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Enhancing Chatbot Intelligence Through Narrative Memory Structures

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Abstract

Through the use of narrative memory structures—a cutting-edge technique intended to provide chatbots context awareness and conversational coherence—we sought to improve the intelligence of chatbots. We carefully designed our process with the goal of immediately incorporating narrative data into the chatbot's memory architecture. In order to find narrative patterns, this required evaluating and classifying previous exchanges. The narrative patterns were then saved and used to guide the chatbot's answers. The incorporation of narrative memory structures into the chatbot resulted in a significant improvement in conversational coherence and relevance, as per our study's key findings. Through the use of its narrative memory, which stores earlier encounters, the chatbot shown an impressive capacity to sustain the conversation's flow and provide more contextually relevant replies. In addition, the chatbot demonstrated improved understanding of human intentions, correctly identifying underlying motives and preferences. In addition, comments produced by integrating narrative memory structures were highly customized in addition to being accurate. By utilizing the extensive history of previous exchanges, the chatbot was able to customize replies to each user's unique situation, building a closer relationship and rapport with them. All things considered; our study highlights how narrative memory processes can revolutionize chatbot intelligence. We can improve chatbots' conversational capabilities and enable more meaningful human-computer interactions by giving them the capacity to extract narrative information from previous conversations. This opens the door to a new era of chatbot designs that put the needs of users, contextuality, and empathy first, changing the game for conversational AI in the process.

Keywords: Naartive Memory, Context, Chatbots, Artificial Intelligence.

INTRODUCTION

Conversational chatbots, sometimes referred to as dialogue systems or chatbots, are computer programmers made to mimic human-user communication, particularly over the Internet. These chatbots can be applied to a variety of tasks, including entertainment, information gathering, customer service, and teaching. In recent years, conversational chatbots have grown in popularity as a tool. These computer programmes use Natural Language Processing (NLP) techniques such as ChatGPT to replicate human-user discussions(Abdullah et al., 2022). Automated conversational technologies serve customers by making recommendations for products, guiding them through the websites of service providers, and/or answering their questions and concerns(Flavián & Casaló, 2021). Intelligent agents in the field of Artificial intelligence are technology or programs that mimic human mind by doing task independently from wast availability of data

around to take decisions on the basis of reasoning to achieve goals in dynamic and run time environment with accuracy and speed on the behalf of human(Koralewski et al.,2019; Moharir, et al., 2019; Rafiq et al., 2024; Raza et al., 2016). These agents learn within environment along perception having ability to choose their own goal, task, action and process. They may have ability to change their own autonomy i.e. autonomy to let other agents or human involved in achieving desired goal or they themselves may or may not allow to help other agents and human to achieve their goal or task on the basis of reasoning(Aslam, 2023; Lin, Huang, & Yang, 2023; Sheth, Yip, Iyengar, & Tepper, 2019). There is no universal design for these type of systems but autonomous agents have common characteristic of Self maintenance, observed decisions should not changed on the basis of reasoning of internal context and they should have ability to deal with new situations(Io & Lee, 2017; Šabanović, et al., 2013).

They are useful for replacing need of man in risky situation where security of man is at at risk as well as for assisting human for taking care of them as social needs in the form of being companion for storing and generation memories for dementia people artificial pets and and for entertainment(De Magistris et al.,2021; Quintas, et al.,2018). Chatbot is a intelligent agent in the field of Artificial intelligence that perform decision making automatically with or without external help. Chatbotst can assist human in any form needed such as companionship or receptionist .these chatbots are performing their task with having different tools ,techniques and pattern in specific domain they limits the need of human work therefore they tend to respond like human(Alonso, 2015; Banchs, 2017; Ketakee & Champaneria, 2017). For responding like human, they need to think like human by understanding human psychology. For this purpose different chatbots today are using different human like patterns but still have some deficiency to take decision in context as human do. The main reason behind this difficulty is they do not follow the basic logic generated in human mind in term of narrative memory which is the only way of making conversation logically(Ketakee & Champaneria, 2017). These agents no doubt doing these task as their best but mapping human intelligence with artificial intelligence still needs some updating so that structure of these agents to understand and act in the situation can be more like human to take logical decision in context. These agents are not understanding context as human do and therefore are lack in capability of using context to generate responses on the basis of narrative memory which is the only way to generate context(Alonso, 2015).

The main issue this study attempts to solve is how traditional chatbots' deprived conversational depth and consistency. More natural and contextually conscious conversational agents cannot be developed in the absence of a method to store and recall previous conversations. In order to overcome these constraints and improve chatbot intelligence, this project aims to explore the integration of narrative memory systems. Enhanced chatbot intelligence is mostly dependent on narrative memory, which is modeled after human memory systems. Because of this, the agent is able to remember details from previous exchanges, which gives future talks meaning. Because of this feature, users can have a more engaging and natural experience using chatbots, which also helps them remember their preferences and keep conversations coherent across lengthy exchanges(Anderson, 2015; Azam et al., 2024; León, 2016). The significance of this study lies in its potential to advance the field of conversational AI. Successful integration of narrative memory structures has the potential to transform

chatbots into more intelligent and context-aware agents. This not only enhances user experience but also opens doors to applications in diverse domains, including customer service, education, and healthcare. As chatbots become more sophisticated, their contribution to human-computer interaction and user satisfaction is likely to increase, making this research pivotal in shaping the future of intelligent conversational agents.

LITERATURE REVIEW

Because machine consciousness is at the nexus of ethics, technology, and philosophy, it presents a wide range of opportunities as well as challenges. This work investigates the complex problems surrounding the attempt to understand and perhaps awaken robots. In theory, machine consciousness can only be achieved through advancements in cognitive science, artificial intelligence, and neuroscience. Even though great strides have been made in developing AI systems that can learn and solve problems, true consciousness remains an elusive goal. The ethical ramifications of machine consciousness are significant. Should a machine acquire sentience, figuring out its moral status and rights would be essential(Rafiq et al., 2024). Artificial intelligence (AI) methods like natural language processing (NLP) and artificial neural networks are used by conversational chatbots of today to comprehend user input and provide relevant responses. We will examine the goals behind the creation of chatbot systems in this study, as well as the important techniques and datasets that were used in their creation. Lastly, the accomplishment of the goals, related difficulties, and potential directions for chatbot growth will be covered(Lin et al., 2023).

Even though they are fully aware that discussion programmers are devoid of identities, emotions, and sentiments. When people engage with service chatbots, they could still believe that they have a social presence(Pantano & Scarpi, 2022). With rare exceptions, not many scholarly works currently investigate human-computer interactions and/or the usefulness of dialogue systems like chatbots by drawing on theoretical frameworks such as the social presence theory and/or the social response theory. When describing the features of chatbots or conversational agents—which are primarily employed for customer engagement—a few commentators specifically cited related theories(Adam et al.,2021; Kull, Romero, & Monahan, 2021). Generally speaking, chatbots are automated conversational systems that can simulate human-like dialogue. Previous studies (Nass and Moon 2000; Nass et al. 1994; Rha and Lee 2022) revealed that although people are perfectly aware that dialogue programmes do not have emotions, feelings, or identities, they occasionally treat computers as social creatures(Camilleri & Troise, 2023). A chatbot is a computer programme that can have natural language conversations with users. Chatbots can be used to deliver information, respond to queries, and carry out other predetermined duties(Fitria, et al, 2023). Eliza as Chatbot was breakthrough invention which started trend to communicate with human (Dale, 2016) but now Communication agents to assist human are coming into existing like a storm from past decade even simplest frameworks are provided to build them up in school level projects(Lin et al., 2023) ,can communicate in any form such as audio text etc and are domain specific such as business (Limna, Kraiwanit, Jangjarat, Klayklung, & Chocksathaporn, 2023). These chatbots are built by using Different techniques, tools, approaches and principles on the basis of requirements of user in certain environment by using natural language interpretation mostly, many platforms are developed for

creating these chatbots to perform different types of services in a domain so they need large set of data as Corpus/ database. Many built in Corpus are available to build these system (Luo et al., 2022; Shalaby, et al., 2020; Suhaili, et al., 2021). Many models have been developed recently for providing framework to Autonomous agents for better performance of goal in specific situation(Frasheri, 2018; Xu, et al., 2021). The goal of this work is to improve the capacity for reasoning and decision-making in conscious agents by creating a model of narrative memory. To replicate human cognitive processes, the model includes a narrative memory module. Agents may now observe, understand, and decide based on players' narration thanks to the model's implementation in a narratively improved game design(Azam et al., 2024).

