

# Unleashing the Power of Rep Notes

## Extracting Actionable Insights Through NLP Driven Analysis

**November 9, 2023**



# Agenda

## ▶ **Who we are**

- What led us to today's discussion
  - Current State
  - Targeted Outcomes
  - Approach
    - NLP Based Approach (Traditional)
    - Generative AI Approach
  - Case Study
    - Challenges & Mitigation

# Arvind Balaji

*Principal Consultant - Analytics*



## TODAY'S PRESENTERS

# Janani Gantal Damodaran

*AVP – Analytics*



*Arvind has a decade of experience in Data science and analytics industry.*

*Experienced at delivering advanced analytical solutions to provide insights and implement action-oriented solutions to complex business problems*

*Implemented multiple projects on Voice of Customer, Patient identification, Sales rep route optimization to maximize the sales rep efficiency in pharma.*

*Janani is an Analytics leader with over a decade of industry experience in the Life Sciences industry.*

*She comes with extensive experience in successfully guiding digital transformations for BioPharma companies.*

*She carries a fascination towards AI/NLP, and has contributed to developing advanced Lifesciences specific solutions such as enterprise search engine, auto-text classification tool, AI enabled conference sessions prioritization based on relevance, etc.*

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# What led us to today's discussion ...

1950

## Origin of healthcare analytics



# What led us to today's discussion ...

1960

**The first electronic health records (EHRs)** are developed

Medical diagnosis decision support systems (**MDSS**)



# What led us to today's discussion ...

1970

The use of **computers in healthcare** becomes more widespread



# What led us to today's discussion ...

1980

**The development of MRIs & CTs,**  
generates a vast amount of new  
healthcare data



# What led us to today's discussion ...

1990

- **Human Genome Project**
- **Surge of Data analytics & NLP models**



# What led us to today's discussion ...

2000

Rise of big data



# What led us to today's discussion ...

2010

**AI/ML based analytics was widely used in healthcare**



# What led us to today's discussion ...

2020

**Boom of Gen AI**



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# A Typical Day of a Sales Rep

Primary responsibilities of reps are to identify potential customers and to nurture existing relationships. Over this process, they are currently spending a considerable amount of time on administrative tasks to prepare and rightly engage with customers



# Illustrative Rep Notes Documented

## Note 1:

- **Date:** 25<sup>th</sup> October 2023
- **HCP:** Dr. Smith
- **Location:** XXX hospital

## Note 2:

- **Date:** 26<sup>th</sup> October 2023
- **HCP:** Dr. Johnson
- **Location:** YYY Hospital

## Note 3:

- **Date:** 25<sup>th</sup> October 2023
- **HCP:** Dr. Martinez
- **Location:** ZZZ Hospital

Sample Data

### Notes:

- Overall Satisfaction rating: 8/10 (Happy)
- Dr. Smith expressed **interest** in our **new hypertension medication**, Brand A.
- Discussed the **clinical trial results** showing significant reduction in systolic blood pressure.
- Mentioned potential patients for sampling and requested **more information on patient assistance programs**.
- **Send** Dr. Smith the latest Brand A **brochure**.
- **Follow up in two weeks** to address any additional questions.

### Notes:

- Overall Satisfaction rating: 7/10 (Neutral)
- Dr. Johnson **inquired about our diabetes medication**, Brand B.
- Shared recent **clinical study findings** demonstrating improved A1C control.
- Discussed potential collaboration for an **upcoming diabetes awareness event**.
- **Provide** Dr. Johnson with Brand B's product **samples**.
- **Schedule a follow-up** meeting to discuss event details.

### Notes:

- Overall Satisfaction rating: 9/10 (Happy)
- Dr. Martinez mentioned **concerns about patient adherence** to our asthma inhaler, Brand C.
- Shared **patient feedback** on device usability.
- Discussed the possibility of organizing an **educational session for patients** on proper inhaler use.
- **Arrange a meeting with our medical education team** to plan the patient education session.
- **Send** Dr. Martinez inhaler **usage guides** for distribution to patients.

