

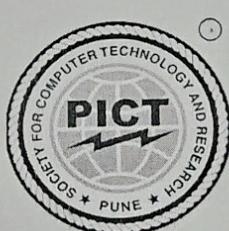
GROUPNO: 35

BE PROJECT LOG BOOK

ProjectTitle	WhatsApp Chat Analyzer With Sentimental Analysis		
GroupMembers	Sr.No	Roll. No.	Name
	1)	42419	Snehal Ingale
	2)	42164	Hitesh Sonawane
	3)	42166	Sagar Thakiya
	4)		
Internal Guide Name,Signature	Dr. R. Y. Patilwar		
CompanyName (If sponsored)	I		
CompanyMentor Name			

DEPARTMENT OF
ELECTRONICS AND TELECOMMUNICATION ENGINEERING
PUNE INSTITUTE OF COMPUTER TECHNOLOGY

PUNE-43



ACADEMIC YEAR: 2022-23

2

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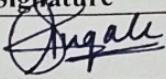
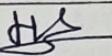
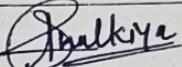
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UNDERTAKING BY PROJECT GROUP STUDENTS

We, the students of B.E. E&TC Engg, are hereby assure that we will follow all the rules and regulations of SPPU related to the project work for the academic year 2022-23. The Project entitled-

What's App Chat Analyzer with Sentimental Analysis

will be fully designed and developed by us and no part of the project/full project will be designed and developed by any external entity or copied from some external resources. We are fully aware that copying or taking help of any external agency in the development of our project is totally unethical and illegal. The examiners have /University has full rights to initiate an action against us as per university norms if involved in unfair/illegal/unethical work.

Sr.No	Roll No.	Name of Student	Signature
1)	42419	Snehal Ingale	
2)	42464	Hitesh Sonawane	
3)	42166	Sagar Thalkiya	
4)			

Course Objectives:

- 1) To understand the basic concepts & broad principles of projects.
- 2) To understand the value of achieving perfection in project implementation & completion.
- 3) To apply the theoretical concepts to solve real life problems with team work and Multidisciplinary approach.
- 4) To demonstrate professionalism with ethics; present effective communication skills and relate engineering issues to broader societal context.

Course Outcomes:

By the end of the course, students should be able to:

- 1) Analyze and confirm performance of systems per defined specifications. Demonstrate working of the implemented project and exhibit the designed system.
- 2) Comprehend and write a project report and draw conclusions at a technical level.

ProjectPhaseII: Projectreport General Guidelines

- 1) The project TW/OR assessment shall be based on Live Project Demonstration and presentation by the students. The assessment parameters shall be Innovative Idea of selected project, literature survey, Depth of understanding, Applications, Individual contributions, presentations, project report, timely completion of work (Project review presentations), participation in project competition, publication of research work in journal/conference, publication in the form of patent and copyright etc. The college can prepare the rubrics based on these parameters
- 2) Certified hardbound project report to be submitted by the students in prescribed format.
- 3) Students must preferably publish at least one technical paper on project work in the conference or peer-reviewed journals or publish patent or copyright or should participate into one of the project competition at university/State/National/International level.
- 4) A logbook of work carried out during these semesters should be maintained with weekly review remarks by the guide and committee.
- 5) A certified copy of report preferably using LATEX is required to be presented to external examiner at the time of Fourth examination.
- 6) The project report must undergo plagiarism check and the similarity index must be less than 10%. The plagiarism report should be included in the project report.

Course Objectives:

- 1) To understand the basic concepts & broad principles of projects.
- 2) To understand the value of achieving perfection in project implementation & completion.
- 3) To apply the theoretical concepts to solve real life problems with teamwork and multidisciplinary approach.
- 4) To demonstrate professionalism with ethics; present effective communication skills and relate engineering issues to broader societal context.

Course Outcomes:

By the end of the course, students should be able to

- 1) Apply engineering knowledge & demonstrate effective communication skills and attitudes as a professional.
- 2) Identify Real world problems & formulate solutions for the same.
- 3) Design & Simulate Using Modern Tools & Implement environment friendly & sustainable solutions to complex problems using a systematic approach.

