<epam>

Automating Quality

FUTURE OF TESTING

Going Beyond AI-Driven Testing

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FLASH
BACK

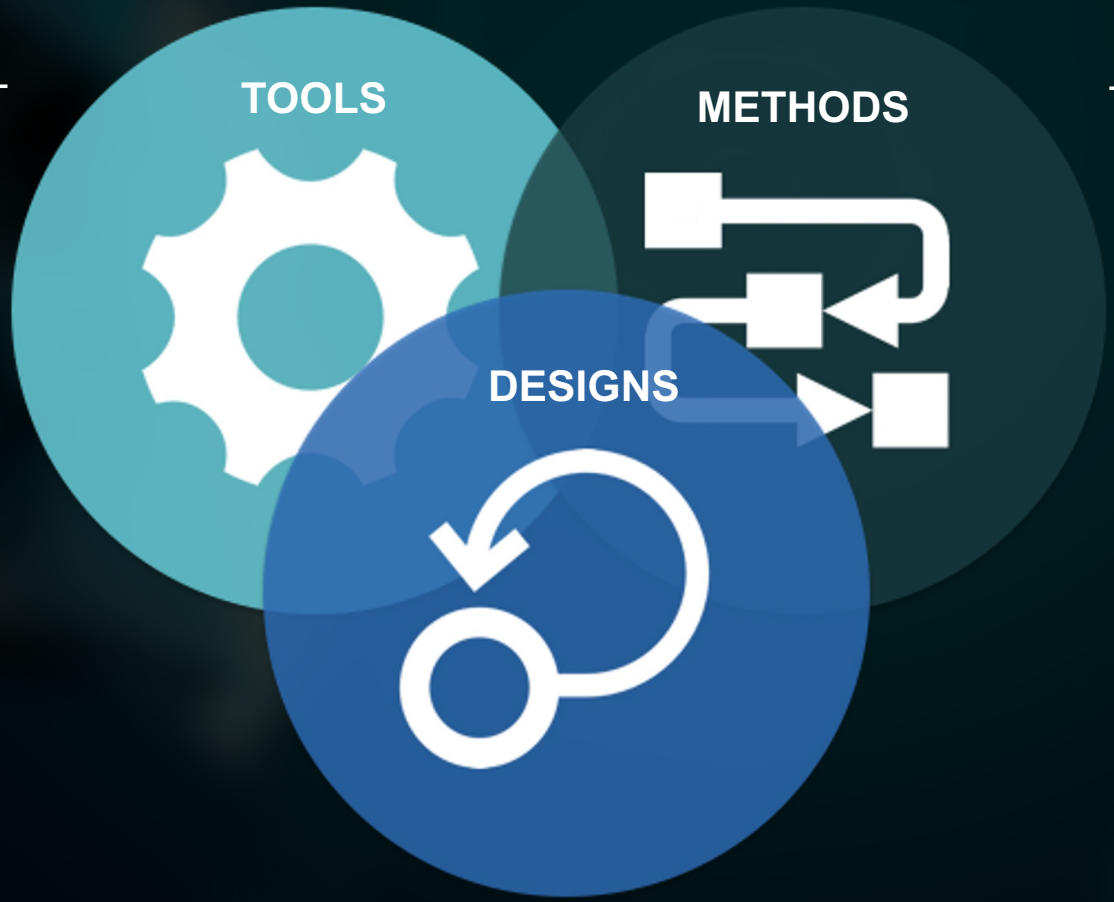

2015

MANUAL, HUMAN-PRESENT EXPLORATION AND TESTING

MANUAL CREATION AND MAINTENANCE OF TEST SCRIPTS

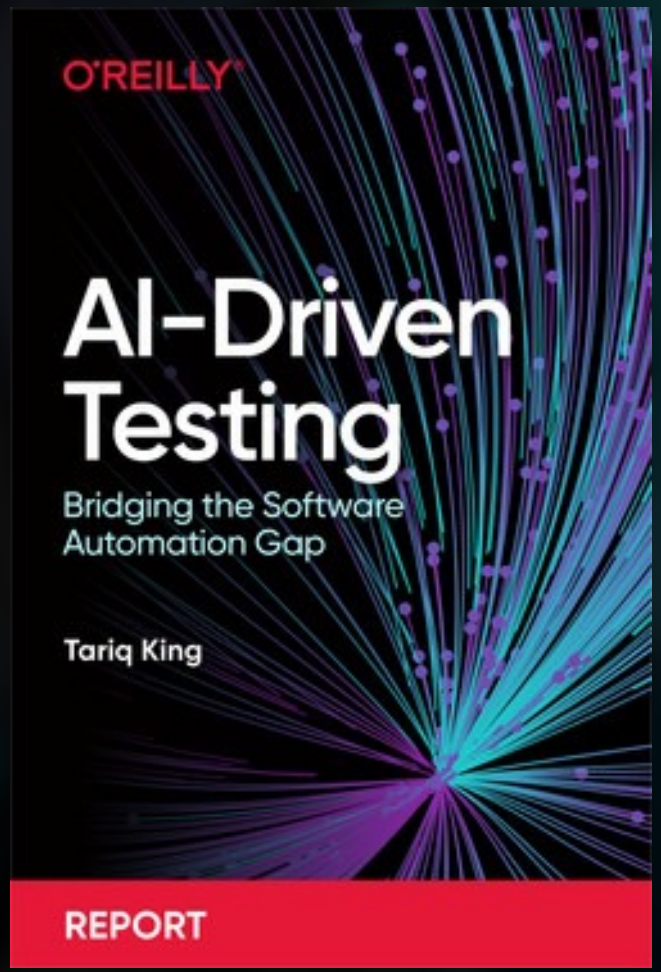

GRAND VISION OF TESTING, LIGHTS-OUT PHILOSOPHY
UNMANNED, LITTLE TO NO HUMAN INTERVENTION

AI-DRIVEN TEST AUTOMATION

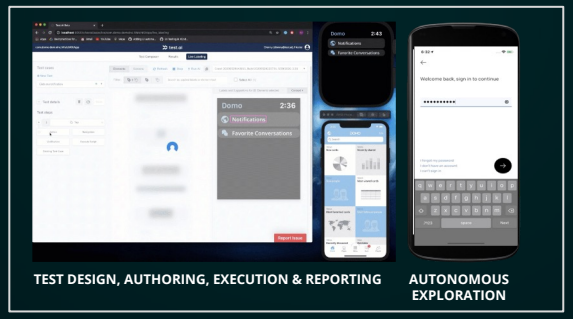


