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Generative AI and Business

Day-to-day usage
of Web UI LLMs

Writing assistant

Rewrite the following to be suitable
for a professional business report:

The marketing campaign for the new
product went really well, beating our
target by 10%.

The product launch marketing
campaign was successful, exceeding
our user acquisition target by 10%.

Marketer

Help me brainstorm an email campaign to reactivate lapsed users of our SaaS product.

Certainly! Here's an email campaign strategy:

1. "We miss you" email
2. Feedback request email
3. Exclusive offer email
4. Feature spotlight email
5. Success story email

Recruiter

Summarize the following review of a job candidate in 50 or fewer words:

I really enjoyed talking to the candidate. I liked their positive energy and excitement about the position, and was also impressed by their knowledge of our company. I did have some concerns about their familiarity with the tools we use [...]

The review was impressed by the candidate's depth of knowledge but had some questions about their experience with specific tools. The reviewer is in favor hiring the candidate but suggests further team discussion about how to train and onboard effectively.

Programmer

Write python code to calculate the average of the last column in a dataframe

Sure! Here's some code that uses the pandas library:

```
import pandas as pd  
# Calculate the mean of the last column  
mean_value = df.iloc[:, -1].mean()  
  
print(mean_value)
```



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Task analysis of jobs

Identifying automation opportunities

- AI doesn't automate jobs. It automates tasks.
- Most jobs involve a collection of many tasks.
- Example: Customer service representative

Tasks	Generative AI potential
Answer inbound phone calls from customers	Low
Answer customer chat queries	High
Check status of customer orders	Medium
Keep records of customer interactions	High
Assess accuracy of customer complaints	Low
[...]	[...]

Augmentation vs. Automation

Augmentation

- Help humans with a task.
- E.g., recommend a response for a customer service agent to edit/approve.

Automation

- Automatically perform a task
- E.g., automatically transcribe and summarize records of customer interactions

For some tasks, businesses will start with augmentation, and gradually move toward automation.

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Evaluating AI potential

The potential for augmenting/automating a task depends on:

(i) Technical feasibility and (ii) Business value.

Technical feasibility: Can AI do it?

- Can a fresh college graduate following the instructions in a prompt complete the task?
- If unsure, try prompting an LLM to see if you can get it to do it.
- An AI engineer can also help assess if RAG, fine-tuning, or other techniques can help.

Business value: How valuable is it for AI to augment or or automate this task?

- How much time is spent on this task?
- Does doing this task significantly faster, cheaper or more consistently create substantial value?

Job databases: Breaking down job roles into tasks

O*NET entry for Customer Service Representatives

Occupation-Specific Information

Tasks

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- + Confer with customers by telephone or in person to provide information about products or services, take or enter orders, cancel accounts, or obtain details of complaints.
- + Keep records of customer interactions or transactions, recording details of inquiries, complaints, or comments, as well as actions taken.
- + Check to ensure that appropriate changes were made to resolve customers' problems.
- + Contact customers to respond to inquiries or to notify them of claim investigation results or any planned adjustments.
- + Determine charges for services requested, collect deposits or payments, or arrange for billing.
- + Complete contract forms, prepare change of address records, or issue service discontinuance orders, using computers.

Source: onetonline.org



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Additional job
analysis examples

Computer programmer

Tasks	Generative AI potential
Write code	Medium
Write documentation	High
Respond to user support requests	Medium
Review others' code	Low
Gather requirements	Low
[...]	[...]

Lawyer

Tasks	Generative AI potential
Draft and review legal documents	High
Interpret laws, rulings, and regulations	High
Review evidence	Low
Negotiate settlements of disputes	Low
Represent clients in court	Low
[...]	[...]

Landscaper

Tasks	Generative AI potential
Maintain and care for plants	Low
Purchase and transport plants	Low
Maintain yard equipment	Low
Communicate with clients	Medium
Maintain business website	Low
[...]	[...]

