AI Tool Selection Framework

# AI Tool Selection Framework

## Downloads

* [Download as Word Document (DOCX)](/downloads/research/ai-tool-selection.docx)

## Overview

This framework provides guidance for selecting the most appropriate AI tools for different research tasks in engineering. It helps researchers make informed decisions about which AI technologies to employ based on their specific research needs, technical requirements, and project constraints.

## Selection Criteria

When selecting AI tools for research, consider the following criteria:

1. **Research Task Alignment**
   * What specific research task are you trying to accomplish?
   * Which AI capabilities are required for this task?
2. **Technical Requirements**
   * Data format and volume requirements
   * Computational resources needed
   * Integration with existing research infrastructure
3. **Expertise Requirements**
   * Level of AI/ML expertise needed to use the tool effectively
   * Training requirements for team members
4. **Cost and Access**
   * Licensing costs and budget constraints
   * Access limitations (academic vs. commercial)
   * Open source vs. proprietary options
5. **Ethical and Privacy Considerations**
   * Data privacy implications
   * Transparency of AI models
   * Potential biases in training data

## Decision Matrix Template

Use this template to evaluate and compare different AI tools:

| Tool Name | Task Alignment (1-5) | Technical Fit (1-5) | Expertise Required (1-5) | Cost/Access (1-5) | Ethical Considerations (Y/N) | Total Score |
| --- | --- | --- | --- | --- | --- | --- |
| Tool A |  |  |  |  |  |  |
| Tool B |  |  |  |  |  |  |
| Tool C |  |  |  |  |  |  |

## Common Research Tools by Category

### Text Generation and Analysis

* GPT models (OpenAI)
* Claude (Anthropic)
* Llama (Meta)
* Hugging Face Transformers

### Data Analysis

* TensorFlow
* PyTorch
* Scikit-learn
* MATLAB AI toolbox

### Image Generation and Analysis

* DALL-E
* Midjourney
* Stable Diffusion
* Google DeepMind’s image models

### Code Generation and Analysis

* GitHub Copilot
* Amazon CodeWhisperer
* Tabnine
* DeepMind’s AlphaCode

## Implementation Guidelines

1. **Start with a pilot project**
   * Test the AI tool on a small-scale project
   * Evaluate performance and limitations
   * Gather feedback from research team
2. **Document performance and challenges**
   * Create documentation about tool usage
   * Note any specific configurations or adaptations
   * Record limitations and workarounds
3. **Iterate and refine tool selection**
   * Regularly re-evaluate tool choice as research progresses
   * Consider switching tools if requirements change
   * Keep up with new AI tool developments