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# Sentimental Analysis

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# What is Sentiment Analysis

- **Sentiments are the feelings, opinions, emotions, likes/dislikes, good/bad.**
- **Sentiment Analysis is the most common text classification tool**
- **Machine learning & Deep learning increases the ability of the Algorithm.**
- **Sentiment analysis is contextual mining of text.**
- **Sentimental analysis also known as the opinion mining.**
- **It's a task of identifying whether the opinion in the text is positive ,negative or neutral.**

# Why we choose these Project

- ❑ **Humans use natural language for communication and sharing information.**
- ❑ **With the rise of social media platforms like Instagram, Twitter, Facebook, and blogs, users express their emotions and sentiments.**
- ❑ **As a results, businesses and institutes are searching for useful information from social media .**
- ❑ **Therefore, there is a need for intelligent systems such as sentiment analyzers, which can convert raw social media user data into useful information.**

# Why Urdu language

- ❑ **Indian sub-content Urdu language is widely used for expressing ideas, feelings, and emotions on social media sites.**
- ❑ **Its unique morphological structure starts from right to left, making it difficult to use for natural language processing tasks.**
- ❑ **Sentiment analysis is crucial for understanding user feelings, emotions, and opinions, as it helps non-Urdu speakers understand the text's content.**

# Why Marathi Language

- ❑ **Marathi has the third largest number of native speakers in India, after Hindi and Bengali.**
- ❑ **It ranks 19 in the list of most spoken languages in the world and spoken by approx. 90 million peoples.**
- ❑ **Marathi language is also helpful to increase your business opportunity as Maharashtra is a big city and has many businesses.**
- ❑ **Marathi is one of the easiest Indian languages to learn.**

# It will define that the comment is Positive, Negative or Neutral



Neutral


- iOS or Android doesn't matter to me. I am good with both  
★ ★ ★

Good

- iOS is great! I love its simplicity  
★ ★ ★ ★ ★

- I love iOS but I hate Android  
★

## SENTIMENT ANALYSIS



**NEGATIVE**

Totally dissatisfied with the service. Worst customer care ever.

**NEUTRAL**

Good Job but I will expect a lot more in future.