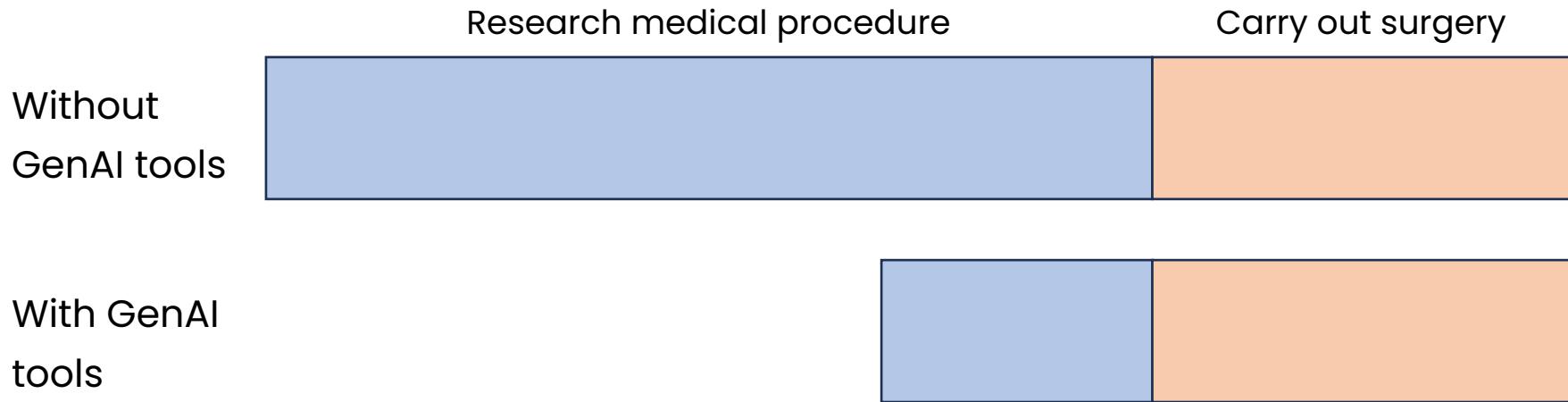


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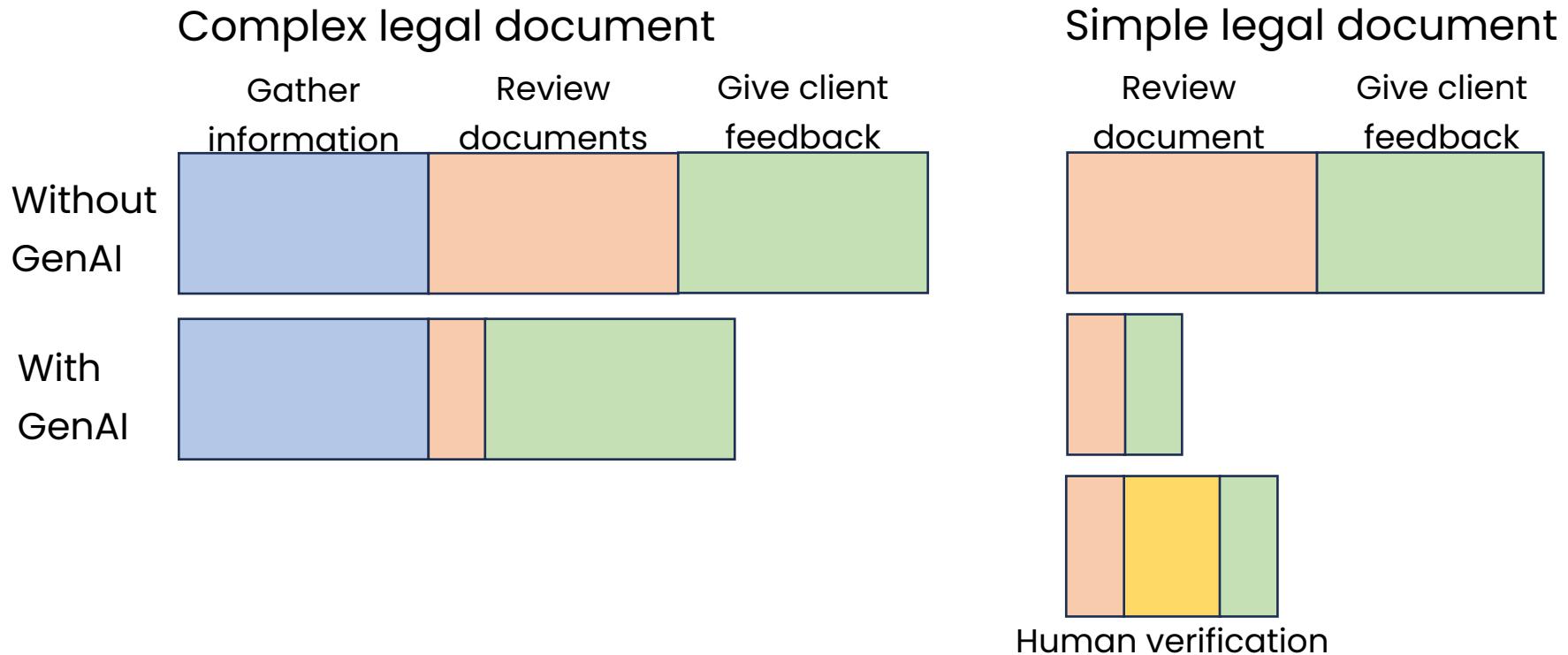
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New workflows and new
opportunities

