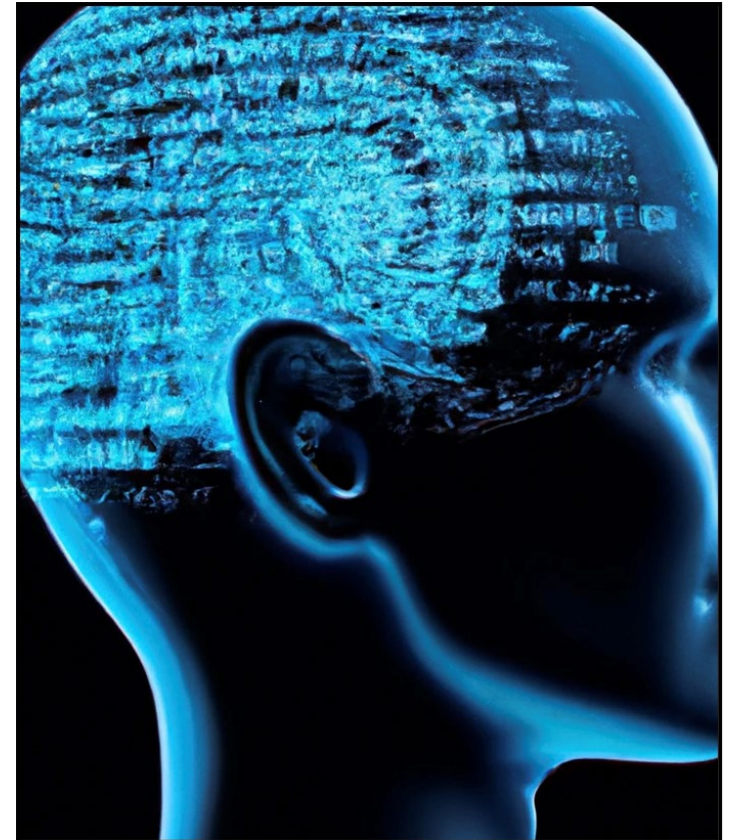


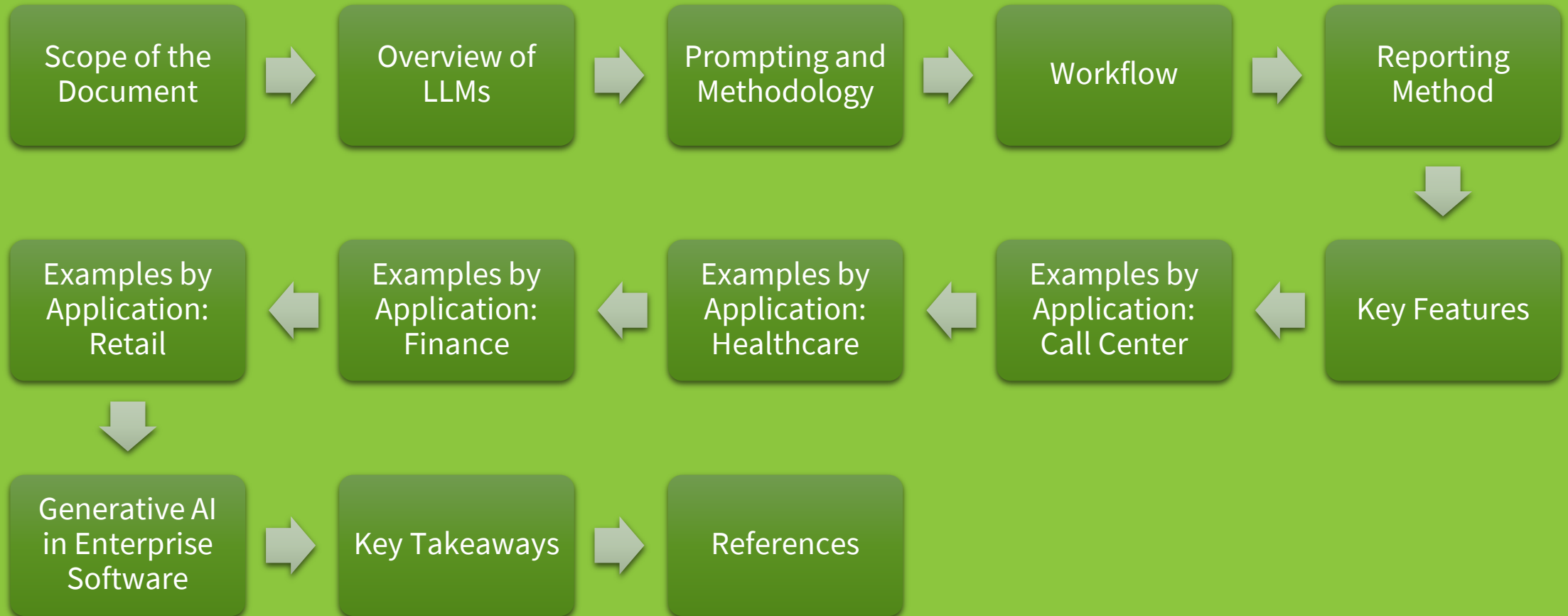


# Generative AI: Application Developments and Trends

By Christiana Till and Art Robbins



# Agenda



# Scope of the Document

This presentation will focus on the application layer.

## Application Software

Call Center  
Healthcare  
Financial  
Retail

## Foundation Software

ChatGPT  
ChatGPT Plus  
BARD  
BING AI

## Main Purpose of the Application Layer

- Support specific business processes