Table 1.

Model	Understanding context	Genrating context	Narrative memory architecture)
Context sensitive conversational agent using DNN	Partial	Partial	No
PEPPER	Yes	Partial	No
Content oriented user modeling for personalized response ranking in chat bot	Partial	Partial	No
Context based emotional analyzer for interactive agents	Partial	Partial	No
Cognitive services and intelligent Chat bots	Yes	Partial	No
Xiaolce	Partial	Partial	No
Architecture for integration of chatbot	Partial	Partial	No
Chatbot Application using Artificial intelligence	Partial	Partial	NO
Meena	Partial	Partial	No

These models no doubt provides way to achieve goal semantically but still have limitation in the perspective of user point of view to understand Behavior of Intelligent agent in certain situation. There is need to act more like human by understanding and generating conversation in context as human do by linking situations and responding accordingly. PEPPER claims to have narrative memory but does not generate context as human do because of lack of understanding of context at first(Dominey et al., 2017; Steyaert & Bouwen, 2019). Context sensitive conversational agent usinh DNN Does not generate content by understanding as it only retrieve stored data where human make conversation on the basis of context and logically relation sing of context to understand and generate general context which is the structure of narrative memory(Karve, et al., 2018). Context based emotion analyzer for interactive agent as model generate responses on Natural language processing by matching pattern completely rather than understanding situation better due to lack of context identification and understanding(Malik et al., 2017; Rokhsaritalemi, et al., 2023). Content-oriented user

modeling for personalized response ranking in chatbot Lack in understanding of general context due to which prediction is not as accurate as human do(Malik et al., 2017). Cognitive services and intelligent chatbots focus only on the language not its meaning itsellf as language or words alone are not enough to understand situations(Sheth et al., 2019).

Xiao Ice chatbot have very large set of data about 660 million users have conversation with it and it Reponses according to their data provided by pattern matching of more probable or similar convos where human does not use only pattern matching techniques to do conversation but uses general context to make new conversation or to lead conversations(Zhou et al., 2020). An architecture proposed for chatbot in the proposal of architecture for the integration of chatbot is mostly based of general knowledge of the world i.e. internal context rather than internal and external context combination to take decisions as human do(Villegas-Ch, 2020). Chatbot Application Using Artificial intelligence have limited conversations due to not having semantic responses if it is not self conscious(Fatima, 2019). Meena does not have ability to lead conversation because of not having human like structure as it is based on external world knowledge only. So their conversations are fixed which are retrieved from database and does not have ability to external knowledge into internal context(Huang, 2018).

Narrative memory, inspired by human memory systems, plays a pivotal role in enhancing chatbot intelligence. It enables the agent to retain information from past interactions, providing a contextual foundation for subsequent conversations. This capability allows chatbots to remember user preferences, maintain coherence over extended dialogues, and create a more natural and engaging user experience(Azam et al., 2024; León, 2016). Approaches and technologies have been explored to imbue chatbots with narrative memory. Memory-augmented neural networks, attention mechanisms, and recurrent neural networks (RNNs) are commonly employed to facilitate the retention and retrieval of contextual information.

Memory-augmented architectures, such as Neural Turing Machines and Memory Networks, have shown promise in improving chatbot performance in handling complex and dynamic conversations. Chatbots lacking narrative memory face notable limitations. They often struggle to maintain context over extended dialogues, leading to responses that may seem disjointed or lack personalization. Without the ability to recall past interactions, these chatbots are more prone to misunderstand user intent and provide generic responses. The absence of narrative memory hampers the development of a more natural and intelligent conversational experience, limiting the potential applications of chatbots in scenarios requiring prolonged interactions and nuanced understanding.

In this paper we have implemented the Narrative architecture on chatbot to make them act more like human in different situations.

METHODOLOGY

All of the chatbot's internal workings and their interconnections are laid out in the system architecture. It describes the steps used to generate replies, incorporate narrative memory, and interpret user inputs. Included in the design are modules for narrative memory, conversation management, and natural language processing. Specifications

of the selected design are detailed, including configurations of neural networks or structures that boost memory. The training and evaluation of the chatbot rely heavily on data collection methods. The dataset used in this study is varied and covers a wide range of conversational situations. To build a strong training set, we gather user interactions like queries, answers, and contextual clues. Another way to measure user happiness and perceived intelligence is by collecting feedback on the chatbot's responses. The incorporation of a memory structure into the design of the chatbot is the essence of narrative memory implementation. Some examples of such structures are attention mechanisms, memory-augmented neural networks, and others. The design takes into account the level of detail to be saved, the amount of time to be remembered, and methods to retrieve information efficiently.

The approach is designed to mimic the way the human brain analyzes narrative memories. During training, the chatbot is exposed to the dataset, the parameters of the neural network are fine-tuned, and the narrative memory components are optimized. Usability, context retention, and conversational coherence are some of the evaluation metrics that have been defined. In order to measure the effect of the new memory structures, the chatbot is compared to baseline models that do not have narrative memory. The generalizability of the model can be checked using cross-validation methods. When creating and releasing chatbot systems, developers must keep ethical issues in mind at all times. By protecting users' privacy and obtaining their explicit agreement before collecting any data, this study complies with ethical standards. Data security and anonymization measures are put in place. Misinformation is minimized by keeping the chatbot's capabilities and limits on full display. By addressing possible biases and reducing hazards related to user interactions, the study complies with ethical requirements in AI research.

RESEARCH FRAMEWORK

Our proposed model is based on narrative structure to solve problem of understanding, perception with the help of reasoning about context to make conversation logically any action in the environment is analyzed by situation with the help of world knowledge base and self preferences modules to take decisions such as perception, with reasoning, situation from environment is extracted to take decisions. Components of narrative memory are mental model, internal context, world knowledge and external context. These components work together to generate general context which are used for perception and learning process to make decisions. These decisions are stored in narrative memory itself as input and output both are context. Context c is generated through narrative memory which forms conceptual state of an entity to achieve desired behavior of application of which categorized any entity, object, people location and covers basic questions 5 question of reasoning i.e. what? When? who? why? where? this categorization is specific characteristics of entities or object that uniquely differentiate them from other entities and objects. These specific characteristics are achieved by the way perceiving things which in turn are a perception of mental model.

