A Seminar Report
(MCS-291)
on

Emotionally Intelligent Machines & Sentiment Synthesis based on Ancient Vedic Astrology

College of Computing Sciences & Information Technology
Teerthanker Mahaveer University
Moradabad

Submitted in partial fulfillment of the requirements for the degree of **Master of Technology** by

Mohit Singh
(TCA-2212005)

under the guidance of
Dr. Priyank Singhal & **Mr. Vikas Kuchhal**

June 1, 2023

Acceptance Certificate

College of Computing Sciences &
Information Technology
Teerthanker Mahaveer University
Moradabad

The seminar report entitled "Emotionally Intelligent Machines & Sentiment Synthesis based on Ancient Vedic Astrology" submitted by Mr. Mohit Singh (Enrollment No. TCA-2212005) may be accepted for being evaluated.

Dr. Priyank Singhal

Signature
June 1, 2023

Mr. Vikas Kuchhal

Signature
June 1, 2023

Acknowledgements

I would like to express my sincere gratitude to my supervisors Dr. Priyank Singhal & Mr. Vikas Kuchhal, as well as my mentor Dr. Anu Sharma and Jyotishacharya Mr. DK Lahori for providing me the guidance, valuable advice and constant encouragement that they provided during this seminar work. I am also greatly thankful to them as they have given me an opportunity to work on this interesting topic.

I am very grateful to Dr. RK Dwivedi the Director of the College of Computing Sciences & Information Technology for providing me the opportunity to do this seminar as part of my academic program. This seminar has not only been a valuable learning experience but has also contributed to the knowledge base of the field.

I would also like to thank my seniors, colleagues and friends who provided me with valuable feedback and suggestions. Their input has significantly improved the quality of this seminar.

Furthermore, I would like to express my gratitude to Teerthanker Mahaveer University for providing me the necessary resources and infrastructure. The library staff and resources have all played an integral role in the successful completion of the study.

I am grateful to have had the opportunity to study at such an esteemed institution and to have been surrounded by individuals who have pushed me to achieve my best. Thank you, Teerthanker Mahaveer University, for contributing to my academic and personal growth.

Finally, I would like to thank my family for their unwavering support and encouragement throughout the research. Their love and understanding have been a source of strength and inspiration to me.

Once again, thank you to everyone who has contributed to this seminar.

-Mohit Singh
CCSIT(TMU)
June 1, 2023

Contents

Emotionally Intelligent Machines & Sentiment Synthesis based on Ancient Vedic Astrology

Abstract

After brain researchers have recognized that emotions are crucial for human and animal intelligence, Artificial Intelligence researchers have also started to acknowledge the importance of emotions in the design of intelligent machines. In this seminar, we will discuss about the Emotionally Intelligent Machines(EIM's) which is the new field of research in Artificial Intelligence but it has a great potential to do immense good, however the technology can be misused but it is up to the consumers of this technology who will decide whether it will be used for good or for evil. Also, Astrology has always been a controversial topic and is completely depends upto the personal faiths and beliefs of an individual. Apart from that, this paper describes that how Emotionally Intelligent Machines(EIM's) & Sentiment Synthesis Systems can be developed by using the concept of Ancient Vedic Astrology.

Keywords

Artificial Intelligence(AI), Emotional Intelligence(EI), Emotional Artificial Intelligence(EAI), Cognitive Psychology, Emotion Dynamics, Long-Short Term Memory(LSTM), Vedic Astrology.