- Accept, analyze, and process data
- Present value-add information to users
- Accomplish tasks efficiently
- Enable user communication with the AI system producing human-like responses

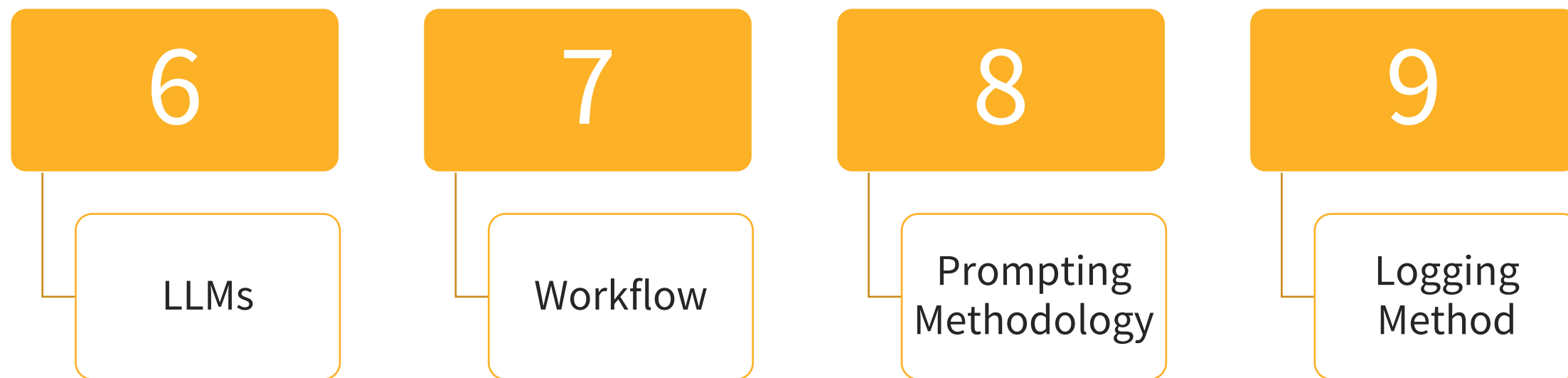


## Application Layer:

The topmost layer of a software application that directly interacts with users by processing data input and delivering output to the user, leveraging knowledge of the business function, based on the underlying AI models and algorithms