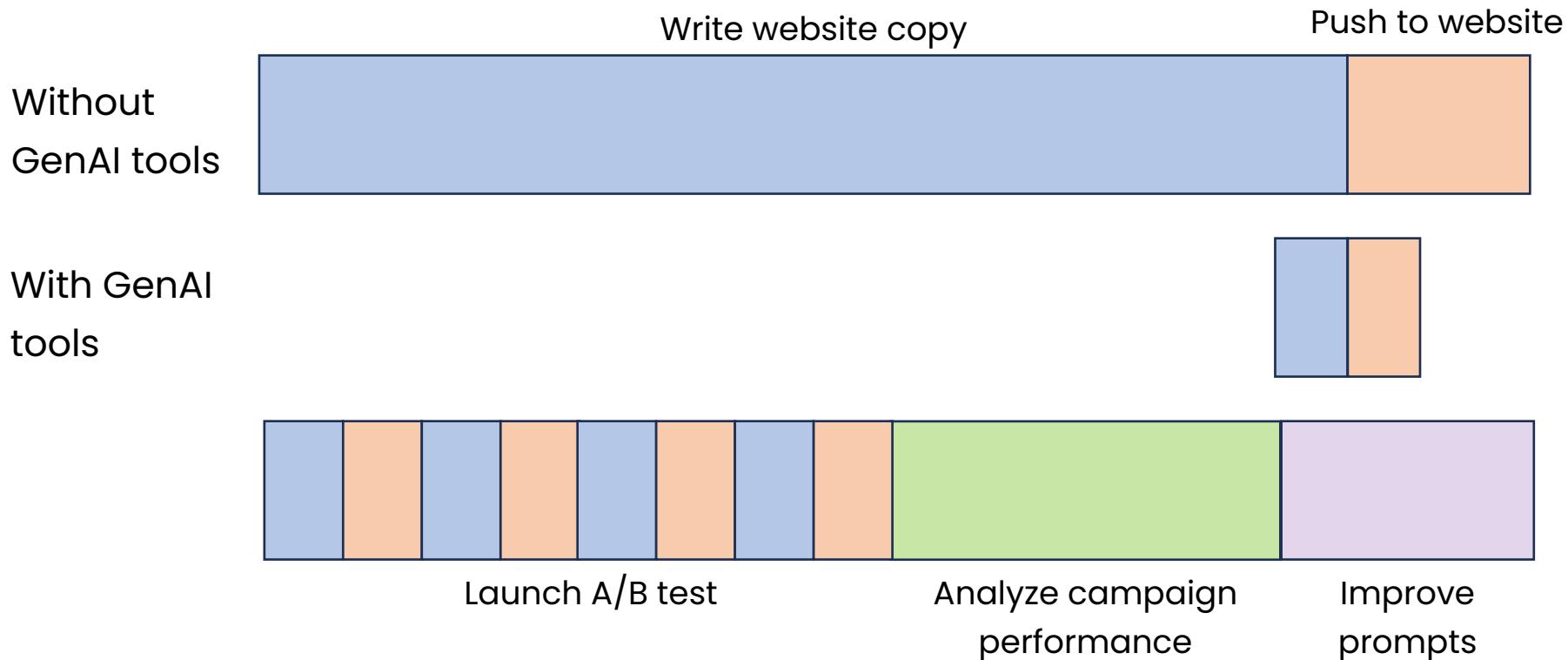
Example 1: Surgeon



Example 2: Legal documentation review



Example 3: Marketing automation



Analyzing Customers' Tasks

Example: Helping customers build websites

Tasks	Generative AI potential
Select website template	Low
Write title	High
Select images	Medium
Write copy for homepage	Medium
Optimize copy for SEO	High
[...]	[...]



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Teams to build
generative AI software

Common roles

- Software engineer
 - Responsible for writing software application
 - Ideally someone who has learned basics of LLMs/prompting
- Machine learning engineer
 - Responsible for implementing AI system
 - Ideally familiar with LLMs/prompting, RAG, fine-tuning
- Product manager
 - Responsible for identifying and scoping the project
- Prompt engineer?
 - Usually not hired as a dedicated role

Getting started with a small team

One person team:

- Software engineer (who has learned some prompting), or
- Machine learning engineer, or
- Just yourself!

