

The Modern Software Developer

CS146S
Stanford University, Fall 2025
Mihail Eric

Guest Lecture - 11/7/25



CPO of [Graphite](#), Tomas Reimers

AI Code Review



I Am Developer

@iamdeveloper

Following



10 lines of code = 10 issues.

500 lines of code = "looks fine."

Code reviews.

4:58 AM - 5 Nov 2013

8,337 Retweets 5,543 Likes



114



8.3K



5.5K



Why

- Software code review is one of the highest leverage activities you can do to become a better engineer and improve overall team code quality

Statistics

- Code review has 55-60% error detection rate compared to 25-45% for different testing modes
- Study of errors on programs without/with code review reported 4.5 → 0.82 errors/100 lines
- Study at AT&T showed code review had 14% increase in productivity and 90% decrease in defects

Source: [Coding Horror](#)

What to Catch

- Logic and correctness errors

```
# ❌ Buggy: accidentally uses `is` for comparison
```

```
if status is "ok":  
    process()
```

```
# ✅ Correct
```

```
if status == "ok":  
    process()
```


What to Catch

- Readability and maintainability

❌ Hard to read

```
x = [i for i in range(100) if i % 7 == 0 and i % 5 != 0 or i % 11 == 0]
```

✅ Clearer with helper functions

```
def is_valid(n):
```

```
    return (n % 7 == 0 and n % 5 != 0) or n % 11 == 0
```

```
x = [i for i in range(100) if is_valid(i)]
```

What to Catch

- Performance

```
# ❌  $O(n^2)$  – unnecessary repeated lookups
for user in users:
    if user in big_list:
        process(user)

# ✅ Better –  $O(n)$  using a set
big_set = set(big_list)
for user in users:
    if user in big_set:
        process(user)
```

What to Catch

- Security

```
# ❌ Dangerous: executing user input
```

```
eval(user_input)
```

```
# ✅ Safe alternative
```

```
import ast
```

```
safe_expr = ast.literal_eval(user_input)
```

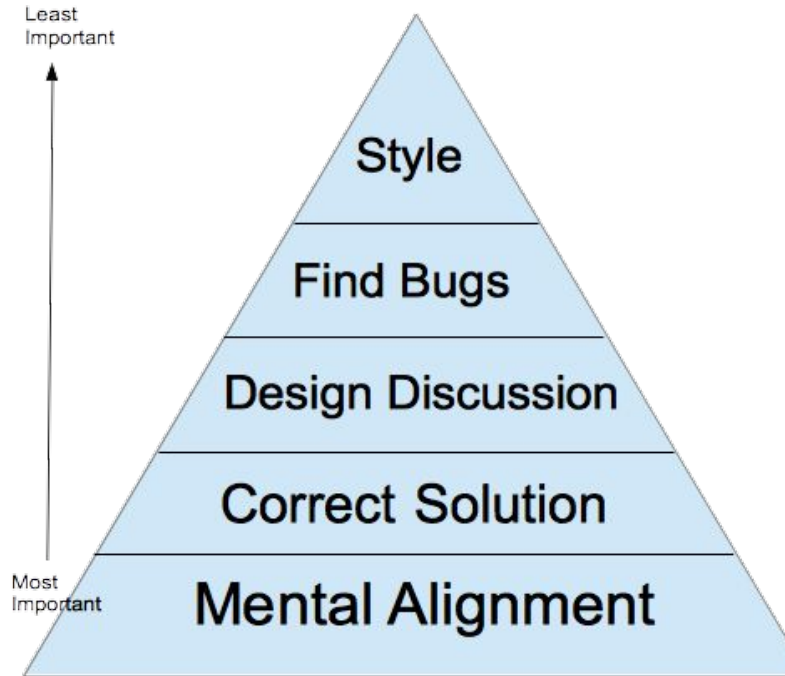
What to Catch

- Best practices

```
# ❌ Non-standard pattern: accessing by username  
user = users_by_username["alice123"]  
send_email(user["email"])
```

```
# ✅ Standard pattern: accessing by user_id  
user = users_by_id[user_id]  
send_email(user["email"])
```