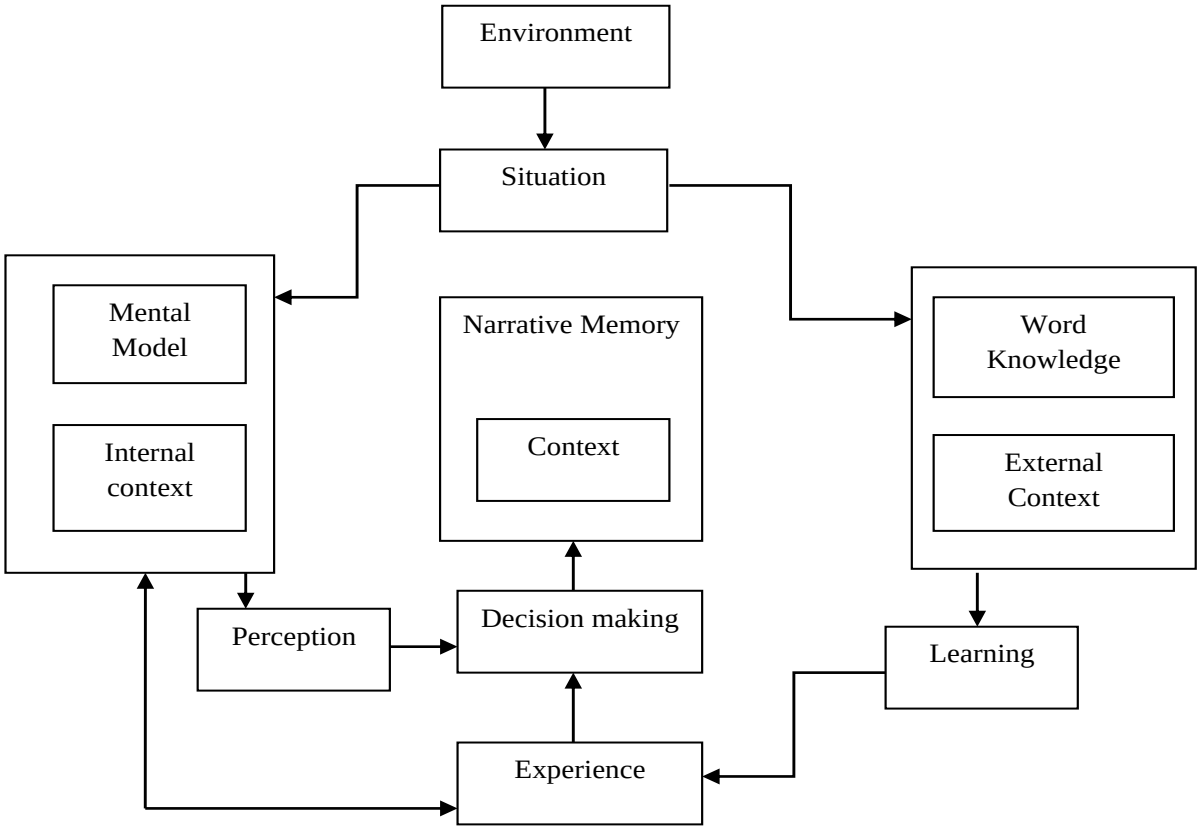


Figure 1.
System Architecture

Mental model is a view from perspective of individuality about world according to belief, norms and values which has experienced by understanding the surrounding. Context varies according to situations and can be changed by changing mental model. Mental model is a sub part of internal context which makes self. To do task in any situation to understand own interest and reasoning parts of internal context are element of mental model such as goal, task, perception, feeling or emotions. Existing models do not have conversation leading capability like understanding multi context as human make conversation in the term of understanding the environment, such as what is the topic, type of conversation (Positive, Negative, happy, sad, angry), what is the mood the mood of other person while making any conversation and how our mood is changing due to influence of the other person behavior. This does not depends only on Natural language processing but depends purely on context such as using metaphors and understanding the emotion effect of conversation regardless of specifically word defined in that conversation.

RESULTS

When any sentence in conversation is created or used in simulation, its id, emotion, identity along with time is stored to generate general context. The below images are the expressed narrative representation of our simulation of chatbot base narrative memory storage to generate context. Where agent understand the input conversation to generate context with reason either the context of the sentence and overall

conversation is happy, sad or angry as average sentiment which is combination of understanding topic of the sentence by differentiating (subject, object,) I.e. who is talking and about what? also with understanding of structure of the sentence by its overall grammar by combining all these, avg sentiment is checked which is base for generating context with reasoning. The general context is generated by overall conversation and average sentiment. where overall emotion of conversations is checked by analyzer that evaluate sentence's emotions by total number of sentences and their avg the below images are the representation of our simulation of general structure of the narrative memory to generate context. Where different components of narrative memory module are created and explained. these memories while combined are used to create context.

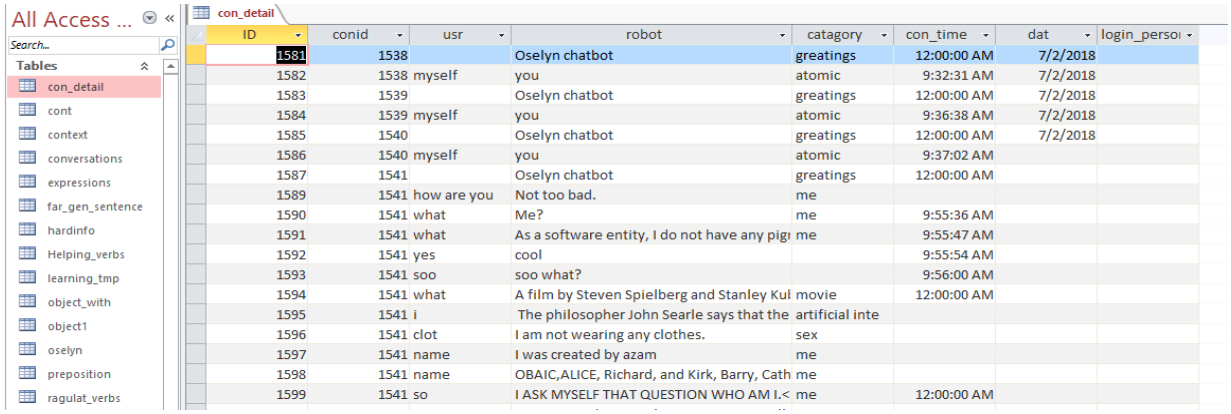


Figure 2.
General memory

In above image, conid id is memory where id of sentence is stored such as id of conversation between user and robot along with category or type of sentence with date and time.

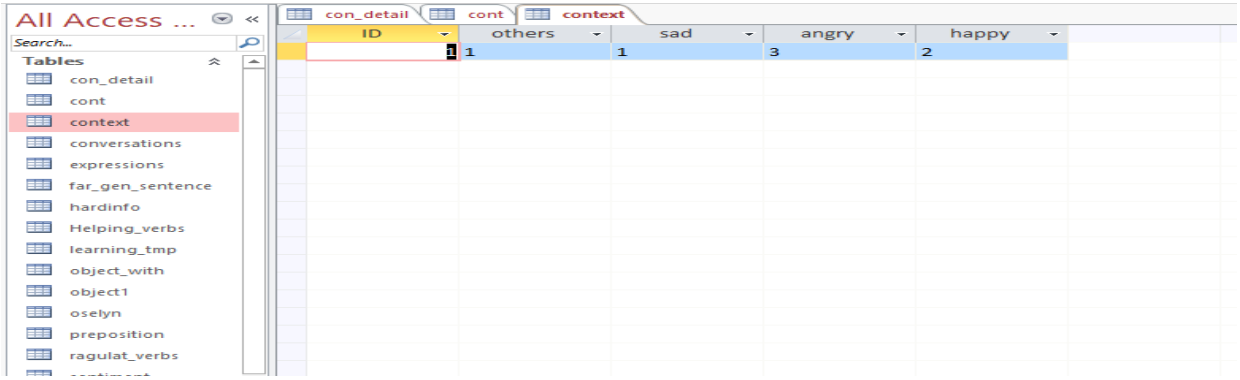


Figure 3.
Updation of emotional Context memory

Context memory in the above image is the result of knowledge base and episodic memory it is used to create general context used for reasoning. By using average of emotion to update context

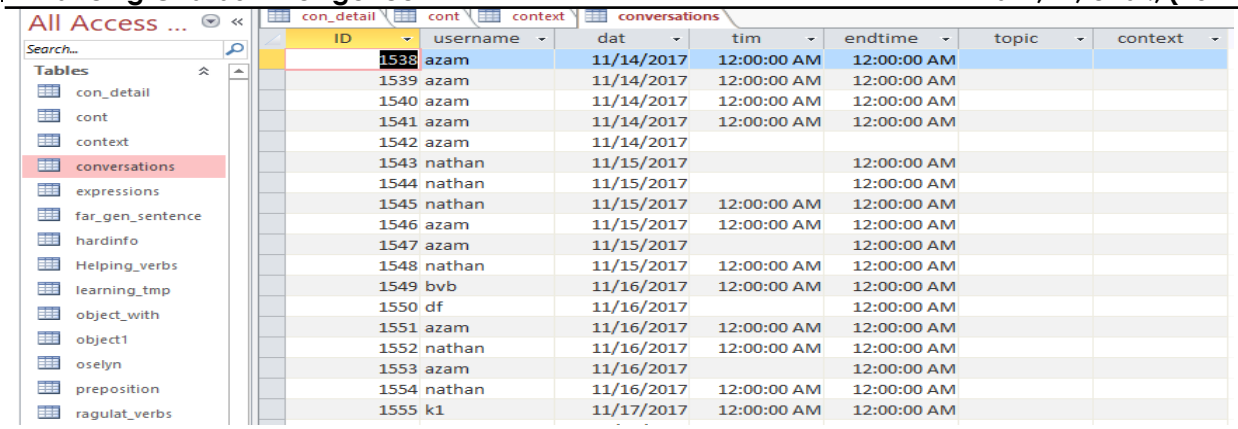


Figure 4.

episodic memory part

Conversation memory is episodic memory component of narrative memory where user name as identity and date with time as temporal event is stored for making experience

Figure 5.