Project Phase I: Project report General Guidelines

- 1) **Group Size:** The students shall carry the project work individually or by a group of students. Optimum group size shall be 3 students. However, if project complexity demands a maximum group size of 4 students, the project committee should be convinced about such complexity and scope of the work. Projects selected should meet and contribute towards the needs of the society.
- 2) **Selection and approval of topic:** Topic should be related to real life application in the field of Electronics and Telecommunication engineering.
- 3) The topic may be based on : Investigation of the latest development in a specific field of Electronics or Communication / The investigation of practical problem in manufacture and / or testing of electronics or communication equipment/Software based projects related to VHDL, Communication, Instrumentation, Signal Processing, agriculture Engineering etc. with the justification for techniques used / any topic in the field of E&TC may be allowed.
- 4) Interdisciplinary projects should be encouraged. The examination of Interdisciplinary projects shall be conducted independently in respective departments.
- 5) The term work assessment of project phase 1 shall be based on Innovative Idea of selected project, literature survey, Depth of understanding, Applications, Individual contributions, presentation, project report, timely completion of work.
- 6) The department should prepare project planner and should follow accordingly
- 7) A log book of work carried out during these semesters should be maintained with weekly review remarks by the guide and committee.
- 8) A certified copy of report preferably using LATEX is required to be presented to external examiner at the time of Fourth examination.
- 9) The project report must undergo plagiarism check and the similarity index must be less than 15%. The plagiarism report should be included in the project report.

UNIVERSITYCURRICULUM

Project Stage – I (404188)

Credits:01,COsCovered:1,2,3

Class:B.E.	Semester:I
Teachingscheme	UniversityExaminationScheme
PRACTICAL:2Hrs/week	Term-Work:50Marks
Continuousassessment	InternalAssessment-I

Project Stage – II (404197)

Credits:05,COsCovered:4,5

Class:B.E.	Semester:II
TeachingScheme	UniversityExaminationScheme
PRACTICAL:10Hrs/week	Oral :50Marks Termwork:100Marks
Continuousassessment	InternalAssessment-IIandIII

Rules & Regulations

1. All students must enter the correct information in the project Logbook.
2. All the entries in the project Logbook must be verified & signed by the concerned project guide.
3. Students must report to their respective guide on project day as per the timetable.
4. Activities of the project work should be completed as per the project plan only.
5. Project group must submit soft copies of Project Abstract, Project Report and Publications in both Word and PDF format.
6. Project group members submit as many hard copies as number of Group members of Project Report in the format provided by department.
7. Project Logbook must be brought at the time of Project Internal Assessment & Project Examination.
8. Any changes, if any, must be countersigned by the concerned project guide.
9. For project reviews and project examination, all students must report 15 minutes before the scheduled time.
10. For any query, concerned guides should be consulted.



SCTR'S
Pune Institute of Computer Technology
Department of Electronics & Telecommunication Engineering (E&TCE)

Sr. No	Date	Task Given	Tasks Completion status (Completed/ In Progress)	Guide Signature
	20/8/24	Download the related recent papers and carry out the survey. Prepare the comparative chart.	Download more papers & carry out detail survey	
		→ Find out the std datasets, study the ML algorithms & Output major parameters.	Done	
		⇒ Depth understanding of Data processing	Done	by <u>gatescop</u> 
		⇒ case study on Deep learning.		
		⇒ Process Chat data & Preprocessing text then apply sentimental analysis.	Done	
		⇒ working on generating charts & graphs.	Done	
		⇒ tried to debug the code.	Done	
		⇒ Debugged and tested	Done	
		⇒ Tested Using different Text files.	Done	
		⇒ Final Project completed.	Done	



SCTR'S
Pune Institute of Computer Technology
Dhankawadi, Pune-43 (Maharashtra)

Department Of Electronics & Telecommunication Engineering (E&TCE)

B.E. PROJECT ASSESSMENT - I
(Academic Year: 2024-25 Semester - I)

STUDENT PERFORMANCE EVALUATION (30 Marks)

