

Interactive Natural Language Summaries

Bridging Code Comprehension and Modification



Ningzhi Tang

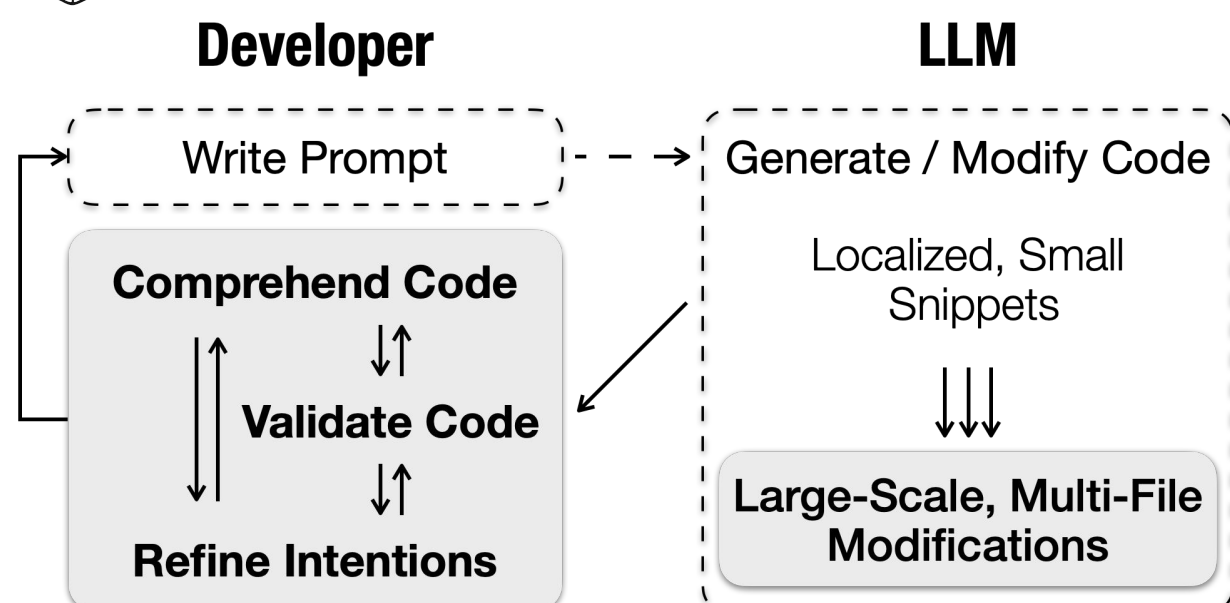
University of Notre Dame

AI for Software Engineering
Developer-AI Interaction
Programming Tools

What if we could modify **code** by simply editing its **plain-English** description?



Lost in Prompting: The Gambling of "Vibe Coding"



Direct Instruction Prompt

Replace ReLU with Leaky ReLU ($\alpha = 0.1$) in the first dense layer. Change the second layer's activation to tanh.

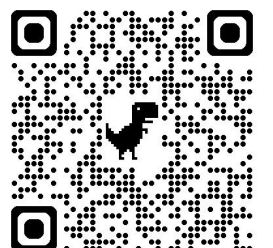
Summary-Mediated Prompt

A sequential encoder with a dense layer of 128 units using Leaky ReLU activation ($\alpha 0.1$), followed by another dense layer with sigmoid/tanh activation.

```
self.encoder = keras.Sequential([
    Dense(128, activation="relu"),
    Dense(encoding_dim, activation="sigmoid"),
    + Dense(128, activation=LeakyReLU(alpha=0.1)),
    + Dense(encoding_dim, activation="tanh"),
])
```

I'm actively seeking an industry internship for summer 2026!