# Key Components



The following slides discuss the essential elements for building an application, the breakdown is shown above

# Overview of Large Language Models

## LLMs



### LLMs

Generative AI algorithm

Uses deep learning techniques and large data

Understands, generates, and predicts new content

Expands data used for training and inference

Enhances capabilities of AI model

Produces realistic and innovative content

### Data Sources



Data sources provide input data for LLMs

#### Significance of data sources:

- Relevance and accuracy of data impact LLMs outputs
- Quality and effectiveness of LLMs depend on data sources

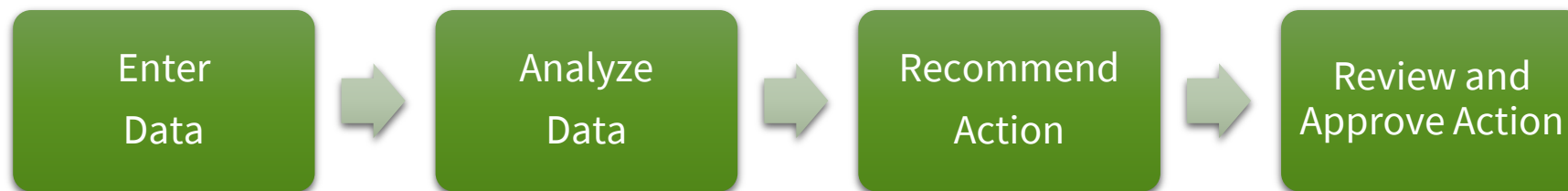
#### Data sources can include:

- Structured or unstructured, including images
- Various repositories, databases, APIs, sensors, or user inputs
- Public as well as proprietary data

- **For application layer software development, the data sources must reflect knowledge of the application**
- **For example, in healthcare, an application specific to diabetes requires data sources for diabetes**

# Workflow

- The sequence of steps followed to implement and execute tasks related to a business function. Workflow encompasses the specific order and arrangement of activities necessary to achieve a desired outcome.
- The implementation of workflow involves translating the business application into practical, discrete actions and executing them within the AI software, leveraging and accessing the Data Sources and LLM.



# Prompting Methodology

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→ **The process of giving instructions of cues to LLMs to help them make decisions. It involves providing guidance to the model on how to approach a specific task or problem.**

**Manual Prompting:** Humans explicitly provide instructions or input to the LLMs.  
Ex. Giving specific guidance, example outputs, or instructing the input in a particular format or sequence

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**Automatic Prompting:** LLMs automatically inferring or understanding the desired prompts based on the given context or input. The models are trained to recognize patterns and generate appropriate responses without explicit instructions from humans.

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**Benefits of automatic prompting:**

1. Increased efficiency: eliminate the need for manual intervention
  2. Adaptability: LLMs adapt to different scenarios
  3. Reduce human bias: minimize human biases that are introduced through manual instructions
  4. Scalability: LLMs handle a large volume of inputs and generate outputs at scale
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# Logging Method

- The logging method involves capturing and recording the outputs generated by the AI model based on given inputs, enhancing the quality and understanding of the AI system.

## Primary purposes of this method:

1. **Capturing Outputs:** The output is captured by the AI model when provided with specific inputs including generated text, images and music
2. **Input-Output Mapping:** A clear mapping is established between the provided inputs and generated content allowing for traceability and analysis of the model's decision-making process
3. **Monitoring and Quality Control:** Enables continuous monitoring and quality control of the model's performance, experts can identify patterns, assess quality of generated content, and identify areas for improvement
4. **Analysis and Research:** Recorded outputs are valuable data for analysis and research purposes, they help gain insight into the model's behavior, strengths and weaknesses, and potential biases
5. **Audit and Compliance:** Ensures transparency and accountability through compliance with ethical guidelines, regulatory requirements, or industry standards
6. **Feedback and Iteration:** Facilitates the feedback loop for generative AI models by collecting and reviewing the outputs
7. **Error Detection and Debugging:** In case of unexpected outputs, the logged data can be used to identify errors and debug the model
8. **Model Governance and Accountability:** Contributes to model governance by establishing a record of the generated content, this ensures accountability and provides an audit trail for transparency purposes