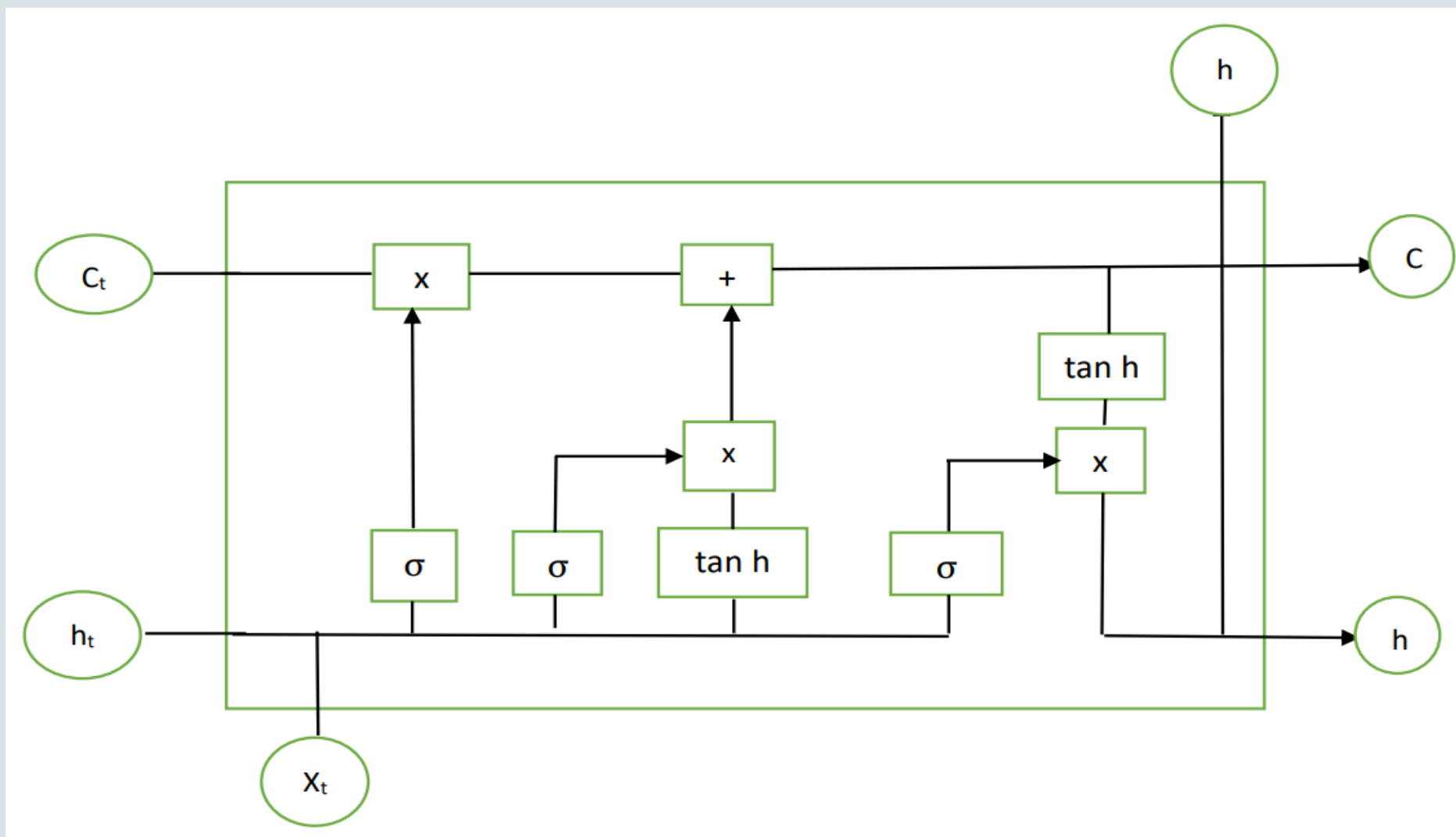
**POSITIVE**

Brilliant effort guys! Loved Your Work.

# Long Short Term Memory (LSTM)

- ❖ **LSTM stands for long short-term memory networks, used in the field of Deep Learning.**
- ❖ **LSTM has feedback connections, i.e., it is capable of processing the entire sequence of data, this finds application in speech recognition, machine translation, etc.**
- ❖ **LSTM is a special kind of RNN, which shows outstanding performance on a large variety of problems.**
- ❖ **LSTM networks are capable of learning long-term dependencies in sequential data, which makes them well suited for tasks such as language translation, speech recognition, and time series forecasting.**

