



REAL-TIME AI CUSTOMER CARE SYSTEM WITH EMOTION RECOGNITION

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INTRODUCTION

Our project introduces a Real-Time AI Customer Care System that overcomes the limitations of traditional call centers by recognizing and responding to customer emotions in real-time. By using advanced speech and emotional analysis, the system automates empathetic responses, saving manpower and reducing human intervention. This enhances customer satisfaction and operational efficiency, giving businesses a competitive edge in delivering superior service.





PROBLEM STATEMENT

IN TODAY'S COMPETITIVE MARKET, CUSTOMER SATISFACTION IS CRUCIAL FOR SUCCESS. HOWEVER, TRADITIONAL CALL CENTERS STRUGGLE TO EFFECTIVELY ADDRESS CUSTOMER NEEDS. THE CHALLENGE IS CREATING A REAL-TIME AI SYSTEM THAT UNDERSTANDS BOTH THE CONTENT AND EMOTIONAL TONE OF CUSTOMER SPEECH, ENABLING EMPATHETIC, PERSONALIZED RESPONSES TO IMPROVE SATISFACTION AND REDUCE OPERATIONAL COSTS.



- **A 2021 REPORT BY SALESFORCE FOUND THAT 67% OF CUSTOMERS WOULD SWITCH BRANDS AFTER A SINGLE POOR CUSTOMER SERVICE EXPERIENCE.**
- **THE 2022 CUSTOMER SERVICE BENCHMARK REPORT INDICATED THAT THE AVERAGE WAIT TIME FOR CALL CENTERS IS 13 MINUTES, WHICH EXCEEDS THE PREFERRED WAIT TIME OF UNDER 5 MINUTES FOR MOST CUSTOMERS.**



