University of Maryland

Project Management Symposium

NEXT SESSION

Demystifying LLMs: A Guide for Project Managers to Unlock the Potential of Large Language Models (LLMs)

Donald Polaski & Marissa Beall

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Chief Data Scientist, Booz Allen Hamilton

PROJECT MANAGEMENT
CENTER FOR EXCELLENCE
A.J. CLARK SCHOOL OF ENGINEERING
Civil & Environmental Engineering Department

This session will be recorded.

Project Management Symposium

Demystifying LLMs: A Guide for Project Managers to Unlock the Potential of Large Language Models (LLMs)

Marissa Beall
Donald Polaski

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Introductions

Donald Polaski

Director of AI,
Booz Allen Hamilton

Marissa Beall

Chief Data Scientist,
Booz Allen Hamilton

Agenda

- LLMs Demystified
- Program Management Applications of LLMs
- Risks and Other Considerations
- Resources

Session Learning Outcomes

- Form shared understanding of generative AI terms & history
- Discover how PMs can enhance efficiency with Generative AI
- Itemize the top pros and cons of using this technology.

LLMs Demystified

What is generative AI, how does it work, and why is important

Terminology Overview

Generative AI is an umbrella term for algorithms that learn from training datasets to *generate new content* such as image synthesis, text generation, annotation, and code composition.

The Rise of Generative AI

Golden Age of AI
1957 – 1974
U.S. Government Funding, DARPA;
Bellman, Klopf – Dynamic Control

The Imitation Game, Alan Turing

1950 | 1956 | 1957 | 1958

Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI) John McCarthy and Marvin Minsky

Stanford, Shakey Robot

1971 – 1990 AI Winter

1980 | 1989

Neural Networks, Backpropagation Hinton, Hopfield, Rummelhart

CNN, LeCun

1997

IBM's Deep Blue beats Garry Kasparov

NVIDIA Fermi arch; Palatucci, Zero Shot Learning

IBM Watson beats Jeopardy; NVIDIA Ships 1 B processor

DeepMind, Deep Reinforcement Learning

Goodfellow, GAN; Yosinski, Transfer Learning; Amazon Alexa; Tesla AutoPilot; Google acq DeepMind

DeepMind's AlphaGo beats Lee Sedol; Sophia Robot; BD Spot Robot; PyTorch Released; TPUs released

BERT; DeepFakes; OpenAI GPT-1; BD Atlas Robot

OpenAI, CLIP; OpenAI, DALL-E; OpenAI CODEX; Tensorflow 3D; 4th Gen TPU; DeepMind AlphaFold2; NVIDIA Omniverse

March 2023
OpenAI Release GPT-4

2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023

ImageNet competition; Apple acquires Siri; DeepMind Est.; Microsoft Kinect

AlexNet, Krizhevsky; CNN wins ILSVR Challenge

Tensorflow Released; YOLO Model; OpenAI Est.; NVIDIA Tegra X1

Transformers; NVIDIA Volta

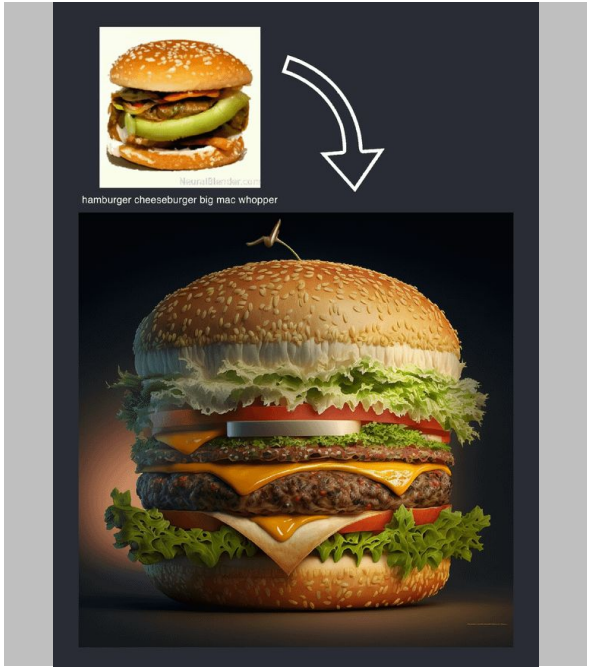
OpenAI Dactyl; OpenAI DOTA 2; AI Detects Lung Cancer; OpenAI GPT-2