1 Introduction

Going beyond sentiment analysis or developing such AI systems who have their own sentiments is currently not studied. However, several examples can be found where different methods are used to develop such systems that are capable of responding emotionally after analysing the sentiments from the input, such as the Emotional Speech Synthesis News Dialogue System, GAN Human Emotion Synthesis, and Emotional Chatting Machine which are discussed in this seminar, but working of all these Emotional Artificial Intelligence(EAI) systems which are present currently is based on the logic not on the intution. If

it may possible for us to make such an EAI systems which can works on the basis of the logic as well as on intution, then the huge gaps and mismatchs which are currently present inbetween the interaction of human and computers can be fulfilled. The AI researchers have focused on giving machines linguistic and mathematical-logical reasoning abilities, modelled after the classic linguistic and mathematical-logical intelligences. This seminar discusses about the new research that is giving machines skills of emotional intelligence. Machines have long been able to appear as if they have emotional feelings, but they are now being programmed to also learn when and how to display emotion in ways that enable them to appear empathetic or otherwise emotionally intelligent. They are now being given the ability to sense and recognize expressions of human emotion such as interest, distress, and pleasure, with the recognition that such communication is vital for helping them choose more helpful and less-aggravating behaviour. Emotionally Intelligent Machines are the systems that can recognize, interpret, process, and simulate human emotions which could be based on the concept of ancient vedic astrology. They are the machines which can adapt different situations and knows how to handle these situations more intelligently and smartly. This paper also highlights different aspects of emotional behaviour of human beings.

2 Review of Literature

Understanding the need for emotional intelligence in modern machines, and also how psychology and Vedic astrology can contribute to further improvement in machine intelligence. To explore this, we collected some literature related to psychology, Vedic astrology, and dynamical systems. These literatures include recently published researches, some ancient scriptures, and also some articles published on blogs by renowned astrologers and psychology researchers, which are mentioned below.

Ref. No.	Paper Title	Techniques	Findings	Year
[1]	A Concise History of Hindu Astrology and Indian Spirituality	-	Overview of Rashi, Nakshastras, Navagrahas and Dashas in Vedic Astrology	2023

Ref. No.	Paper Title	Techniques	Findings	Year
[2]	The Unconscious Mind and Planetary Influences on the Human Unconscious Mind and Personality	-	Planetary Influences on Human Physiology and Psychology	2023
[3]	Predictability and Predictions	Nonlinear, Baroclinic, 3D Model of the Tropical Cyclone	Effects of Initial Conditions on Numerical Instabilities	2022
[4]	Three Kinds of Butterfly Effects within Lorenz Models	Classical Lorenz Model	Sensitive Dependence of the Solutions of Non-Linear Differential Equations on Initial Conditions	2022
[5]	Reinforcement Learning for Emotional Text-to-Speech Synthesis with Improved Emotion Discriminability	Interactive training paradigm for Emotional Text-to-Speech Synthesis (i-ETTS)	Use of Reinforcement Learning in Sentiment Synthesis	2021

Ref. No.	Paper Title	Techniques	Findings	Year
[6]	Sentiment Analysis for Emotional Speech Synthesis in a News Dialogue System	Combination of BERT and BiLSTM-CRF Models	Need and Real World Application of Sentiment Systhesis	2020
[7]	Sentiment Analysis Based on Deep Learning: A Comparative Study	DNN, CNN, RNN and TF-IDF	Application of different types of Deep Learning Techniques on Sentiment Analysis	2020
[8]	Astrology, modernity and the project of self-identity	-	Application of Astrology in getting Self-Knowledge, Self-Determination and Encour-agement of Elective Biography and Self-Identity	2020
[9]	Generative Adversarial Networks in Human Emotion Synthesis:A Review	Generative Adversarial Net-works(GANs)	Working of GAN Model and Sentiment Sythesis using it	2020

Ref. No.	Paper Title	Techniques	Findings	Year
[10]	Summarizing Emotions from Text Using Plutchik's Wheel of Emotions	Psychological Model of different Human Sentiments	Sentiment Analysis using Plutchik's Wheel of Emotions	2019
[11]	The Study of Emotional Intelligence in Artificial Intelligence	-	Role of Emotional Intelligence in Artificial Intelligence and its Potential Applications	2019
[12]	Consciousness and Uncon-sciousness of Artificial Intelligence	-	Problem of Multilevel Mind in Artificial Intelligence Systems	2019
[13]	Word-level sentiment analysis with reinforce-ment learning	LSTM(WS-LSTM) Model	Application of LSTMs in Sentiment Analysis	2019
[14]	Sentiment Intensity Ranking among Adjectives Using Sentiment Bearing Word Embeddings	Semi-Supervised Technique	Sentiment Specific Word Embeddings (SSWE) are significantly better than word2vec and GloVe	2017