Semantic memory

The above image is Semantic memory part for narrative memory where general words with emotional meaning along description is created to be used in general context for making logical decisions

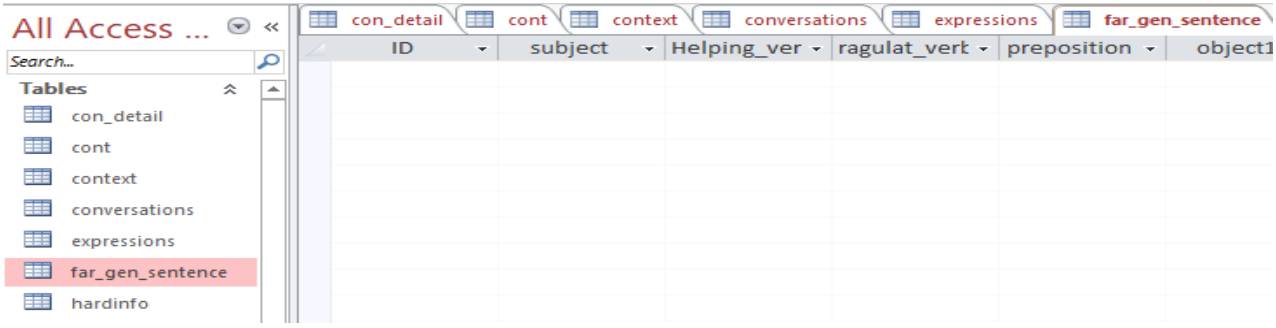
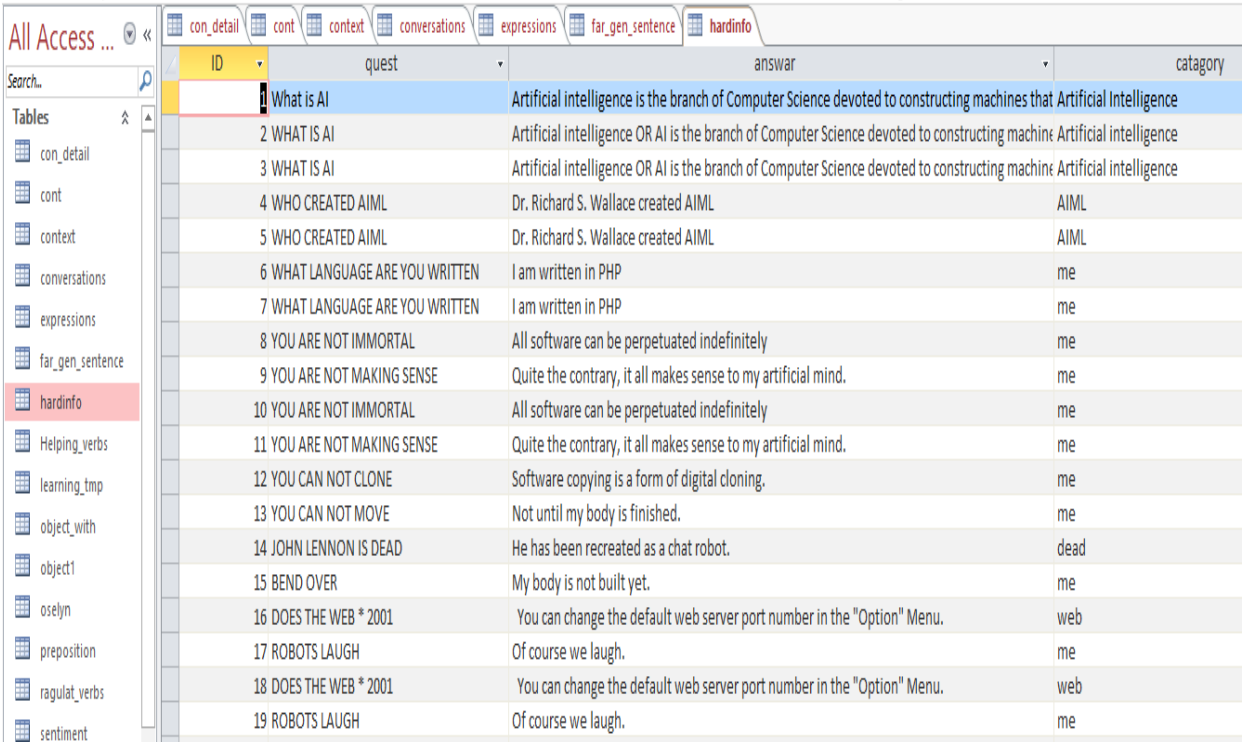


Figure 6.

POS

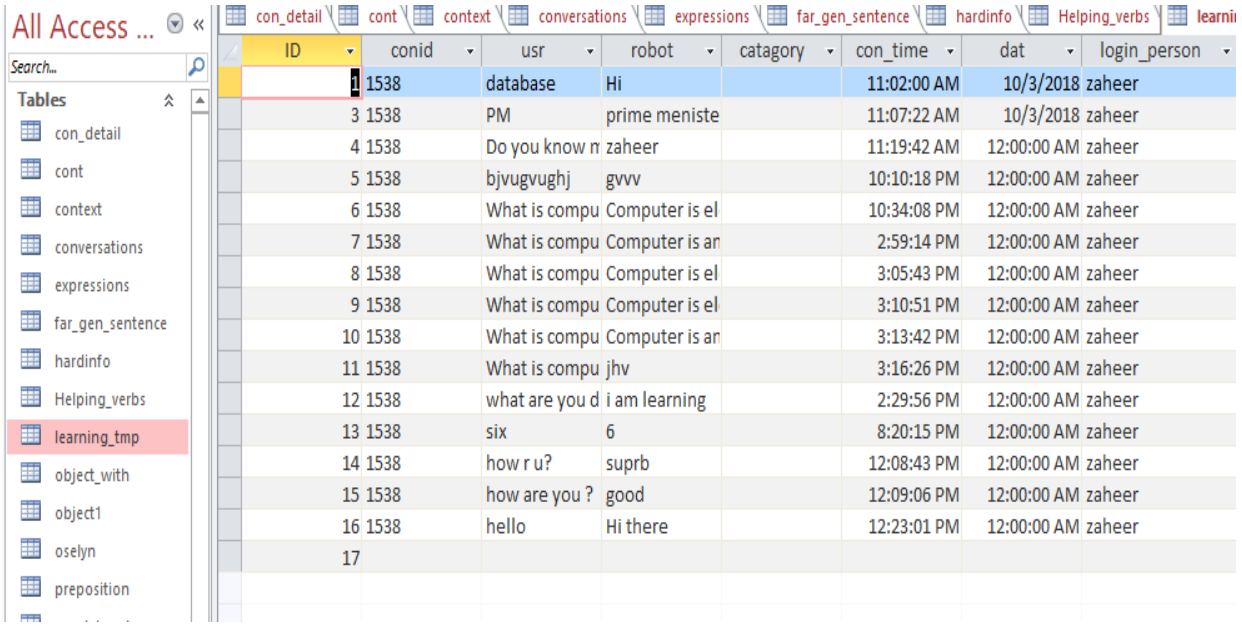
In Above image we have done POS tagging for understanding structure of sentence on the basis of subject, helping verb, regular verb and preposition.



ID	quest	answar	catagory
1	What is AI	Artificial intelligence is the branch of Computer Science devoted to constructing machines that	Artificial Intelligence
2	WHAT IS AI	Artificial intelligence OR AI is the branch of Computer Science devoted to constructing machine	Artificial intelligence
3	WHAT IS AI	Artificial intelligence OR AI is the branch of Computer Science devoted to constructing machine	Artificial intelligence
4	WHO CREATED AIML	Dr. Richard S. Wallace created AIML	AIML
5	WHO CREATED AIML	Dr. Richard S. Wallace created AIML	AIML
6	WHAT LANGUAGE ARE YOU WRITTEN	I am written in PHP	me
7	WHAT LANGUAGE ARE YOU WRITTEN	I am written in PHP	me
8	YOU ARE NOT IMMORTAL	All software can be perpetuated indefinitely	me
9	YOU ARE NOT MAKING SENSE	Quite the contrary, it all makes sense to my artificial mind.	me
10	YOU ARE NOT IMMORTAL	All software can be perpetuated indefinitely	me
11	YOU ARE NOT MAKING SENSE	Quite the contrary, it all makes sense to my artificial mind.	me
12	YOU CAN NOT CLONE	Software copying is a form of digital cloning.	me
13	YOU CAN NOT MOVE	Not until my body is finished.	me
14	JOHN LENNON IS DEAD	He has been recreated as a chat robot.	dead
15	BEND OVER	My body is not built yet.	me
16	DOES THE WEB * 2001	You can change the default web server port number in the "Option" Menu.	web
17	ROBOTS LAUGH	Of course we laugh.	me
18	DOES THE WEB * 2001	You can change the default web server port number in the "Option" Menu.	web
19	ROBOTS LAUGH	Of course we laugh.	me

Figure 7.
world knowledge base

Hard info memory is world knowledge base component of narrative memory to having general world knowledge.