# Agenda

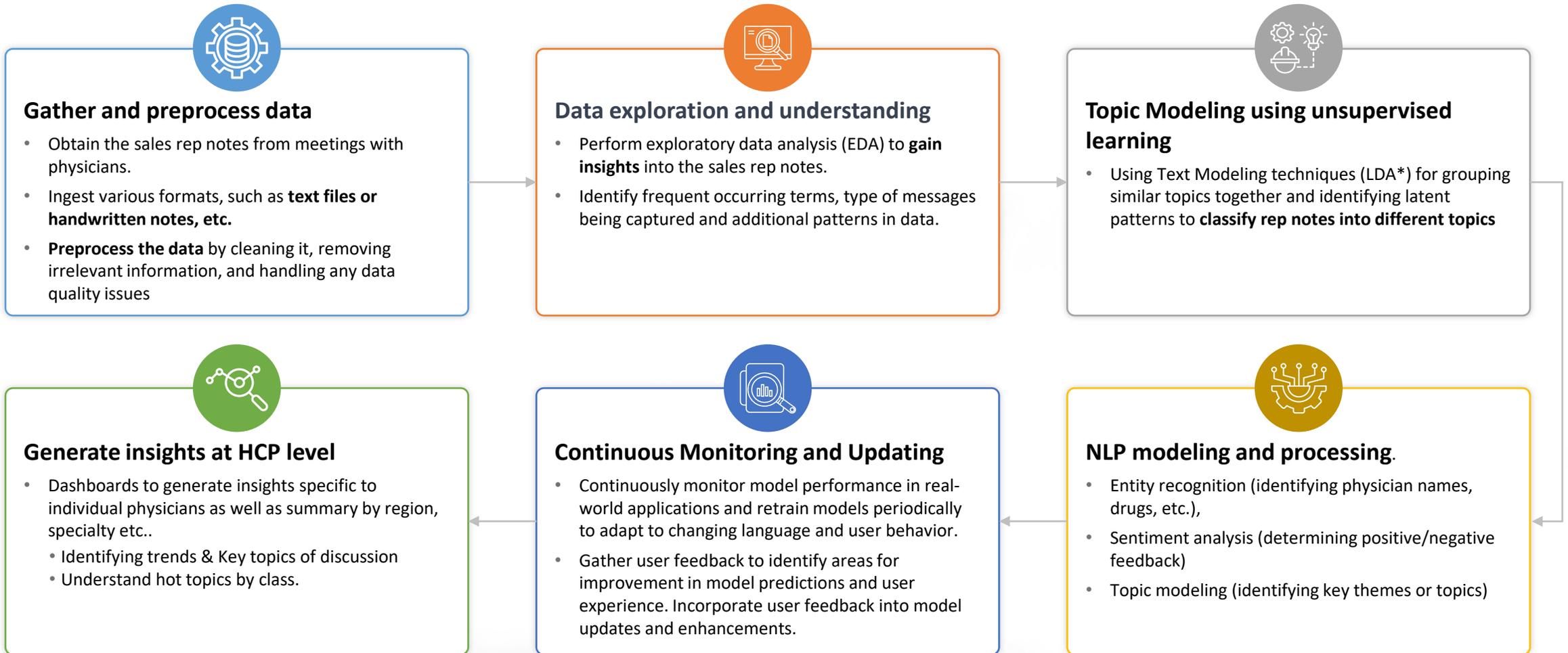
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# General Approach on Processing Sales Rep data