TESTING AI SYSTEMS

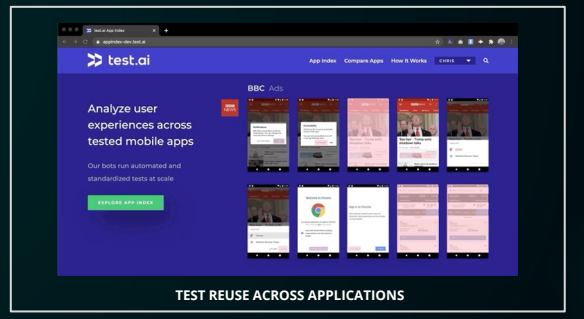
SELF-TESTING SYSTEMS



DESCRIBES PRACTICAL AIST EXPERIENCES

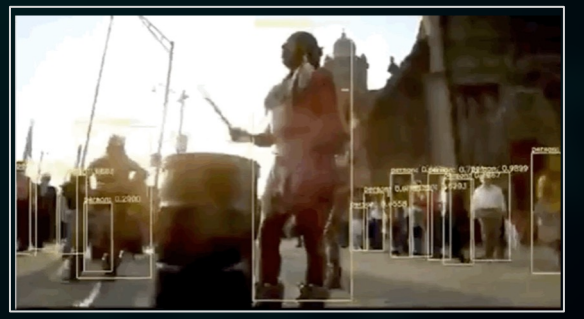


AI FOR TESTING WEB, MOBILE AND DESKTOP

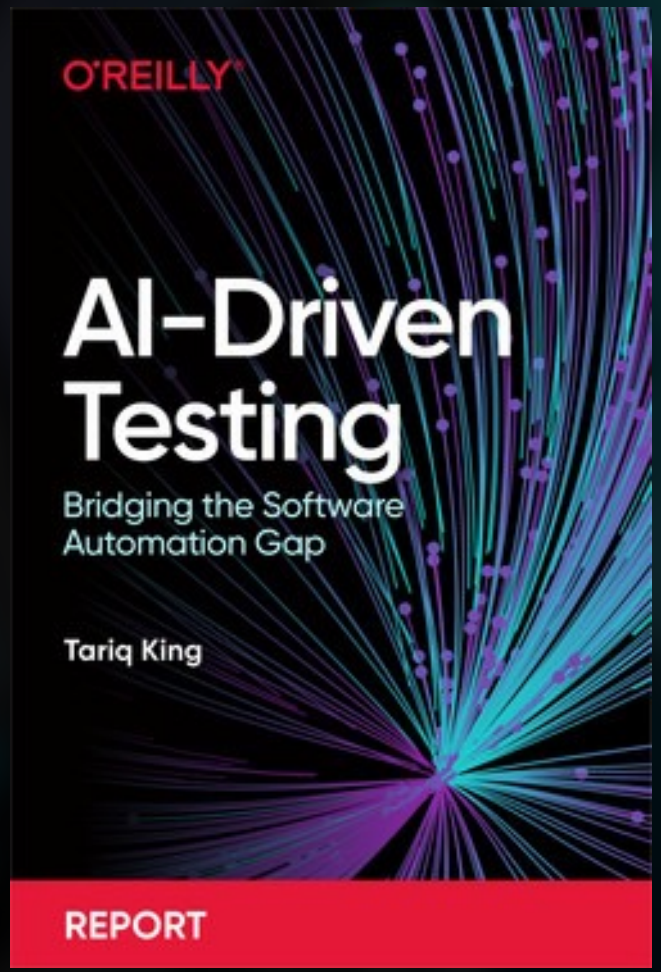


AI FOR TESTING APPSTORES

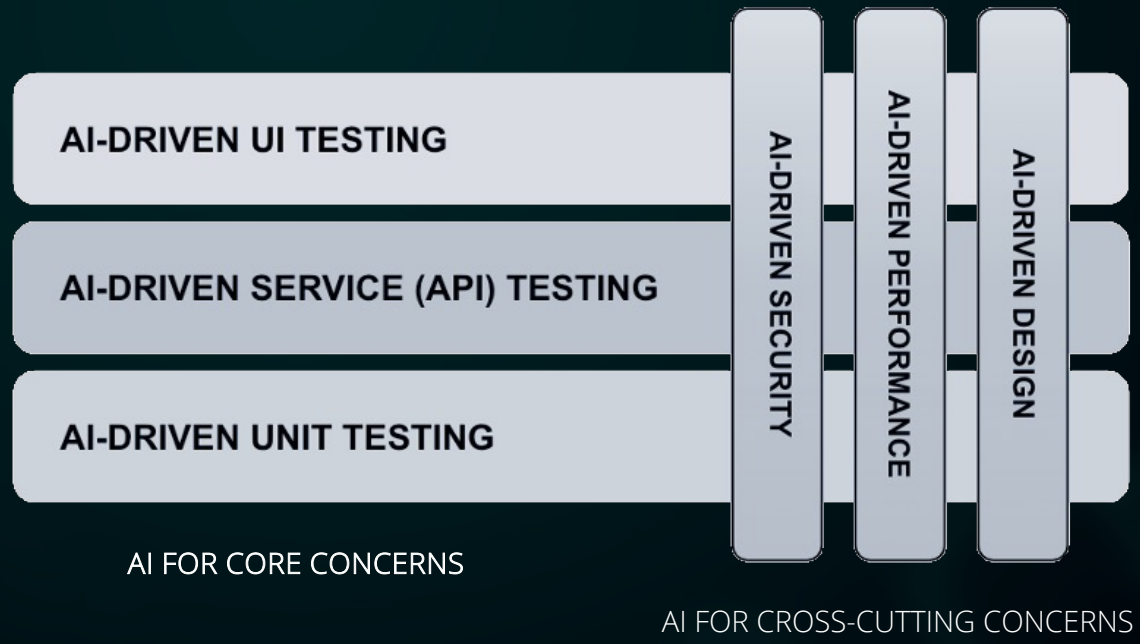
AI FOR TESTING VIDEO GAMES

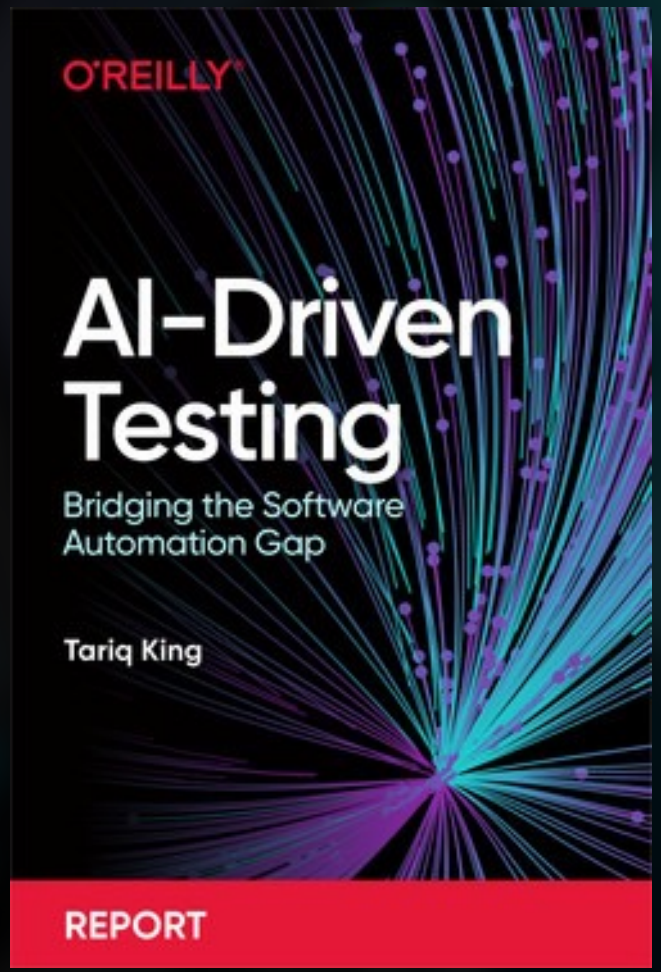


AI FOR TESTING VIDEO QUALITY

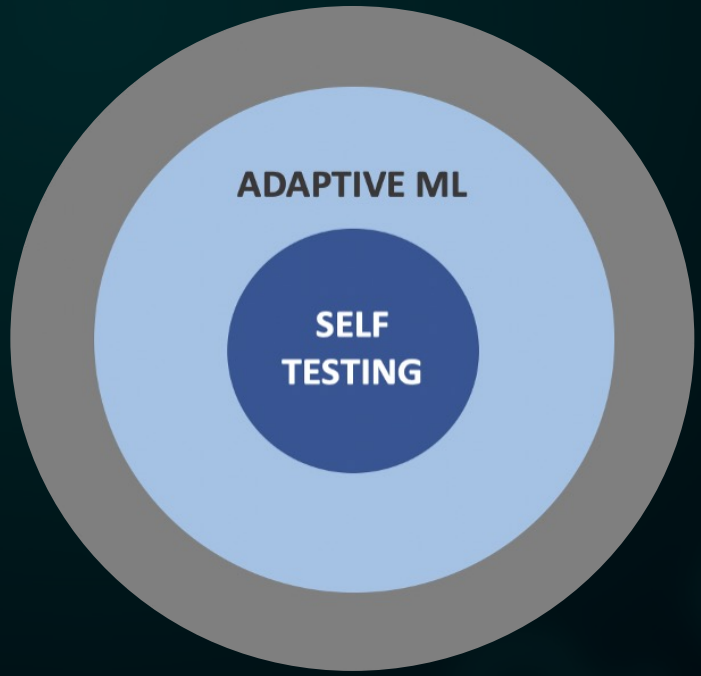


PREDICTS FULL-STACK AIST TAKEOVER AND...