# LSTM Architecture

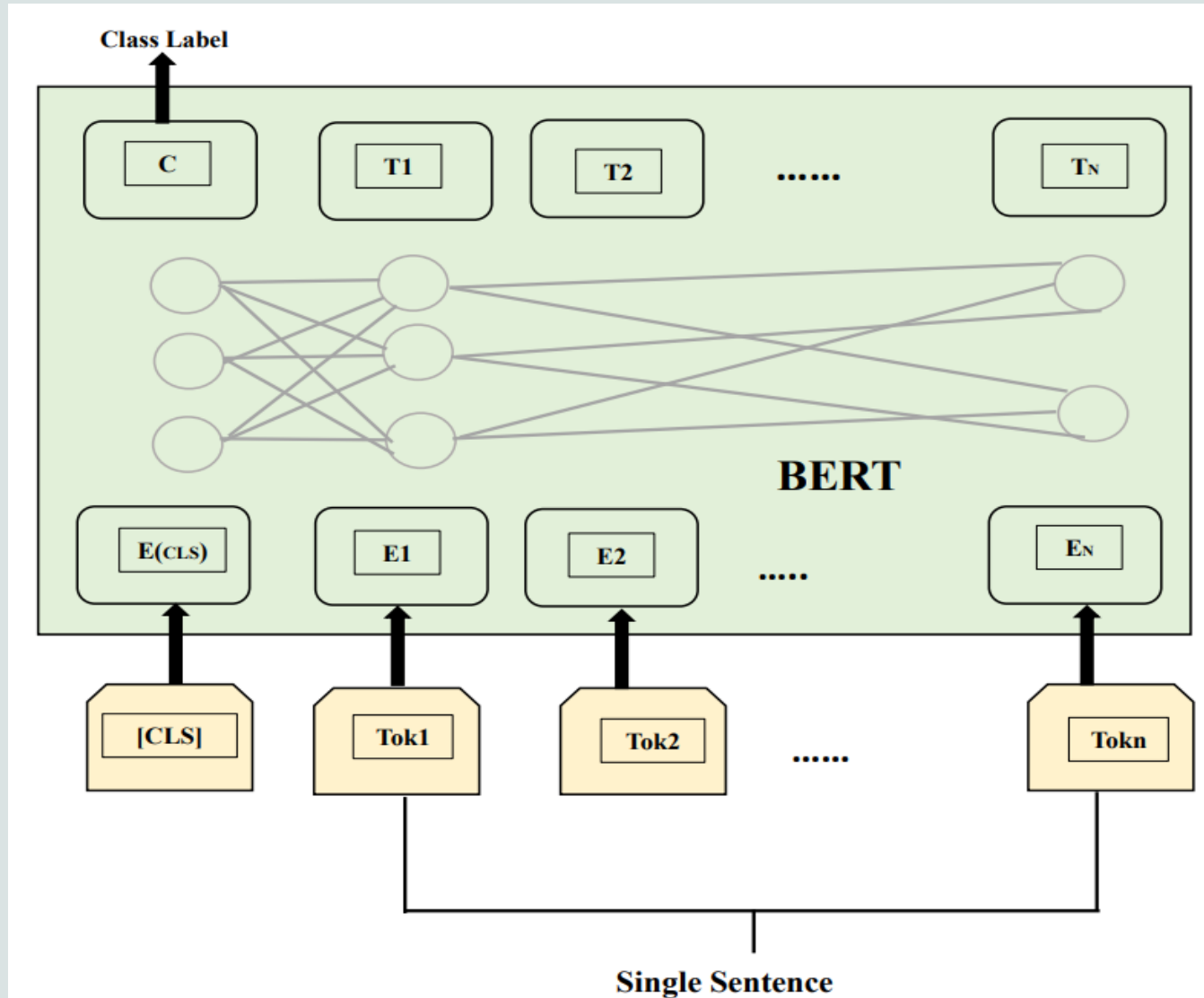




# BERT (Bidirectional Encoder Representations from Transformers)

- ❖ BERT is based on Transformers, a deep learning model in which every output element is connected to every input element.
- ❖ The meaning of ambiguous language in text by using surrounding text to establish context.
- ❖ BERT has a large impact on voice search as well as text-based search.
- ❖ Historically, language models could only read text input sequentially -- either left-to-right or right-to-left -- but couldn't do both at the same time.
