e-GMAT Sales Call Transcripts Analysis:

A Report on Enhancement of Conversion Rates through Analytics

1. Conversion Analysis

1.1 Objective

The primary goal was to determine which set of sales calls led to higher customer conversions and to explain the factors influencing this gap.

1.2 Methodology

- **Data Annotation**: Utilized Gemini 2.5 Flash for annotating 80% of the transcripts, with the remaining 20% manually annotated to ensure completeness and correctness.
- **Speaker Classification**: Employed a BERT-based transformer model using PyTorch for linear classification, optimized with the Adam optimizer and cross-entropy loss function.
- **Emotion Detection**: Implemented a BERT model fine-tuned on the GoEmotions dataset for multilabel emotion detection, using a sigmoid activation function.
- **Keyword Extraction**: Applied the YAKE algorithm to extract prominent keywords from each transcript.
- **Topic Segmentation**: Initially attempted constrained agglomerative clustering with K-Nearest Neighbors to segment transcripts into phases. Due to suboptimal results, adopted a heuristic approach based on observed patterns in video recordings and transcripts, dividing each call into predefined sections with allocated percentages.
- **Named Entity Recognition (NER)**: Leveraged SpaCy's NER capabilities to extract entities such as locations, organizations, education, and dates.
- **Data Structuring**: Compiled the processed data into a structured JSON format, subsequently converting it into CSV for analysis.

1.3 Hypotheses and Testing

Developed and tested the following hypotheses:

1. **Positive Emotions in Q&A and Wrap-Up Phases Enhance Conversion**: Calls where prospects exhibited positive emotions during the Q&A and wrap-up phases were more likely to convert.
2. **Prospect's Determination and Low Stress Correlate with Conversions**: Prospects displaying strong determination during performance discussions and low stress during price discussions had higher conversion rates.
3. **Agent Confidence in Later Phases Signals Positive Outcomes**: Agent confidence during the Q&A and wrap-up phases was indicative of successful conversions.

H S GOWRI YAAMINI

4. **Agent's Clarity and Understanding Drive Conversions**: Effective explanation and understanding by agents during the planning, product explanation, and pricing phases correlated with higher conversions.

5. **Balanced Engagement Between Agent and Prospect is Crucial**: A higher agent-to-prospect speaking ratio during planning and explanation phases, coupled with increased prospect engagement during performance and Q&A phases, signalled better conversion likelihood.

1.4 Findings

- **Statistical Evidence**:
    - *Prospect Speaking Duration*: A weak positive correlation (r = +0.040) was observed between the duration of prospect speech and conversion likelihood.
    - *Agent-to-Prospect Speaking Ratio*: A negligible correlation (r = +0.028) was found, suggesting that dominance by either party did not significantly impact conversions. (Fig.1)

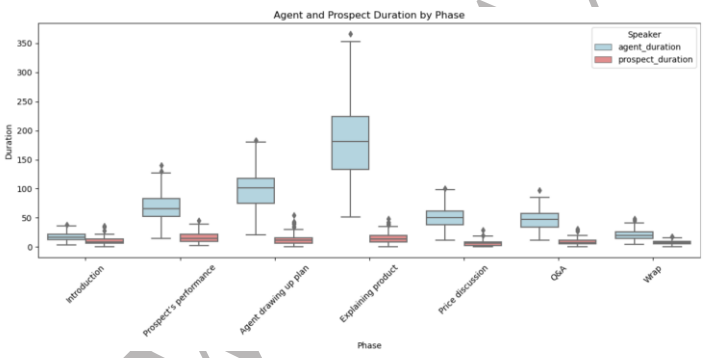

Fig.1

- **Anecdotal Evidence**:
    - Emotional Progression (Fig.2, Fig.3): Shows how agent confidence and positive prospect emotions peak during the Q&A and wrap-up phases—key indicators of higher conversion likelihood.

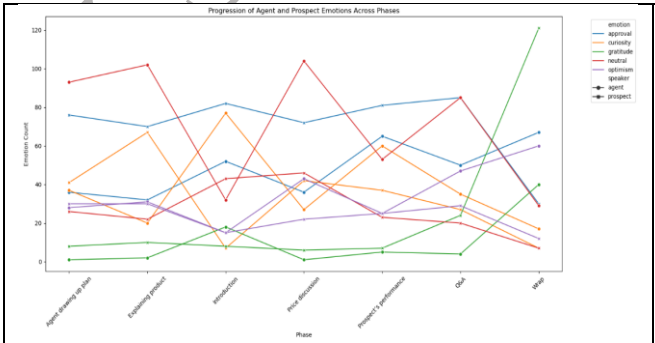

Fig.2

Fig.3

- Conversion Likelihood Distribution (Fig.4, Fig.5): Visualizes the spread of conversion likelihood, helping to identify common traits of high- and low-performing calls.

