AI Agent Best Practices: 12 Lessons from AI Pair Programming for Developers

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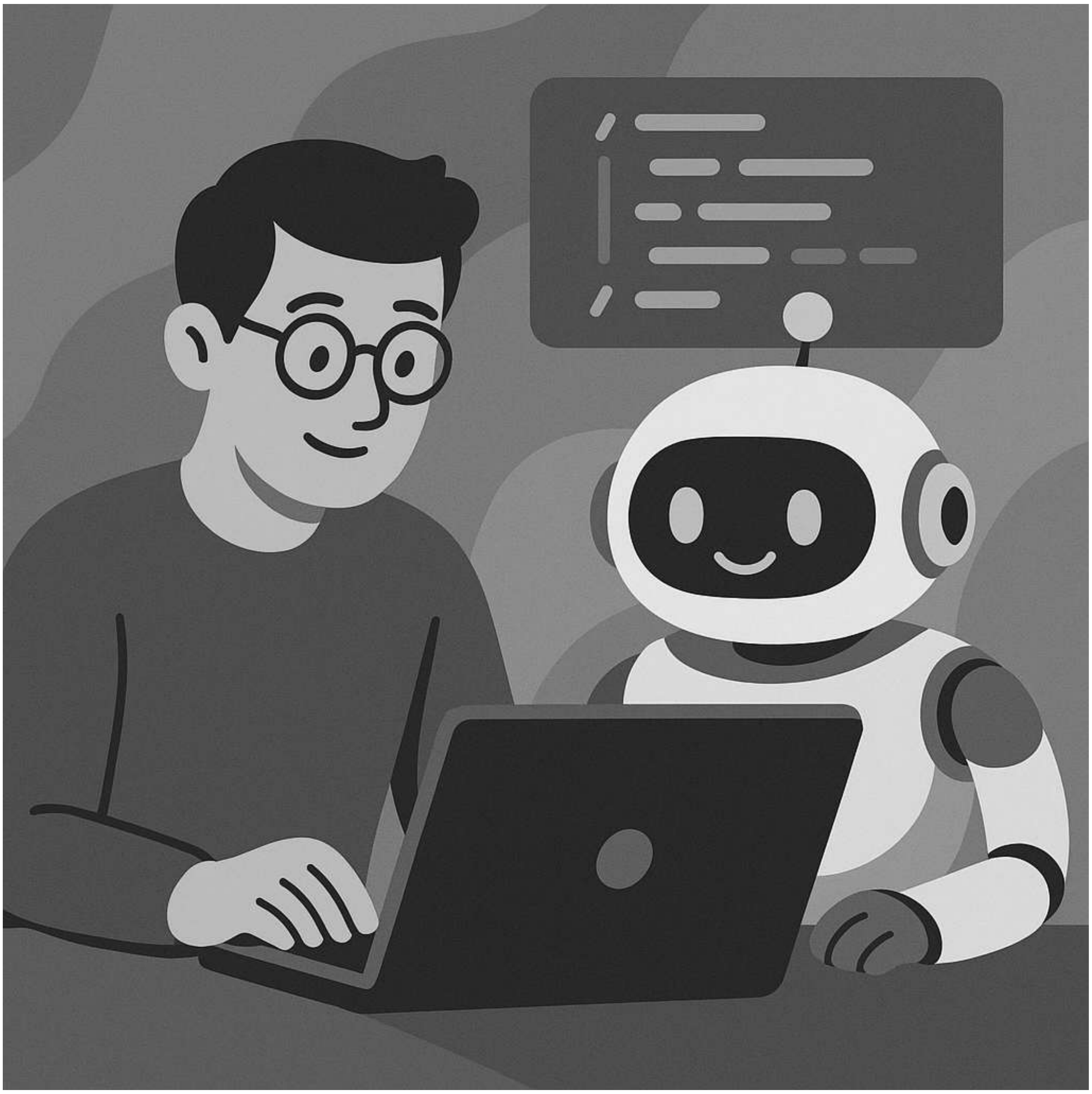
AI Coding Pair Programming Productivity Software Engineering

AI Agent Developer Best Practices Workflow Optimization



After 6 months of daily AI pair programming across multiple codebases, here's what actually moves the needle. Skip the hype this is what works in practice.

TL:DR

Prompt Engineering:

- Keep prompts short and specific context bloat kills accuracy
- Ask for step-by-step reasoning before code
- Use file references (@path/file.rs:42-88) not code dumps

Context Management:

- Re-index your project after major changes to avoid hallucinations
- Use tools like gitingest.com for codebase summaries
- Use Context7 MCP to stay synced with latest documentation
- Treat AI output like junior dev PRs review everything

What Doesn't Work:

- Dumping entire codebases into prompts
- Expecting AI to understand implicit requirements
- Trusting AI with security-critical code without review

1. Start With a Written Plan (Seriously, Do This First)

Ask your AI to draft a **Markdown plan** of the feature you're building. Then make it better:

1. **Ask clarifying questions** about edge cases

```
Write a plan for adding rate limiting to our API. Incluc
- Which endpoints need protection
- Storage mechanism for rate data
- Error responses and status codes
- Integration points with existing middleware

Now critique this plan. What did you miss?
```

2. Master the Edit-Test Loop

This is TDD but with an AI doing the implementation:

1. **Ask AI to write a failing test** that captures exactly what you want
2. **Review the test yourself** - make sure it tests the right behavior
3. **Then tell the AI: "Make this test pass"**
4. **Let the AI iterate** - it can run tests and fix failures automatically

The key is reviewing the test before implementation. A bad test will lead to code that passes the wrong requirements.

