 months
Goal: Build a strong foundation in machine learning and AI with hands-on experience in data manipulation, training models, and building AI systems.
Resources:

- **Books**:
    - "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron
    - "Mathematics for Machine Learning" by Marc Deisenroth et al.
- **Courses** (optional): Fast.ai or Andrew Ng's ML course for reinforcement
- **Datasets**: Work with datasets from Kaggle, UCI, etc.

Key Activities:

- Start by building simple ML models using Scikit-Learn: Linear regression, decision trees, random forests, etc.
- Gradually move to neural networks using TensorFlow/Keras.
- Work on projects such as:
    - Movie recommendation system
    - Sentiment analysis on text data
    - Image classification model using CNNs

Year 2: Advanced AI, Full-Stack Development, & MicroSaaS Creation

Phase 4: Deep Learning & Advanced AI Concepts

Duration: 3-4 months
Goal: Delve into advanced AI topics such as deep learning, NLP, computer vision, and reinforcement learning.
Resources:

- **Books**:
    - "Deep Learning" by Ian Goodfellow, Yoshua Bengio, Aaron Courville
    - "Natural Language Processing with Python" by Steven Bird, Ewan Klein
    - "Reinforcement Learning: An Introduction" by Sutton and Barto
- **Projects**: Focus on more complex AI projects like:
    - Building a chatbot using NLP
    - Image recognition using CNNs, RNNs, and transfer learning
    - Experiment with reinforcement learning algorithms for games

Key Activities:

- Focus on improving the performance of your AI models.
- Use TensorFlow, PyTorch, and experiment with different deep learning architectures (CNNs, RNNs, GANs).
- Continue engaging with Kaggle competitions for practical ML/AI exposure.

Phase 5: Full-Stack Development

Duration: 3-4 months
Goal: Learn web development, APIs, and databases to build a full-stack application, crucial for building and deploying MicroSaaS.
Resources:

- **Books**:
    - "Flask Web Development" by Miguel Grinberg (for backend development)
    - "JavaScript: The Good Parts" by Douglas Crockford
- **Courses** (optional): Udemy Full-Stack Developer Bootcamps
- **Technologies**:
    - Frontend: HTML, CSS, JavaScript (with React)
    - Backend: Flask/Django (Python) for server-side
    - Databases: PostgreSQL, MongoDB

Key Activities:

- Build small web apps to practice:
    - A blog site with user authentication
    - Task manager with a dynamic front-end
    - RESTful APIs to integrate AI models into web apps
- Create backend services that connect with your machine learning models.

Phase 6: Building & Launching Your MicroSaaS

Duration: 4-6 months
Goal: Develop and launch a MicroSaaS product based on your previous experience, ideally automating a task, solving a niche problem, or providing an AI/ML-powered service.
Resources:

- **Books**:
    - "The Lean Startup" by Eric Ries (for startup guidance)
    - "The SaaS Playbook" by Ryan Law (for SaaS strategy)
- **Platform Resources**: Stripe for payment integration, AWS/GCP for cloud deployment, Docker for containerization

Key Activities:

- Start with MVP (Minimum Viable Product) development.
- Refine your MicroSaaS based on feedback from potential users.
- Focus on key business aspects such as customer acquisition, subscription models, and scaling.
- Deploy and launch your MicroSaaS, with active iteration based on feedback and market demand.

Resources-

Year 1: Foundational Skills & Deep Learning Mastery

Goal: Solidify your Python, AI/ML, and web development skills while building a strong portfolio.

Python Proficiency & Algorithms

- **Books**:
  - *Python Crash Course* by Eric Matthes (already progressing)
  - *Fluent Python* by Luciano Ramalho (for advanced Python concepts)
  - *Grokking Algorithms* by Aditya Bhargava (simplified explanation of algorithms)

  Focus: Finish the Python books you have and dive into more advanced concepts like object-oriented programming, algorithms, and data structures. Practice coding on LeetCode or Codeforces.

AI/ML and Deep Learning

- **Books**:
  - *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow* by Aurélien Géron
  - *Mathematics for Machine Learning* by Marc Deisenroth (to strengthen your understanding of the math behind ML)
  - *Deep Learning* by Ian Goodfellow, Yoshua Bengio, and Aaron Courville

  Projects:

  - Participate in Kaggle competitions using the datasets and problems there.
  - Implement algorithms from scratch in Python (you'll need this foundation to succeed with deep learning and AI systems).

Web Development & Full-Stack Basics

- **Books**:
  - *Eloquent JavaScript* by Marijn Haverbeke (freely available online)
  - *You Don't Know JS* by Kyle Simpson (available for free on GitHub)
  - *Full Stack Python* (available free online)

  Focus: Learn front-end and back-end development with an emphasis on JavaScript, HTML, and Python. Experiment with small full-stack projects and integrate them with databases like SQLite or PostgreSQL.

Year 2: Building AI-Powered Applications & MicroSaaS

Full-Stack Mastery & API Development

- **Books**:
  - *Flask Web Development* by Miguel Grinberg (Python micro-framework, free tutorials available online)
  - *The Django Book* by Nigel George (freely available online)

  Focus: Build multiple full-stack applications using Flask or Django. Create and deploy REST APIs that integrate with AI/ML models you develop from scratch.

MicroSaaS Development

- **Books**:
  - *Lean Startup* by Eric Ries (strategy for building products that users love, available in libraries)
  - *The SaaS Playbook* by Michael Skok (guides for developing SaaS ideas, free resources available)

  Focus: Once you've built a few AI-based apps, focus on converting them into SaaS products. Learn how to deploy and maintain them using cloud services like AWS (free tier available).

Advanced Machine Learning & AI Projects

- **Books**:
  - *Artificial Intelligence: A Modern Approach* by Stuart Russell and Peter Norvig (classic AI book)

  Focus: Work on more complex AI/ML projects involving reinforcement learning, NLP, or advanced computer vision. Develop end-to-end solutions and integrate them into web apps.

Resources for Free Books:

- **Project Gutenberg**: Offers free access to many programming and AI-related books.
- **GitHub**: Many authors upload their books and tutorials here for free.
- **Z-Library** (z-lib.is)**: Offers many technical books for free (be mindful of legal issues based on your location).