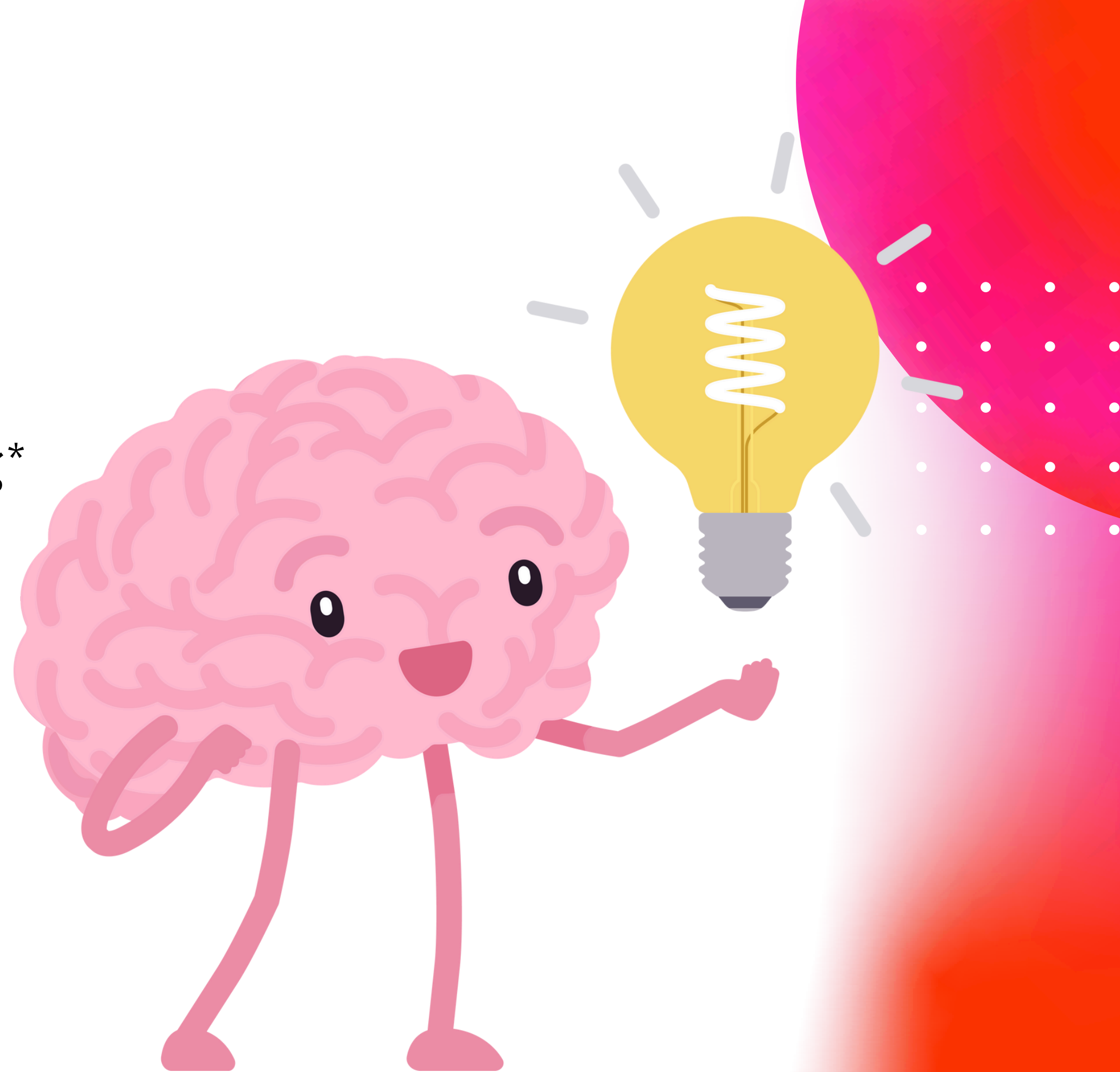


LITERATURE SURVEY



Existing Solutions:

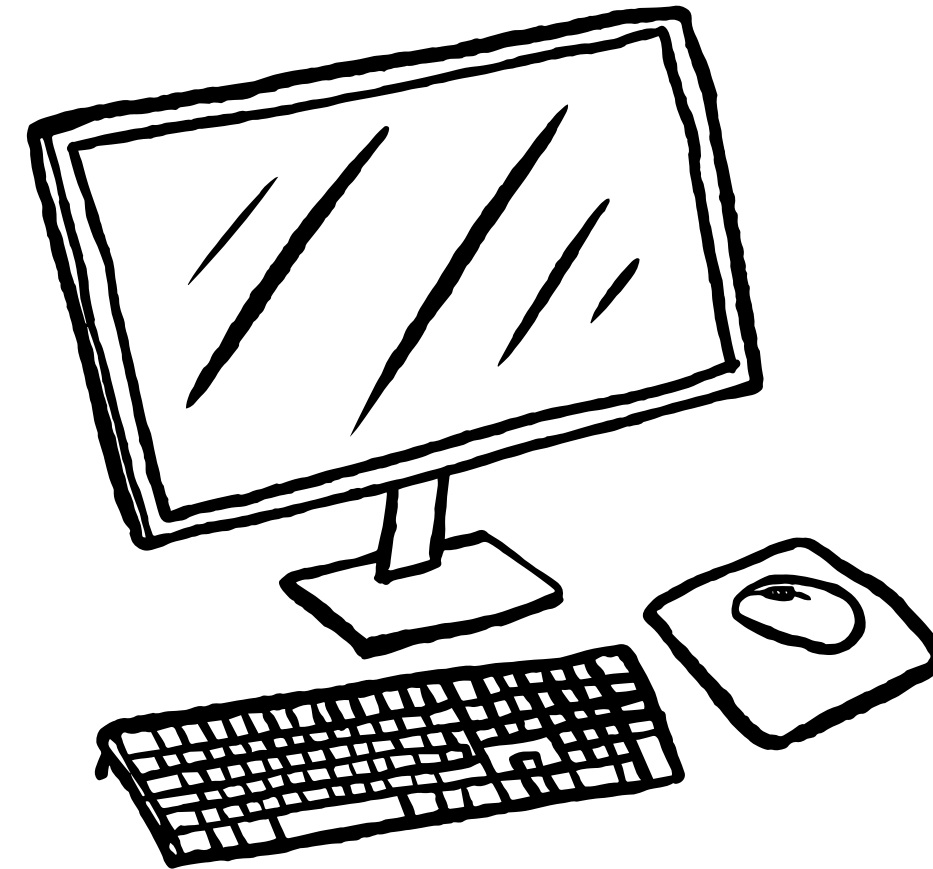
- Emotional Recognition in Speech: introduction to affective computing*
- Natural Language Processing for Sentiment Analysis: ability to understand sentiment in text*
- Multimodal Emotion Reaction: improvement to emotion reaction through combining modalities*



Affective Computing

Insights from the resource:

- By integrating emotional understanding, AI systems can enhance user satisfaction and engagement.
- AI systems can offer more empathetic responses to reduce users' frustration with customer-care.
- AI systems need to consider responsible use since there is a possibility of emotional manipulation.