Two person team:

- Can be machine learning engineer + software engineer.
- But many other configurations are fine.

Additional roles:

- Data engineer, Data Scientist, Project Manager, Machine Learning Researcher

Additional roles

Data engineer: Responsible for organizing data and ensuring data quality

Data scientist: Responsible for analyzing data to make recommendations to guide project or business decisions

Project Manager: Responsible for coordinating project execution

Machine learning researcher: Responsible for developing advanced AI technologies

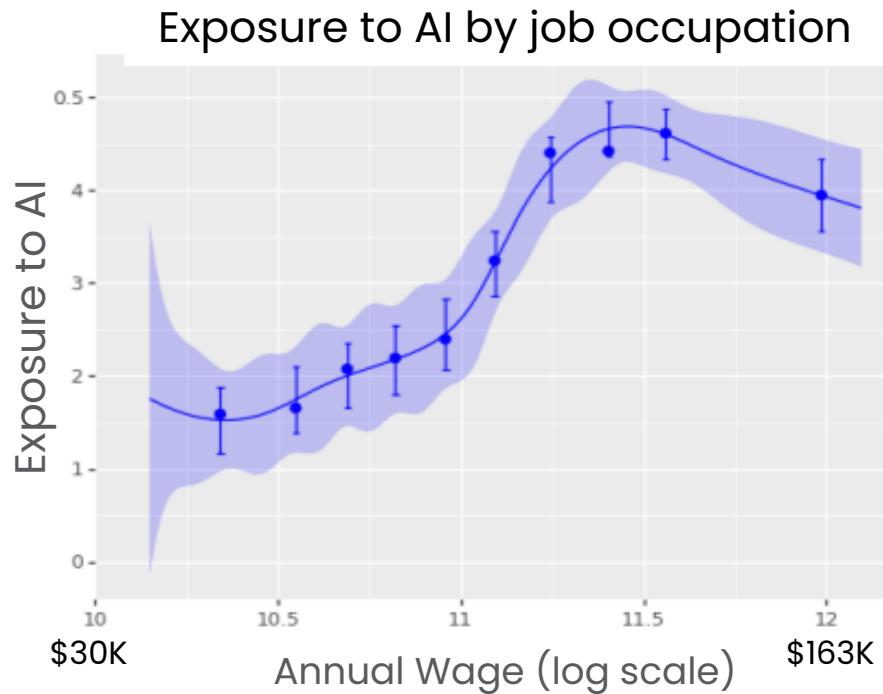


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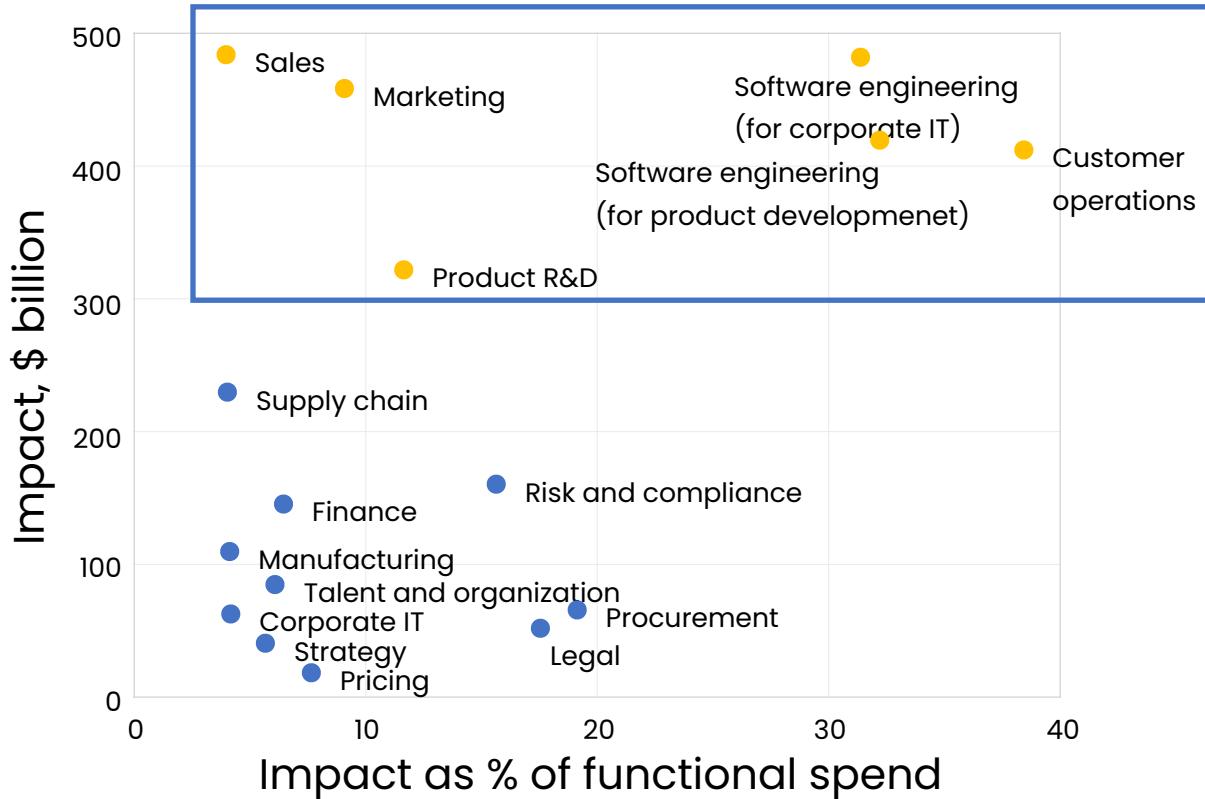
Automation potential
across sectors