Code Review: Hierarchy of Needs



Source: [Blake Smith](#)

What's a Good Code Review

This won't work

VS

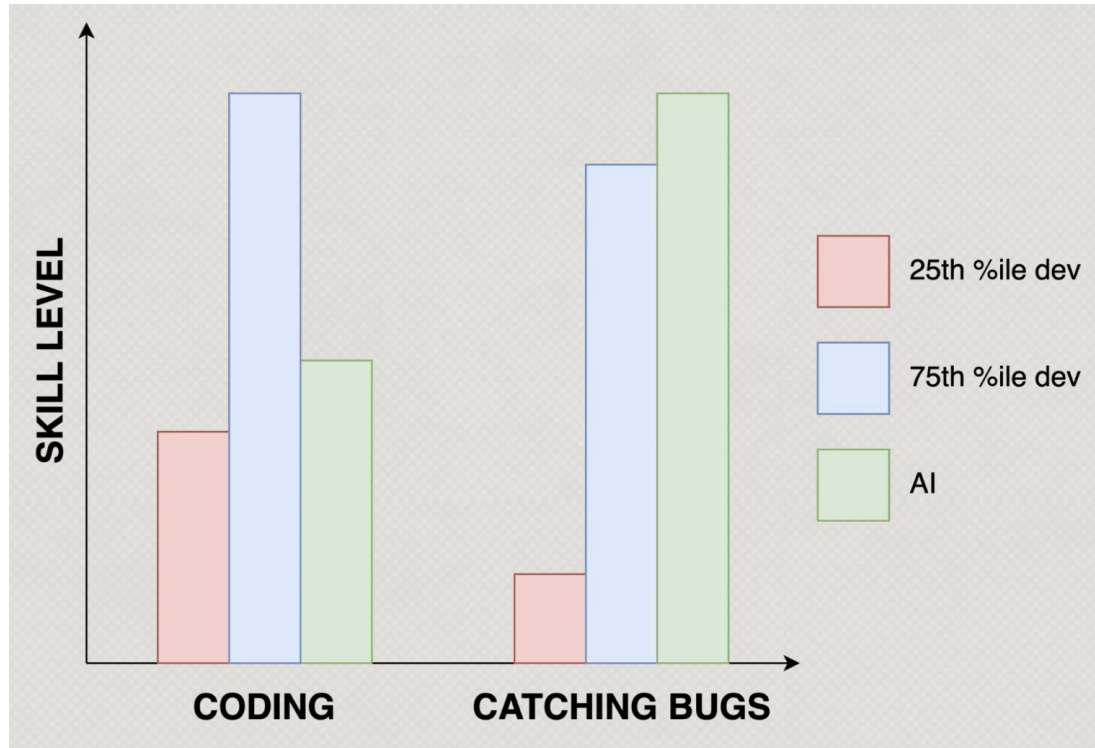
I see your new method matches the existing style in this file, taking [X] parameters. Having that many parameters hurts readability and implies the function is doing too much. What do you think about refactoring this method and the existing ones in a later pull request to reduce how many parameters they take?