THE NEED FOR SELF-TESTING AI




2023

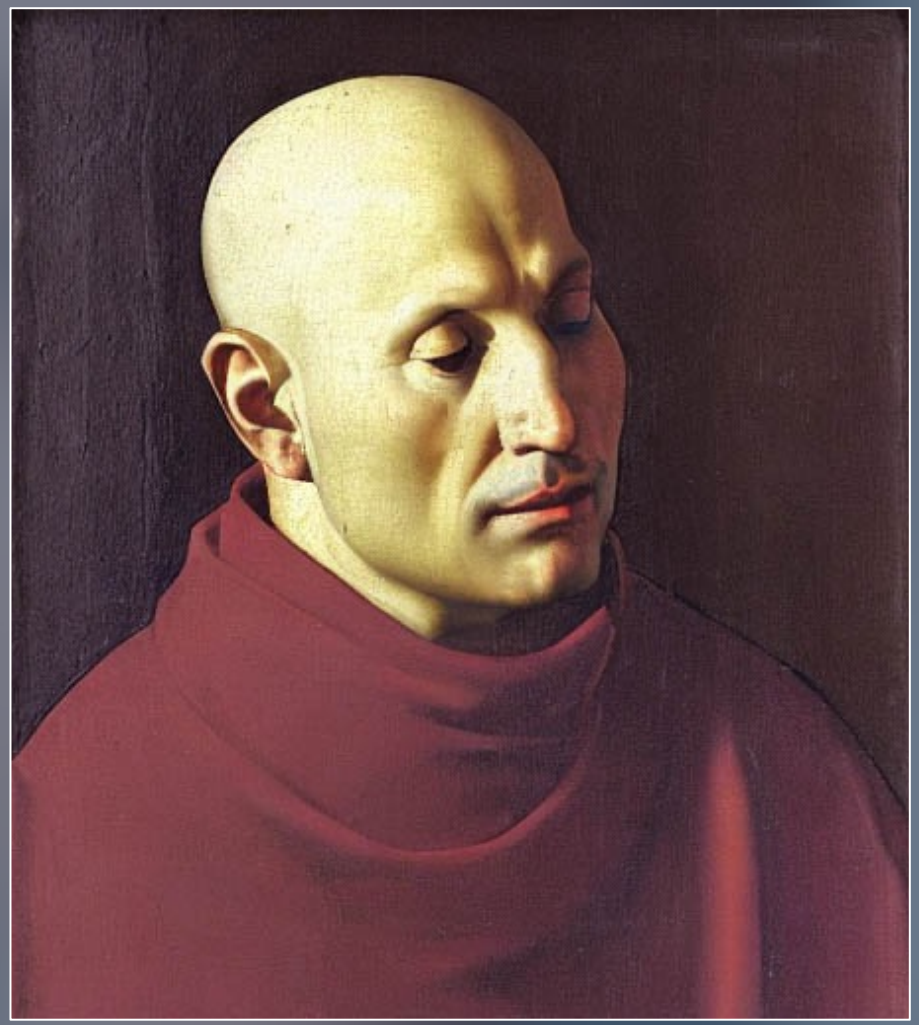
GENERATIVE AI

GENERATIVE AI

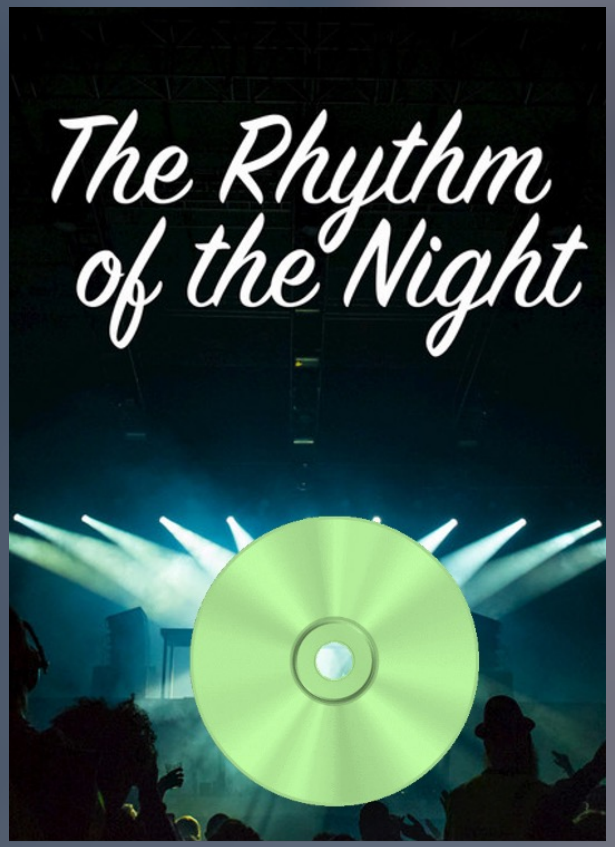
Describes computer algorithms that can be used to create natural language, audio, images, and videos with little to no human intervention

AI GENERATES PHOTO-REALISTIC FACES

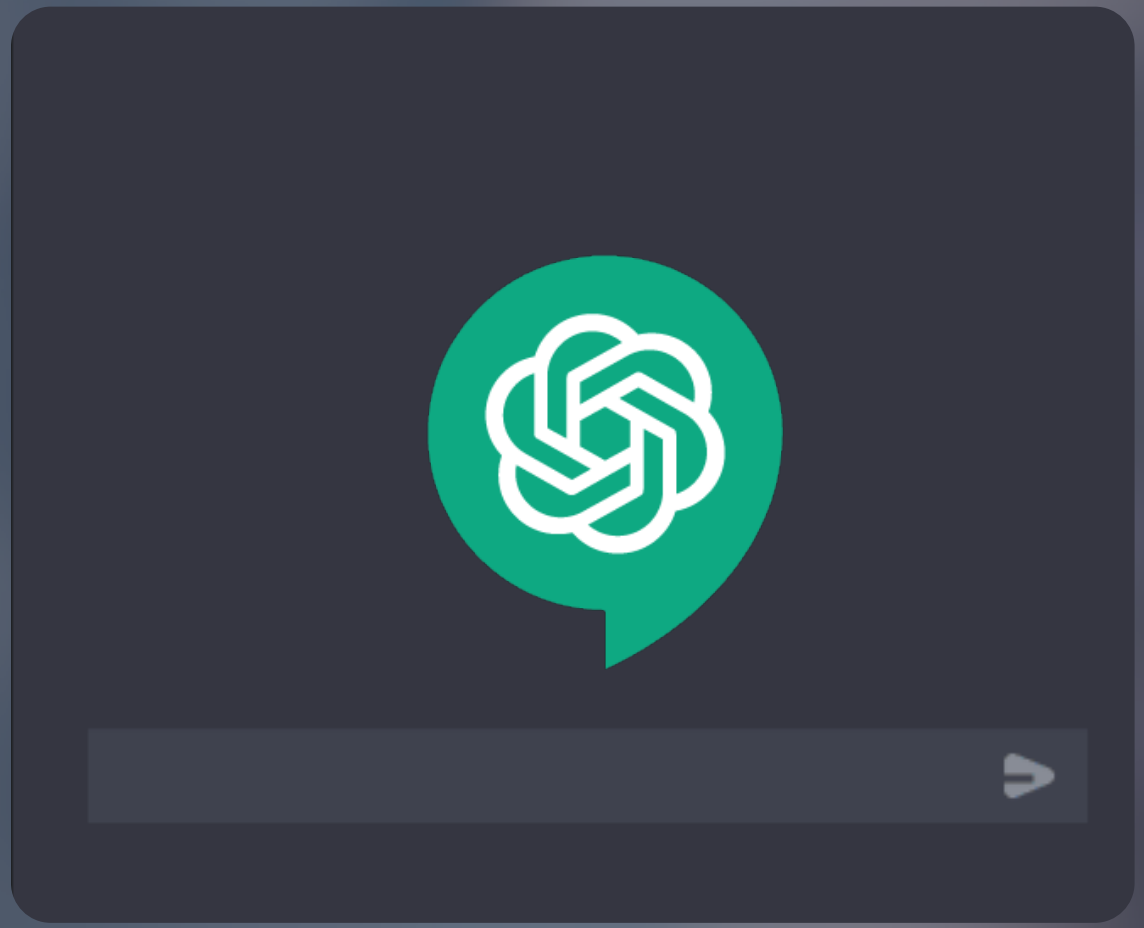
AI GENERATES ARTWORK



AI GENERATES MUSIC



AI GENERATES NATURAL LANGUAGE



MADE AI BELIEVABLE

USABLE

VISIBLE

COMPREHENSIBLE


1
2
3

Can We Leverage AI to Improve Software Productivity?