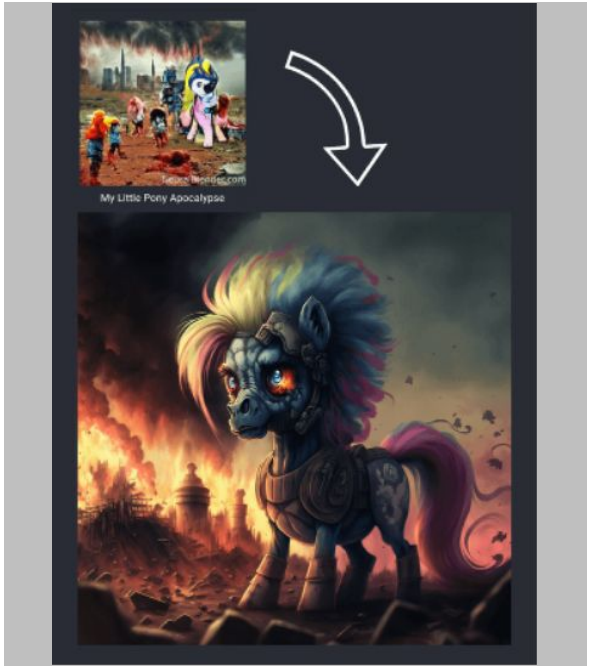
OpenAI, GPT-3; NVIDIA Ampere

DeepMind, AlphaTensor; OpenAI, DALLE-2; Stability AI, Stable Diffusion; Meta, Galactica & CICERO; OpenAI, ChatGPT