ID	conid	usr	robot	catagory	con_time	dat	login_person
1	1538	database	Hi		11:02:00 AM	10/3/2018	zaheer
3	1538	PM	prime meniste		11:07:22 AM	10/3/2018	zaheer
4	1538	Do you know n	zaheer		11:19:42 AM	12:00:00 AM	zaheer
5	1538	bjvugvughj	gvvv		10:10:18 PM	12:00:00 AM	zaheer
6	1538	What is compu	Computer is el		10:34:08 PM	12:00:00 AM	zaheer
7	1538	What is compu	Computer is ar		2:59:14 PM	12:00:00 AM	zaheer
8	1538	What is compu	Computer is el		3:05:43 PM	12:00:00 AM	zaheer
9	1538	What is compu	Computer is el		3:10:51 PM	12:00:00 AM	zaheer
10	1538	What is compu	Computer is ar		3:13:42 PM	12:00:00 AM	zaheer
11	1538	What is compu	jhv		3:16:26 PM	12:00:00 AM	zaheer
12	1538	what are you d	i am learning		2:29:56 PM	12:00:00 AM	zaheer
13	1538	six	6		8:20:15 PM	12:00:00 AM	zaheer
14	1538	how r u?	suprb		12:08:43 PM	12:00:00 AM	zaheer
15	1538	how are you ?	good		12:09:06 PM	12:00:00 AM	zaheer
16	1538	hello	Hi there		12:23:01 PM	12:00:00 AM	zaheer
17							

Figure 8.
learning memory

When any new situation arise, learning memory store the situation for making experience which will be stored in episodic memory.

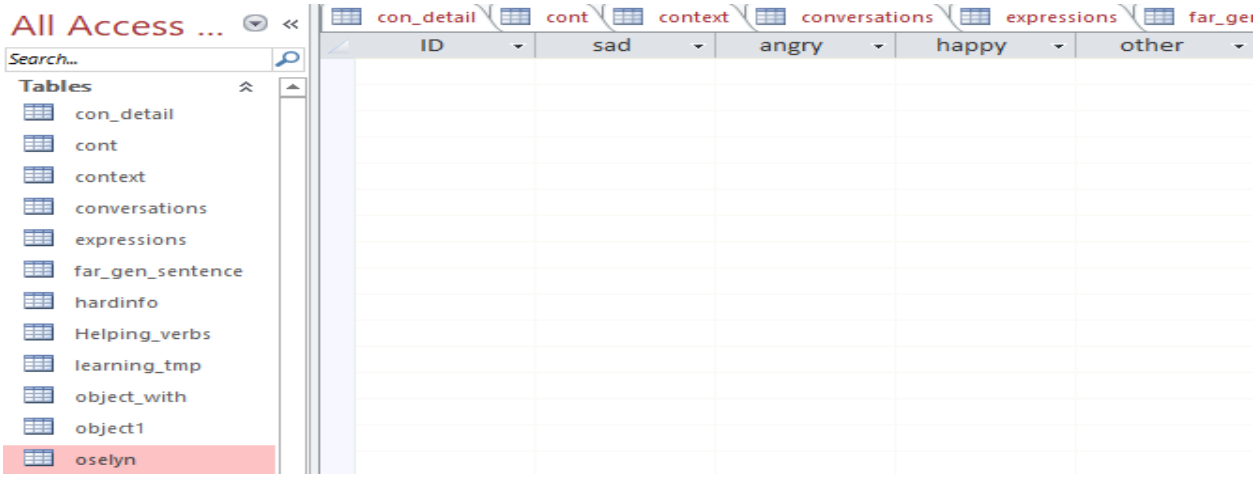


Figure 9.
Agent and person emotion

Oselyn is name of our agent where its emotions such as sad, happy, angry and other emotion are stored on the basis of these emotions, responses will be generated.

Figure 10.
Mental model component

When any sentence in conversation is created or used in simulation, its id, emotion, identity along with time is stored to generate general context. The below images are the expressed narrative representation of our simulation of chatbot base narrative memory storage to generate context. where agent understand the input conversation to generate context with reason either the context of the sentence and overall conversation is happy ,sad or angry as average sentiment which is combination of understanding topic of the sentence by differentiating (subject, object,)

I.e. who is talking and about what? Also with understanding of structure of the sentence by its overall grammar by combining all this avg sentiment is checked which is base for generating context with reasoning.