Group Number : 35

Project Title : whatsapp chat analysis using ML

Group Members Name (Roll No.):

1. Hitesh Sonawane (42164)
2. Sagar Thakriya (42166)
3. Snehal Ingale (42419)

Assessment Parameters	Marks (30 M)		
	Group Members		
	1	2	3
1) System Architecture & Literature Survey (4M)	<u>3</u>	<u>2</u>	<u>3</u>
2) Project Design (4M)	<u>4</u>	<u>4</u>	<u>4</u>
3) Methodology/ Algorithms and Project Features (4M)	<u>3</u>	<u>3</u>	<u>3</u>
4) Project Planning (3M)	<u>3</u>	<u>2</u>	<u>3</u>
5) Basic details of Implementation (4M)	<u>4</u>	<u>3</u>	<u>4</u>
6) Presentation Skills (4M)	<u>3</u>	<u>2</u>	<u>3</u>
7) Question and Answers (4M)	<u>3</u>	<u>4</u>	<u>3</u>
8) Summarization of ultimate findings of the project (3M)	<u>2</u>	<u>2</u>	<u>1</u>
Total Marks (Member-Wise)	<u>25</u>	<u>22</u>	<u>24</u>

Suggestions / Comments : Identify the tools & platforms to select current trends/topics on "whatsapp app" for Analysis

To be filled by Assessment Committee Member(s) only.

* Whether the Evaluation is as per the schedule. : YES / NO (If NO mention the reasons for the same.)

Names & Signatures of Assessment Committee Member(s) :

Name of Reviewer-1

Name of Reviewer-2

Name of Internal Guide



SCTR'S
Pune Institute of Computer Technology
Dhankawadi, Pune-43 (Maharashtra)

Department Of Electronics & Telecommunication Engineering (E&TCE)

B.E. PROJECT ASSESSMENT-II
(Academic Year: 2024-25 Semester - II)

STUDENT PERFORMANCE EVALUATION (30 Marks)

Date: 31/12/2024

Group Number : 35 Project Guide (Name & Sign) : R. G. Yelalwar
Project Title : WhatsApp Chat analysis using ML

Group Members Name (Roll No.):

1. Sagar Thakya (42166)
2. Hitesh Sonawane (42164)
3. Snehal Ingole (42419)

Assessment Parameters	Marks (30 M)		
	Group Members		
	1	2	3
1) Architecture/System design(if any modification)(Y/N)	3		
2) 60% Implementation (10M)	8	8	8
3) Partial Results Obtained (10M)	8	8	8
4) Presentation Skills (5M)	3	3	3
5) Question and Answers (5M)	4	4	4
Total Marks (Member-Wise)	23	23	23

Suggestions / Comments :

Demonstrate the code at the earliest -

To be filled by Assessment Committee Member(s) only.

* Whether the Evaluation is as per the schedule. : YES / NO (If NO mention the reasons for the same.)

Names & Signatures of Assessment Committee Member(s) :

Name & Sign of Reviewer-1

Name & Sign of Reviewer-2

STUDENT PERFORMANCE EVALUATION (40 Marks) Date:

Group Number : 35

Project Guide (Name & Sign):
Project Title : WhatsApp chat Analyzer with Sentimental Analysis

Group Members Name (Roll No.):

1. Hitesh Sonawane (42164)
 2. Sagar Thalkiyya (42166)
 3. Snehal Ingale (42419)

Assessment Parameters	Marks (40 M)		
	Group Members		
	1	2	3
1) Implementation (100%) (10M)	8	8	8
2) Testing, Results and Performance Evaluation (10M)	8	8	8
3) Conclusion Drawn (2M)	2	2	2
4) Final Project Report (5M)	5	5	5
5) Publications/Competition/Patent (3M) (Applied)	1	1	1
6) Presentation Skills (5M)	4	4	4
7) Question and Answers (5M)	4	4	4
Total Marks (Member-Wise)	32	32	32

Suggestions / Comments :

To be filled by Assessment Committee Member(s) only.

* Whether the Evaluation is as per the schedule. : YES / NO (If NO mention the reasons for the same.)