Midjourney – 1 Year Ago vs. Today

LIBREDDIT User Post by Lozmosis

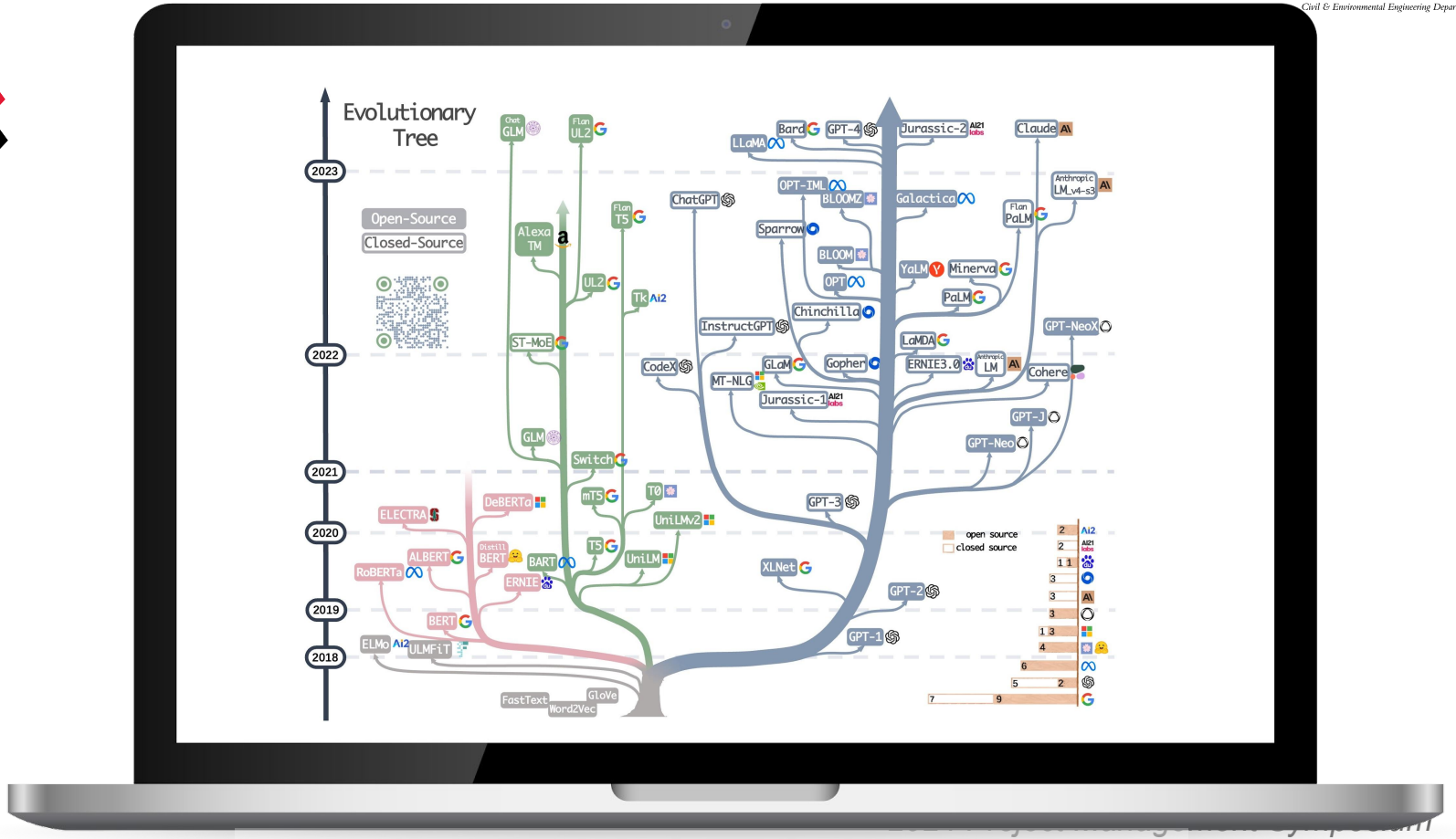




Terminology Overview

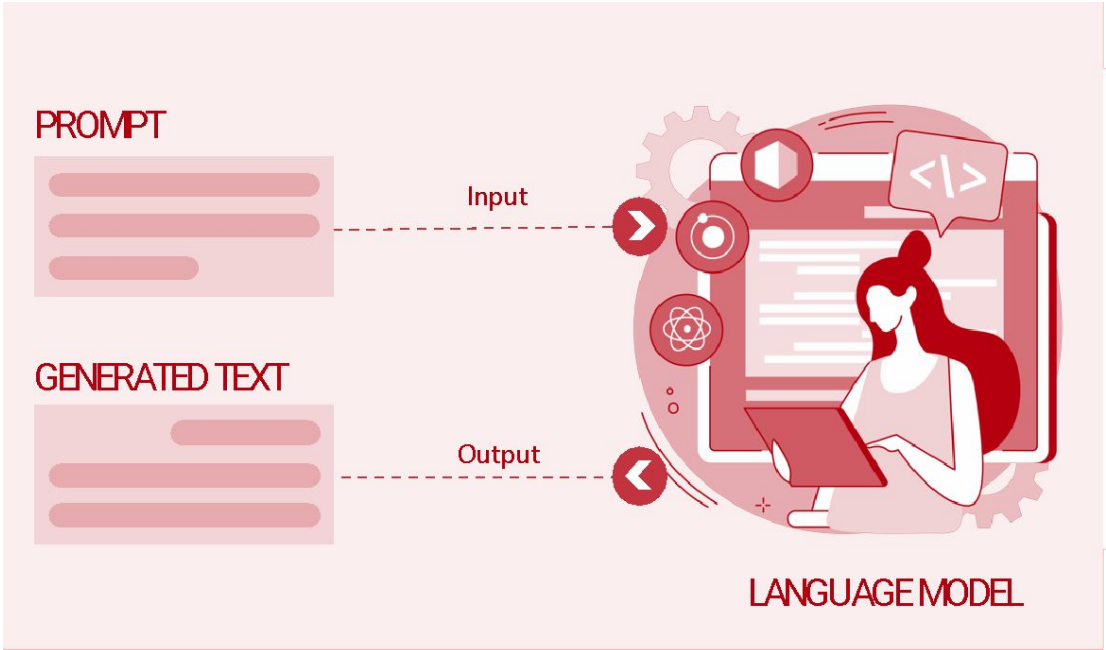
Large Language Models (LLMs) refer to a subset of generative models trained on a vast amounts of text data to take input text and *predict the next word*. LLMs are a type of generative AI.