# Other Key Features

1

2

3

4

## **Accessibility and Multilingual Support:**

Can be used by people with disabilities

Interacts with the application in the user's preferred language

## **Integration with APIs and Services:**

Seamless communication between applications and external systems

Supports different data formats

Allows for leveraging third party functions: payment gateways, social media platforms, mapping services

## **Scalability and Performance:**

Increased workload without compromising response times-

Smoother user experience

## **Security and Authentication:**

Protects sensitive data

Prevents unwanted access

# Application Examples



Call Center



Finance



Healthcare



Retail

- **The following slides will showcase specific examples according to application**

# Call Center

## Company Overview

Kraken is Octopus Energy's proprietary technology platform designed to improve the quality of the customer experience for utilities.

The company developed "Magic Ink" incorporating Generative AI into its call center software to enhance customer service, issue resolution and agent efficiency.

Kraken tracks higher Customer Happiness where Magic Ink assisted in call resolutions.

## Ways AI is Incorporated

1. Enhance Customer Experience: Go beyond traditional chatbots by implementing a human-assisted AI model where AI supports the agent to be more responsive to the customers.
2. Leverage Knowledge Base: The AI software creates a contextual summary of the customer's account history across all data sources, empowering the agent by eliminating research time during a call.
3. Sentiment Analysis: Analyze customer sentiment during calls to drive more personalized, empathetic responses.
4. Suggested Responses: Magic Ink generates suggested replies and actions which are reviewed by agents and adjusted based on human judgment.
5. Call Analytics: used to extract valuable insights from customer calls.

## Benefits

Customers' issues are resolved faster and more effectively

Agent productivity and job satisfaction is increased being empowered with AI tools

More accurate and relevant responses

Enhanced customer satisfaction

Reduced churn rates

Identify and leverage best practices to resolve future issues

## Key Features



CUSTOMER  
SUPPORT / ISSUE  
RESOLUTION



AGENT  
PERFORMANCE  
OPTIMIZATION



CUSTOMER DATA  
INTEGRATION

## Company Example: Kraken

# Healthcare

## Company Overview

DeepMind is an AI research lab and subsidiary of Alphabet Inc.

They are led by a team of renowned researchers and engineers, known for expertise in machine learning, deep learning and reinforcement learning.

DeepMind collaborated with medical institutions to explore the application of AI in improving patient care.

## Ways AI is Incorporated

1. Medical Image Analysis: processing images, such as scans and X-rays, to assist in diagnosis and treatment planning.

2. Disease Prediction and Early Detection: identifying patterns and indicators of diseases at an early stage.

3. Patient Monitoring and Predictive Analytics: monitoring patients in critical care settings by analyzing real-time patient data.

4. Streamlining Healthcare Operations: optimizing healthcare operating and improve efficiency .

Ex. The collaboration between DeepMind and Moorfield's Eye Hospital demonstrated how AI technology can assist in diagnosing eye diseases. By leveraging advanced image analysis capabilities, the AI system accurately detected diseases, offering the potential for early intervention and improved patient outcomes in ophthalmology.

## Benefits

Enhanced diagnostics accuracy

Early disease detection

Improved operational efficiency

Personalized treatment and care

Augmented decision-making

Advancements in medical research

Enhanced accuracy and efficiency of medical imaging interpretation

Timely interventions

Improved patient outcomes and safety

## Key Features



ELECTRONIC  
HEALTH RECORDS  
MANAGEMENT



APPOINTMENT  
SCHEDULING



TELEMEDICINE  
CAPABILITIES

## Company Example: DeepMind

# Finance

## Company Overview

ANT operates several financial technology platforms.