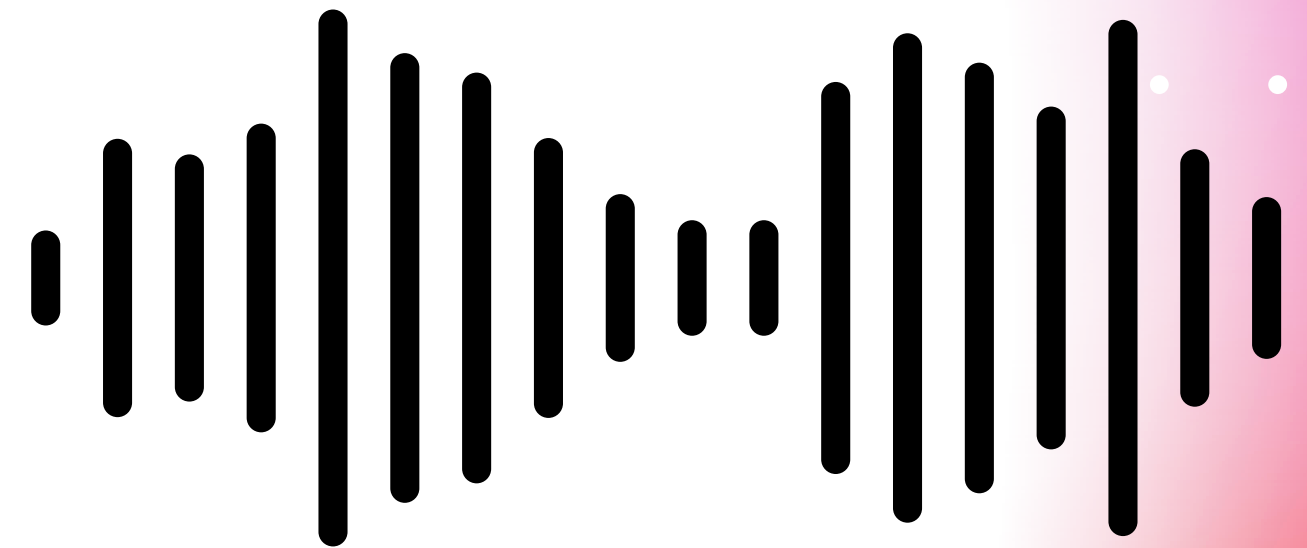
- Picard, R. W. (1997). *Affective Computing*. MIT Press.

openSMILE - The Munich Versatile and Fast Open-Source Audio Feature Extractor

Insights from the resource:

- openSmile (Speech and Music Interpretation by Large-space Extraction) is a tool applicable to domains such as emotional recognition.
- Tone, pitch, and rhythm can all be analyzed using the tool, which are essential signals to detect emotion
- The real-time performance of the tool makes it really beneficial for customer care applications

- Eyben, F., Wöllmer, M., & Schuller, B. (2010). openSMILE - The Munich Versatile and Fast Open-Source Audio Feature Extractor. ACM Multimedia



Recursive Deep Models for Semantic Compositionality Over a Sentiment Treebank

Insights from the resource:

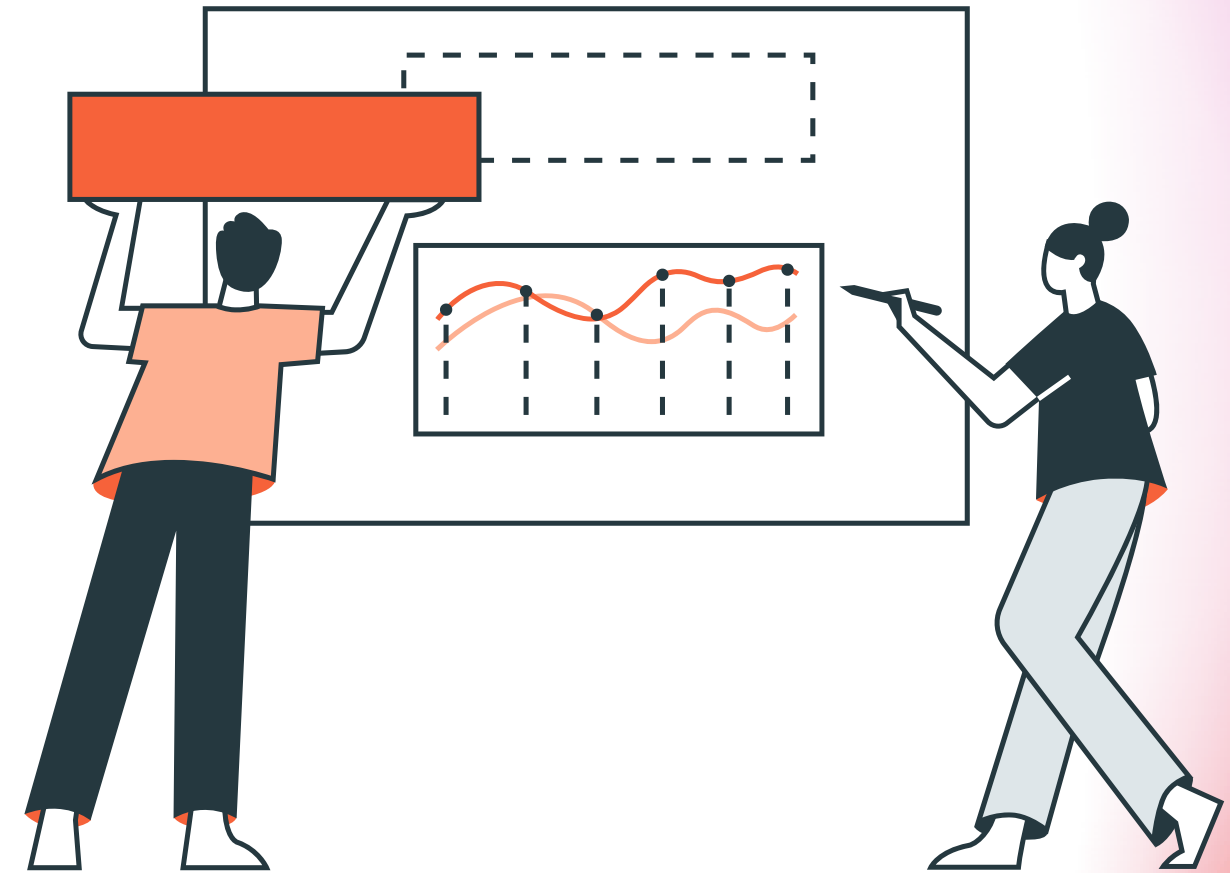
- This paper discusses a RNN model where each word is analyzed in terms of its context to understand sentiment relatively accurately
- The Sentiment Treebank is a dataset with fine-grained sentiment annotations for individual phrases
- This model outperforms alternatives due to its ability of capturing hierarchical relationships where the nuance and structure of a statement can be understood




A Review of Affective Computing: From Unimodal Analysis to Multimodal Fusion

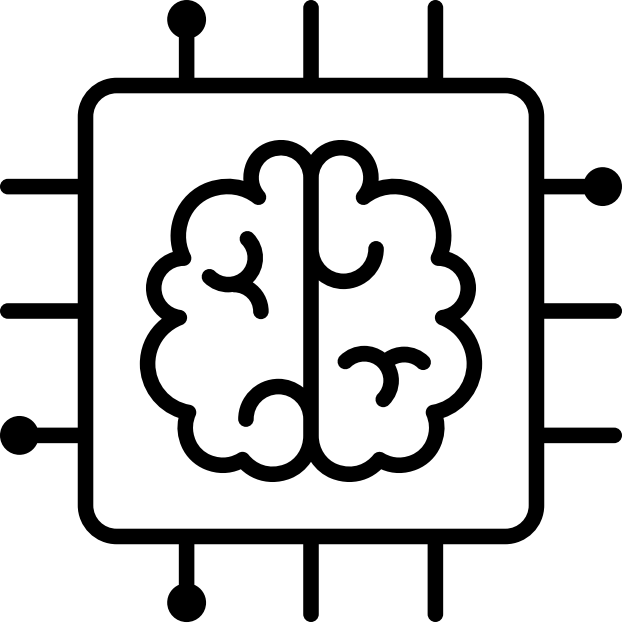
Insights from the resource:

- The unimodal approach to affective computing where only text or only speech is analyzed is quite limited
- Multimodal fusion integrates data from various channels (e.g., facial expressions, voice tone, and text) to provide a accurate and holistic understanding of emotions.
- Real-time performance is a challenge since multiple data streams need to be synchronized

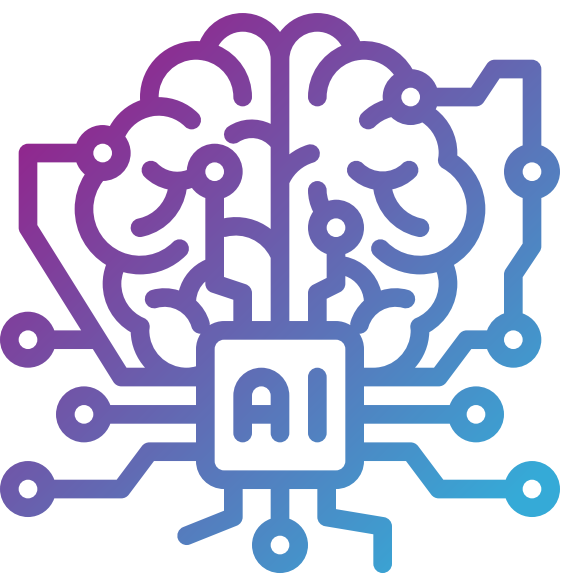




ANALYSIS,
PERFORMANCE
METRICS, AND
DEPLOYABILITY OF
THE SOLUTION



THE SOLUTION'S PERFORMANCE METRICS DEMONSTRATE ITS ABILITY TO ANALYZE EMOTIONS AND PROVIDE EMPATHETIC RESPONSES. IN PILOT TESTS, IT ACHIEVED A 4.3/5 CSAT SCORE, A 70% RESOLUTION RATE, AND AN AVERAGE WAIT TIME OF ~10 SECONDS, HIGHLIGHTING ITS REAL-TIME EFFICIENCY.