AI-ASSISTED SOFTWARE ENGINEERING

A HOLSTIC VIEW OF LEVERAGING GEN-AI ACROSS THE SOFTWARE DEVELOPMENT LIFECYCLE

	Requirements Gathering	User Design	System Design & Architecture	Implementation	Testing	Deployment	Support & Evolution
GENERATIVE AI ACCELERATED ACTIVITIES	End User Personas and Journeys		Design Guidance	Coding Guidance	Test Guidance	Ops Guidance	Debugging
	Stakeholder Interviews	Wireframing	Quality Attributes	Code Generation	Test Generation	Build and Deployment Script Generation and Maintenance	Troubleshooting
	Story Generation	Prototyping	Non-Functional Requirements	Unit and API Test Generation	System, SIT, BAT and Non-Functional		Proactive Monitoring
	Requirements Documentation and Analysis		Design Validation	Code Reviews	Test Result Analysis	Deployment	Recovery
GENERATIVE AI TOOLS & ACCELERATORS	GPT-4 Bard AI	Midjourney Stable Diffusion	GPT-4 Bard AI	Co-Pilot Code Whisperer	GPT-4 Bard AI	GPT-4 Bard AI	GPT-4 Bard AI
ENGINEERING EXCELLENCE	Agile Practices	Shift-Left Testing	Quality Engineering Practices		Testing Practices	CI/CD and DevOps Practices	

AI FOR REQUIREMENTS ENGINEERING

GENERATING USER STORIES WITH ACCEPTANCE CRITERIA AND UI MOCKUP DESIGNS

Agile User Story Generator

💭 Wishlist Addition

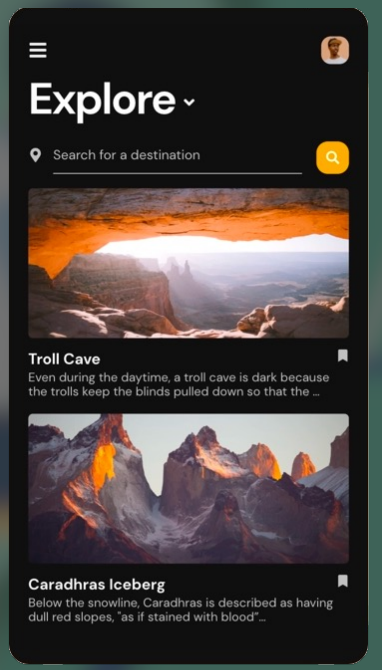
1. **As a** registered user,
2. **I want to** be able to add items to my wishlist,
3. **So that** I can save items I'm interested in for later purchase.

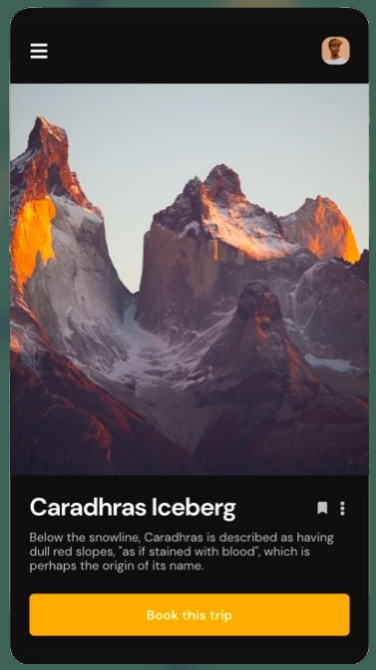
✅ Acceptance Criteria

1. Given that I am a registered user, when I view a product, then I should see an "Add to Wishlist" button.
2. Given that I click the "Add to Wishlist" button, the product should be added to my wishlist.
3. Given that a product is in my wishlist, when I visit my wishlist page, then I should see all the products I've added.
4. Given that a product is in my wishlist, when I click on the product, then I should be taken to that product's page.
5. Given that a product is in my wishlist, I should have an option to remove it from my wishlist.

📝 Notes

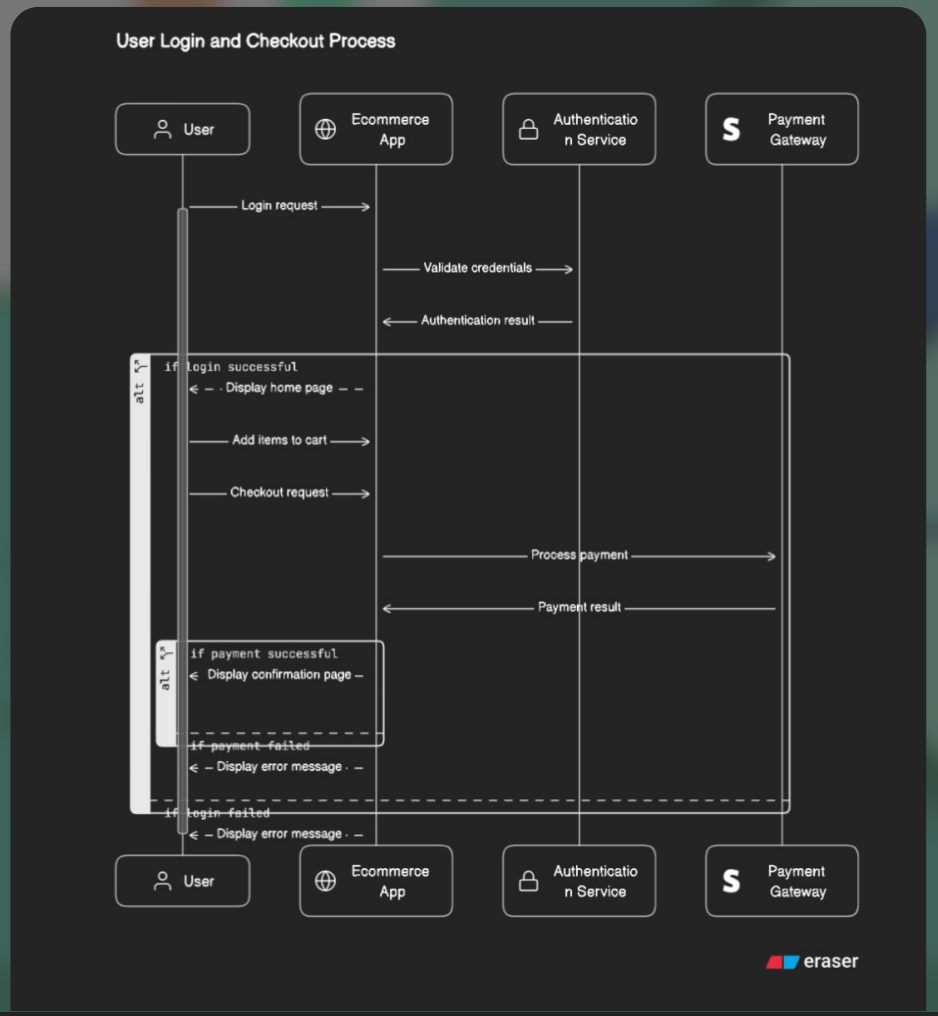
- The "Add to Wishlist" button should not appear for items that are already in the user's wishlist.
- Users should be able to add items to their wishlist from both product listing and product detail pages.
- Users should be able to access their wishlist from the main navigation menu.
- If the product becomes unavailable or out of stock, the user should be notified in the wishlist.

