EA and Generative AI: Ideas and Gotchas!

Leveraging AI Models in the Enterprise

Trac Bannon
Senior Principal
Software Architect & Digital Transformation Advisor
MITRE Advanced Software Innovation Center

September 2023

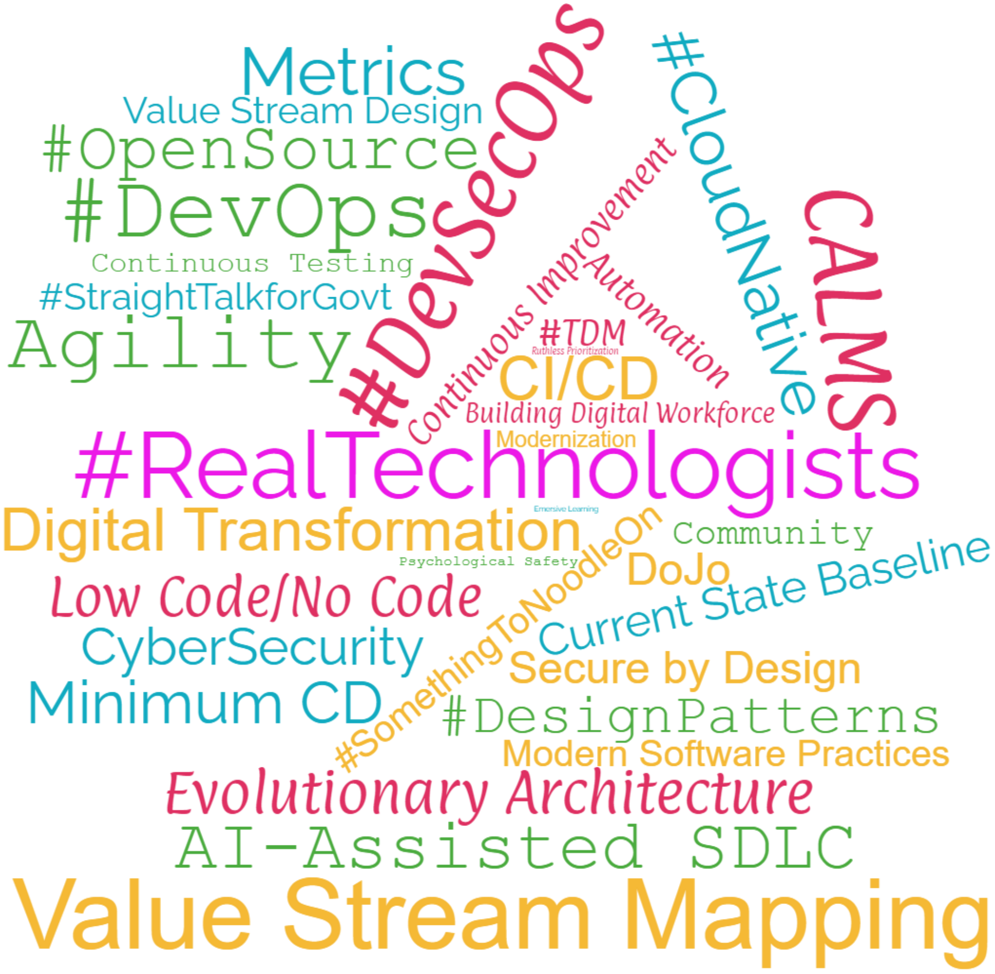
Tracy L. Bannon

“Trac”

Software architect | engineer | mentor | community leader

Who Am I?