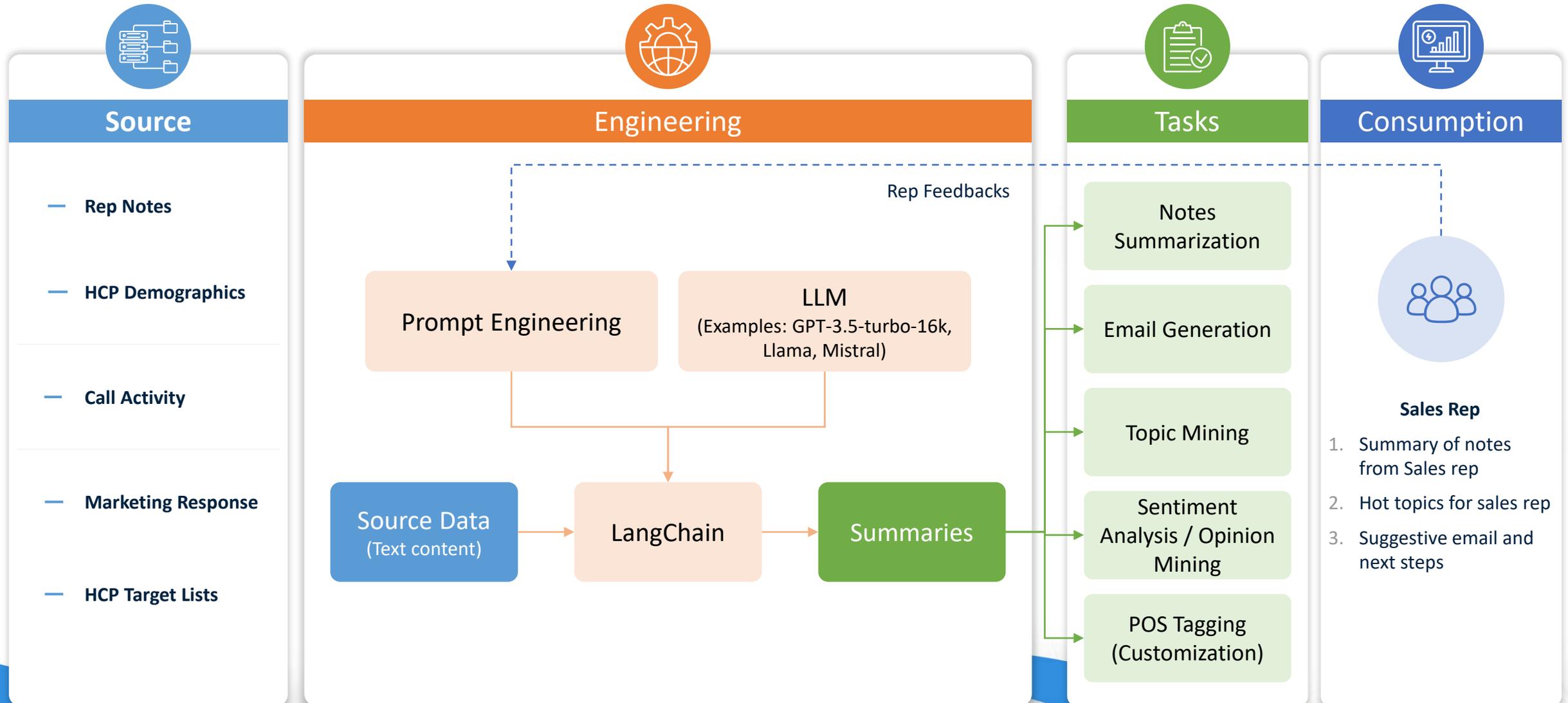


\* LDA - Latent Dirichlet Allocation is a popular topic modeling technique

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# How we use LLMs - Overview



# Use Case Maturity Continuum for Gen AI

- Most/all generative AI use cases will require meaningful iteration/feedback to get to “consistently good” results
- While taking time and effort, this also represents an opportunity for Trinity to differentiate by doing this work well within the life sciences space

1

## Tech Hooked Up

Generative AI is helping interpret Qs and/or give results based on the LLM and/or connected sources/data.

*The answers may not be good*

**Example:** If a sales rep asks, "**Show me the recent product preferences of Dr. Smith,**" generative AI can analyze the notes, extract relevant information about Dr. Smith's preferences, and provide the sales rep with a summary of recent product choices made by Dr. Smith

2

## Prompting Refinement

Feedback loop established with users leading to tweaks in prompt pipelines, prompt engineering, sources, or which model is used (e.g., summarization specific ones)

*Answers show promise but may be a mixed bag*

**Example:** Sales Rep notes can have 3 primary prompts which can be fine tuned:

1. Summary
2. Actions from the notes
3. Topics of Interest

3

## Prompting Steady State

We've more or less optimized the performance of the answers using the types of tweaks described at left

*High confidence that an acceptable # of answers will be good*

This enhancement in response quality ensures that the information extracted from the notes is more accurate and valuable for decision-making and customer engagement.

4

## Data Science Refinement

Collected user feedback/ratings used to train a supplemental model layer that further improves results quality (likely via a reward model)

*Either proprietary to Trinity, or something that learns based on the client users' feedback*

For instance, when a sales rep interacts with the system and provides feedback on the relevance and accuracy of the responses, this data is used to fine-tune the model.

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# From Free Notes to Actionable Insights: A Case Study

## ? *Client Situation*

- Client wanted to do a POC on how they can utilize the free notes from sales rep after the conversation with HCP and see if they can get some actionable insights from the data.