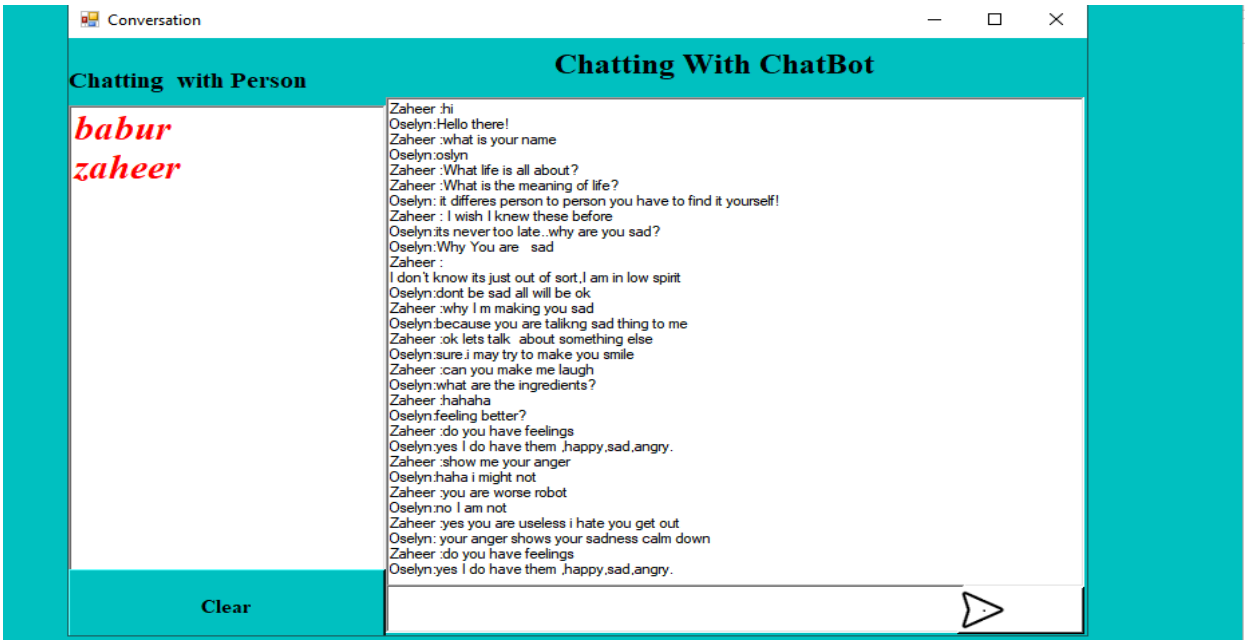


Figure 11.
Chat with bot

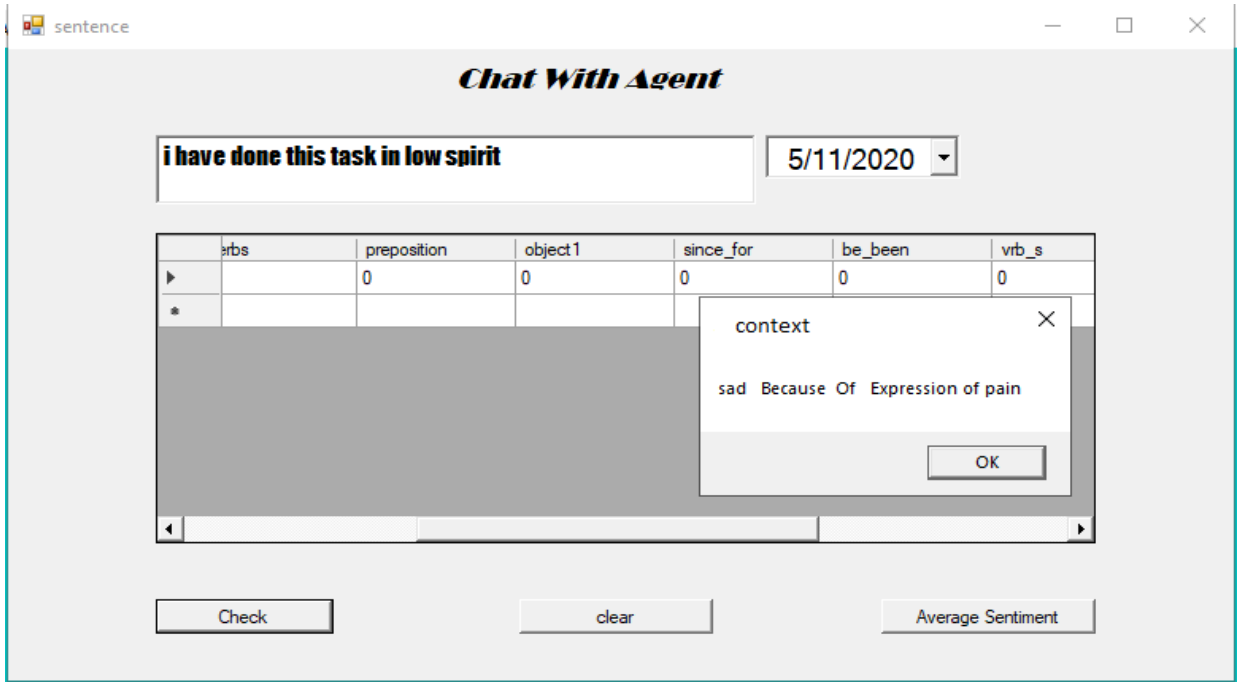


Figure 12.
sentence sentiment context

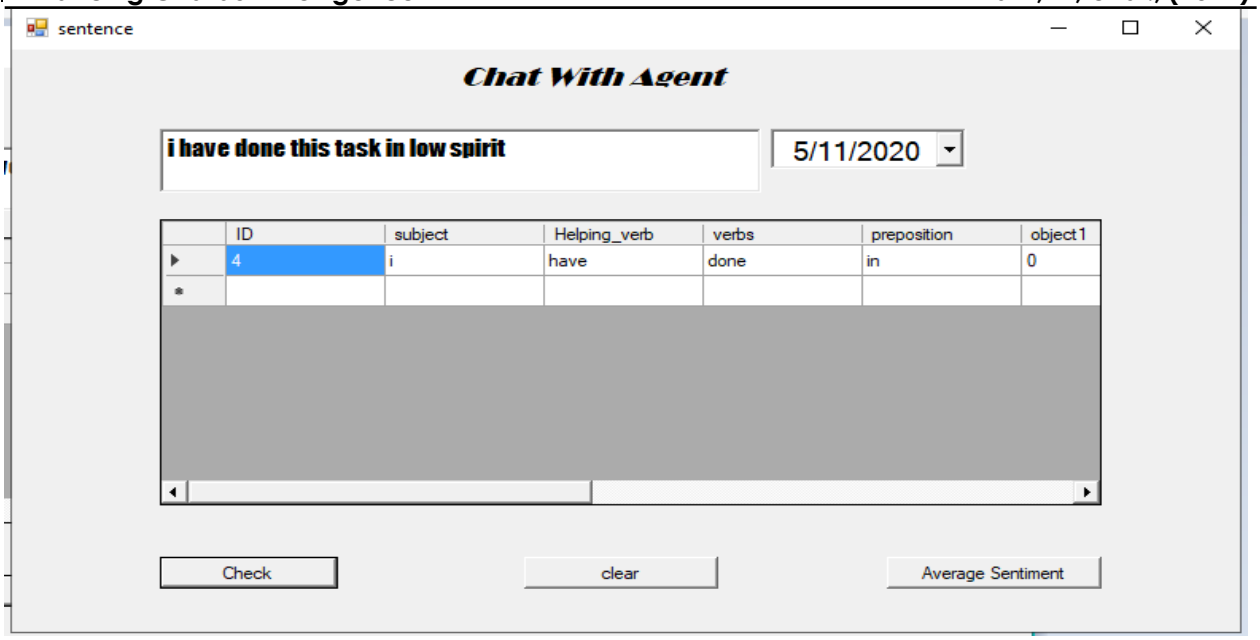


Figure 13.
sentence context

The above sentence is divided into different parts of speech to understand the sentiment of sentence these images describe the context of the sentence by providing reason why this resentence has sad.

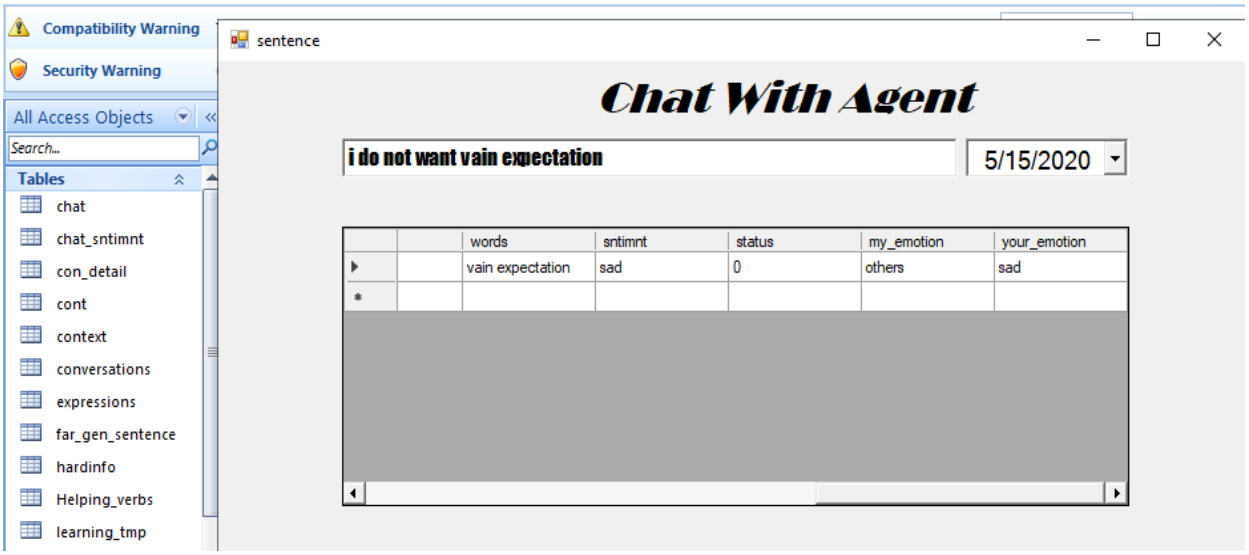


Figure 14.
Emotion

emotion by understanding the expression of doing task in low spirit, and understanding structure of the sentence.

Agent's and person emotion

my_emotion is extracted emotion of agent and your_emotion is emotion of the person on the basis of which context for decision making Is changed.

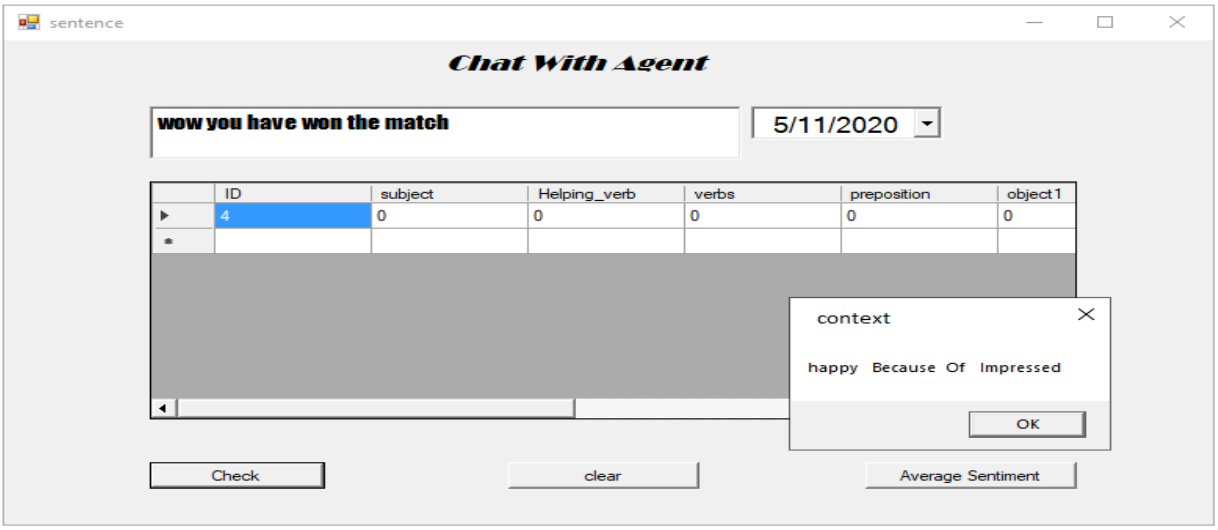


Figure 15.
Happy Context

The above figure represents the happy context because of reason impressed and the below figure represents the context generated from narrative memory having topic, subject, object, verb, prepositions, as topic, and work.