3. Demand Step-by-Step Reasoning

Add this to your prompts:

think out loud make fewer stupid mistakes.

4. Stop Dumping Context, Start Curating It

Large projects break AI attention. Here's how to fix it:

Use gitingest.com for Codebase Summaries

1. Go to gitingest.com
2. Enter your repo URL (or replace "github.com" with "gitingest.com" in any GitHub URL)
3. Download the generated text summary
4. Reference this instead of copy-pasting files

Instead of: Pasting 10 files into your prompt
Do this: "See attached codebase_summary.txt for project structure"

For Documentation: Use Context7 MCP or Alternatives for Live Docs

Context7 MCP keeps AI synced with the latest documentation by presenting the "Most Current Page" of your docs.

When to use: When your docs change frequently, reference the MCP connection rather than pasting outdated snippets each time.

- **Use meaningful commit messages:** they help AI understand change context

6. Keep Prompts Laser-Focused

Bad: "Here's my entire codebase. Why doesn't authentication work?"

Good: "`@src/auth.rs` line 85 panics on `None` when JWT is malformed. Fix this and add proper error handling."

Specific problems get specific solutions. Vague problems get hallucinations.

Use your code's terminology in prompts: reference the exact identifiers from your codebase, not generic business terms. For example, call `createOrder()` and `processRefund()` instead of 'place order' or 'issue refund', or use `UserEntity` rather than 'account'. This precision helps the AI apply the correct abstractions and avoids mismatches between your domain language and code.

7. Re-Index After Big Changes

If you're using AI tools with project indexing, rebuild the index after major refactors. Out-of-date indexes are why AI "can't find" functions that definitely exist.

Most tools auto-index, but force a refresh when things seem off.

[illegible]

Benefits:

- AI sees the current file state, not a stale snapshot
- Smaller token usage = better accuracy
- Less prompt clutter

Note: Syntax varies by tool (Forge uses `@`, some use `#`, etc.)

9. Let AI Write Tests, But You Write the Specs

Tell the AI exactly what to test:

```
For the new `validate_email` function, write tests for:
- Valid email formats (basic cases)
- Invalid formats (no @, multiple @, empty string)
- Edge cases (very long domains, unicode characters)
- Return value format (should be Result<(), 
ValidationError>)
```

AI is good at generating test boilerplate once you specify the cases.

10. Debug with Diagnostic Reports

```
3. Identify why the current error is occurring
```

```
4. Propose 3 different debugging approaches
```

This forces the AI to think systematically instead of guess-and-check.

11. Set Clear Style Guidelines

Give your AI a brief system prompt:

```
Code style rules:
- Use explicit error handling, no unwraps in production
code
- Include docstrings for public functions
- Prefer composition over inheritance
- Keep functions under 50 lines
- Use `pretty_assertions` in test
- Be explicit about lifetimes in Rust
- Use `anyhow::Result` for error handling in services and
repositories.
- Create domain errors using `thiserror`.
- Never implement `From` for converting domain errors,
manually convert them
```

Consistent rules = consistent code quality.

- Check for injection vulnerabilities
- Verify input validation
- Look for hardcoded secrets

Performance Review:

- Watch for N+1 queries
- Check algorithm complexity
- Look for unnecessary allocations

Correctness Review:

- Test edge cases manually
- Verify error handling
- Check for off-by-one errors

The AI is smart but not wise. Your experience matters.

What Doesn't Work (Learn From My Mistakes)

The "Magic Prompt" Fallacy

There's no perfect prompt that makes AI never make mistakes. Better workflows beat better prompts.

AI is great at implementing your design but terrible at high-level system design. You architect, AI implements.

Ignoring Domain-Specific Context

AI doesn't know your business logic, deployment constraints, or team conventions unless you tell it.

Controversial Take: AI Pair Programming Is Better Than Human Pair Programming

For most implementation tasks.

AI doesn't get tired, doesn't have ego, doesn't argue about code style, and doesn't judge your googling habits. It's like having a junior developer with infinite patience and perfect memory.

But it also doesn't catch logic errors, doesn't understand business context, and doesn't push back on bad ideas. You still need humans for the hard stuff.

Final Reality Check

AI coding tools can significantly boost productivity, but only if you use them

The future of coding isn't human vs AI it's humans with AI vs humans without it. Choose your side wisely.

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