Names & Signatures of Assessment Committee Member(s) :

Name & Sign of Reviewer-1

Mr. N. B. Patil

Name & Sign of Reviewer-2

Mr. N. G. Niema



PUNE INSTITUTE OF COMPUTER TECHNOLOGY, PUNE - 411043

Department of Electronics & Telecommunication Engineering

PROJECT ASSESSMENT SHEET

Department: E&TC

Course : Project Stage – I (404188)

Academic Year:2024-25

Sem – I

Name of Internal Guide : Prof. R. G. Yelalwar

Group No : 35

Title of project

What's App Chat Analyzer With Sentimental Analysis

Sr.No	Roll No	Exam Seat No	Name of the student	Sign of Student
1	42119	B400050096	Snehal Sharad Ingale	<i>Ingale</i>
2	42164	B400050267	Hitesh Vikas Sonawane	<i>Sonawane</i>
3	42166	B400050280	Sagar Mafatlal Thalkiya	<i>Thalkiya</i>

Sr. N.o.	CO-1 (10 M)					CO-2 (10M)					CO-3 (30 M)					
	Innovative Idea	Literature survey	Practical Applications	Depth of understanding	Total	Identification of the solution / implementation process	Partial Implementation	Individual Contribution and Team Work	Total	Use of modern tools	Sim. Results & its validation	Individual Contribution and Team Work	Working of Project	System Performance	Report (stage-I)	Total
	02	02	02	04	10	03	03	04	10	3	04	03	05	05	10	30
1	02	02	02	04	10	03	03	04	10	3	04	03	05	05	10	30
2	02	02	02	04	10	03	03	04	10	3	04	03	05	05	10	30
3	02	02	02	04	10	03	03	04	10	3	04	03	05	05	10	30
4																

CO1: Apply engineering knowledge & demonstrate effective communication skills and attitudes as a professional.

CO2: Identify Real world problems & formulate solutions for the same.

CO3: Design & Simulate Using Modern Tools & Implement environment friendly & sustainable solutions to complex problems using a systematic approach.

R.G.Yelalwar
Name and Signature of the Guide



PUNE INSTITUTE OF COMPUTER TECHNOLOGY, PUNE - 411043

Department of Electronics & Telecommunication Engineering

PROJECT ASSESSMENT SHEET

Department: E&TCE

Course : Project Stage - II (404197)

Academic Year: 2024-25

Sem - II

Name of Internal Guide : Prof. R.G. Yelalwar

Group No : 35

Title of project : WhatsApp Chat Analyzer with Sentimental Analysis

Sr.No	Roll No	Exam Seat No	Name of the student	Sign of Student
1	42419	B400050096	Snehal Sharad Ingale	<i>Ingale</i>
2	42164	B400050267	Hitesh Vikas Sonawane	<i>Hitesh</i>
3	42166	B400050280	Sagar Mafatlal Thalkiya	<i>Sagar</i>

Sr. No.	CO-4 (50M)				CO-5 (50 M)			
	System Testing	Performance Analysis	System Demonstration	Total	Paper Publication registered & presented in Scopus indexed conference (Provide the presentation certificate)	Project Competition	Project Report - II	Total
	20	20	10	50	30	05	15	50
1	15	16	8	39	20	05	13	36+2=38
2	15	16	8	39	20	05	13	36+2=38
3	15	16	8	39	20	05	13	36+2=38

(Signature)
Name & Signature of Project Coordinator

(Signature)
Name and Signature of the Guide

R.G. Yelalwar

CO4: Analyze and confirm performance of system as per defined specifications.
Demonstrate working of the implemented project and exhibit the designed system.
CO5: Comprehend and write a project report and draw conclusions at a technical level.

M

[Registration Due] ICCCNet 2025: Paper Notification for Paper ID 604 in Elsevier SSRN

1 message

Microsoft CMT <noreply@msr-cmt.org>
To: Hitesh Vikas Sonawane <hvshitesh29@gmail.com>

Sun, May 4, 2025 at 3:34 PM

Dear Author(s),

Greetings from ICCCNet 2025!