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www.nztang.com

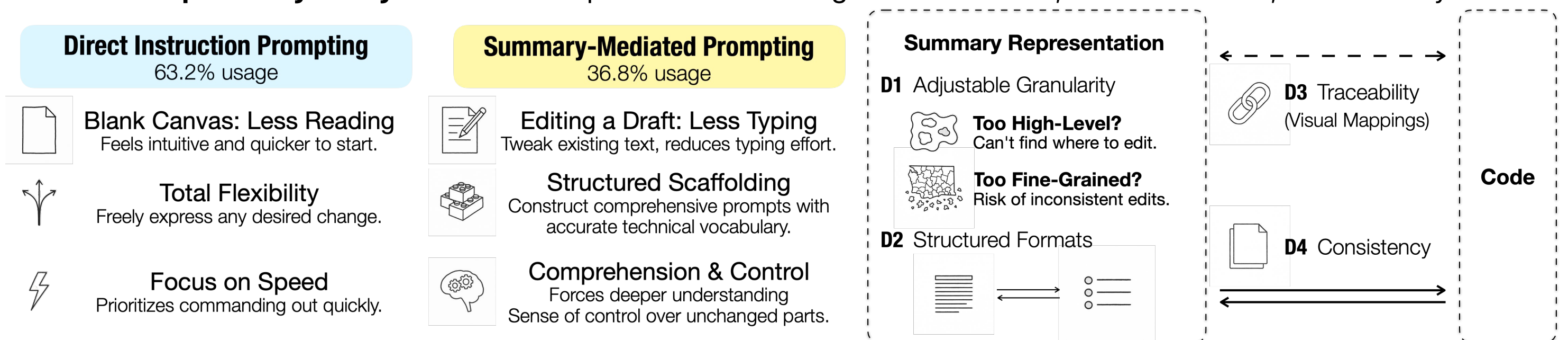


Empirical Blueprint: Developer Workflow to Design Principles

In collaboration with Emory Smith, Yu Huang, Collin McMillan, and Toby Jia-Jun Li

Tang et al.
VL/HCC 2025

An **exploratory study** with 15 developers reveals the cognitive workflows, main trade-offs, and usability needs.

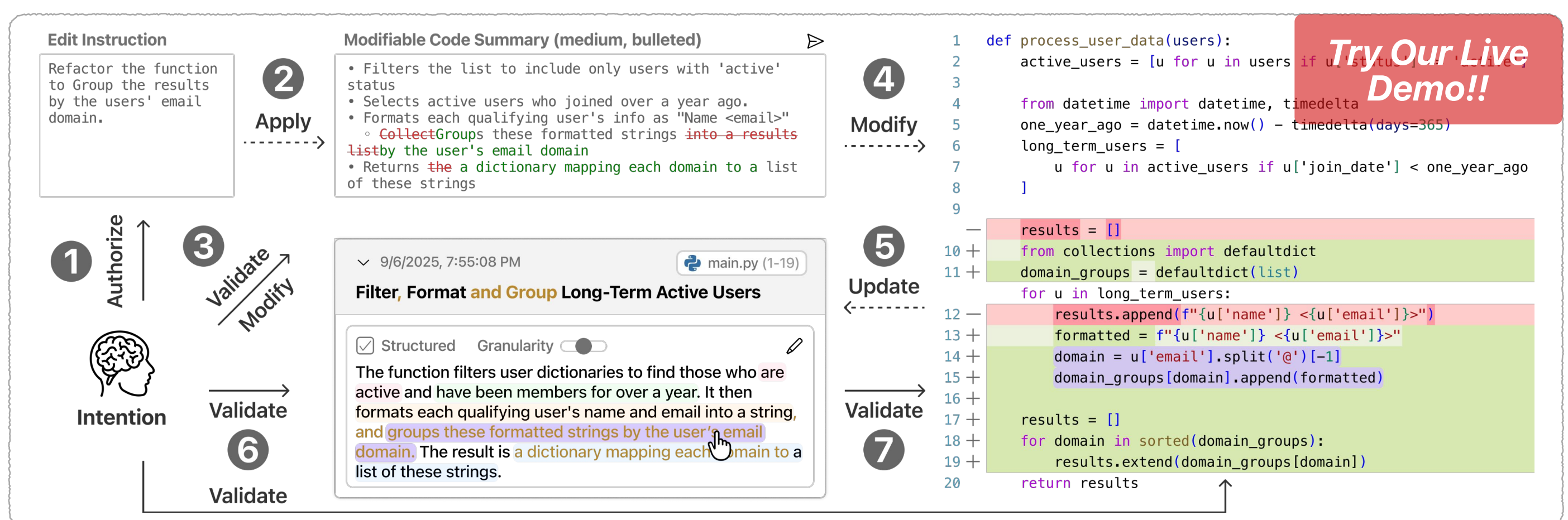


Putting Insights into Action: Representations and Interactions

In collaboration with David Meininger, Gelei Xu, Yiyu Shi, Yu Huang, Collin McMillan, and Toby Jia-Jun Li

Tang et al.
arXiv 2025

A novel system, **NaturalEdit**, instantiates these design principles with adaptive summaries, interactive mapping, and intent-driven workflows, validated through a two-stage technical evaluation and a 12-developer user study, demonstrates improved performance and enhances developer workflows.



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