Generative AI will impact higher-paid jobs more



Credit: Eloundou et al., 2023

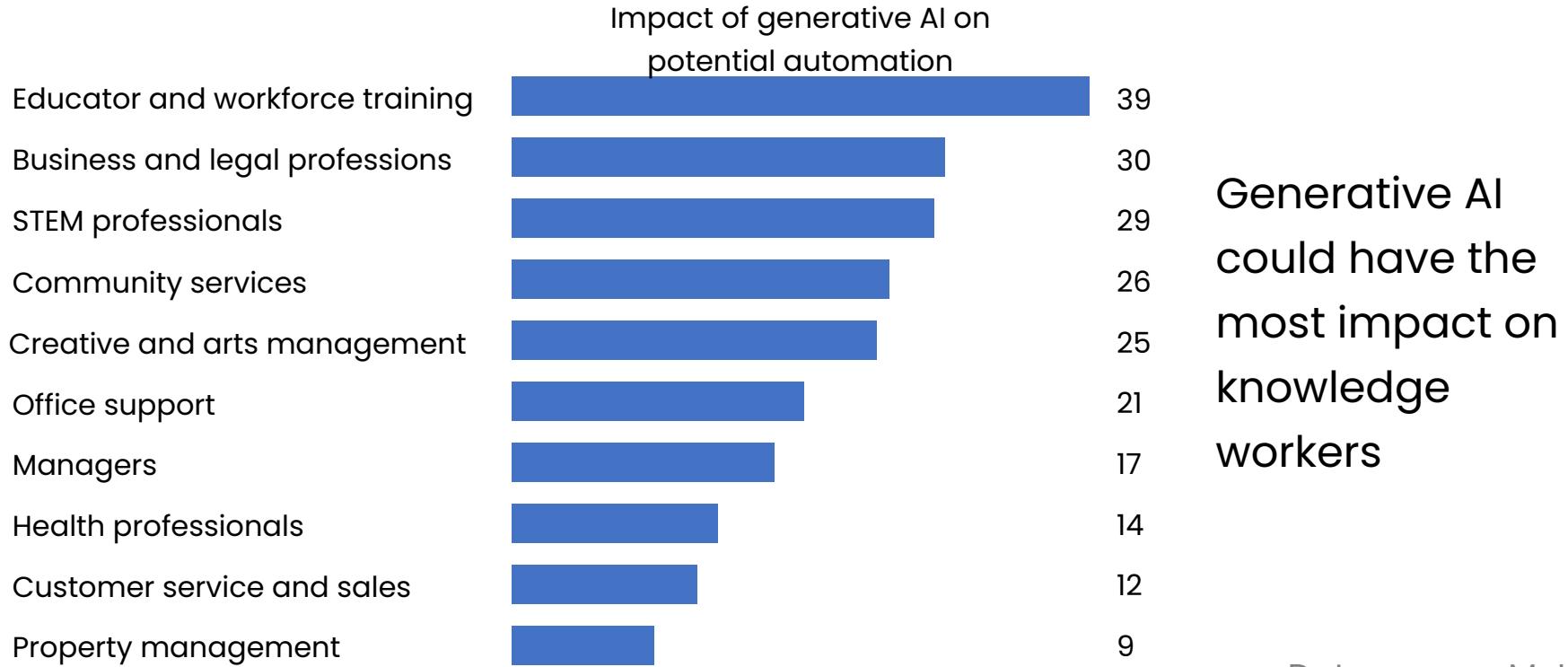
Analysis by functional role



These business areas together represent 75% of total annual impact of generative AI