- ❖ BERT is different because it is designed to read in both directions at once.

# BERT Architecture



# Advantages

**1.Social Media Sentiment Analysis:**

**2. Brand Experience Insights:**

**3. Improve Customer Service:**

**4. News Trend Analysis :**

**5-Real-Time Sentiment Insights:**

**6. Customer Feedback**

**7-Product Development**

# Some Application

**1.Social media monitoring**

**2.Customer support ticket analysis**

**3.Brand monitoring and reputation management**

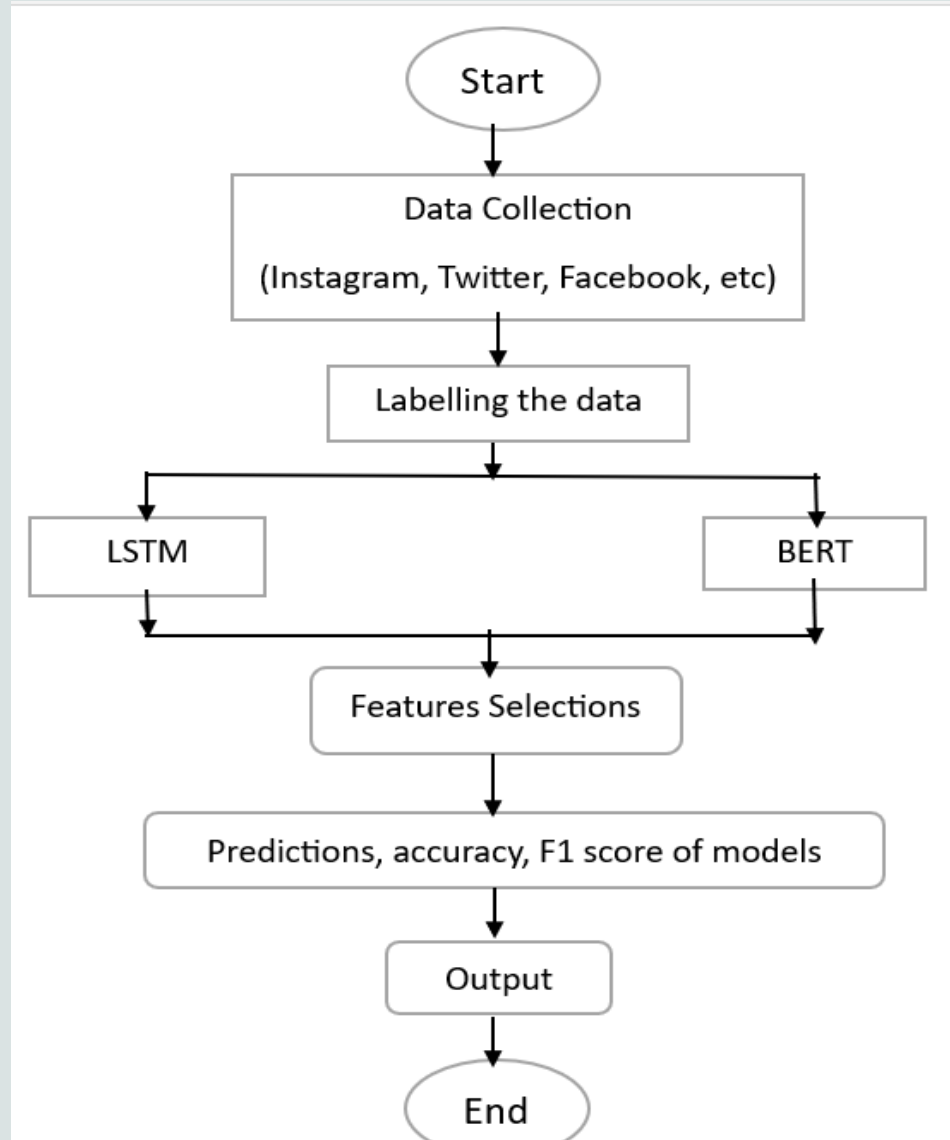
**4.Listen to voice of the customer (VoC)**