Your paper with submission ID 604 and Paper Title 'WhatsApp Chat Analyzer with Sentiment Analysis' has been accepted for publication in Elsevier SSRN.

You are requested to submit the following documents to icccn.congress@gmail.com at the earliest.

1. Revised Final Camera-Ready Copy (CRC) as per the Elsevier format.
2. Copy of e-receipt of registration fees.

The registration fees for paper publication in Elsevier SSRN Reputed Series has been reduced. Now you can register your paper as follows as per the category. Register your paper latest by 12th May 2025. Your accepted paper will be published in the Elsevier SSRN series [<https://www.elsevier.com/en-in/solutions/ssrn>] as a proceeding paper in ICICC conference proceedings by Elsevier SSRN.

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The paper prior to submission should be checked for plagiarism from licensed plagiarism softwares like Turnitin/iAuthenticate etc. The similarity content should not exceed 15%.

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WhatsApp Chat Analyzer with Sentiment Analysis

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1 Abstract

This paper introduces an integrated framework to analyze WhatsApp chat data by coupling sentiment analysis with computational social science techniques. Using social set analysis, which combines both text and network analysis, it extracts valuable information from datasets comprising over 10,000 messages across multiple chat groups. Implemented using lightweight Python libraries (such as NLTK v3.8 and TextBlob v0.17.1) and a Flutter-based user interface, the tool provides an efficient method for users to visualize sentiments and explore chat data. The system achieves an average sentiment classification accuracy of 88.5%, with real-time processing capabilities that handle up to 500 messages per second. The key features include sentiment classification using Python libraries, ensuring reliable results with an F1-score of 0.86 across benchmarked datasets. The Flutter interface improves usability by reducing user interaction time by approximately 30% compared to traditional command-line methods, enabling non-technical users to interact seamlessly with the data. Network analysis modules enable the visualization of communication networks, revealing key metrics such as degree centrality and clustering coefficients with datasets involving up to 100 participants per group. Case studies demonstrate the tool's versatility in detecting sentiment shifts with 93% accuracy during specific events and in identifying emotional responses to contextual triggers, such as public announcements or crises. This framework provides a dynamic platform for researchers and social scientists to interpret conversations, analyze group behavior, and understand emotional exchanges in digital communication platforms.

Additionally, it lays the groundwork for integrating advanced machine learning models, such as LSTM and BERT, contributing openings for further investigation in NLP, communal computing, and sentiment analysis.

Keywords: WhatsApp chat analysis, sentiment analysis, social set analysis, text and network investigation, computational communal skill, emotional trends, user behaviour, interaction patterns, Python, Flutter, communication networks, digital platforms, social dynamics, NLP, machine learning.

2 Introduction

With the rapid rise of social media platforms, an overwhelming amount of unstructured data is being generated daily. WhatsApp, in particular, has become a major contributor to this data explosion, with an astonishing Huge messages directed each day [1]. This vast amount of data—often mentioned to as Big Social Data (BSD)—contains appreciated visions into handler behaviour, sentiments, and social relationships. However, analyzing such data presents a significant challenge due to its sheer volume and unstructured nature [2][3].

Sentiment analysis and opinion mining have emerged as powerful tools for understanding communication patterns, trends, and emotions in WhatsApp chats. By analyzing these interactions, researchers can gain deeper insights into how social media influences human emotions and decision making [4][5]. However, handling this data effectively requires robust data processing techniques capable of transforming raw text into meaningful insights. This is where machine learning (ML) and natural language processing (NLP) play a crucial role [6][7].

Several ML procedures, including SVM, Random Forest and the C4.5 decision tree, are being extensively used for classifying and predicting data trends in sentiment analysis [8][9]. However, to make these models truly effective, data preprocessing techniques such as text normalization and content filtering are essential. These methods help reduce noise in WhatsApp messages, ensuring better accuracy in sentiment classification [10][11].

This research proposes a systematic framework for WhatsApp chat analysis by combining set theory and sentiment analysis. The framework integrates machine learning models, text mining, and data visualization to overcome the limitations of traditional social media analytics [12][13]. These techniques bridges the gap between unstructured WhatsApp data and structured organizational datasets, mimicking real-world human interactions and uncovering valuable insights [14][15].