Source: McKinsey

Analysis by industry sector



Data source: McKinsey



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Concerns about AI

Concern 1: Amplifying humanity's worst impulses

- LLMs are trained on text from the internet, which reflects some of humanity's best qualities, but also some of its worst
- Will it amplify our worst impulses?

Bias example: The _____ was a CEO.

- LLMs are becoming less biased through fine-tuning and more advanced techniques such as Reinforcement Learning from Human Feedback (RLHF)

Reinforcement learning from human feedback (RLHF)

Reduce bias

Step 1: Train an answer quality (reward) model

Prompt:

The _____ was a CEO.

Input (A) Response	Output (B) Score (reward)
man	5
woman	5
airplane	1
#!%^?	1

Step 2: Have LLM generate a lot of responses. Further train it to generate more responses that get high scores.

Concern 2: Job loss

"If you work as a radiologist, you're like the coyote that's already over the edge of the cliff, but hasn't yet looked down, so it doesn't realize there's no ground underneath them.

People should stop training radiologists now.

It's just completely obvious that within five years deep learning is going to do better than radiologists."

Radiologist tasks (O*NET)

Tasks

All 30 displayed

- ⊕ Prepare comprehensive interpretive reports of findings.
- ⊕ Perform or interpret the outcomes of diagnostic imaging procedures including magnetic resonance imaging (MRI), computer tomography (CT), positron emission tomography (PET), nuclear cardiology treadmill studies, mammography, or ultrasound.
- ⊕ Document the performance, interpretation, or outcomes of all procedures performed.
- ⊕ Communicate examination results or diagnostic information to referring physicians, patients, or families.
- ⊕ Obtain patients' histories from electronic records, patient interviews, dictated reports, or by communicating with referring clinicians.
- ⊕ Review or transmit images and information using picture archiving or communications systems.
- ⊕ Confer with medical professionals regarding image-based diagnoses.
- ⊕ Recognize or treat complications during and after procedures, including blood pressure problems, pain, oversedation, or bleeding.
- ⊕ Develop or monitor procedures to ensure adequate quality control of images.
- ⊕ Provide counseling to radiologic patients to explain the processes, risks, benefits, or alternative treatments.
- ⊕ Establish or enforce standards for protection of patients or personnel.
- ⊕ Coordinate radiological services with other medical activities.
- ⊕ Instruct radiologic staff in desired techniques, positions, or projections.
- ⊕ Participate in continuing education activities to maintain and develop expertise.
- ⊕ Participate in quality improvement activities including discussions of areas where risk of error is high.
- ⊕ Perform interventional procedures such as image-guided biopsy, percutaneous transluminal angioplasty, transhepatic biliary drainage, or nephrostomy catheter placement.

Radiologist

Tasks	AI potential
Interpret X-rays	High
Operate imaging hardware	Medium
Communicate exam results	Medium
Respond to complications during procedure	Low
Document procedure and outcomes	Medium
[...]	[...]