**5.Listen to voice of the employee**

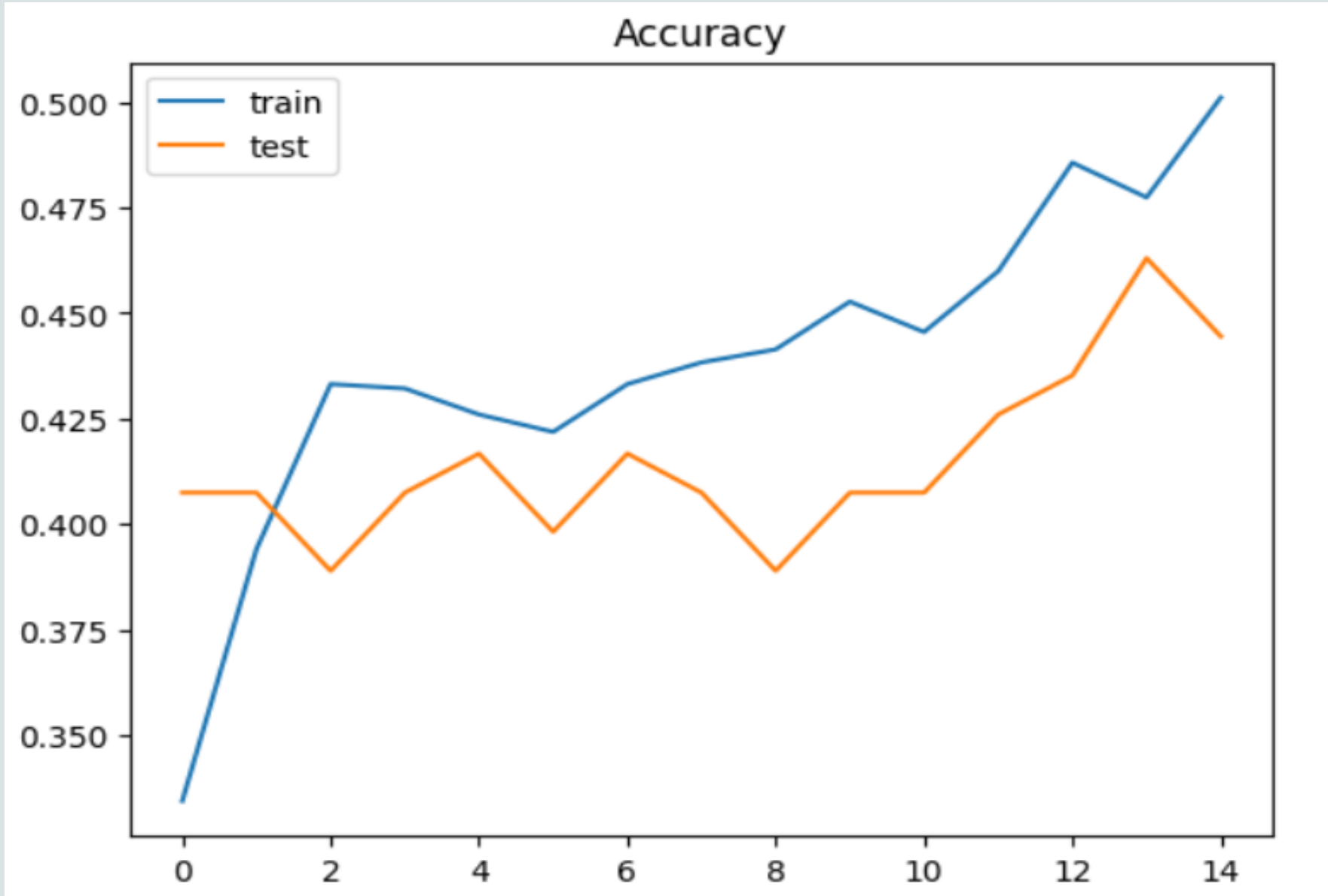
**6.Product analysis**

**7.Market research and competitive research**

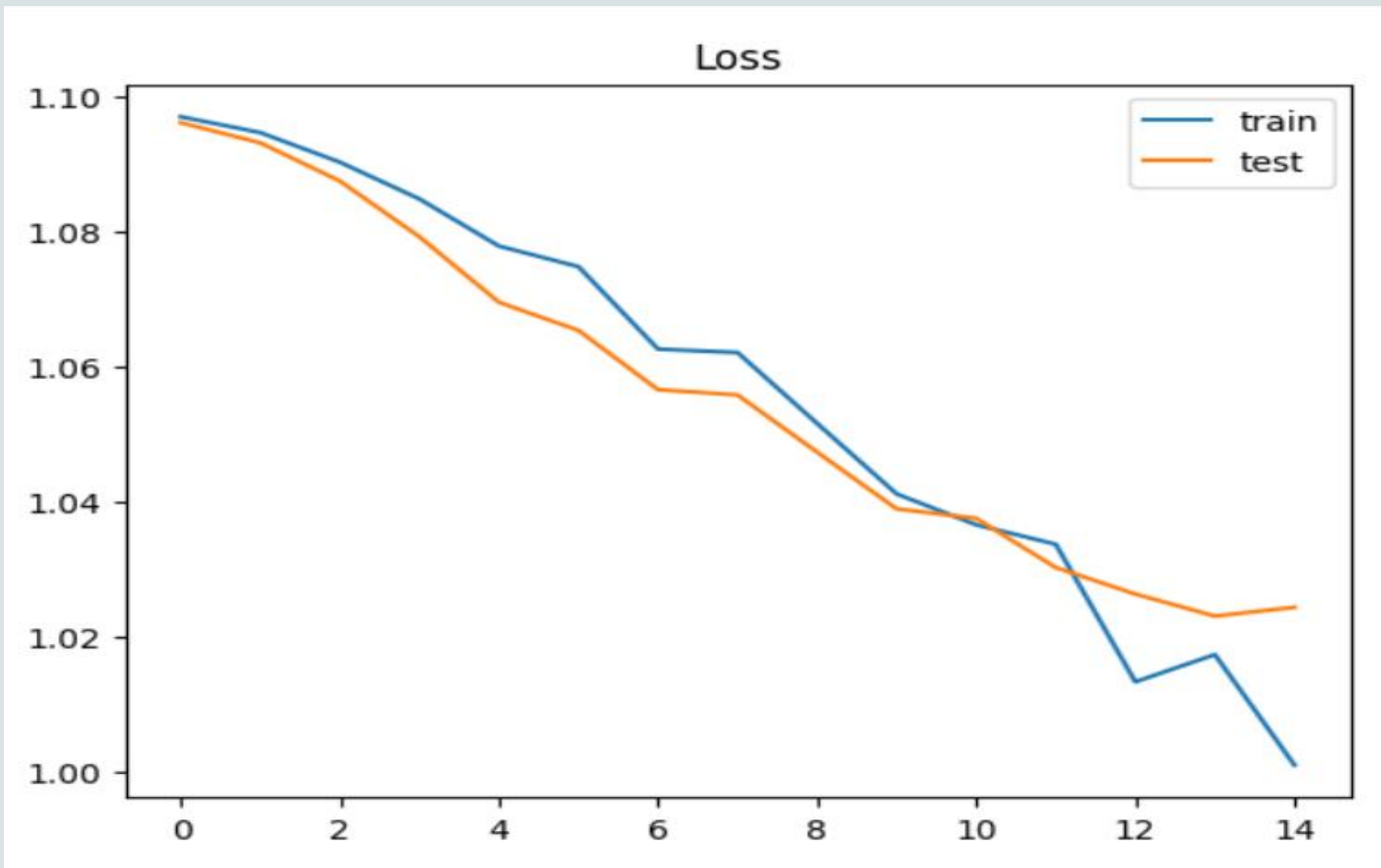
# Data Flow Diagram



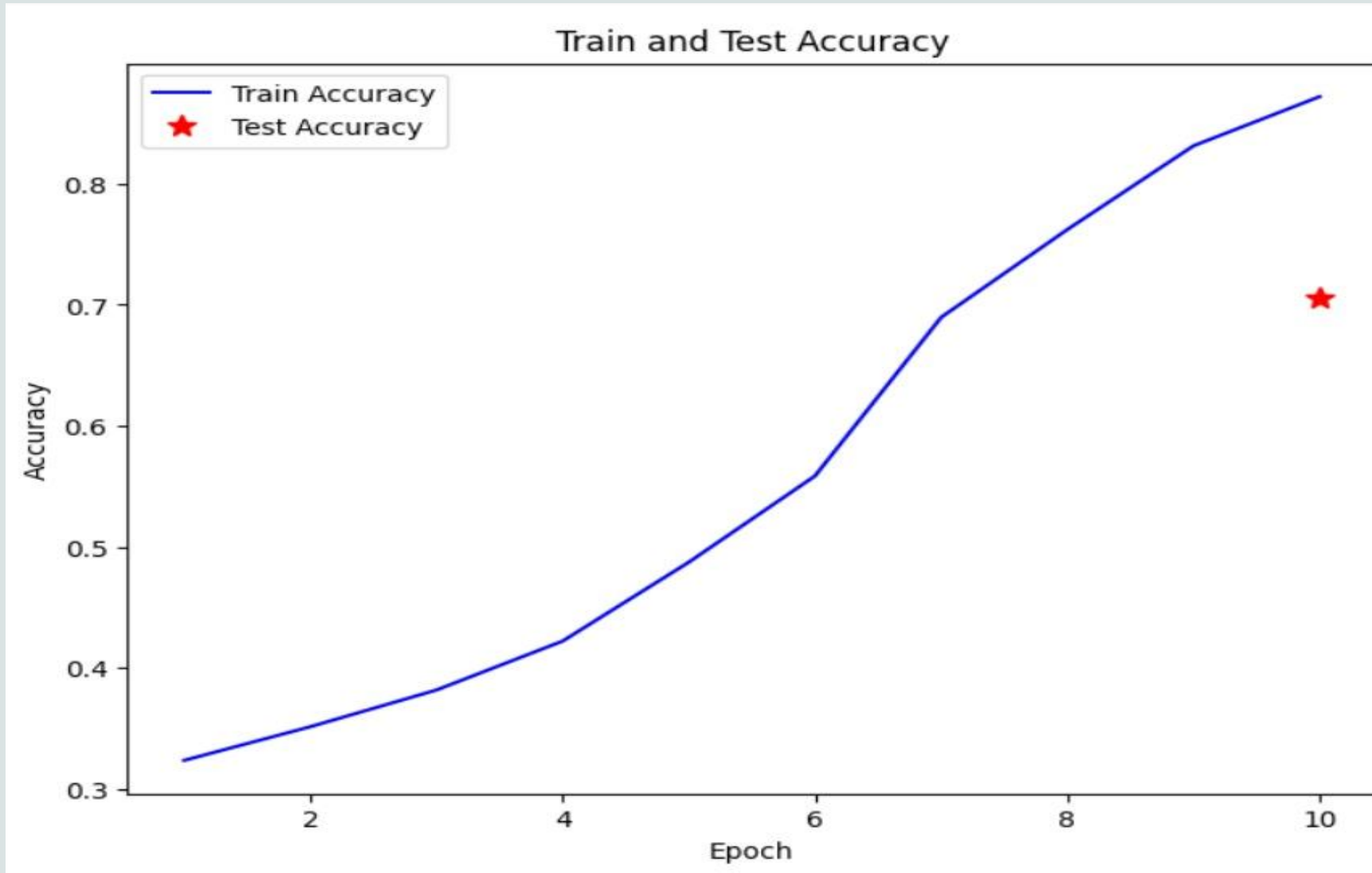
# LSTM Accuracy Graph



# LSTM Loss Graph

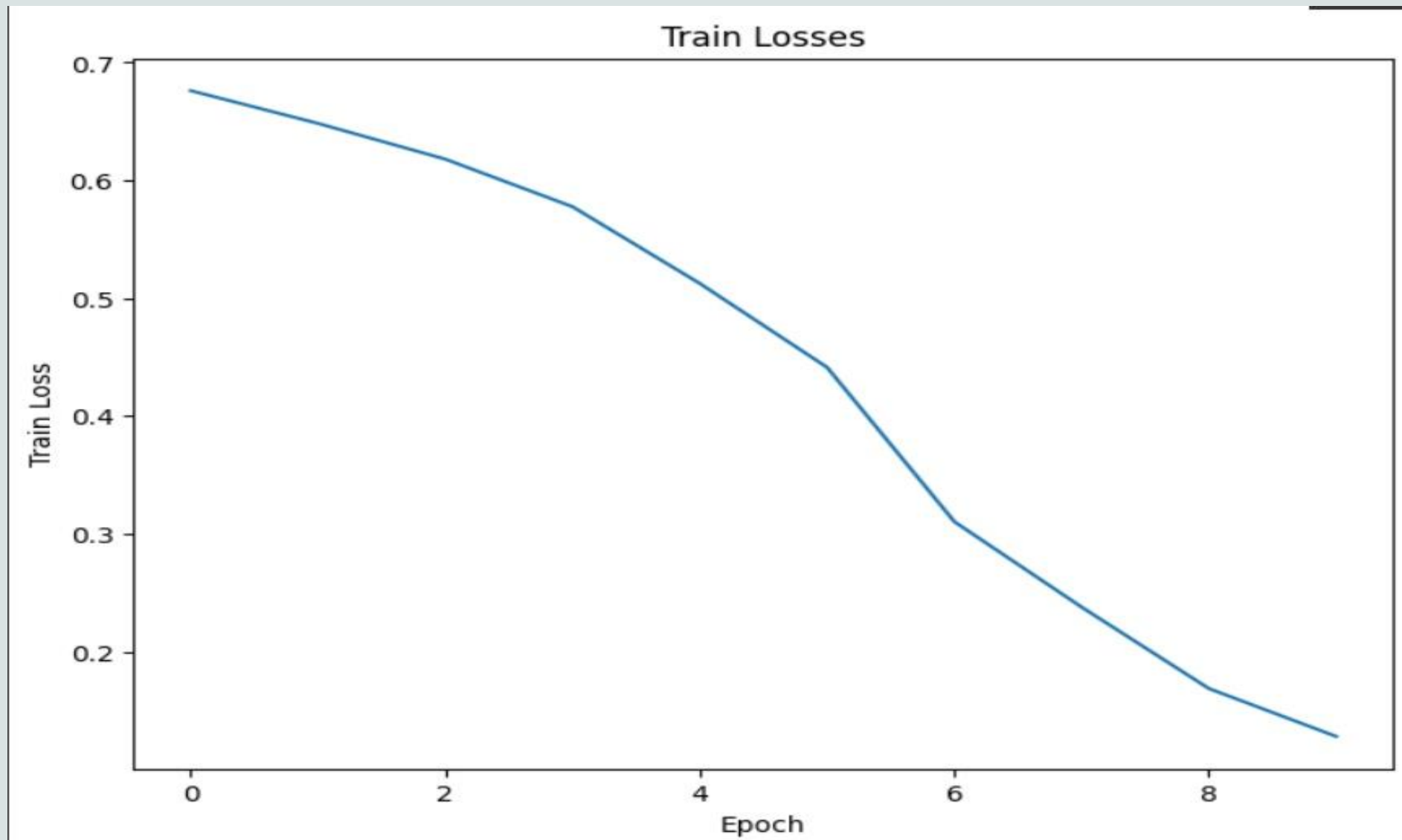


# BERT Accuracy Graph





# Bert Loss Graph



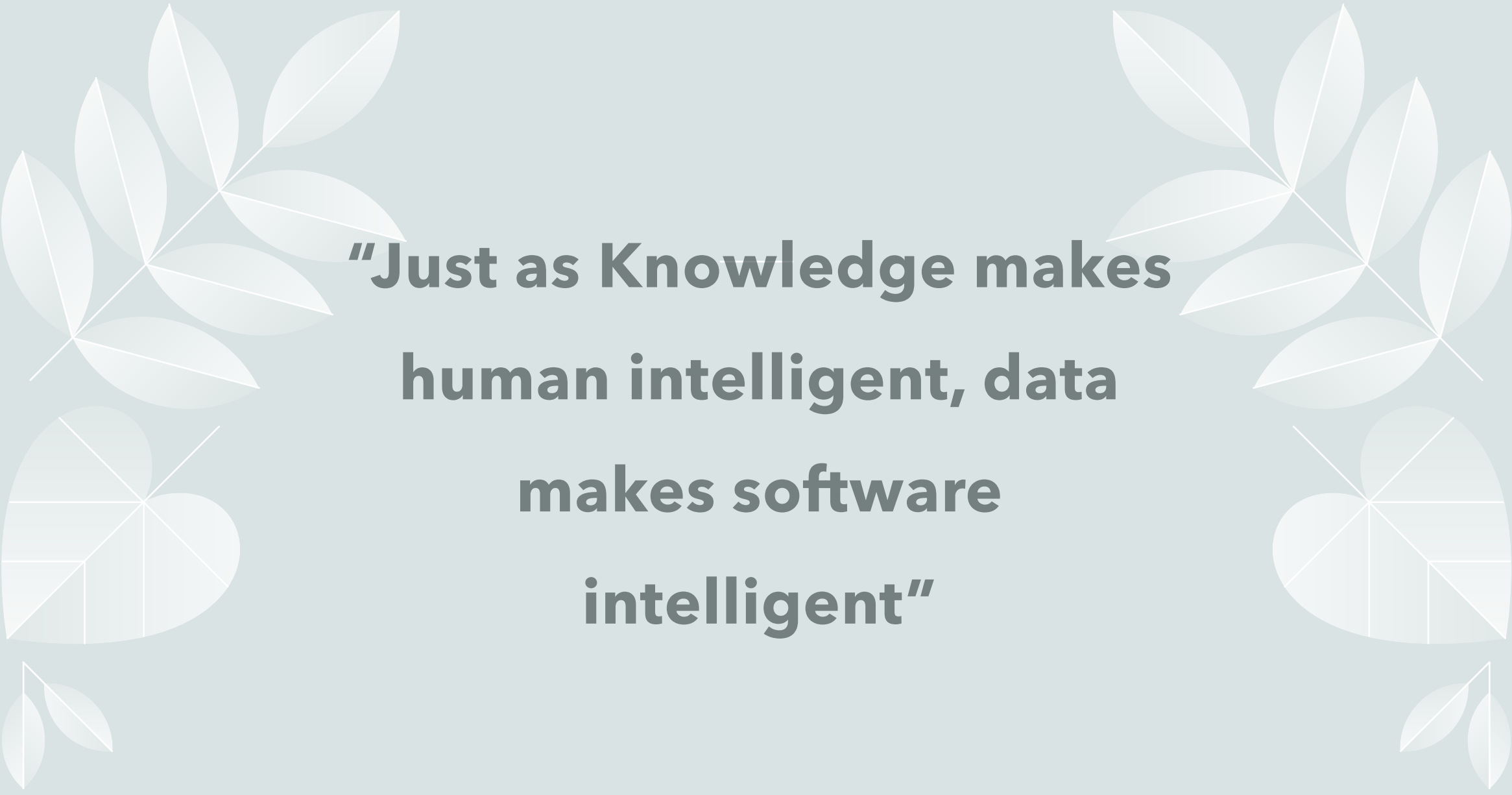
# Conclusion

- **Sentiment analysis benefits far exceed in terms of return on investment because ML platforms that analyze sentiment keep getting more and more intelligent with time.**
- **By analyzing sentiment, companies can enhance operational efficiency, customer and employee experience, and brand awareness.**
- **This solution is used globally in various industries, such as healthcare, banking, education, and retail.**
- **Real-time insights and time-based sentiment data are available, allowing companies to adapt their approaches without coding.**

# Model Comparison

Sr. No	Model	Data Language	Loss	F1 Score	Train Accuracy	Validation Accuracy
1	BERT	Urdu	0.1281	0.7041	0.9516	0.7063
2	LSTM	Urdu	0.5524	0.6857	0.5669	0.5450

**Permormance of BERT and LSTM models on Urdu and Marathi Dataset**

The image features a light gray background with decorative white line art of leaves and branches in the corners. The top-left and top-right corners have clusters of elongated, pointed leaves. The bottom-left and bottom-right corners have clusters of rounded, lobed leaves. The central text is a quote in a bold, dark gray sans-serif font.

**"Just as Knowledge makes  
human intelligent, data  
makes software  
intelligent"**



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**Thank You**