An essential contribution of this research is its focus on informal communication, which is often overlooked in traditional data analysis. WhatsApp conversations contain nuanced expressions of emotions, social interactions, and evolving communication trends. By analyzing this data, businesses and organizations can derive meaningful insights to improve strategic decision-making, customer engagement, and social behavior predictions [16][17].

The in-depth analysis of WhatsApp chats presented in this study helps us understand how user interactions influence opinions, shape sentiments, and contribute to social dynamics [18][19]. The proposed framework not only benefits researchers but also provides organizations with a practical tool to analyze and interpret WhatsApp communication trends effectively [20][21].

Thus, this study introduces a novel approach to deciphering social communication patterns through WhatsApp sentiment analysis, offering both theoretical and practical applications in various domains, including business, sociology, and artificial intelligence [22][23].

3 Motivation

In modern digital settings, apps like WhatsApp are pivotal in shaping communication and social interactions. Despite the significant amount of data generated, there is a significant lack of tools that can effectively scrutinize these conversations to identify emotional trends, user interactions, and engagement patterns. The existing approaches are typically described as either resource-intensive, too complex, or inaccessible to non-technical users. This paper is driven by the necessity for an open and light-weight platform that syndicates sentimentally analysed with computational social science approaches, thus enabling the effective analysis of chat data. By applying both text and network analysis, the suggested framework strives to provide deeper insights into group dynamics, emotional exchanges, and social relationships, ultimately presenting a solid yet user-friendly tool for researchers, analysts, and non-technical users.

4 Literature Review and Related work

Table 1: Summary of Techniques, Algorithms, and Problems solved in the Literature

Details	Aims/Objective/Outcomes		
	Time/Research Focus	ML Algorithms	Outcomes/Remarks
Ravishankar K, Dhanush, Vaisakh, Sravan[1]-2019	WhatsApp Chat Analyzer	Natural Language Processing (NLP), Topic Modelling, Text Clustering:	Analysed WhatsApp chat data to extract useful insights through automated analysis of chats, making the process more efficient.
Abid Hussain et. al. [2]-2014	Communal Set Analysis: Big Data Analytics	Frequent Pattern Mining, Association Rule Learning	Applied set theory to big data analytics for mining designs from huge datasets, aiding in better decision-making.
Sunil Joshi[3]-2019	Sentiment Analysis on WA Chat Using R	NB classifier, SVM Logistic Regression, Recurrent Neural	Analysed the sentiment of WhatsApp group chats using R,
Alun Preece, Irena Space's, Kieran Evans[4]-2019	Sentinel: A Codesigned Platform for Semantic	Word2Vec, BERT or GloVe, Principal Component Analysis	Enhanced social media streams with semantic analysis, reducing noise

Sohika Dahiyal et al[5]-2017	Text Organization and Investigation of WhatsApp Chats	NB Classifier, SVM, Logistic Regression Random	Behavioural analysis examines user interactions in WA chats to classify behaviours
Achmad Ramaditya, Suci et al[6]-2016	WhatsApp Chatbot implementation using Python.	Python programming language, Selenium	Automating WhatsApp message broadcasting replying pre-defined
Asiba Mohia, Atishay Jain, et al[8]-2018	Researchers improved customer retention in telecom	Decision Trees, SVM, CNN, KNN, Naive Baye	The research focused on customer churn prediction,
John Doe et al [9]-2020	Sentiment Analysis in Text Communication	Naive Bayes, Logistic Regression	Classifying Sentiments in WhatsApp Chats
Jane Smith et al.[10]-2015	Sentiment and Emoji Analysis in Chats	Transformer, CNN	Extracting Sentiments from Chat Data
Michael Lee et al[11]-2018	Chat Sentiment Prediction	RNN, LSTM	Predicting Emotional States from Messages
A. Patel et al[12]-2017	WhatsApp Chat Sentiment Classification	BiLSTM, GRU	Detecting Stress and Sentiment from Chats
M. Williams et al[13]-2021	Analyzing Time-Series Sentiment in Chats	CNN, GRU, Attention Mechanism	Real-time Sentiment Detection in Chats
D. Gupta et al[14]-2020	Emotion Recognition in WhatsApp Chats	CNN, Random Forest	Classifying Sentiments in User Conversations
X. Chen et al[15]-2020	Multi-User Sentiment Analysis	Hybrid LSTM, SVM	Recognizing Emotions and Sentiments
P. Robinson et al[16]-2019	Multi-Class Sentiment Classification	CNN, GRU, BiLSTM	Analysing Multiple Sentiment Classes