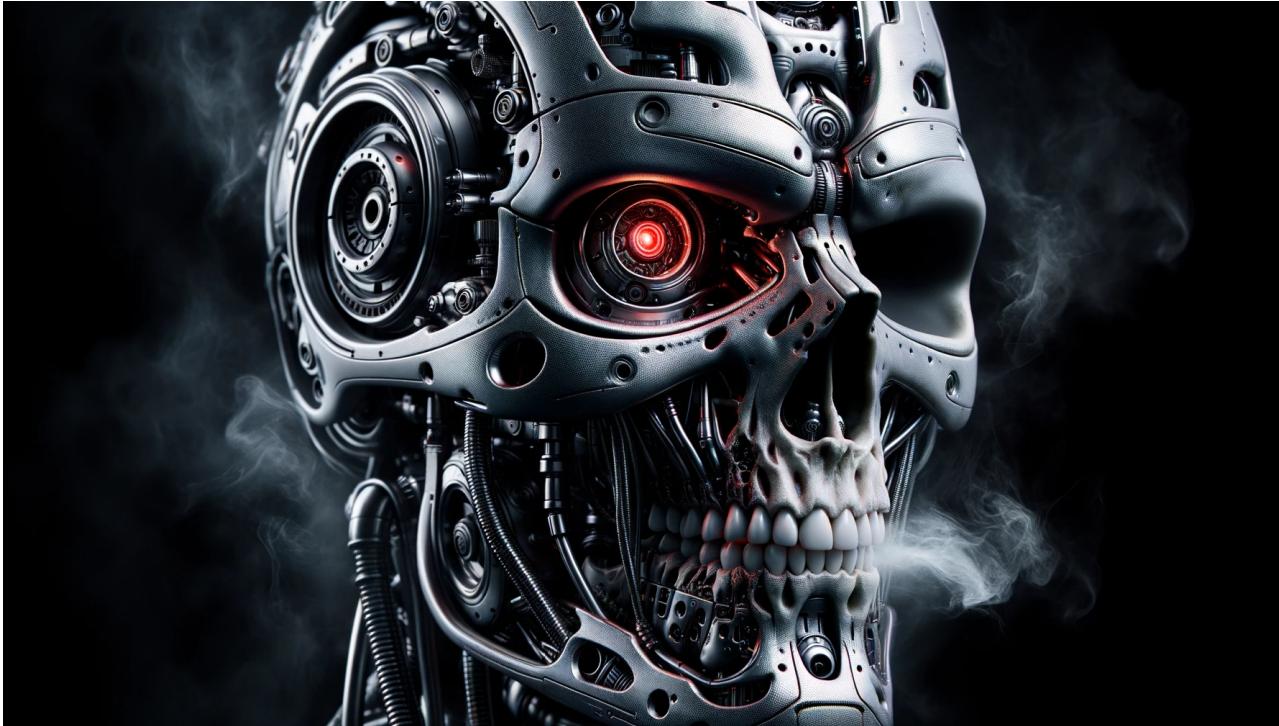
Radiologists

“AI won’t replace radiologists.

But radiologists that use AI will replace radiologists
that don’t.”

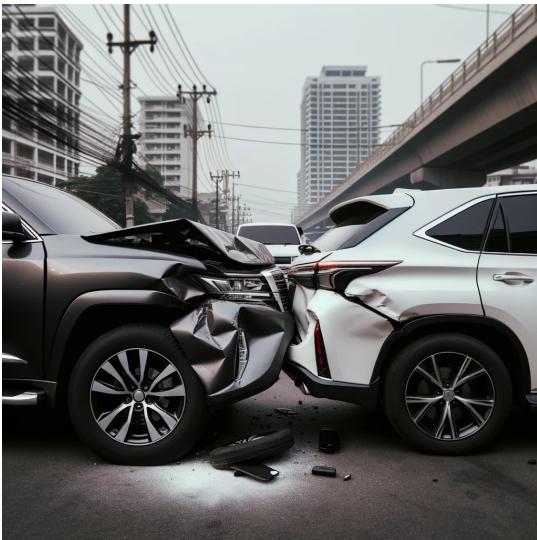
Curtis Langlotz
Professor of Radiology
Stanford University
Andrew Ng