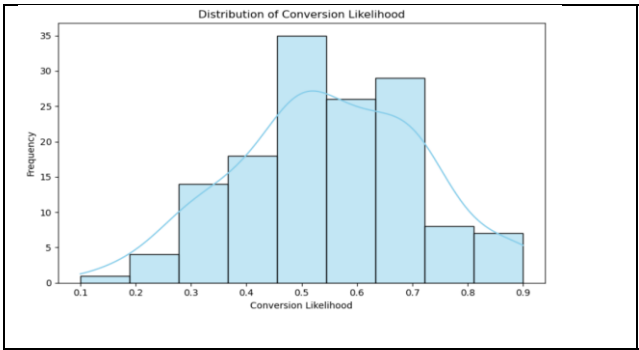

Fig.4

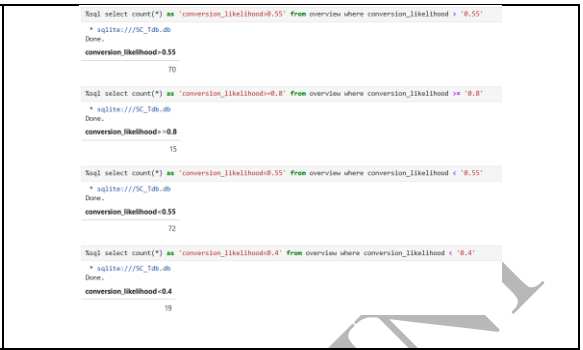

Fig.5

- Conversion by Month (Fig.6): Indicates a slight seasonal trend—calls in GMAT prep months (e.g., months after January like February so on) show higher conversion likelihood.
- Conversion by Education (Fig.7): Prospects with technical or higher education backgrounds (e.g., CS, engineering, master's+) convert more often. Arts and commerce backgrounds may need more support.

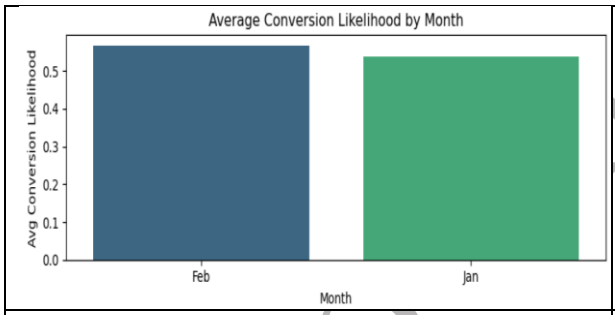

Fig.6

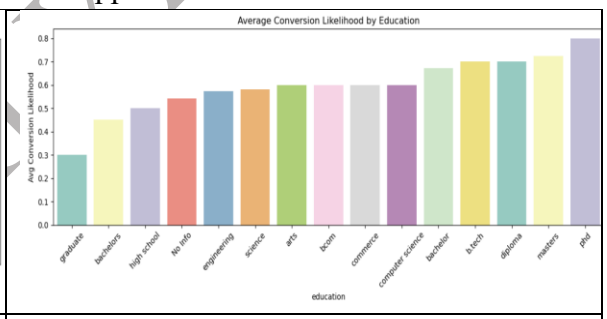

Fig.7

- Key Phase Impact (Fig.8, Fig.9): The Price Discussion phase is most predictive of conversions.
  - Group 1 (Plan & Product Explanation): Relies on agent clarity and understanding.
  - Group 2 (Performance, Q&A, Wrap): Driven by strong agent-prospect engagement.

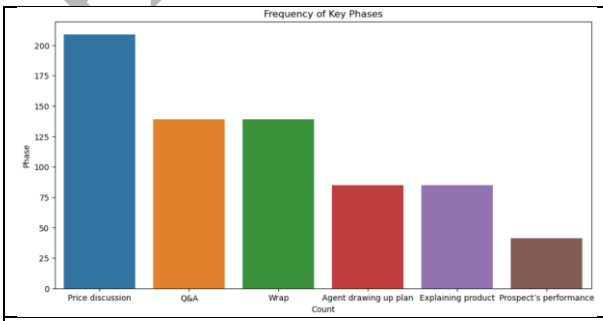

Fig.8

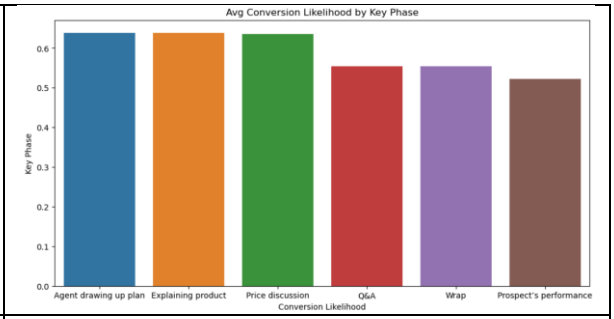

Fig.9

2. Performance Factors Analysis

2.1 Objective

To investigate the underlying reasons for performance differences between the two sets of calls, focusing on customer demographics and sales representative performance.