The company applied AI to various financial services to enhance efficiency, risk management, and customer experience.

## Ways AI is Incorporated

1. Risk Assessment and Credit Scoring: assess creditworthiness and make data driven lending decisions, AI models generate credit scores for individuals and businesses.
2. Fraud Detection and Prevention: identify and prevent fraudulent activities in real-time.
3. Investment Recommendations: provide personalized investment recommendations to their users.
4. Chatbot Customer Support: Integrated AI powered chatbots to enhance customer support services.

## Benefits

Timely and efficient customer service

Reduced need for human intervention in routine support tasks

Access to credit for previously underserved populations

Personalized customer experience

Improved risk management

Data driven insights

## Key Features



ONLINE BANKING



CREDIT MANAGEMENT



FRAUD DETECTION

**Company Example: ANT Financial Services Group**

# Retail

## Company Overview

Stitch Fix is an online personal styling service.

The company utilizes AI to create personalized clothing recommendations for its customers.

<https://www.stitchfix.com>

## Ways AI is Incorporated

1. Personalized Styling: analyzing customer data such as style preferences, size, and fit feedback along with external fashion trends, the data is then turned into personalized clothing recommendations.
2. Data-driven Stylist Support: providing human stylists with data-driven insights for more informed decisions .
3. Inventory Management: understanding which items are popular and in demand, ensuring informed decisions about inventory purchasing and stocking.
4. Fit and Sizing Recommendations: providing accurate fit and sizing recommendations by analyzing customer measurements and feedback.
5. Feedback Loop and Learning: leverages AI to continually learn and improve its recommendations .

## Benefits

- Personalized shopping experience
- Continuous learning and improvement
- Time and cost savings
- Accurate fit and sizing recommendations
- Enhanced inventory management
- Improved stylist efficiency
- Enhanced understanding of customer preferences
- Reduced need for returns and exchanges

## Key Features



ECOMMERCE  
FUNCTIONALITY



CUSTOMER  
EXPERIENCE



INVENTORY

**Company Example: Stitch Fix**

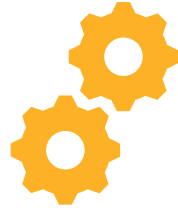
# Generative AI in Enterprise Software



## Overview

Generative AI is transforming enterprise software, driving innovation across industries

Major software suites such as Microsoft Dynamics 365, SAP, and Oracle Applications are integrating generative AI capabilities



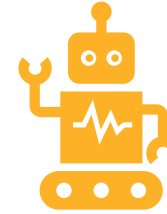
## Integration of Generative AI

Microsoft is integrating Generative AI features into its suite, empowering users to automate repetitive tasks, enhance productivity, and gain actionable insights from data

Generative AI is revolutionizing inventory management by optimizing stock levels, demand forecasting, and supply chain optimization

AI-driven generative models are enhancing manufacturing process control by predicting and preventing quality issues, reducing downtime, and optimizing production efficiency

Microsoft is embedding Generative AI into their applications as a copilot to assist the user in doing their work more efficiently and accurately



## Transformation of the Enterprise Software Market

Generative AI streamlines workflows, automates repetitive tasks, and augments decision-making processes

Businesses are being empowered to extract valuable insights from vast amounts of data through AI enabling advanced data analysis, pattern recognition, and predictive capabilities

Enterprise software can deliver personalized experiences to customers, with recommendations, offers, and services based off individual preferences

Generative AI is going to become a natural part of the workflow, embedded in these business applications. For example, the same way a user interacts with spell check.



# Key Takeaways

- The **real business value** of generative AI is within the **application layer**
- The **application layer** is where we will see **most** of the **growth** of new products as we move up the maturity curve
- With industry or functional knowledge, **more applications** will be **developed to address specific needs**, and this is where **businesses** will be **making the most of their investment**
- **Businesses** that embrace generative AI **gain a competitive edge** by leveraging the power of AI to **innovate, optimize processes, and deliver superior products and services**

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