Concern 3: Human extinction

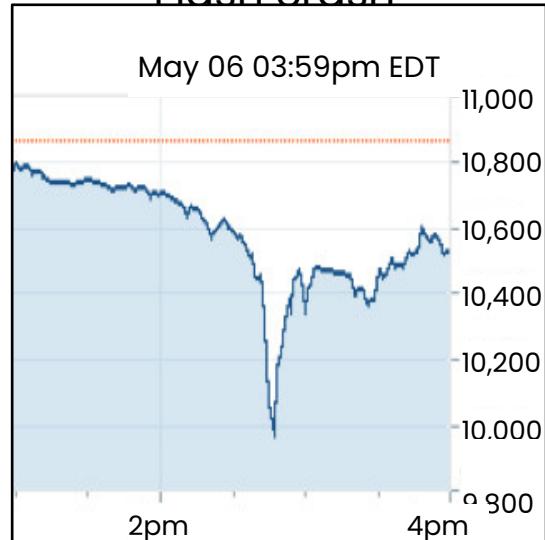


Examples of harm caused by AI

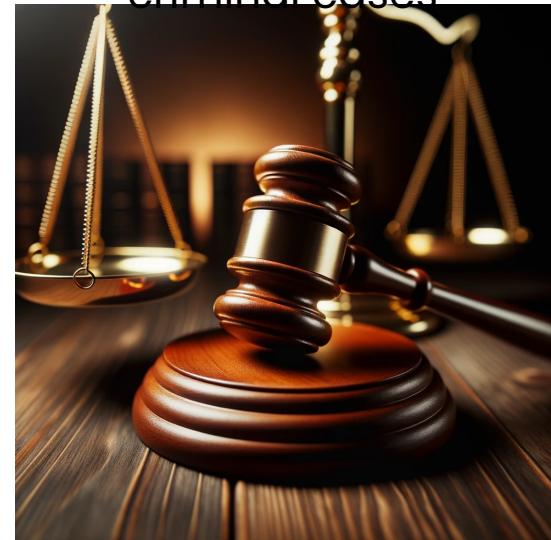
Self-driving car crashes



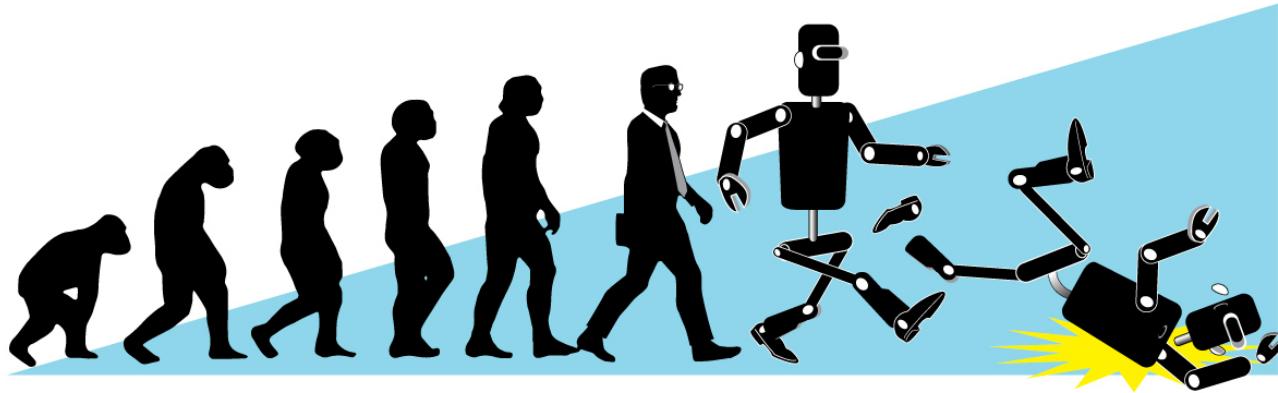
2010 Stock Market
Flash crash



Unjust sentencing in
criminal cases



Human extinction?



- Extinction arguments are not concrete
- Most arguments boil down to “it could happen.”
- “This is a new type of technology.”

Perfect control not needed to be valuable and safe

- Humanity has ample experience controlling many things far more powerful than any single person, such as corporations and nation states.
- Many things that we can't fully control are nonetheless valuable and safe. Example: Airplanes



- If we look at the real risks to humanity – such as climate change and pandemics – AI will be a key part of the solution.



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Artificial General Intelligence

Artificial General Intelligence

Definition: AI that can do any intellectual task that a human can

Examples:

- Learn to drive a car through ~20 hours of practice
- Complete a PhD thesis after ~5 years of work
- Do all the tasks of a computer programmer (or any other knowledge worker)



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Responsible AI

Dimensions of responsible AI

- **Fairness:** Ensuring AI does not perpetuate or amplify biases
- **Transparency:** Making AI systems and their decisions understandable to stakeholders impacted
- **Privacy:** Protecting user data and ensure confidentiality
- **Security:** Safeguard AI systems from malicious attacks
- **Ethical Use:** Ensuring AI is used for beneficial purposes

Tips for responsible AI

- Build a culture that encourages discussion and debate on ethical issues
- Brainstorm how things can go wrong
 - E.g., Could there be issues with fairness, transparency, privacy, security, ethical use?
- Work with a diverse team and include perspectives from all stakeholders



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Course Summary

Course Summary

- How generative AI works
 - What it can and cannot do
 - Common use cases: Writing, reading, chatting
- Generative AI Projects
 - Lifecycle of a generative AI project
 - Technology options: Prompting, RAG, Fine-tuning
- Implications on Business and Society
 - Analyzing tasks in jobs for automation or augmentation potential
 - Societal concerns, responsible AI



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Building a more
intelligent world





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Week 3 graveyard