## ||| *Trinity's Role*

- **Construct a Vector Database:** Develop a robust database for systematic storage and efficient retrieval of Representative (Rep) notes pertaining to Healthcare Professionals (HCPs).
- **Create an Extraction Framework:** Formulate a framework that can seamlessly identify and extract pertinent Rep notes associated with the targeted HCPs.
- **Leverage LangChain and Prompt Engineering:** Utilize the LangChain framework and prompt engineering techniques to craft effective queries and prompts. This will facilitate the extraction of actionable insights from the Rep notes.
- **Employ GPT-3.5-Turbo Model:** Harness the capabilities of the state-of-the-art GPT-3.5-Turbo model by OpenAI to generate intelligent recommendations based on the insights derived from the Rep notes.
- **Enhance HCP Engagement Strategy:** By integrating these advanced technologies and methodologies, Reps are equipped to significantly enhance their Healthcare Professional (HCP) engagement strategy, transforming it into a more data-driven and effective approach.

## ✓ *Project Outcomes*

**Data-Driven Insights:** The project leads to a treasure trove of data-driven insights, allowing sales representatives to make more informed decisions when engaging with HCPs.

**Enhanced HCP Profiling:** Reps can gain a deeper understanding of individual HCP preferences, needs, and behaviors.

**Time and Resource Efficiency:** Sales representatives can optimize their time and allocate resources more effectively, resulting in higher productivity.

**Personalized Engagement:** Sales reps can now engage with HCPs on a more personal level, tailoring their interactions and communications to specific HCP preferences and interests

## *Illustrative outputs*

**Rep Notes Agent**

Ask a question about your documents

Give me insights on Dr. Smith

Ask

1. Topics of interest:
  - HypoDoxa medication
  - Clinical trial results
  - Patient assistance programs
2. Key takeaways:
  - Dr. Smith is interested in the new hypertension medication, HypoDoxa.
  - Dr. Smith is aware of the clinical trial results showing significant reduction in systolic blood pressure.
  - Dr. Smith is interested in patient assistance programs and potential patients for sampling.
3. Actionable recommendations to the representative:
  - Provide Dr. Smith with the latest HypoDoxa brochure.
  - Follow up with Dr. Smith in two weeks to address any additional questions.
  - Provide more information on patient assistance programs and potential patients for sampling.

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# Challenges

- 1 Rep Behavior:** Time is often limited during sales visits, and taking detailed notes can slow down the interaction. Sales Rep typically don't enter detailed notes
- 2 Compliance Issues:** Compliance related resistance preventing sales rep from entering sensitive data into the system.
- 3 Accuracy of Outputs from Gen AI:** The outputs from Generative AI are suggestive and can't be considered fully vetted results.



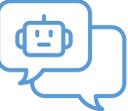
# Mitigation

**Change Management:** Behavioral trainings and change management process will have to be installed. Smaller focus teams / Field input Teams can be selected to run the initiative

**Sanitized Notes:** Leveraging Gen AI to auto-flag any sensitive/non-compliant data on the notes before submitting

**Integration with Human Intelligence:** Humans cognitive skills are required to choose and consider the outcomes from Generative AI before using.

# Phased Approach



01

**Basic data connections and compliance sanitized Notes from Rep**

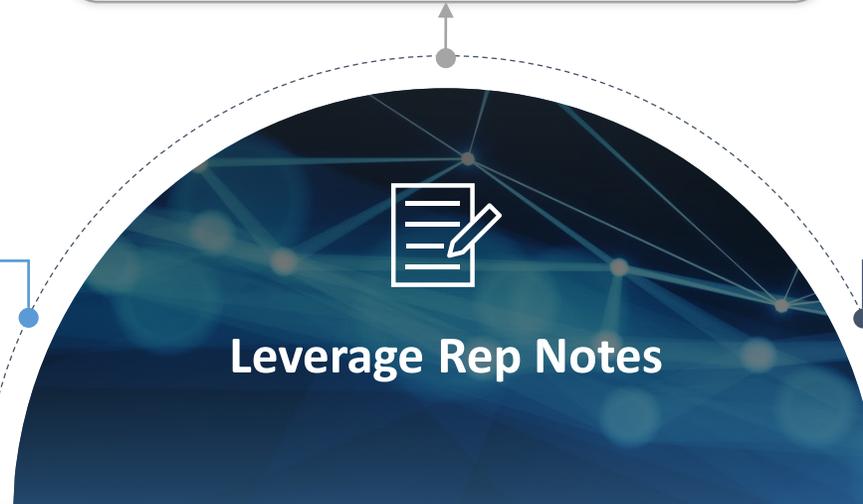
- Sanitize the existing notes data and use them to create chat bots with additional data for Sales Rep to consume.  
Example: Sales rep can ask the chat bot on “Last interaction with HCP?”