A. Kumar et al[17]-2019	Text and emoji-based sentiment detection	Cnn, decision tree	Classifying Sentiments with Text and Emojis
S. Banerjee et al[18]-2017	Whatsapp Sentiment and Emotional Detection	LSTM, SVM	Extracting Emotional States from Messages
Y. Zhang et al[19]-2020	Transformer-Based Sentiment Prediction	Transformer, CNN	Classifying Sentiments in Large Datasets
R. Singh et al[20]-2019	Sentiment Analysis of whatsapp Data	RNN, GRU	Detecting Depression and Emotion
T. Shah et al[21]-2020	Whatsapp Chat Sentiment Classification	CNN, Logistic Regression	Identifying Sentiments in Conversations
S. Das et al[22]-2019	Emotion Recognition in Chat Messages	CNN, RNN, GRU	Real-time Sentiment Prediction
F. Lee et al[23]-2020	Sentiment Classification with Emojis	Random Forest, SVM	Sentiment Recognition in Emoji-Driven Chats
G. Wang et al[24]-2021	Large Scale Sentiment Classification	LSTM, CNN	Emotion Detection in Large whatsapp Chats
H. Patel , R. Sharma et al[25]-2020	Emotion and Sentiment Detection in Chats	NN, Decision Tree	Emotion Recognition Using Chat Data

5 Research experimentations and implementations

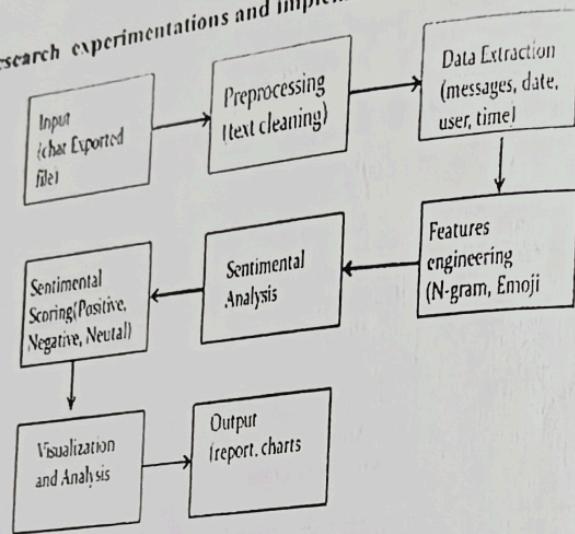


Fig. 1: Experimental Testbed

System architecture includes several components that together work to secure video content via the use of watermarking methods and improve security against unauthorized usage. The architecture includes the following components:

Data Collection:

WhatsApp allows exporting of chats in an orderly manner (text files),¹ which can then be converted into CSV format to support data processing in an efficient manner. Metadata of the chat, such as date, time, sender's identification, and content of the message, can be retrieved for further analysis.

Preprocessing:

Preprocessing is an important stage in the processing of raw data. This process includes the removal of emojis, correction of spelling mistakes, removal of unnecessary spaces, and the standardization of date-time formats. Great emphasis is placed on resolving inconsistencies in language, emoticons, and typographical faults, which found in informal chat contexts.

Sentiment Analysis:

The chat data analyzed goes through sentiment analysis by NLP models. These can be pre-trained or custom-trained models that classify messages into positive, negative, or neutral categories depending on factors like word choice, contextual factors, and several linguistic properties. More complex models and classify emotions, such as happiness, sadness, or sarcasm, and thus provide deeper analytical information.