/trās/



Metrics

Value Stream Design

#OpenSource

#DevOps

Continuous Testing

#StraightTalkforGovt

Agility

#DevSecOps

Continuous Improvement

Automation

#CloudNative

CALMS

#TDM

Ruthless Prioritization

CI/CD

Building Digital Workforce

Modernization

#RealTechnologists

Emersive Learning

Digital Transformation

Psychological Safety

#SomethingToNoodleOn

Community

DoJo

Low Code/No Code

Current State Baseline

CyberSecurity

Secure by Design

Minimum CD

#DesignPatterns

Modern Software Practices

Evolutionary Architecture

AI-Assisted SDLC

Value Stream Mapping

vsm consortium Influencer

AMBASSADOR DevOps Institute ADVANCING THE HUMANS OF DEVOPS

IEEE SENIOR MEMBER

MITRE

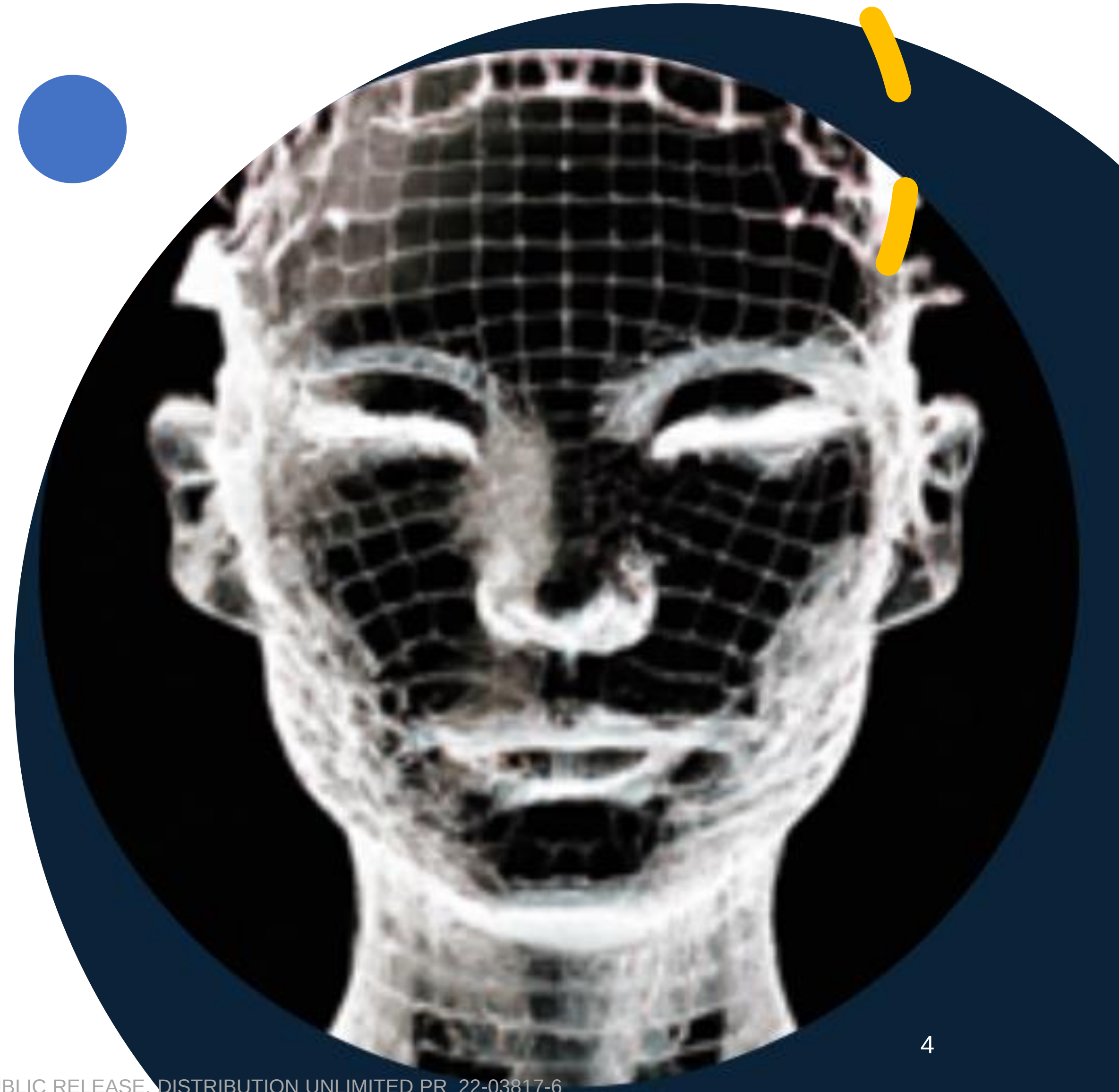
```
openapi: 3.0.0
info:
  title: CRM API
  version: 1.0.0
  description: API for managing customer data in a CRM system
  contact:
    name: John Smith
    email: john.smith@example.com
    url: https://example.com
paths:
  /customers:
    get:
      summary: Retrieve a list of customers
      description: Retrieves a list of customers in the
system, with optional filtering and sorting options.
      parameters:
        - name: filter
          in: query
          schema:
            type: string
```

Based on an illustration by Nicholas Konrad / The New Yorker

Artificial Intelligence and the Enterprise

Some definitions to help our conversation

- **Generative AI** is a category of AI algorithms that focus on generating new content, data, or patterns after being trained on existing information.
- Generative AI includes text, images, video, or even music (tool names)
- **Large language models (LLMS)** are a subset of Generative AI trained on vast amount of text data
- LLMs calculates probability distribution over sequences of words and scores the likelihood of word sequences
- Parameters in LLMs help the model to understand relationships in the text, which helps them to predict the likelihood of word sequences
- By sampling over the probability distribution, the models can write text mimicking human-like language understanding
- **AI-assisted** development often refers to using LLMs to improving developer productivity



MITRE

Show of Hands

Who is using Generative AI in their enterprise?