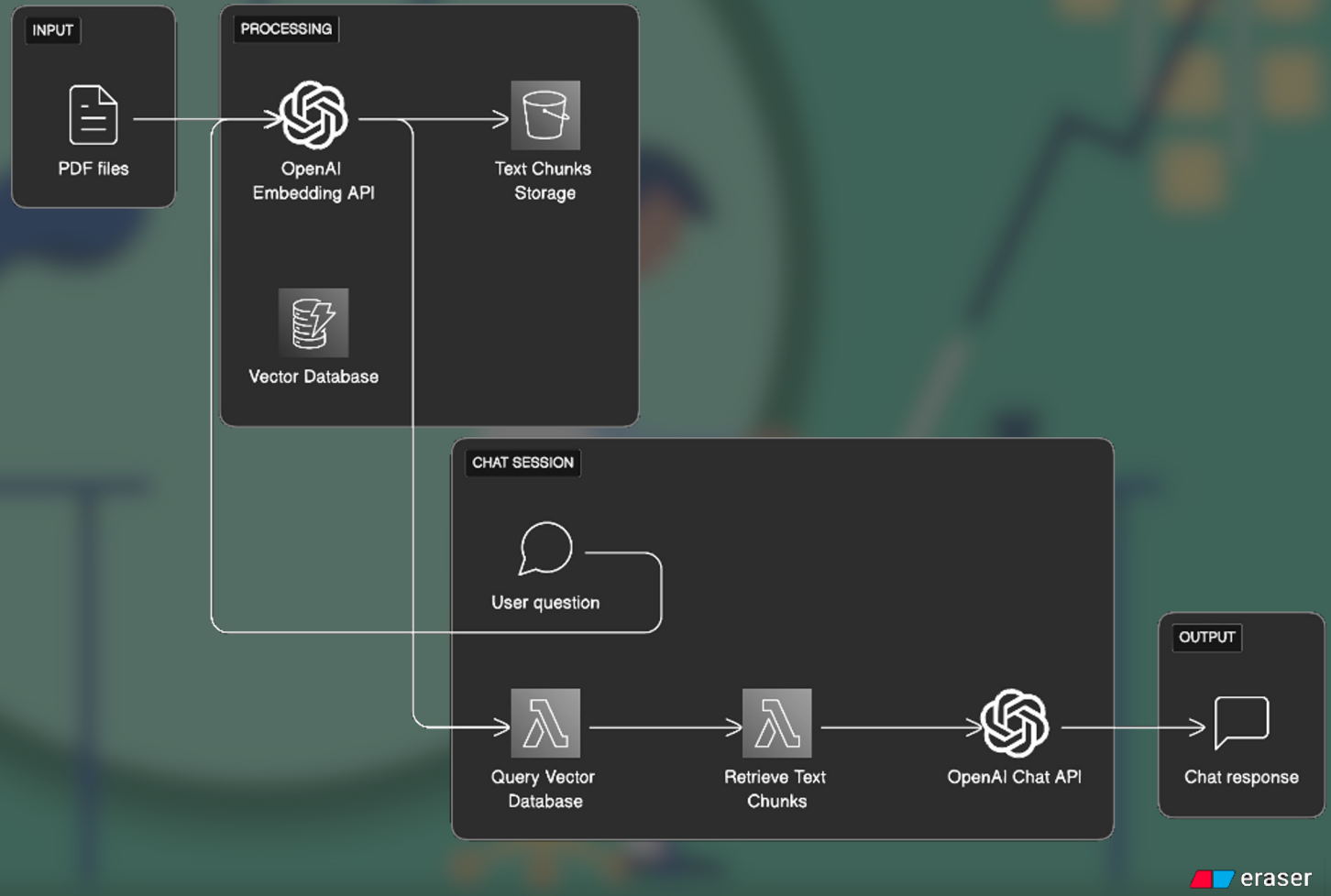




AI FOR SOFTWARE DESIGN

GENERATING DESIGN AND ARCHITECTURE MODELS





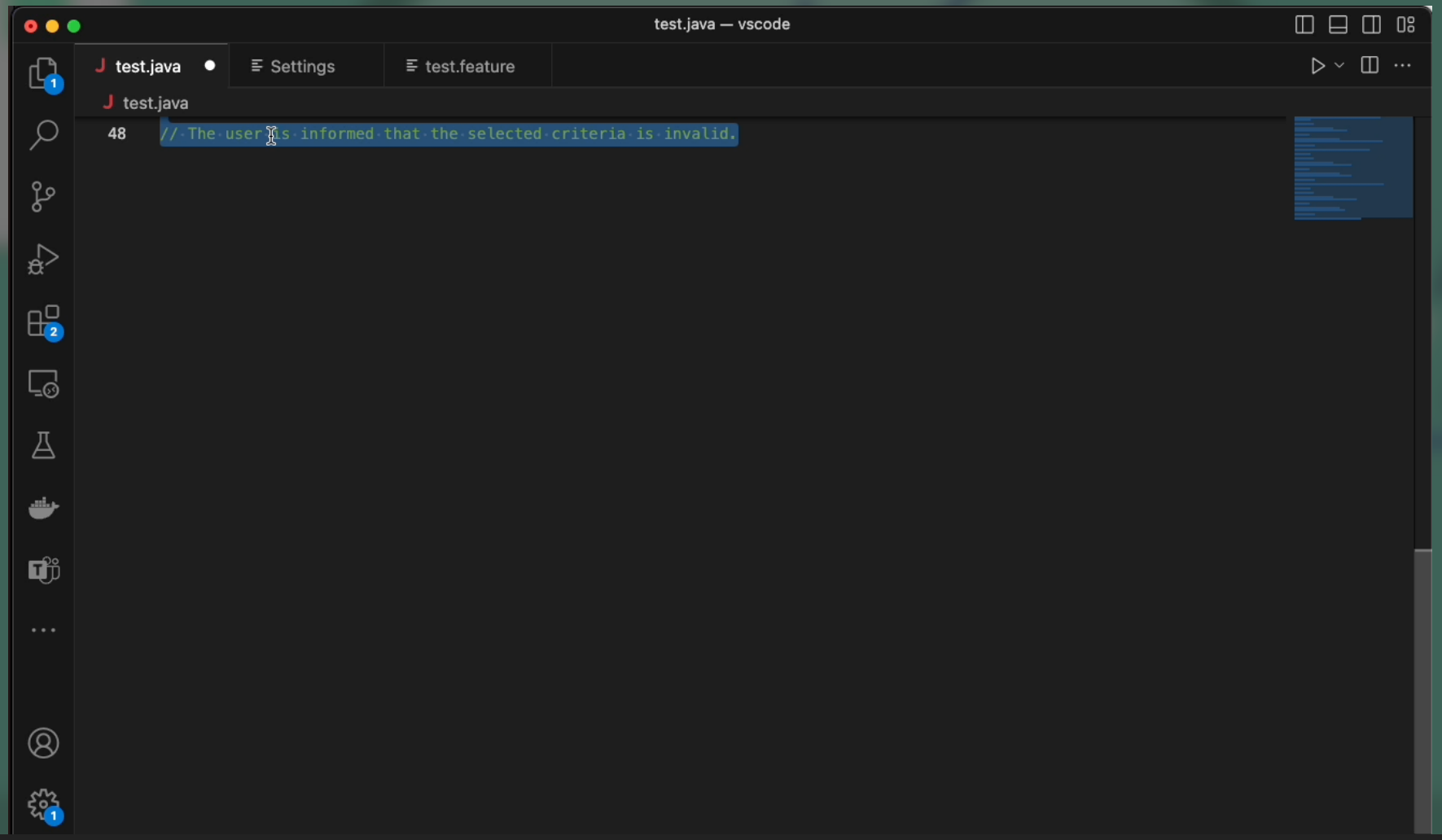
AI FOR SOFTWARE DEVELOPMENT

GENERATING ALGORITHMS AND PROGRAM SOURCE CODE

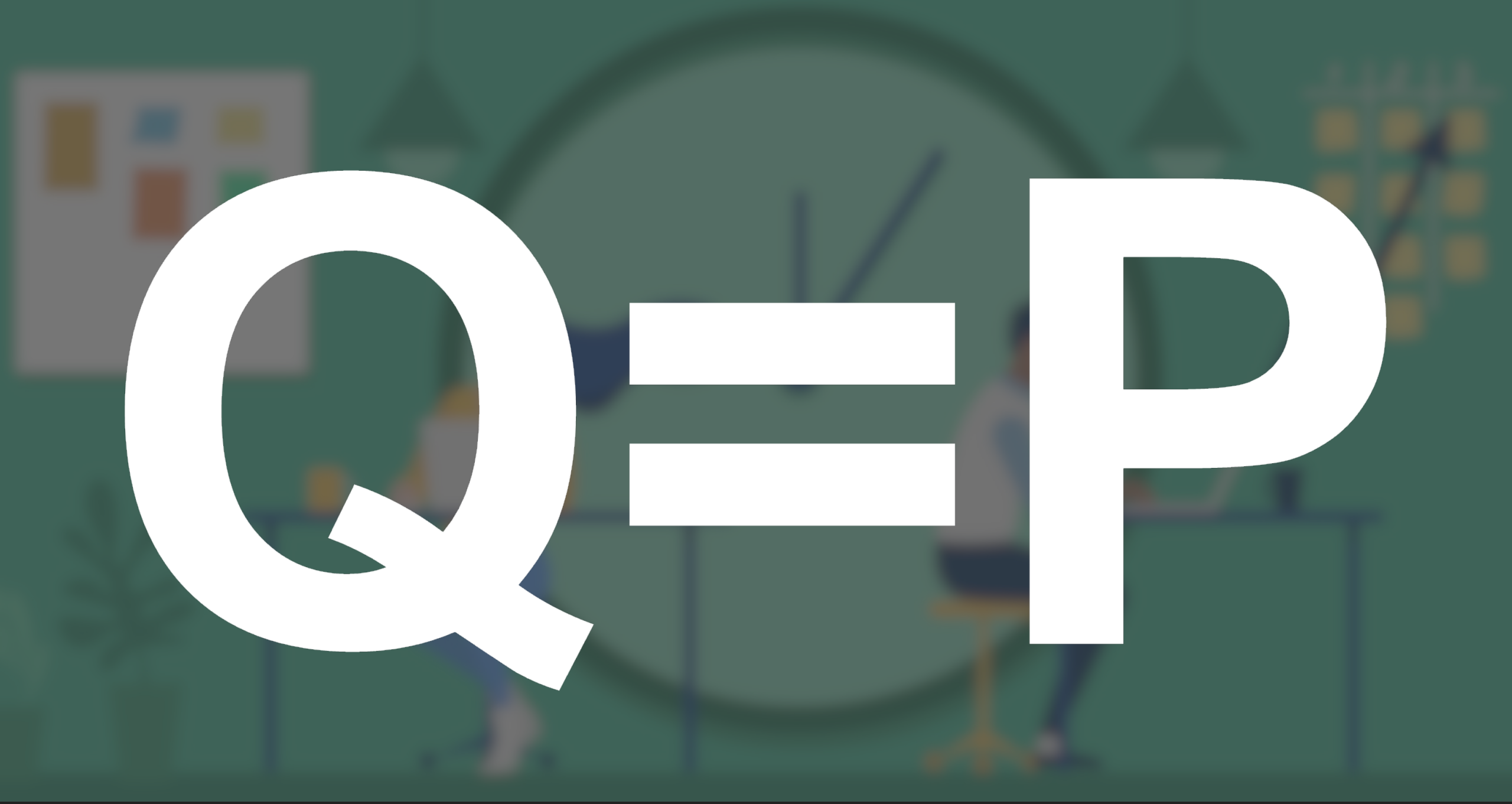
```
0 references | 0 changes | 0 authors, 0 changes
public static void CreateTables()
{
    using (var context = new TaskContext())
    {
        context.Database.ExecuteSqlRaw("CREATE TABLE tasks (id INT PRIMARY KEY, title VARCHAR(50), priority INT)");
    }
}
```