2.2 Findings

- **Customer Demographics**:
    - *Education*: Prospects with backgrounds in engineering, computer science, or higher education levels showed higher conversion rates. Prospects with arts and commerce background show moderate conversion likelihood which is more than mean rate but indicate lack of support structure.
    - *Location*: No significant correlation was found between prospect location and conversion likelihood due to lack of data.
- **Sales Representative Performance**:
    - Agents who maintained confidence and provided clear, structured explanations during key phases positively influenced conversion rates.
    - Balanced interactions, where agents allowed prospects to express concerns and ask questions, were more successful.

3. AI-Powered Follow-Up Strategy

3.1 Objective

To design an AI-driven follow-up process aimed at improving conversion rates by addressing identified barriers.

3.2 Strategy Components

A. Emotional Engagement & Real-Time Interaction

1. **Emotion Tracking During Key Phases**: Implement real-time emotion monitoring during calls to identify and respond to emotional triggers dynamically.
2. **Emotional Intelligence Training for Agents**: Train agents to recognize and manage emotional cues to reduce stress and foster trust during high-stakes phases like pricing.
3. **Positive Wrap-Ups**: Ensure enthusiastic tone and reaffirmation during wrap-up to leave a strong final impression.
4. **Automated Study Plan Tools During Calls:** Free agents from manual planning by using real-time STT services and auto tagging tools to increase real-time prospect healthy engagement.

B. Product Understanding & Experience

H S GOWRI YA AMINI

5. **Personalized Video Demonstrations**: Tailored videos highlighting product features relevant to individual prospect needs.
6. **Interactive Practice Exercises & Free Trials**: Hands-on exercises and demo access to showcase product value firsthand.
7. **Clear & Standardized Product Explanations and AI-Powered Diagnostic Tool Emphasis**: Use structured scripts and explainers to simplify complex features. Clearly communicate the value of AI diagnostic tools during the sales conversation.

C. Prospect-Centric Personalization

8. **Demographic-Based Segmentation**: Collect and use educational and location background data to tailor messaging and support.
9. **Segmented Marketing & Resource Recommendations**: Provide AI-driven resource suggestions and targeted follow-ups based on engagement patterns.

D. Financial Accessibility & Incentives

10. **Financial Aids**: Emphasize affordability, value, and scholarship options during pricing discussions. Also plan to introduce sponsorship based on display of merit in the first few days of the course.
11. **Seasonal Promotions**: Offer time-sensitive discounts aligned with GMAT exam seasons to create urgency.

E. Follow-Up, Feedback & Continuous Improvement

12. **Post-Call Summaries**: Automated recaps of discussion points and next steps sent immediately after calls.
13. **Feedback Collection & Agent Loop**: Use feedback from both agents and prospects to refine strategies continuously.
14. **Performance Dashboards**: Equip agents and managers with visual tools to monitor and optimize conversion metrics.

3.3 Implementation Approach

a. LLM Usage Strategy

A **weighted multi-model approach** was adopted based on empirical prompt testing, balancing accuracy and cost:

- **Transcript Summarization**
  - Compared: LLaMA 3.3 8B Instruct vs DeepSeek R1 Qwen3-8B
  - Final Choice: DeepSeek, for more structured and concise row-wise summaries.
- **Insights Analysis**
  - Compared: LLaMA 3.3 8B Instruct vs Claude 3.5 Sonnet
  - Final Choice: Claude 3.5 Sonnet, due to higher contextual relevance and abstract pattern recognition.
- **Fallback Strategy Generation**
  - Compared: LLaMA 3.3 8B Instruct vs Mistral 8B
  - Final Choice: Mistral 8B, for actionable and less repetitive strategies.

H S GOWRI YAAMINI

Using **different LLMs per task** improved specificity and relevance, despite increased latency and cost. **Uniform LLaMA** usage has lowest cost, speed, but produced **generic** and **less insightful** outputs.

b. Caching System

Implemented query and transcript-based caching of LLM outputs (summaries, insights, strategies) to minimize repeated API calls, to reduce cost and delay from multi-model querying, and tomaintain consistency for repeated queries

c. System Integration

- Frontend: React + Vite
- Backend: Flask (handles LLM/API requests)
- Databases:
  - SQLite3 for structured call dataset
  - MongoDB for segmented transcripts (by phase and speaker)
- LLM Access: Via OpenRouter API, dynamically routed per task
- Workflow: LLM responses processed, cached, and served through Flask to the web UI.

4. Conclusion

Through a comprehensive analysis combining advanced AI techniques and strategic insights, this study identified that the mean conversion likelihood is 0.55, indicating a moderately positive sales performance, with clear opportunities for optimization.

Key factors influencing sales call conversions are positive emotional tone during key phases (pricing, wrap-up), clear product explanation and personalized engagement, low stress during pricing discussions, prospects from technical or postgraduate backgrounds. With the right interventions, the average likelihood can credibly shift toward the 0.65–0.7 range, boosting overall sales conversion

Repository Link

X

H S Gowri Yaamini

GOWRI YAAMINI