AI Use in Electrical Contracting

An Introduction to the Responsible Application of Artificial Intelligence

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Agenda

- **What is AI?**
- **Types of AI**
- **Current popular AI applications**
- **AI pitfalls and risks**
- **Where do we go from here?**
- **Hands-on learning**

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What is AI?

"Artificial intelligence (AI) is a field of science that uses technology to create machines that can perform tasks that usually require human intelligence. AI systems can learn from data, analyze patterns, and make decisions." -definition from Google Gemini

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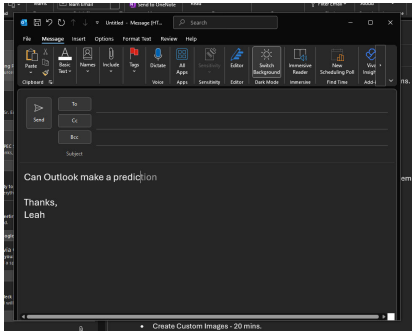
Machine learning

- Predictions or decision-making based on data
- Can be used for:
  - revenue prediction
  - labor hour consumption prediction

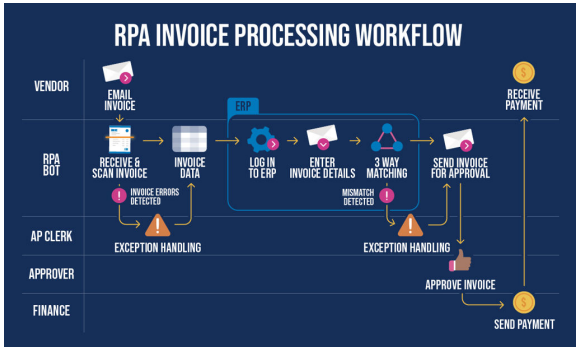
Machine learning



Robotic process automation

Used to automate repetitive, rule-based tasks in business processes

Robotic process automation



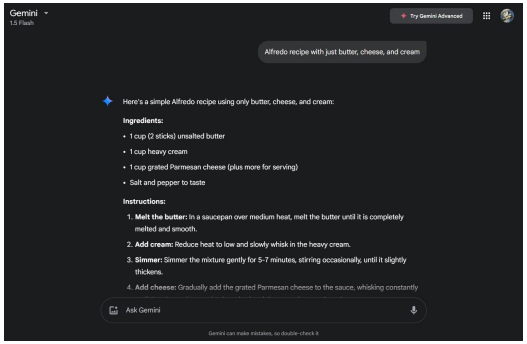
Large language model

- GPT = generative pre-trained transformer
- Can generate text, images, and video
- Summarizes large data sets

Large language model

- Common programs
  - ChatGPT (OpenAI)
  - Gemini (Google)
  - Co-Pilot (Microsoft)

Large language model



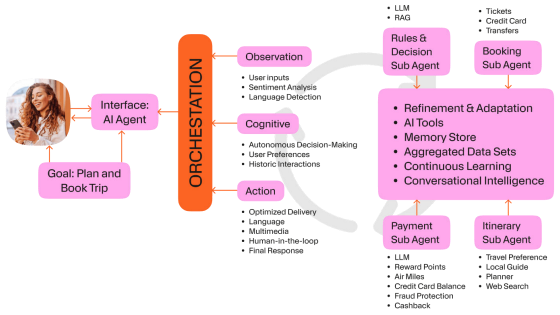
Agentic AI

- Uses LLM as “orchestrator”
  - Human interacts with bot
  - Bot makes autonomous decisions

Agentic AI

- Can connect with multiple platforms
- Needs limited human supervision

Agentic AI



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Current popular AI applications

Risky business

Proceed with caution

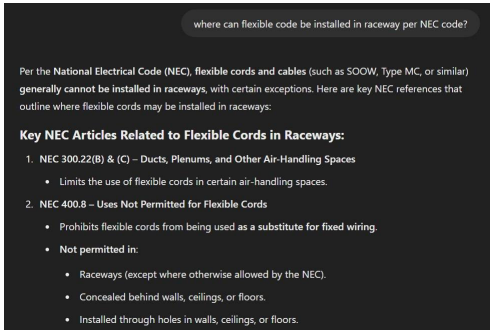
Low-risk applications

	Proposal	Pre-construction	Construction	Close Out	Back Office	Business Strategy
Risky business	Produce bid and quotes	Generate field site map/layout Write purchase orders			Self-check document mistakes Document review and approval	Make business decisions at management and stakeholder levels
Proceed with caution	Automatically count fixtures for bidding	Write code and Python scripts			Gemirage nuanced language Process and navigate payments and payroll	
Low-risk applications	Review proposals and contracts Assist in bid writing and editing		Create safety guidelines and manuals Control site safety and access virtually		Marketing content Supplementary writing tools Contract management and search engine Record meetings and create meeting minutes	Build KPIs based on company's historical data and financial review

Other applications

- Fraud detection (identity theft, time theft)
- Code and standard research (AHJ-specific)
- Troubleshooting in the field

