



# AIML HACKATHON

## Master Resource

Straight, No-Nonsense, Practical Guide

Ye woh exact roadmap hai jisse hackathon-winning projects bante hain.  
Aise hi random YouTube playlists se nahi hora, ye execution-heavy hai.

### STAR SECTION 1

## BASICS THAT MOST PEOPLE IGNORE

AIML ke andar ghusne se pehle ye chaar cheezein clear honi chahiye:

#### Python Foundations

- Data structures
- OOP basics
- APIs kaise call hote hain
- File handling

⚠️ Ye superficial mat rakhna. Hackathon projects Python pe hi run hote hain.

#### MATHS REQUIRED

Koi IIT entrance-level nahi... bas itna:

- Linear algebra (vectors, matrices)
- Probability basics
- Loss functions kya hota hai

💡 Itna ho gaya to 70% legon se aage ho.

### STAR SECTION 2

## THE REAL STUFF THAT WINS HACKATHONS

Ye woh tech stack hai jo abhi EVERY winning project mein common tha.

#### A. Generative AI

- Prompt engineering (itna log underestimate karte hain, utna hi important hai)
- LLM APIs:
  - OpenAI
  - Gemini
  - Meta Llama (local inference)

#### B. Retrieval-Augmented Generation (RAG)

💡 Hackathon winners literally RAG projects ke upar hi dance kar rahe the.

#### What to Learn:

Concept	Priority
Embeddings	🔴 High
Chunking strategies	🔴 High
Context size optimization	🟡 Medium
Query transformation	🟡 Medium
Hybrid search (BM25 + Vector)	🟢 Advanced

#### Tools:

- LangChain — industry standard
- LlamaIndex — easier for quick prototypes
- FastAPI — API layer banana padega

#### Vector Databases:

- Pinecone
- Chroma
- Weaviate
- Milvus

### STAR SECTION 3

## FINE-TUNING

#### When to Fine-Tune:

✓ Domain-specific intent detection chahiye

✓ Instruction-following behaviour improve karna ho

✓ Model ko custom workflows sikhane ho

#### What You Actually Need:

- LoRA adapters
- QLoRA
- TRL (transformers + RLHF style training)
- Datasets formatting (JSONL)

✗ Fine-tuning blindly karte wale log fail hote hain.

✓ Fine-tuning ko optimize karte wale log first prize le jaate.

### STAR SECTION 4

## MULTI-MODAL SYSTEMS

Bonus: Judges ko impress karne ka hack

Agar project text + image/audio/video combine kare...

Judges ki aankhen automatically chamakti hain.

#### Tools:

Use Case	Tool
Speech to Text	Whisper
Vision Models	ViT, CLIP
Image Understanding	Grounding DINO + SAM

💡 Ek multimodal system = instantly premium.

### STAR SECTION 5

## PROJECTS TO BUILD

#### GREEN LEVEL 1 (2-3 Projects)

- Custom chatbot for PDFs
- AI form filler (structured extraction)
- Notes summarizer with citations

Objective: RAG basics + embeddings + vector search

#### YELLOW LEVEL 2 (2 Projects)

- Domain-expert assistant (Finance/Law/Health)
- Email workflow automation (LLM + prompts + APIs)

Objective: Multistep reasoning + workflow design

#### RED LEVEL 3 (Hackathon Winners)

- Autonomous AI agent (end-to-end tasks)
- Multi-modal RAG with images + text
- Local LLM fine-tuned for a niche

Objective: This is where trophies come. 🏆

### STAR SECTION 6

## PROJECT STRUCTURE THAT WINS

Judges ko gyaan nahi chahiye. Unhe clarity, execution, aur impact chahiye.

1. Problem Statement 2. Why Existing Tools Fail 3. Your Solution + Architecture 4. Tech Stack 5. Demo (clean and short) 6. Limitations - trust me, this impresses judges 7. Future Scope

⚠️ 99% teams fail because they just "Show the app" without showing thinking.

### STAR SECTION 7

## LEARNING ORDER

1. Python 2. Git/GitHub 3. Basics of ML 4. LLM APIs 5. Vector DBs 7. Prompt Engineering 8. LangChain/LlamaIndex 9. Fine-tuning Fundamentals 10. Deployment (FastAPI + Render/Vercel) 11. Multi-modal Integration

💡 Yahi order tera growth ko straight line bana dega.

### STAR SECTION 8

## PRESENTATION TIPS

#### The Formula:

- ✓ Less complexity
- ✓ More clarity
- ✓ More visuals
- ✓ Small wins
- ✓ Real-world impact

#### Pro Tip:

"Ye real data pe tested hai, aur ye metrics hain."

Metrics kill. 🚫

### STAR SECTION 9

## SUMMARY

Phase	Focus Area
Foundation	Python + Math basics
Core Skills	RAG, LLMs, Vector DBs
Advanced	Fine-tuning, Multi-modal
Execution	Clean demos, clear structure

Made for Hackathon Warriors 💪

Keep learning, keep building, keep winning!