How is Generative AI being used?

Do you have a corporate AI strategy?

Applying Generative AI:

the question is not if but how

Three Areas for EA Focus

Start with anything repetitive then expand

SDLC and Testing

Cybersecurity

IT Operations

Applying to the SDLC

- Faster adoption into the LC/NC platforms
- Code Generation and Testing
- Personalizing User Experience

Key Considerations

- **Ethical AI**: Ensuring that the AI does not propagate existing biases in code

- **Quality Assurance**: Rigorous testing to ensure generated code meets quality standards

Improving Cybersecurity

- Threat Modeling
- Security Protocols

Key Considerations

- **Data Privacy**: Ensure that AI models are trained on anonymized data

- **Human Oversight**: Maintain human supervision for crucial security decisions

IT Operations

- Automated Resource Allocation
- Predictive Maintenance

Key Considerations

- **Cost**: Careful assessment of ROI for implementing AI-driven solutions
- **Scalability**: Solutions should be able to scale as the organization grows

Adding AI to the Enterprise Strategy

MITRE

Parts of an AI Strategy

Organizations need to thoughtfully incorporate generative AI into the enterprise strategy

- Needs Assessment
- Pilot Programs
- Skill Development
- Governance
- Monitoring and Feedback Loop
- Thought Leadership

Questions to ask your platform vendors

How does the platform ensure the security and privacy of data used by the generative AI models?

What measures have been taken to prevent the AI model from generating malicious or vulnerable code?

How does the platform manage and control access to the generative AI models and their generated outputs?

How does the vendor handle AI model updates, and what steps are taken to evaluate and maintain the security of the generative AI models over time?

More questions to ask your vendors

What are the pricing options and licensing terms for using the generative AI features?

Are there any hidden costs or usage limitations we should be aware of?

How does the tool handle edge cases or unexpected inputs?

Are there any built-in fail-safes to prevent the generative AI from producing harmful or problematic code?

Can the generative AI model be fine-tuned or customized to our organization's specific coding standards and practices?

Is it possible to extend the model's capabilities to address our unique requirements or use cases?

Other things we need to understand

- Prompt engineering as a discipline; turning human factors on its edge
- Human-Machine teaming
- Software team performance
- Trust and reliability in software outcomes when driven by AI-assisted or AI-generated software
- Automating decisions and software development workflows
- Ethics of prompts and who owns the data once created

We can’t put the genie back in the bottle; we need to discuss, research, and understand

Call to Action

Your next steps:

- Connect with your vendors to ask model quality and security questions
- Ask your platform vendor about their AI roadmap
- Pulse your organization to see if and how generative models are being used
- Enable research and discovery or LLM usage with Cybersecurity as your highest priority
- Establish on reasonable guardrails

What I need from you:

- Share your organization’s story and lessons learned
- Continue to share out new use cases and new tools

Tracy L. Bannon

tbannon@mitre.org | alt: Trac@tracybannon.tech

https://www.linkedin.com/in/tracylbannon

@TracyBannon

https://tracybannon.tech

Disclaimer: The views, opinions and/or findings contained in this report are those of The MITRE Corporation and should not be construed as an official government position, policy, or decision, unless designated by other documentation.

MITRE

SOLVING PROBLEMS FOR A SAFER WORLD®

References

[1] https://www.gartner.com/en/newsroom/press-releases/2022-12-13-gartner-forecasts-worldwide-low-code-development-technologies-market-to-grow-20-percent-in-2023

[2] https://spectrum.ieee.org/ai-code-generation-language-models

[3] https://www.codecademy.com/resources/blog/programming-languages-created-by-women/

[4] https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai

[5] https://www.marktechpost.com/2022/08/25/researchers-develop-ticoder-framework-for-code-generation-using-user-feedback-with-90-4-consistency-to-user-intent/

[6] https://advisory-marketing.us.kpmg.com/speed/pov-generativeai.html

[7] https://youtu.be/8Vat_jRt128 (Artificial Intelligence and Low Code/No Code - Leveraging AI models to improve software creation)