Large Language Model History



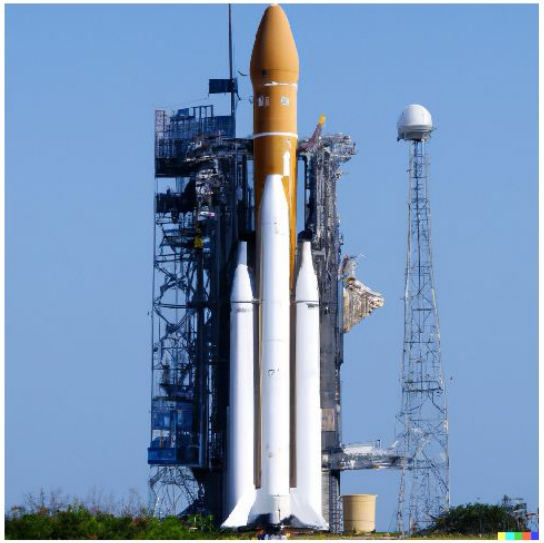
Source: https://github.com/Mooler0410/LLMsPracticalGuide/blob/main/imgs/qr_version.jpg

Prompts: A Key Element for Working with GenAI



Prompts are functions that map an example from a dataset to a natural language input and target output.

Prompt Engineering



OPENAI DALL-E WITH A BAD PROMPT

"Delta four heavy rocket"

MIDJOURNEY WITH A GOOD PROMPT

"A Boeing Delta IV Heavy rocket lifting off from the launch pad at Cape Canaveral on a beautiful sunny day"

Why do I Care?

"By 2030, 80 percent of the work of today's project management (PM) discipline will be eliminated as artificial intelligence (AI) takes on traditional PM functions such as data collection, tracking and reporting, according to Gartner, Inc."

Katie Costello, Gartner

Why do I Care?

"If applying AI and other technological innovations to project management could improve the success ratio of projects by just 25%, it would equate to trillions of dollars of value and benefits to organizations, societies, and individuals."

How AI Will Transform Project Management – Antonio Nieto-Rodriguez and Ricardo Viana Vargas, Harvard Business Review

PM Applications of LLMs

How can Project Managers use this technology today?

Sample LLM Tasks


```
Prompt: Translate the following sentence from English to
Spanish: "The cat sat on the mat."
```

Machine Translation

```
Prompt: Analyze the sentiment of the following statemen
t: "I loved the movie, it was so good."
```

Sentiment Analysis

```
Prompt: Identify all the people and organizations mentio
ned in the following text: "John Smith is the CEO of ABC
Corp. He will be speaking at the upcoming conference in
New York."
```

Named Entity Recognition

Citation – Prompt Engineering, Georgios V. Efstratiadis

```
Prompt: Answer the following question: "What is the capi
tal of France?"
```

Question Answering

```
Prompt: Summarize the following article in three sentenc
es or less: "Scientists have discovered a new species of
dinosaur that roamed the earth during the Late Cretaceou
s period. The dinosaur, named Magnapaulia laticaudus, ha
d a long tail and was herbivorous. The discovery sheds n
ew light on the biodiversity of the Late Cretaceous."
```

Text Summarization

```
Prompt: Generate a paragraph of text on the topic of cli
mate change.
```

Text Generation

Example Applications

- Record and transcribe meetings (e.g., summarize notes, build a task list)
- Create or edit communications (e.g., emails, invitations)
- Create a template for or draft project documents (e.g., schedule, pitch, plan, budget, user stories)
- Provide recommendations (e.g., impact analysis, issue resolution,)

Transcription & Note Taking

Otter.AI – Records, transcribes, summarizes, records action items, and automatically schedules meetings

Microsoft Teams Meeting Recap –Review meeting recordings, transcripts, follow-up actions, shared documents, and meeting

Sample Otter.AI Output

Jan and Alex discuss the need for an end-to-end testing plan and certification for the project. Jan mentions that they have documented what needs to be tested for user acceptance testing and production, but Alex questions the document and seeks clarification. Jan suggests making the topic an agenda item for the core team to discuss and finalize the end-to-end testing plan.