AI FOR SOFTWARE TESTING

GENERATING TEST CASES, TEST SCRIPTS, AND ANALYZING TEST RESULTS




Lots of tasks are completed
(QUANTITY)
Productivity
Finished work is excellent
(QUALITY)
Little effort is wasted
(EFFICIENCY)


Q=P

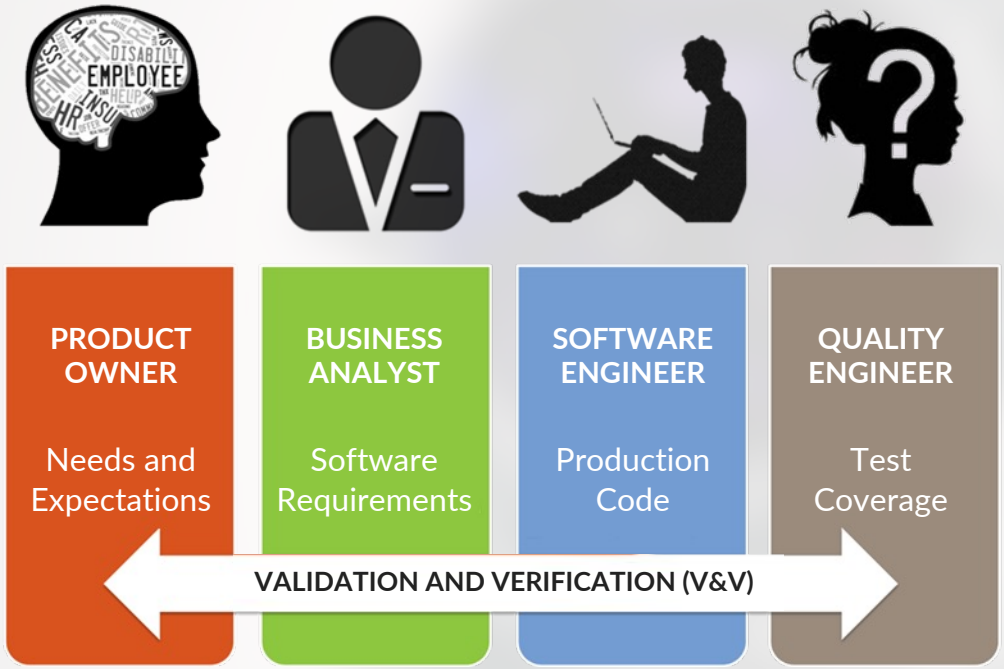

FUTURE
OF TESTING
FUTURE
OF TESTING

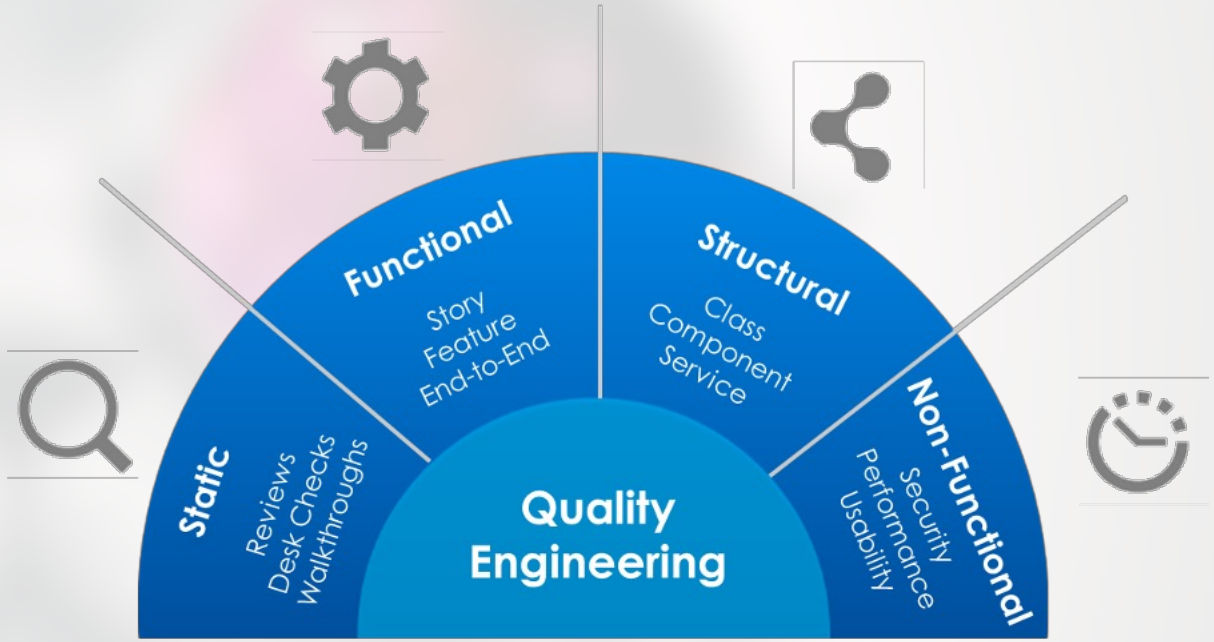

Q
P

HOW DO WE KEEP PACE WITH VALIDATING ALL OF THIS AI-GENERATED CONTENT?

AUTOMATING QUALITY ENGINEERING

BUILDING QUALITY IN, RATHER THAN TESTING IT OUT AT THE END





START BY ADDRESSING GEN-AI CHALLENGES

DON'T LET FEAR DETERMINE OUR FUTURE

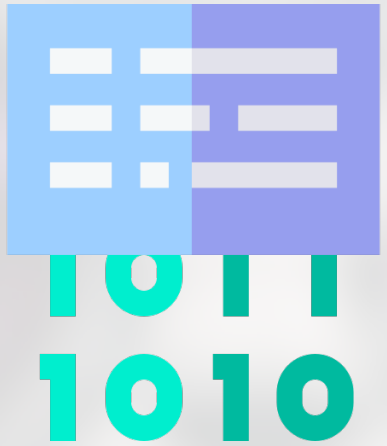
- Uncertainties in areas of security and intellectual property ownership when using large language models.
- Upskilling is needed to learn how to interact with generative AI tools to use them effectively.
- Wrong input results in the wrong answer.
  Correct inputs don't guarantee right answer.
- Tools may generate large quantity of software artifacts (code, tests) that look correct to the untrained eye.
- Measuring productivity gains is non-trivial.
  Faster output doesn't always mean better results.