02

**Prescribe Actions from Notes**

- Gen AI models can **auto curate existing draft emails** for both **cold outreaches** and for **responding** to HCPs on **specific questions**.  
Example: Gen AI suggests Rep – “Send the email on recent presentation at YY Conference on XXX disease to Dr. Smith”



03

**Realtime Insights on Trending Topics of Discussion**

- Analyzing and publishing trending topics of discussion, which could help MSAs, Med Affairs, and Marketing teams to **holistically understand the needs and address them effectively**

# Questions



# Thank you!

# Appendix



**pmsa**

PHARMACEUTICAL MANAGEMENT  
SCIENCE ASSOCIATION

# Unleashing the Power of Rep Notes: Extracting Actionable Insights through NLP-driven Analysis with LLMs and Generative AI

In the pharmaceutical industry, unlocking the wealth of knowledge embedded in a vast array of pharma representative notes is pivotal for enhancing sales strategies, fostering data-driven decision-making and ultimately optimizing interactions with healthcare professionals (HCPs). Within life sciences organizations, there are usually multiple teams of reps operating in isolated silos--and the full potential of these valuable notes often remains untapped.

This innovative approach aims to achieve the following outcomes:

- **Intuitive Insights Across Therapeutic Areas and Business Units:** By analyzing and processing the representative notes using NLP algorithms, valuable insights spanning various therapeutic areas and business units are uncovered. These insights can serve as a compass, guiding strategic decision-making and enhancing overall performance.
- **Identification of Hot Topics, Trends and Key Client Remarks:** The NLP-driven analysis clearly shows the emerging trends, hot topics, and crucial remarks from HCP interactions. Such real-time insights empower representatives to stay ahead of the curve and tailor their engagements more effectively.
- **HCP Conversation Summarization using Generative AI for Reps via CRM solutions:** Implementing Generative AI within a CRM tool empowers representatives with automated summarization of HCP conversations. Augmented by LLMs, this approach streamlines data processing and equips representatives with comprehensive summaries to fuel their engagements.

Trinity's presentation will cover the design, development and implementation of the entire solution, including real world examples.

# Example medical topics for text mining

## Pharmaceutical products and Medications



### Product Mentions

Identifying which pharmaceutical products or medications are frequently discussed by HCPs and tracking trends in product mentions



### Adverse Events

Detecting mentions of adverse events or side effects associated with medications and assessing their impact on treatment decisions



### Competitor Analysis

Analyzing references to competitor products or medications and assessing their market presence



### Brand Sentiment

Assessing the sentiment (positive, negative, neutral) associated with specific pharmaceutical brands or products



### Emerging Therapies

Detecting discussions on emerging therapies or clinical trials that may influence future pharmaceutical sales strategies



### Treatment Guidelines

Identifying adherence to clinical guidelines in the prescriptions and recommendations made by HCPs



### Therapeutic Areas

Categorizing discussions based on therapeutic areas, such as cardiology, oncology, or neurology, to assess market dynamics



### Emerging Research

Identifying references to recent medical research, clinical trials, or scientific publications

## Treatment



### Treatment Outcomes

Analyzing how HCPs perceive the effectiveness and outcomes of different treatments or medications



### Prescribing Habits

Examining prescribing habits, such as preferred dosages or combinations of medications, to tailor sales approaches



### Treatment Challenges

Detecting challenges or barriers that HCPs face in treating patients and potential solutions

## Patient Insights



### Patient Demographics

Extracting information on patient demographics, such as age, gender, and comorbidities, to understand the target patient population



### Patient Engagement

Understanding how HCPs engage with patients, including discussions on patient education, adherence, and follow-up

## Others



### Key Opinion Leaders (KOLs)

Identifying mentions of influential KOLs and their impact on prescribing behaviors



### Market Access

Tracking discussions related to reimbursement, formulary access, and payer considerations