Action items

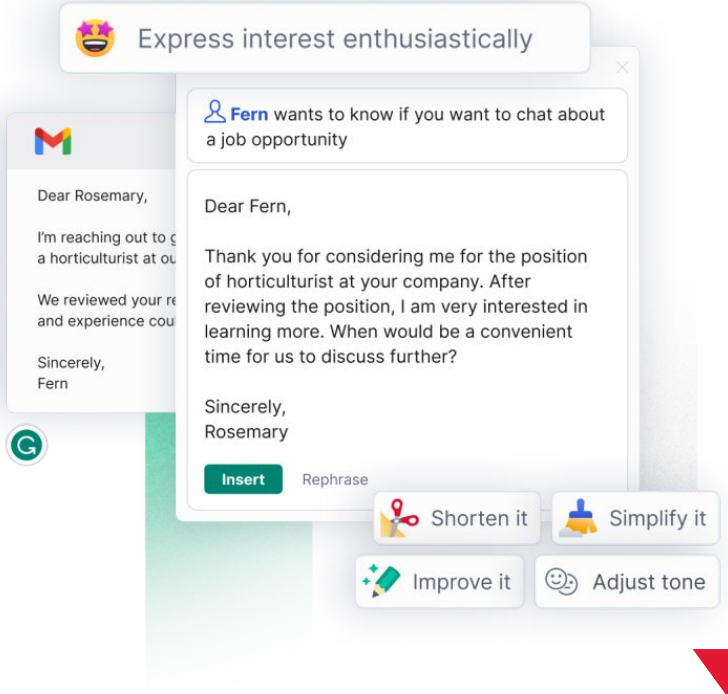
- [ ] Add the certification end-to-end test plan as an agenda item for the core team meeting.
- [ ] Clarify what is expected to be tested as part of the end-to-end certification test plan.

Writing Assistance

Grammarly – automate creation of emails, blog posts, and other documents. Customize with your own voice.

Copy.ai – tool focused on automatically generating emails, marketing materials, & blogs