LEVERAGE DIFFERENT APPROACHES

SELECT THE APPROPRIATE TECHNIQUES TO ACHIEVE THE DESIRED RESULTS USING AI

PROMPT ENGINEERING

Guiding the Model
Low Entry Barrier
Limited Context Size



EMBEDDINGS

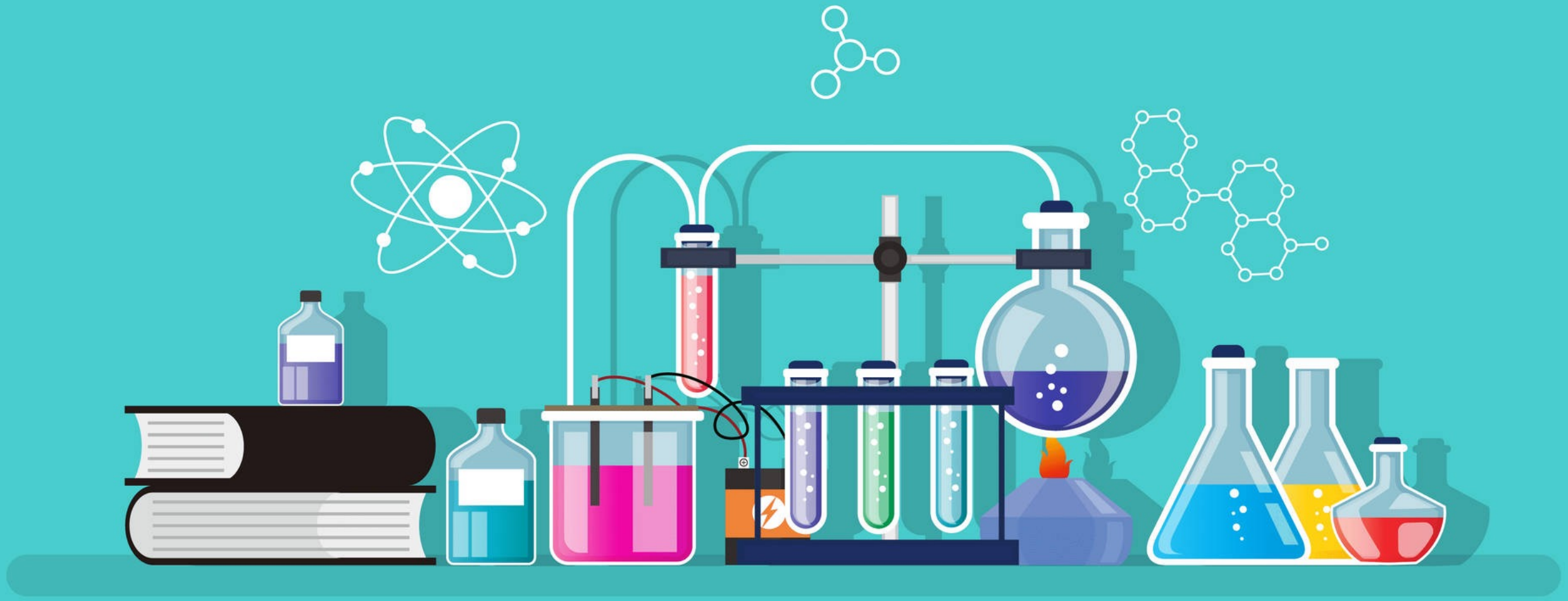
Vectorizing the Input
Requires More Time/Expertise
Facilitates Broader Context