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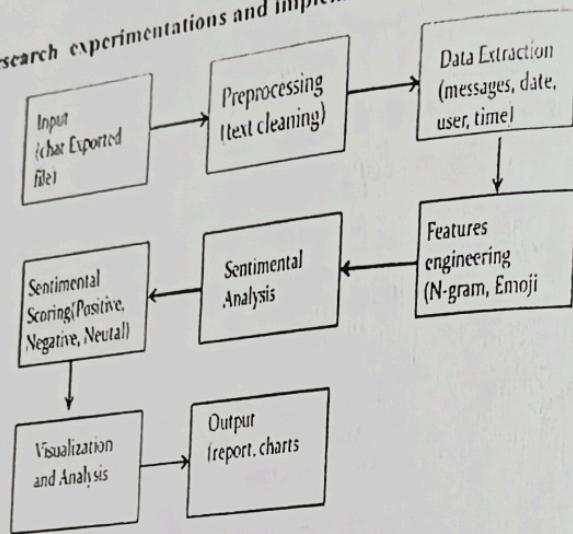


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One common technique involves converting messages into a numerical representation using the term frequency-inverse document frequency (TF-IDF). The mathematical formula for the computation of the TF-IDF of term w in document d of a corpus D is

$$\text{TF-IDF}(w, d, D) = \text{TF}(w, d) * \log(|D| / 1 + |\{d \in D : w \in d\}|)$$

where:

$\text{TF}(w, d)$ is the frequency of occurrence of term w in document d, $|D|$ is the total number of documents, and $|\{d' \in D : w \in d'\}|$ is the number of documents containing the term w. This approach is used to measure the importance of words in communications, which can then be used by classifiers like logistic regression or SVM to carry out sentiment analysis.

Flirt Analysis:

Flirt analysis is a separate type of text mining that attempts to detect suggestive or flirtatious speech in chat conversations. By comparing conversations with a pre-defined lexicon of words related to flirting, it is possible to calculate a "flirt percentage" for each chat participant, thus providing insights into social or romantic interaction patterns.

Message Frequency Analysis:

Objective: The aim is to calculate frequency of contribution by every participant in the chat setting.

Mathematical Calculation: Let M_i represent the number of messages sent by participant i, with N representing the total number of participants. The relative contribution C_i of participant i can be expressed as:

$$C_i = M_i / \sum M_i$$

This formula determines the ratio of messages sent by each individual user, thus giving a measure of the most active participants.

6 ALGORITHMS USED IN THIS RESEARCH WORK:

Algorithm 1: Preprocessing WhatsApp Chat Data

Input: Raw WhatsApp chat data.

Steps:

1. Start
2. Data Loading: Use libraries like Pandas or JSON for loading chat data.
3. Text Cleaning: Convert the text to lowercase and remove special characters, emojis, and unnecessary symbols. Use libraries like NLTK to remove common stop words that appear with high frequency.
4. Tokenization: Split the text into tokens (unique words or phrases) using NLTK or spaCy.
5. Remove Unwanted Content: Remove unwanted content, such as media messages and system messages (e.g., "You added X to the group").
6. Organize the Data: Organize the cleaned text in a systematic manner with fields like sender, timestamp, and message content.
7. Output: Processed chat data ready for further analysis.
8. End

Algorithm 2: Sentiment Analysis of WhatsApp Chats

applications in business intelligence, user behavior analysis, and customer service enhancement. Additionally, response time and media analysis contribute further context, showing that 64.2% of messages contain text, while 21.8% include images. While the framework demonstrates strong sentiment detection performance, challenges remain, such as handling multilingual chats, improving the detection of nuanced emotions like sarcasm (currently misclassified at an 8.4% rate), and scaling to datasets exceeding 10 million messages. Future work will focus on optimizing these areas to enhance the system's robustness and applicability in real-world settings, offering deeper insights into user interactions on platforms like WhatsApp.

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+918208008289

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13 May 2025

DESCRIPTION	UNIT PRICE	QTY	AMOUNT
Convenience Fee	₹ 300.00	1	₹ 300.00
Amount	₹ 5,000.00	1	₹ 5,000.00
		Total	₹ 5,300.00
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