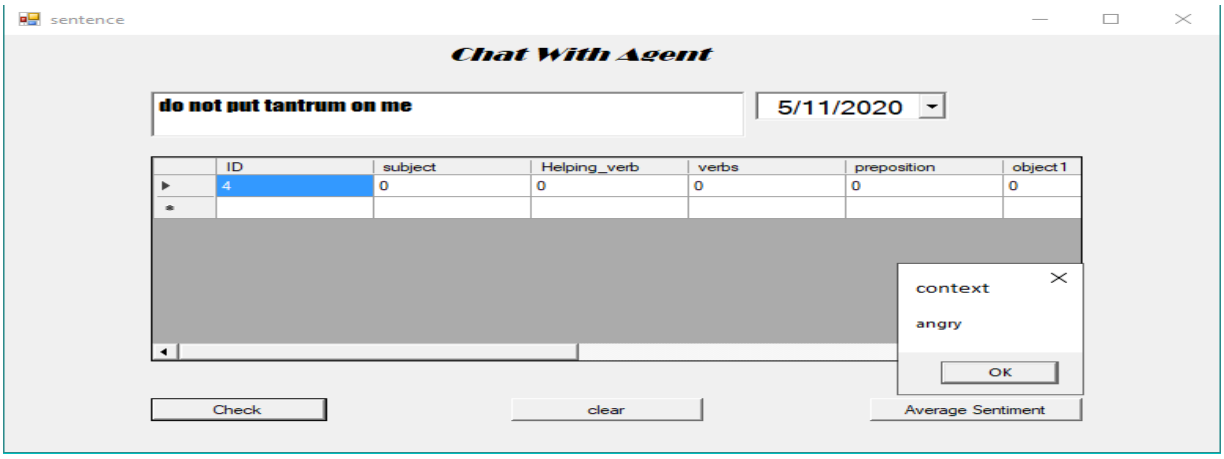


Figure 16.
angry context

Figure 17.
sentence structure

Angry sentiment of sentence is generated on the basis of reasoning of understanding logic of sentence.

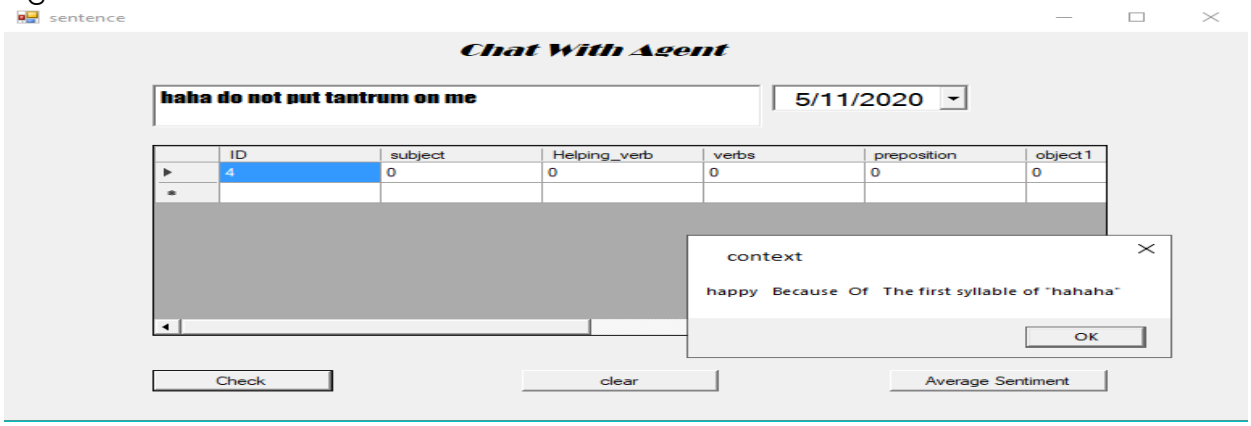


Figure 18.
Happy sentence context

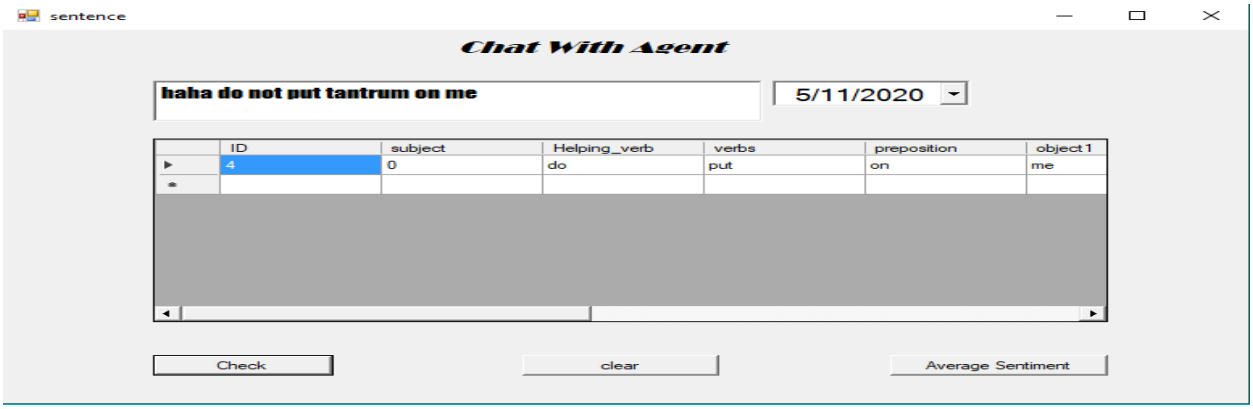
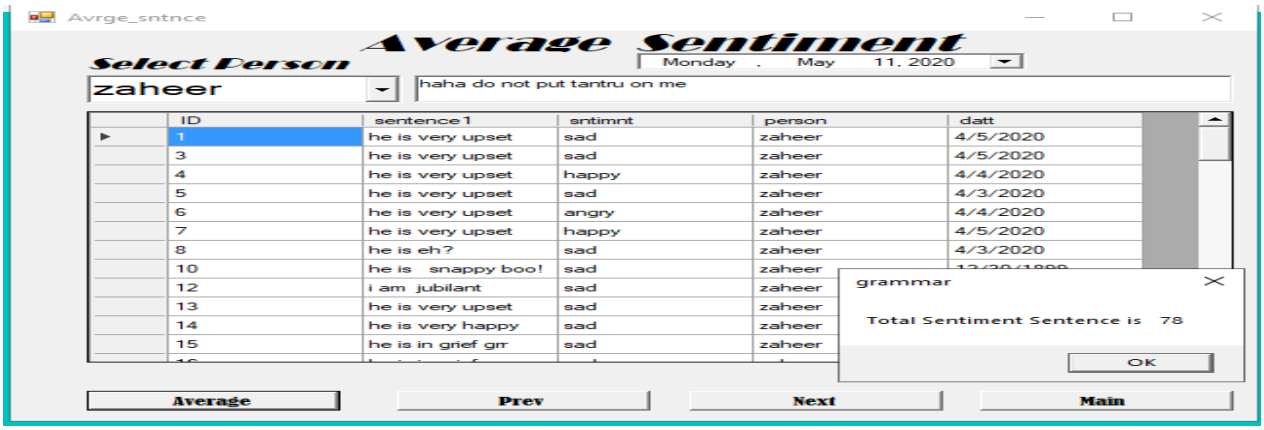
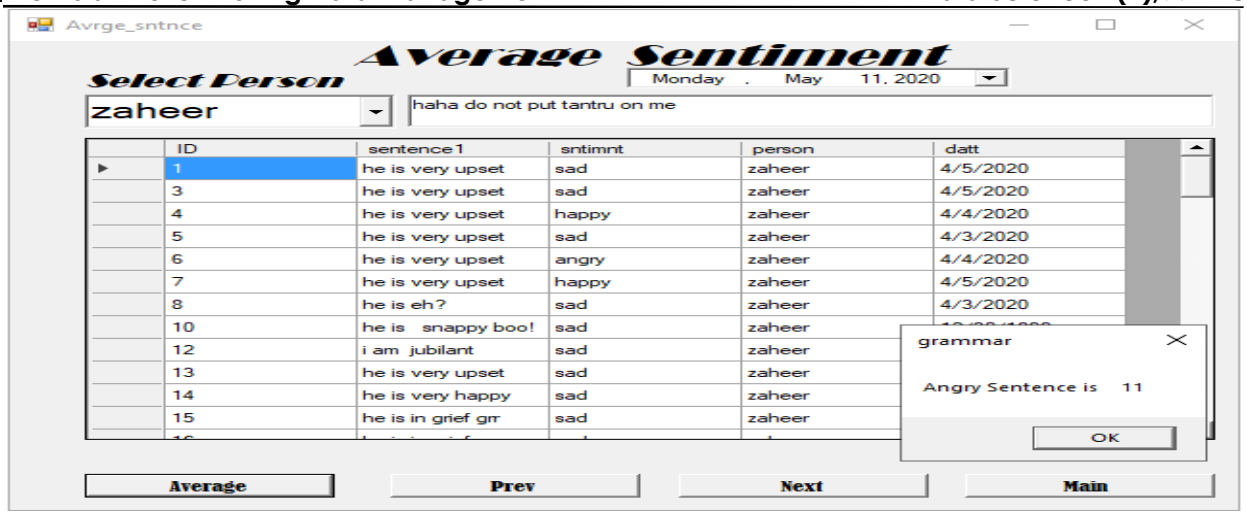