Grammarly E-Mail Example

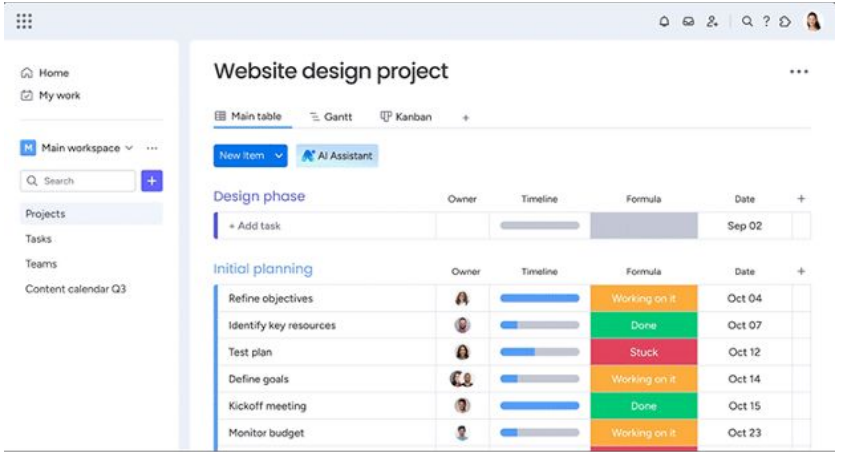


Project Plan Automation

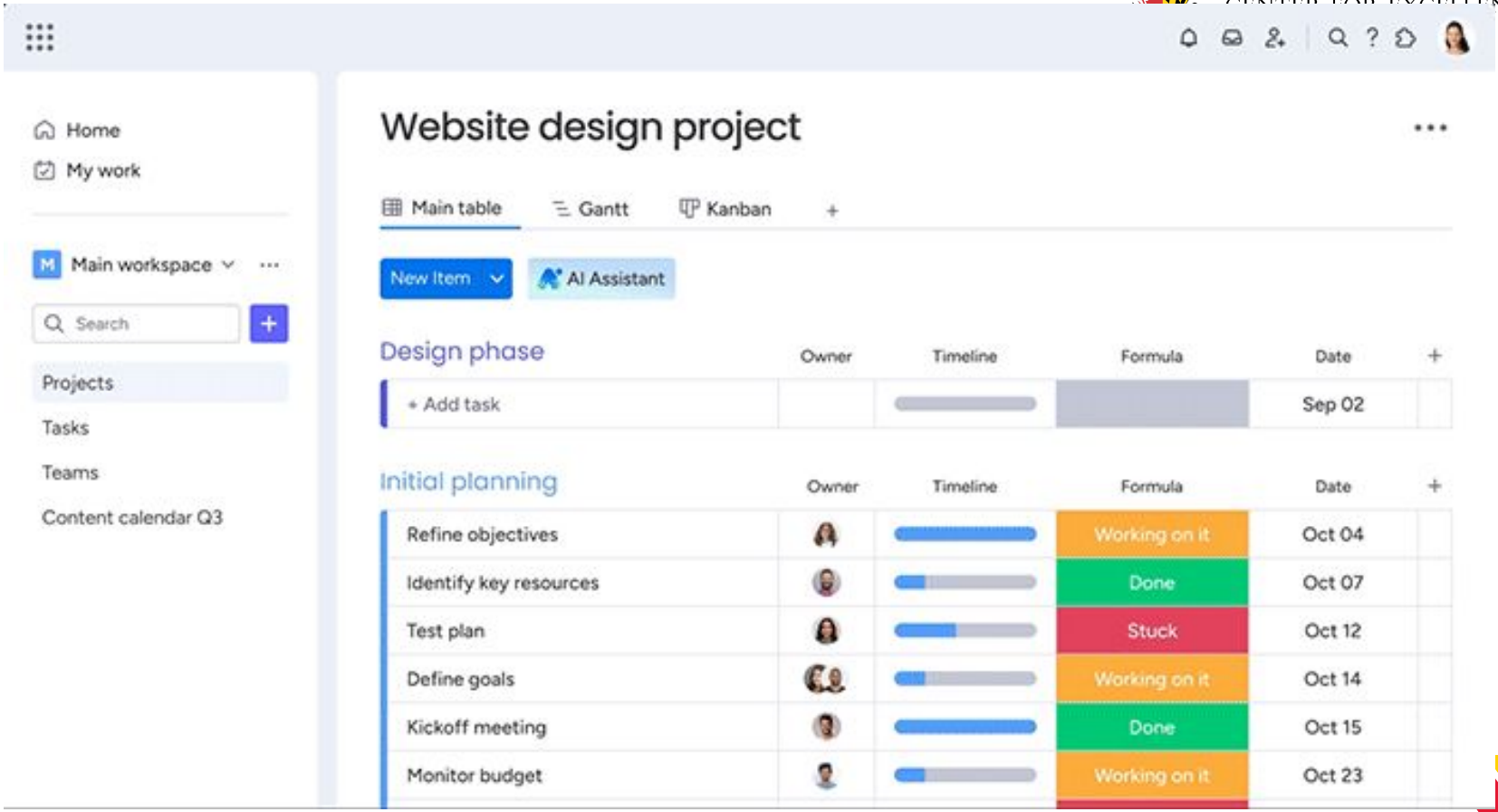
monday.com – automatic generation of project tasks based on project ideas

AutoPlan Trello Plug-In

–Automatically generate tasks for new projects and create project checklists



monday.com project planning interface


Home
My work
Main workspace
Search
Projects
Tasks
Teams
Content calendar Q3
Website design project
Main table
Gantt
Kanban
New Item
AI Assistant
Design phase
Owner
Timeline
Formula
Date
+ Add task
Sep 02
Initial planning
Refine objectives
Working on it
Oct 04
Identify key resources
Done
Oct 07
Test plan
Stuck
Oct 12
Define goals
Working on it
Oct 14
Kickoff meeting
Done
Oct 15
Monitor budget
Working on it
Oct 23

Risks & Other Considerations

How can I protect myself and my business when applying LLM technology

KEY COMPONENTS	KEY CHALLENGES/ RISKS
App Dev & Integration	• **IP accountability** for input/output of content • **Data security** and ownership
Instruction Fine-Tuning	• **Control for misinformation, hallucinations, bias** in outputs with use case specific data • **Labor economics** for labeling data
LLM (i.e. GPT) Training	• **Massive compute** required. Training most LLM's from scratch requires several millions in compute alone
Training data	• **Data ownership uncertainty** and proper licensing of training data (e.g. use of bootlegged books and media)

Questions?

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Evaluate Session