FINE-TUNING

Adapting the Model
Requires More Time/Expertise
Customized/Improved Result

EXPERIMENT AND SHARE EXPERIENCES

DON'T MAKE ASSUMPTIONS, MAKE HYPOTHESES AND TEST THEM



GENERATIVE AI EXPERIMENTATION

ONGOING CONTRIBUTIONS

300+

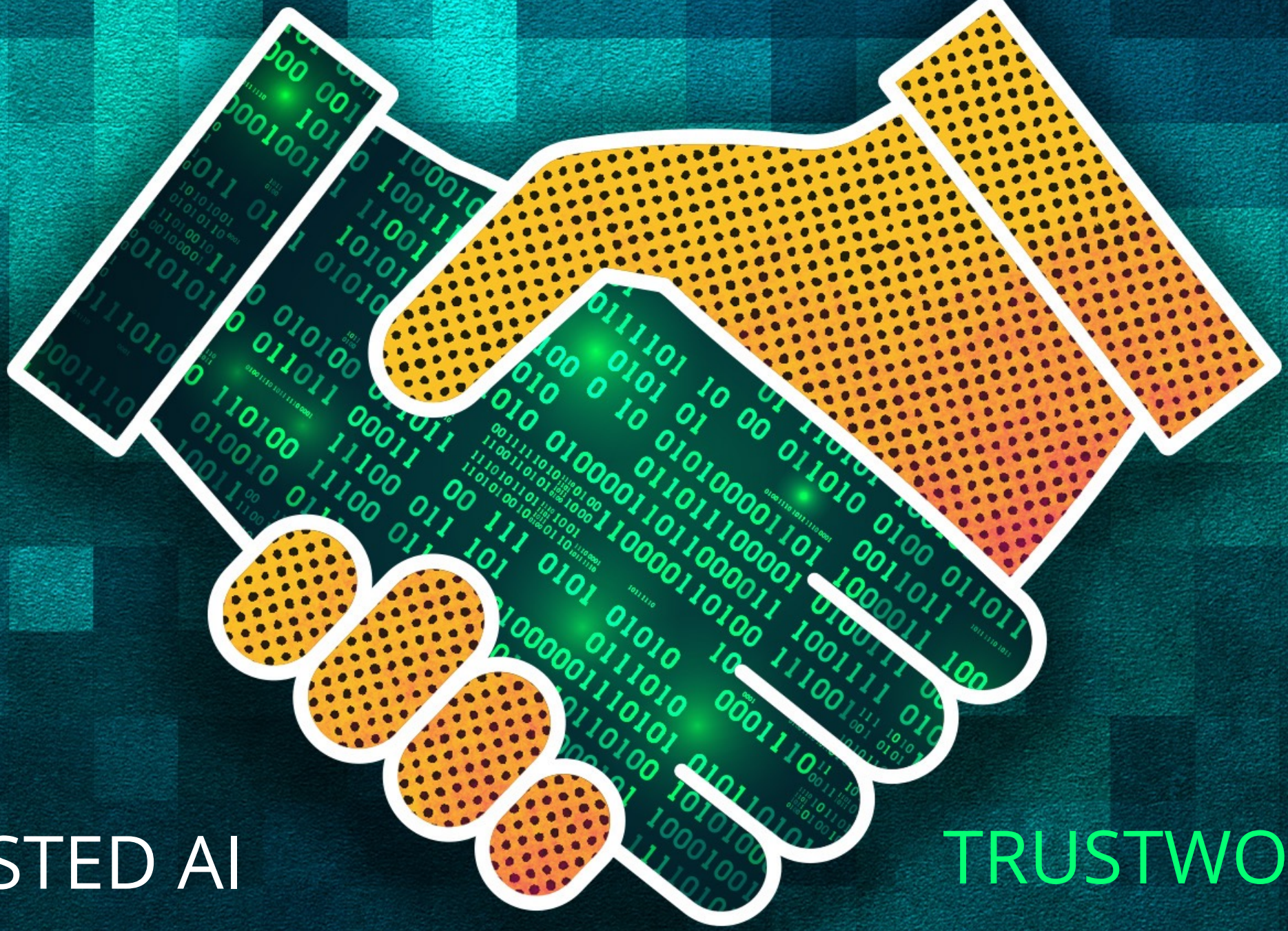
PRACTITIONERS SURVEYED

1200+

USE CASES ACROSS LIFECYCLE

400+

QUALITY-RELATED EXPERIMENTS



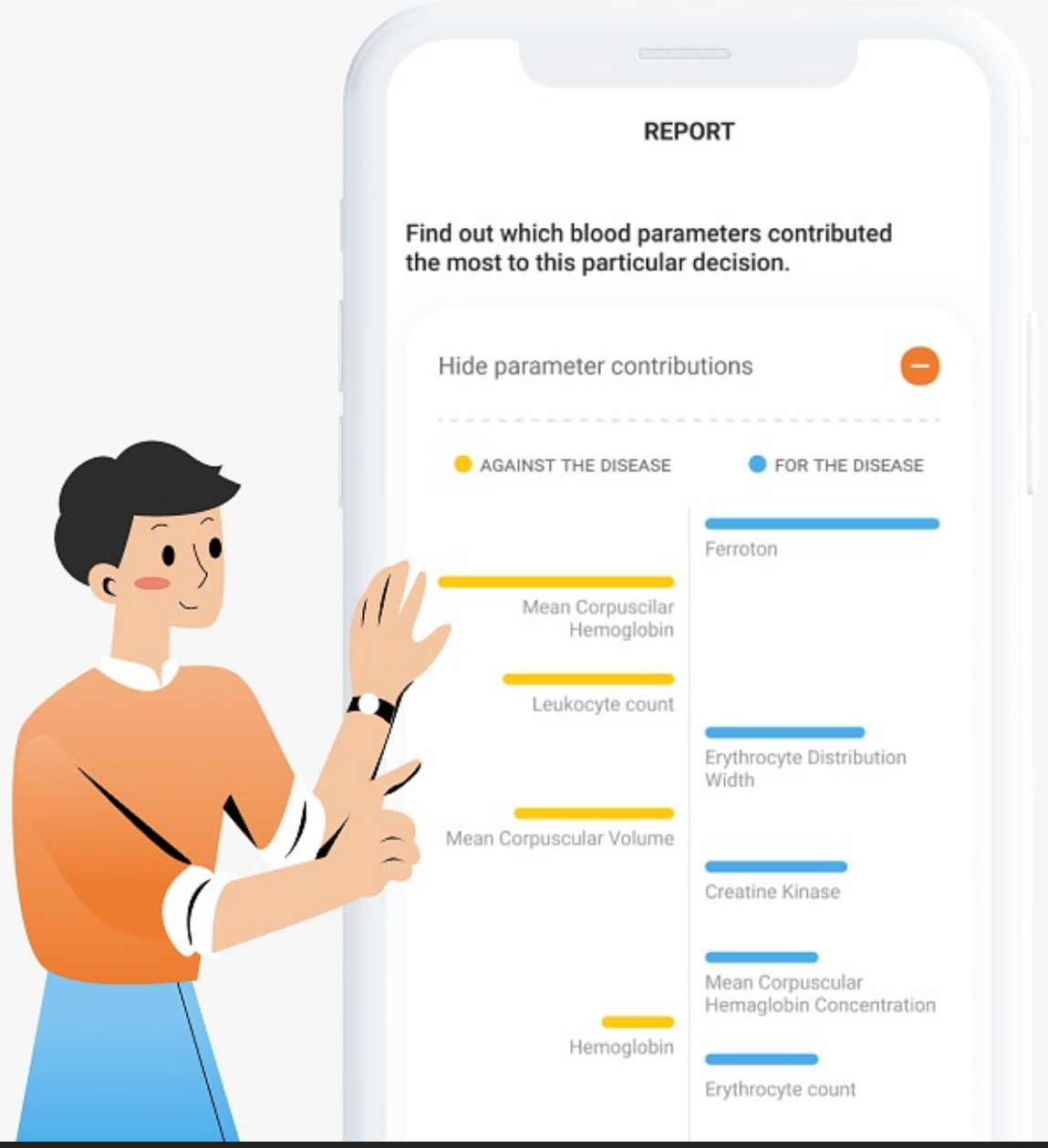
TRUSTED AI

TRUSTWORTHY


CONTROLLABILITY
TESTABILITY
EXPLAINABILITY
OBSERVABILITY

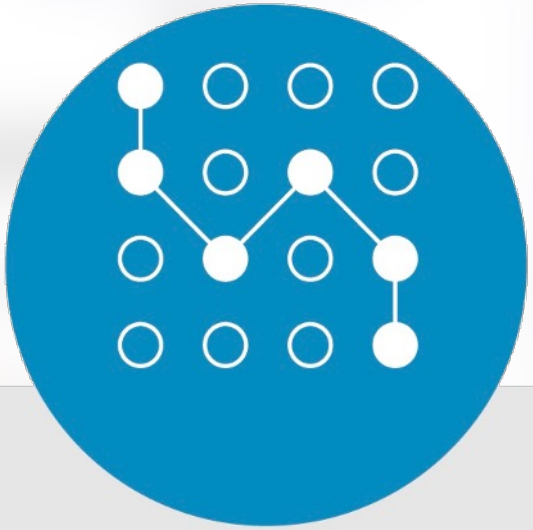
XAI

EXPLAINABLE AI



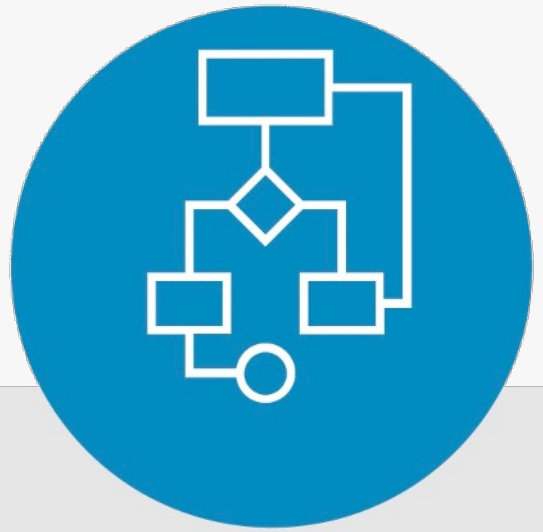
Explainable Data

What data was used to train the model and why?



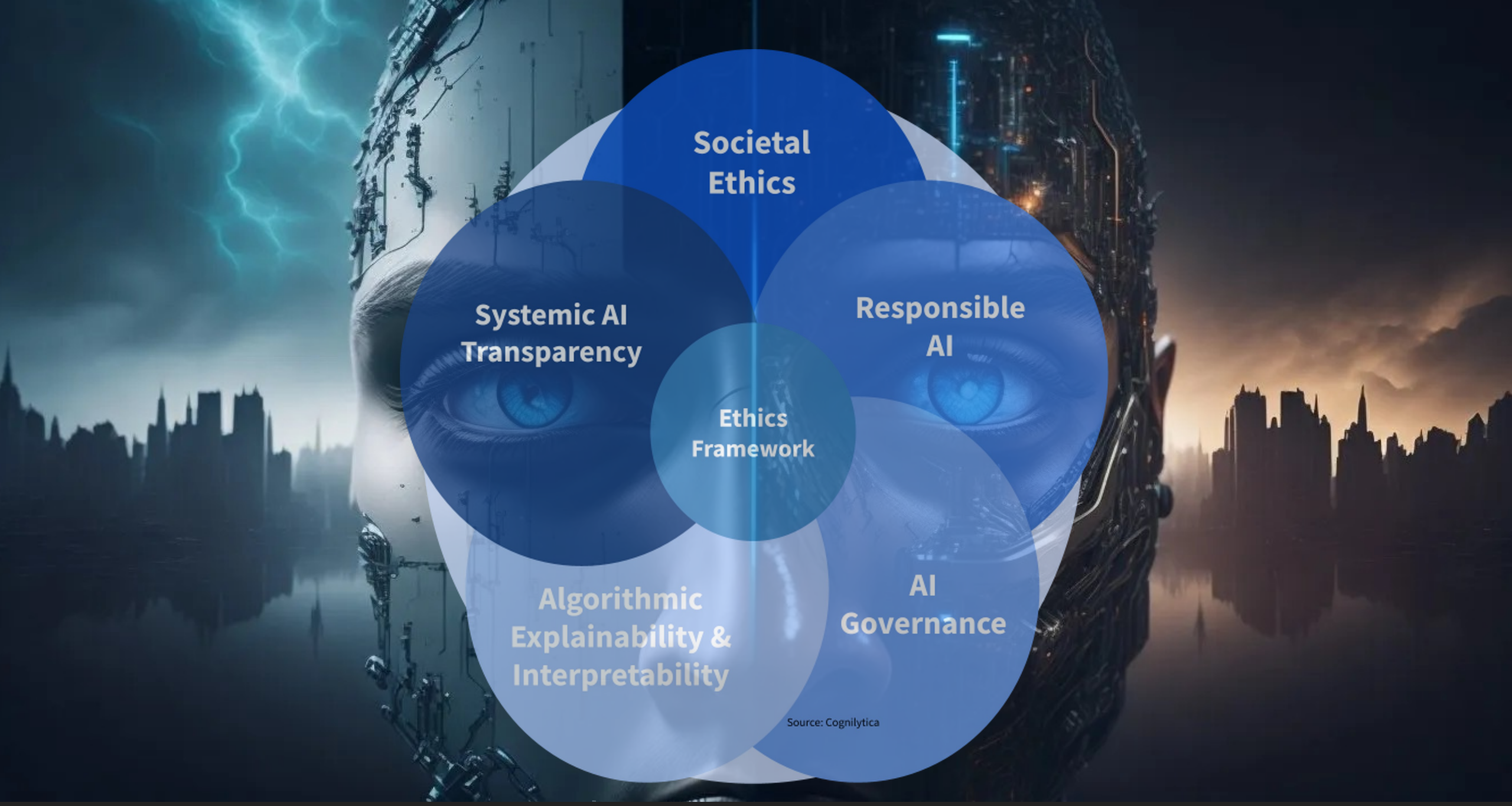
Explainable Predictions

What features and weights were used for this particular prediction?



Explainable Algorithms

What are the individual layers and the thresholds used for a prediction?


Societal Ethics
Systemic AI Transparency
Responsible AI
Ethics Framework
Algorithmic Explainability & Interpretability
AI Governance
Source: Cognilytica

Thank You

For more information contact:

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