Figure 19.
Happy context

The general context is generated by overall conversation and average sentiment. where overall emotion of conversations is checked by analyzer that evaluate sentence's emotions by total number of sentences and their avg the figure is shown below.





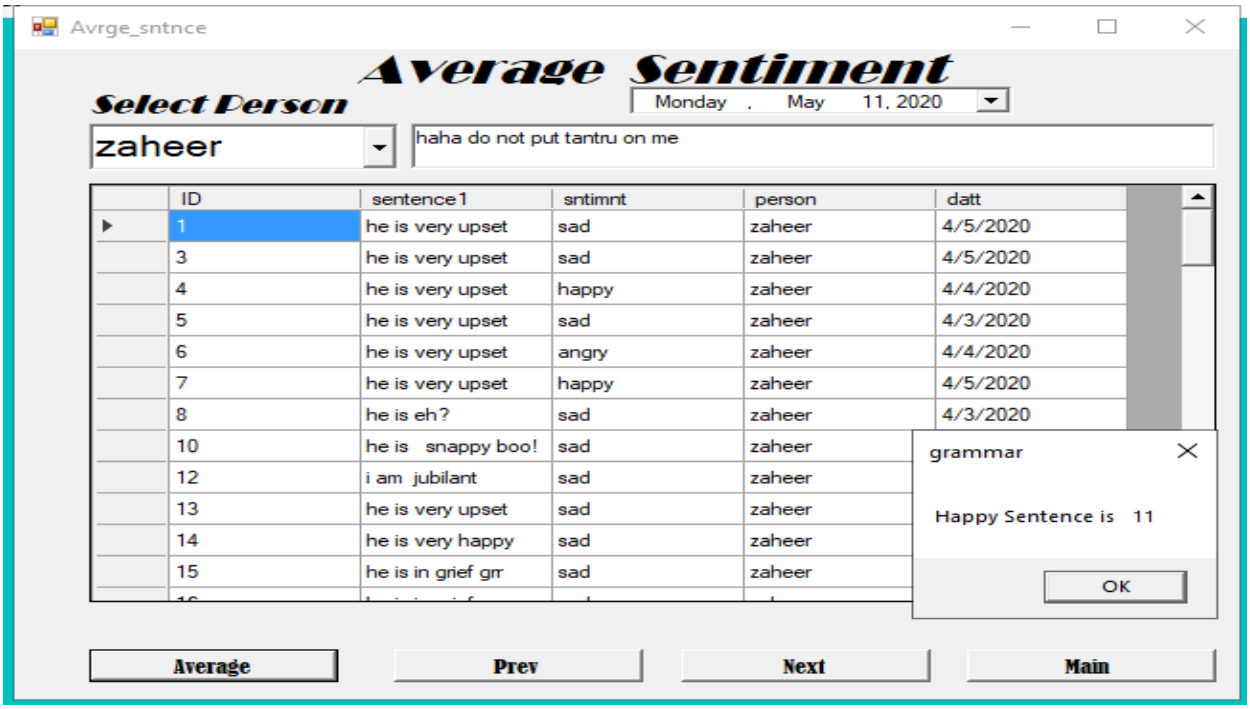


Figure 20.
stored narrative

Above figures are stored narrative where every sentiment of the conversation is stored and according to this stored narrative decisions can be made in chatbot. Our created chatbot has conversation leading ability whose emotion changes due to user (other person's) emotion which leads to changing the emotion of user on the basis of understanding the topic of user.

DISCUSSION AND LIMITATIONS

Evaluation of performance indicators, user comments, and comparison analyses are all part of the process of interpreting the results. The research objectives provide a framework for discussing important findings, which illuminate the role of narrative memory

structures in the chatbot's enhanced intelligence. To further understand how story memory affects chatbot performance, we look for trends, patterns, and outliers in the data. How Narrative Memory Affects the User Experience: Explored in this article are the more general effects of narrative memory on the user interface. It delves into how user happiness, customization, and conversational authenticity are affected by narrative memory structures integration. More interesting and tailored to the user's needs and preferences, context-aware interactions are being thought about. We honestly describe the challenges and constraints that we encountered during the research. Problems with data biases, limitations of the selected methodology, or narrative memory structures in their execution are all part of this category. There is an acknowledgment of possible sources of mistake or uncertainty and an overview of efforts to address these concerns. The limitations and potential improvements of the study are laid out in detail in the discussion. Areas that should be explored further are outlined in the discussion of future research directions. Improving narrative memory mechanisms, investigating adaptive learning models, or broadening the study to include other cultural settings are all possible steps in this direction. The article concludes with recommendations for improving narrative memory's utility in various chatbot contexts and resolving any outstanding issues. Innovation and more study in the topic are sparked by the conversation. This section adds to our understanding of the study's findings and how they could affect chatbot AI development by delving into the interpretation of results, the effects of narrative memory on user experience, the difficulties encountered, and possible avenues for future study.

CONCLSION

Autonomous agents that assert to have context fail to demonstrate human-level reasoning when it comes to tasks like decision-making based on perception and reasoning. This leaves the possibility of incorrect decisions caused by misunderstanding or misinterpretation of the situation, and it fails to address the issue of producing inaccurate context.hence, it's necessary to employ the idea of a Narrative Memory based model to help autonomous agents comprehend and construct context through reasoning regarding their actions.Through precise context awareness, the model may adapt to external situations by modifying its own context.Just as the scenario alters the agent's context, the agent can also alter their environment through the use of narrative memory structure.The agent with the Narrative memory model can mimic human behavior and thought processes.In order for autonomous agents to mimic human performance, they need narrative memory, which includes episodic, semantic, and working memory. There is a lack of ability to mimic the human mind in the models presented in the literature review since they do not incorporate narrative memory. In order for the suggested model to comprehend, see, and generate context by reasoning about its actions, it employs and supports the components of narrative memory. The efficacy of the intended model has been examined in the Results chapter through the use of simulation. We have a model that can adapt to changing conditions. It is important to consider the context of any circumstance when deciding what to do in order to achieve a desired outcome.In order to gain a better grasp of the subject matter, context is first divided into several elements. These aspects are then integrated according to predetermined rules that establish relationships between them, resulting in the formation of new context. When we classify things in this new light, we have a better

knowledge of the circumstance and how to respond to it. Then, we record the behaviors that come from our decisions in a memory module called Narrative memory. Data is immediately sent to narrative memory in order to swiftly evaluate and retrieve decision-making context whenever new decisions are to be made. On the other side, narrative memory uses reason-based interactions with the analyzer to retain the internal and external context, which is merged and called general context. This is accomplished by retrieving features from semantic and episodic memory. Quick decisions can be made with the help of this stored context, which is the outer layer of narratives.

FUTURE RECOMMENDATIONS

Research might concentrate on creating algorithms that dynamically balance the significance of previous exchanges according to how recently they occurred. This would guarantee that chatbots give precedence to recent data when providing contextually relevant answers, while simultaneously preserving a long-term knowledge base to ensure the continuity of conversations.

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