The New AI World

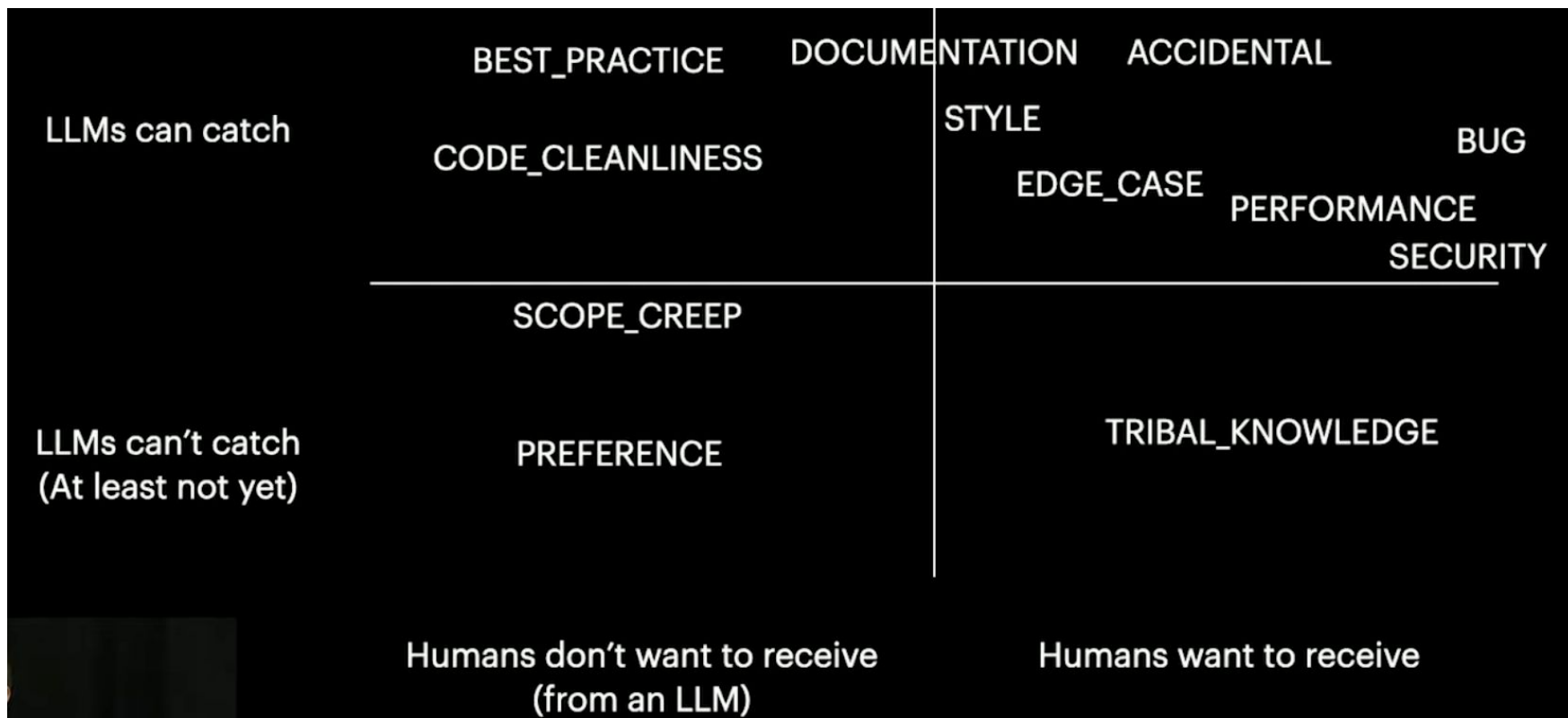
- **Graphite** (guest lecture 11/7)
- Greptile
- Coderabbit
- Claude Code / Codex

What Has Changed

- Efficiency
- Consistency
- Knowledge sharing
- Reduced cognitive load
- Continuous improvement
- Holistic understanding of your code



Source: [Greptile](#)



Source: [Graphite](#)

Let's See AI Code Review in Action

Limitations

- More configuration/setup
- False positives
 - Have to train the system → continuous learning
- Can't yet catch the idioms and repo best practices
- Can't handle complex business logic and architecture decisions
 - But that's where humans are still needed
- Must be extra cautious with security changes
- Often misses edge cases
- Code review is more important now than ever with AI coding systems
 - You own the code that is merged and shipped, no blaming of the AI

Questions?