# 📄 News Summarizer & Text-to-Speech (TTS) Application – Documentation

## 1️. Project Overview

The News Summarizer & TTS Application is a web-based tool that:  
- Extracts news articles related to a company using BeautifulSoup (bs4).  
- Summarizes the articles using Hugging Face Transformers.  
- Performs sentiment analysis (Positive, Negative, or Neutral).  
- Extracts key topics from the articles using SpaCy.  
- Generates a comparative sentiment analysis of different articles.  
- Converts the final sentiment analysis into Hindi speech using Google TTS (gTTS).

## 2️. Project Setup & Installation

* 1. **System Requirements**
* Python Version: 3.9.21

Required Libraries: Mentioned in `requirements.txt`

* 1. **Steps to Install & Run the Application**

1️⃣ Clone the repository:  
git clone https://github.com/your-repo/news-summarizer-tts.git  
cd news-summarizer-tts

2️⃣ Install dependencies:  
pip install -r requirements.txt

3️⃣ Download the SpaCy language model:  
python -m spacy download en\_core\_web\_sm

4️⃣ Run the FastAPI backend (API):  
uvicorn api:app –reload

➡️ API will be available at “http://localhost:8000”

## 3️.Model Details

The application uses multiple AI models for different tasks:

* News Summarization: Hugging Face Transformer model (`distilbart-cnn-12-6`)
* Sentiment Analysis: TextBlob for classifying sentiment as Positive, Negative, or Neutral.
* Topic Extraction: SpaCy (`en\_core\_web\_sm`) for Named Entity Recognition (NER).
* Text-to-Speech (TTS): Google TTS (`gTTS`) for Hindi speech synthesis.

## 4️. API Development

The application includes an API backend for fetching and processing news articles.

FastAPI Backend (`api.py`)

✅ Endpoint: `GET /analyze/{company\_name}`

Example Usage: `curl http://localhost:8000/analyze/Tesla`

## 5️.API Usage & Third-Party Integrations

This project integrates third-party APIs & libraries:

|  |  |
| --- | --- |
| API/Library | Purpose |
| FastAPI | Handles API requests for news summarization, sentiment analysis, and text-to-speech conversion. |
| BeautifulSoup (bs4) | Extracts news articles from Bing News. |
| Hugging Face Transformers | Summarizes news articles. |
| SpaCy | Extracts key topics from articles. |
| TextBlob | Performs sentiment analysis. |
| Google TTS (gTTS) | Converts final sentiment analysis to Hindi speech. |

## 6️.Assumptions & Limitations

✅ **Assumptions:**

* News articles are in English, and the final TTS summary will be in Hindi.
* At least 10 unique articles are available for a given company.
* Sentiment analysis is polarity-based, which may not always capture complex meanings.

**❌ Limitations**

* Dependency on Bing News: If search results change, article extraction may fail.
* Google TTS requires an internet connection.
* Summarization may be slow due to Transformer model processing.
* Hindi translation accuracy depends on GoogleTranslator.

## 7️.Future Improvements

* Use a fully offline Hindi TTS model like VITS or Coqui-TTS.
* Improve sentiment analysis with BERT-based models.
* Optimize news extraction using direct article scraping instead of search engines.
* Add real-time sentiment trend visualization.