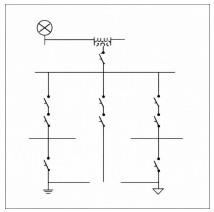
Other applications

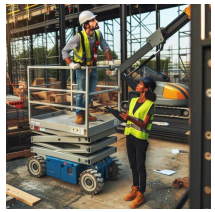


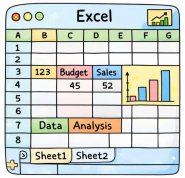
Other applications

- Invoice scanning
- Analysis of scanned documents or even pictures of documents
- Take-offs for estimating

Other applications







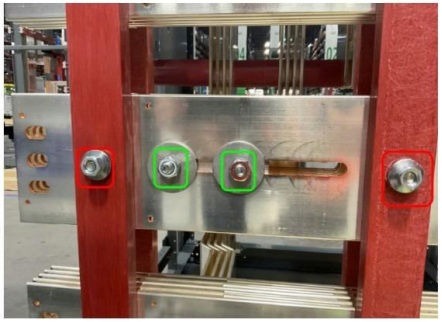
Other applications

- One-line interpretation
- Safety documents and trainings
- Excel/G-sheet formulas

Other applications

- BIM - generate coordinated design (but is it constructible?)
- VDC - translate 2D napkin drawings to 3D
- QA/QC - detect anomalies

Other applications



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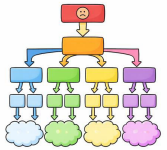
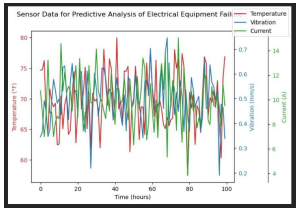
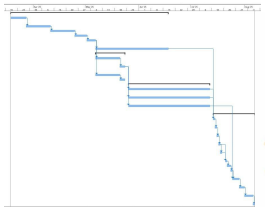




- Predictive maintenance based on sensor data
- Post-incident root cause analysis
- High-level company-wide lessons learned

Other applications



- Writing assistance
- Daily reports generation
- 3-week look-ahead

Other applications

Automated note-taking for in-person meetings or video calls (ex: Otter.AI)

Other applications

Contract review can find problematic language (ex: Document Crunch)

Other applications

Virtual construction site can show proof of progress (or lack thereof) and support change order approval (ex: OpenSpace)

Other applications

- Generate RFIs, submittals (ex: DataGrid)
- Reverse image search (ex: Google Lens, iPhoto)

Other applications

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Only YOU can protect your data!

- What data is confidential?
  - ***Is your project covered by an NDA?***
  - Company related data like financial spreadsheets
  - Personal employee data like phone number, email address, SSN

Who owns YOUR data?

- Who are you sharing data with?
  - What happens if that company is sold?
  - End-user license agreements don't last forever.

Who owns YOUR data?

- How is the data being used?
  - Paid vs free version?
  - Is the data being used to train the model?
  - Are you trading functionality (like document upload) for frugality?

Only YOU can review the content

- Carefully review any data prior to sharing outside of the AI tool.
  - Example - code research
  - Example - LOTO planning

Only YOU can fight bias

- Even if unintentional and non-malicious, bias is present and should be accounted for.
  - Example - image generation of a construction worker wearing PPE almost always yields a male
  - Example - most PMs are male; therefore, the ideal PM must be male

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Data is the new oil

The value lies in the potential, but it must be refined for effective use.

What about YOUR department?

- What should we be measuring or tracking?
- How often should we look at the data for trends?
- Can any repetitive tasks can be automated?
- Which tasks are most time-consuming?

What do we gain?

- Management / office - more time for business development and problem solving
- Field - more time for direct crew supervisions
- AI can help augment the existing workforce during shortages

Tips and Tricks

- Prompt engineering
  - Role
  - Purpose
  - Constraint
  - Tone

Tips and Tricks

- Avoid uploading .pdf when possible
  - Convert to .doc, .xlsx, etc. whenever possible
- Train the model when possible. Tell it politely when it is wrong.

Tips and Tricks

- Clean up the data before uploading
  - Remove personal information
  - Remove gender, age, or race information

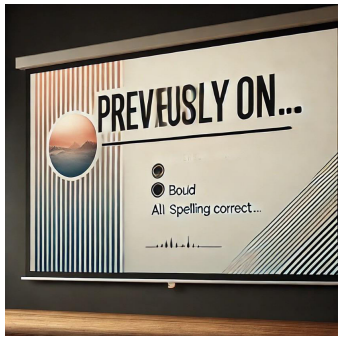
Tips and Tricks

- AI sometimes guesses instead of saying “I don’t know”
  - Use the prompt to force the model to tell you when it is guessing (like use red text when the model isn’t certain about a conclusion)

Tips and Tricks

- Forcing an outcome doesn’t always work. AI can be confidently wrong. Don’t get too comfortable.
- Build projects within LLM for easier sorting

Tips and Tricks



Tips and Tricks

- Ask for specific outputs
  - Top 3 conclusions
  - 1 paragraph response
  - 5 different strategies

Tips and Tricks

- If the uploaded data wasn't well-structured
  - Tell the model where to find the data
  - Use the model to help restructure the data

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Can you use AI to recreate this image?

Hands-on learning

Use AI to generate .xlsx light fixture schedule from .pdf drawing

Conclusion – any questions?

“AI won’t take your job, but a human trained to use AI just might!” -unknown