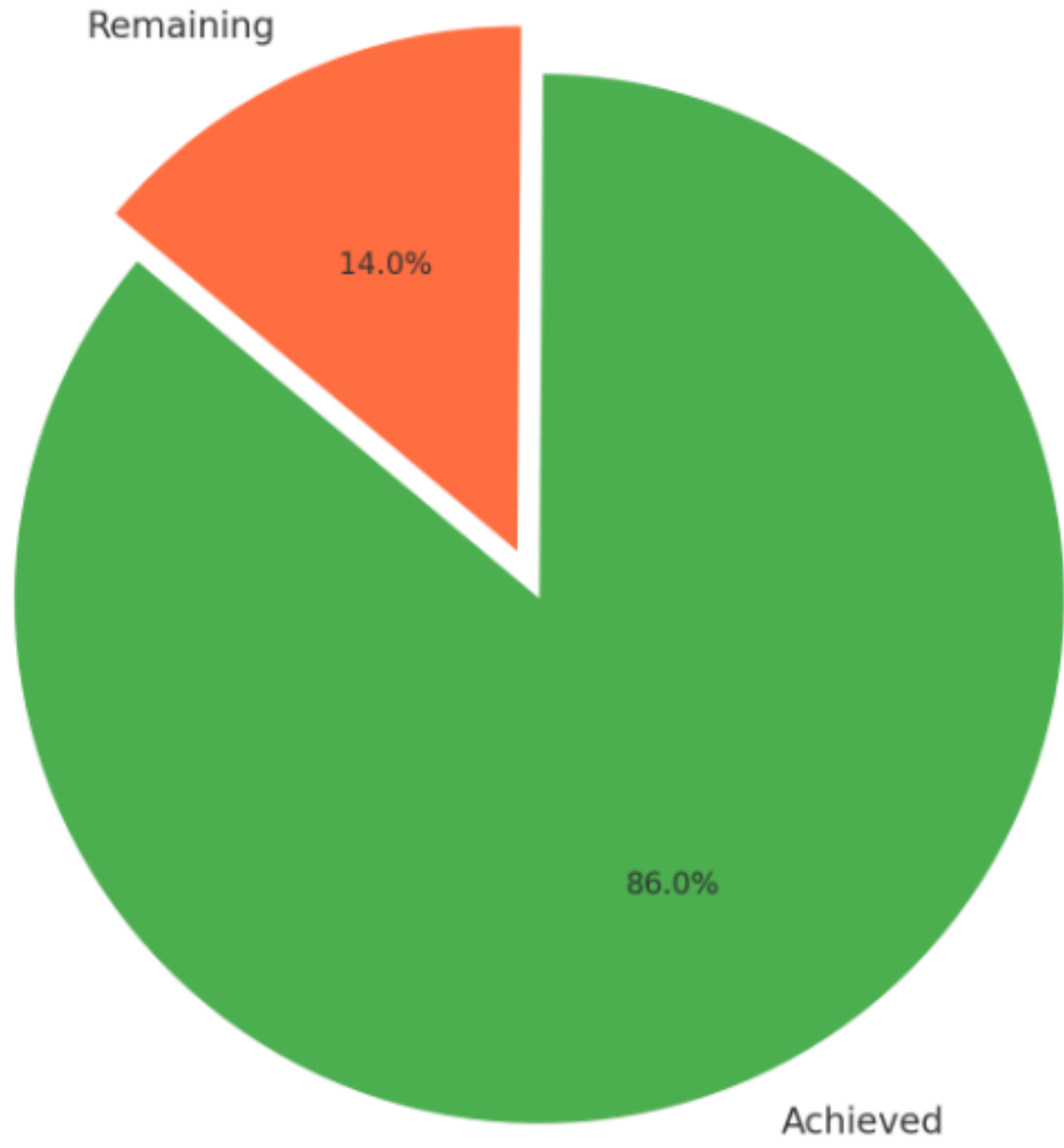


INTERVENTION IN THE EXPERIMENT

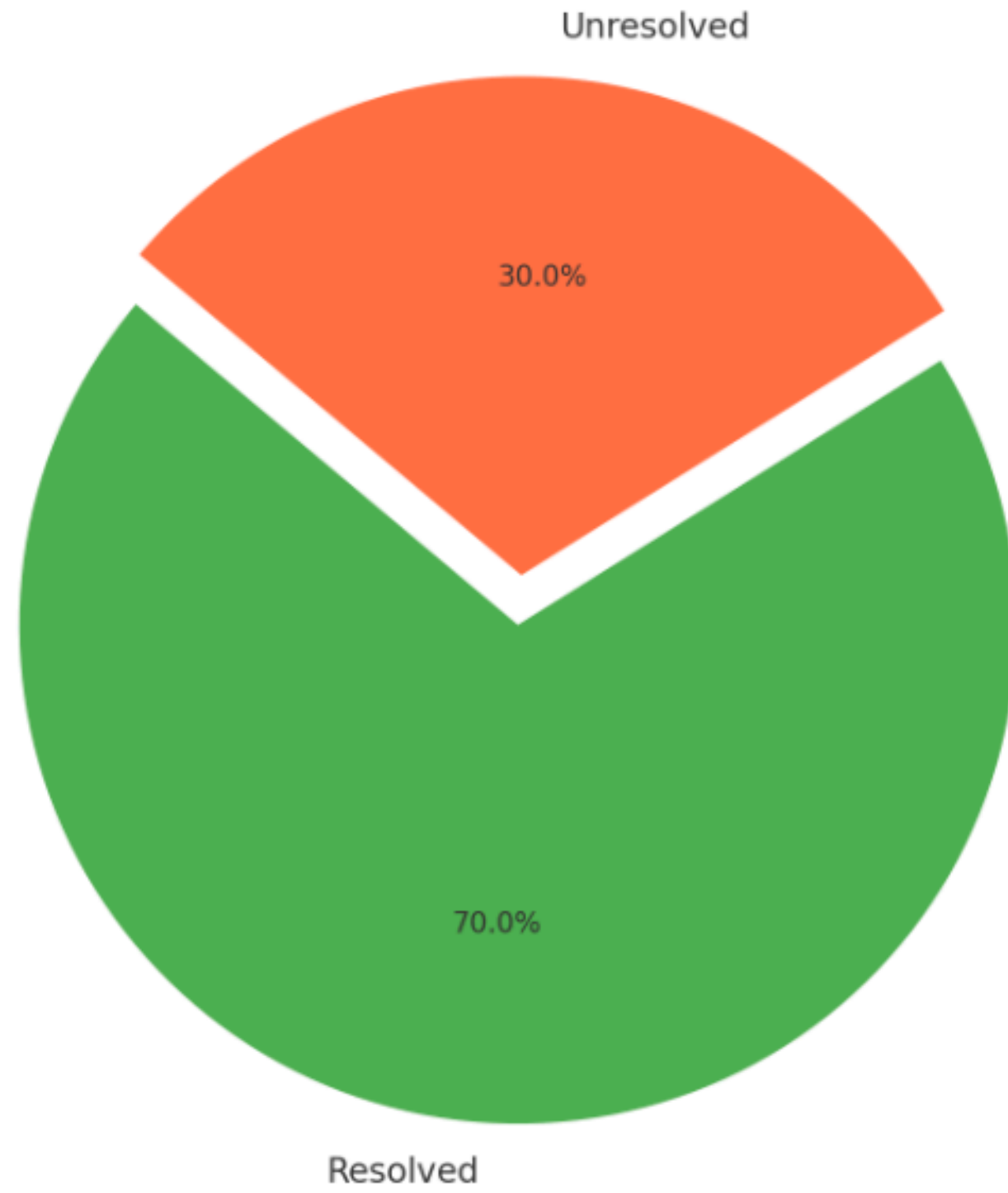
- EXPERIMENTAL GROUP:
 - AI BOT DEPLOYED TO ADDRESS USER QUERIES AUTONOMOUSLY.
 - INTEGRATION OF NLP MODULES FOR ISSUE IDENTIFICATION AND RESOLUTION.
 - PREDEFINED ESCALATION TO HUMAN AGENTS FOR COMPLEX QUERIES.
- CONTROL GROUP:
 - STANDARD CUSTOMER SUPPORT PROCESSES WITH HUMAN AGENTS ONLY.
- EXPERIMENT PROCESS:
 - USERS WILL BE RANDOMLY ASSIGNED TO EITHER GROUP UPON CONTACTING CUSTOMER SUPPORT.
 - THE SAME ISSUE CATEGORIES AND PROCESSES WILL APPLY TO BOTH GROUPS TO ENSURE CONSISTENCY.



CSAT Score Distribution (Out of 5)



Resolution Rate Distribution



The background features a gradient from light orange to deep pink. Two large, semi-transparent circles are positioned on the left and right sides. A 3x5 grid of small white dots is located in the top-left corner, and another 5x3 grid is in the bottom-right corner.

IMPACT

The proposed AI-driven solution can significantly enhance call center operations by improving emotional intelligence and response quality. With industry benchmarks for customer satisfaction (CSAT) around 80% and resolution rates near 70%, this system aligns with the need for empathy, personalization, and efficiency. By integrating emotion recognition (valence, arousal, dominance) into real-time interactions, it personalizes customer experiences, reduces misunderstandings, and speeds up issue resolution.

Trends show that 90% of customers expect personalized interactions, and companies using omnichannel strategies see a 90% boost in retention. Additionally, addressing issues like high agent turnover (30%-40%) and long wait times (20 seconds) can improve overall service delivery.



44 CALL CENTER STATISTICS AND METRICS YOU SHOULD KNOW | SMITH.AI

2024 CALL CENTER TRENDS & STATISTICS



THANK YOU!

LET US KNOW IF YOU HAVE QUESTIONS
OR NEED CLARIFICATIONS.