Ref. No.	Paper Title	Techniques	Findings	Year
[15]	Emotional Chatting Machine: Emotional Conversation Generation with Internal and External Memory	Gated Recurrent Unit(GRU)	Model can Generate Emotions as Responses	2017
[16]	Long Short-term Memory	-	Introduction to LSTM-RNN	1997
[17]	Surya Siddhanta of Mayasura by Prof. Ram Chandra Pandey	Ancient Mathemati-cal Techniques for Calculations of Astronom-ical Phenomena	Timings, Dashas and Transits in Vedic Astrology	1999
[18]	Brihat Parashar Hora Shastra of Maharishi Parashar Vol.1	-	Guidelines and Principles for Analyzing a Person's Traits, Strengths, Weaknesses	1996
[19]	Brihat Parashar Hora Shastra of Maharishi Parashar Vol.2	-	Effects of Dashas and Transits on a Person's Traits, Strengths, Weaknesses	1996

Ref. No.	Paper Title	Techniques	Findings	Year
[20]	Surya Siddhanta - Wikisource	Ancient Mathematical Techniques for Calculations of Astronomical Phenomena	Timings, Dashas and Transits in Vedic Astrology	2018
[21]	Brihat Parashara Hora Shastra - Wikisource	-	Guidelines and Principles for Analyzing a Person's Traits, Strengths, Weaknesses	2023
[22]	Geometric Series — Wikipedia	Convergence	Relation of Convergence with Human Beliefs	2022
[23]	Ramanujan summation — Wikipedia	Divergence	Relation of Divergence with Human Beliefs	2023
[24]	Robert Plutchik — Wikipedia	Modelling of Human Emotions on the Basis of Psychology	Relationship Between Different Kinds of Human Emotions	2023
[25]	Emotion Dynamics - Equations of Emotion	Modelling of Human Emotions on the Basis of Analogy	Analogy of Human Mind with an Electrical Dynamical System	2017

Ref. No.	Paper Title	Techniques	Findings	Year
[26]	Understanding Conjunction in Vedic Astrology	-	Analogy of Electrical Concepts with Vedic Astrology	2023

In 2023, Martins, Paulo in their paper "A Concise History of Hindu Astrology and Indian Spirituality" provides a concise history of Hindu astrology and its symbolism present in its spirituality which is transversal to all cultures. They also mentioned the foundations and main conceptions of Hindu astrology, namely Rasi, Nakshastra, Navagrahas, Bhava, Dashas [1].

In 2023, Bhardwaj, Rishi and Pareek, Aditya in their paper "The Unconscious Mind and Planetary Influences on the Human Unconscious Mind and Personality" discusses the concept of the unconscious mind and its importance in psychology. The authors argue that the unconscious mind is not separate from the rest of the universe and that there is a connection between the human unconscious and the universal unconscious. They also discuss the impact of planetary vibrations on the huma physiology as well as on human psychology [2].

In 2022, Anthes, Richard A. in their paper "Predictability and Predictions" describes their experiences with predictability theory and weather predictions. The author classified the development of mesoscale weather systems into two types: those resulting from forcing by surface inhomogeneities and those resulting from internal modifications of large-scale flow patterns. The author also developed a nonlinear, baroclinic, three-dimensional model of the tropical cyclone and suffered through various forms of numerical and physical instabilities. The numerical instabilities could be controlled by suitable choices of finite difference schemes and various damping or smoothing mechanisms, but physical instabilities persisted and resulted in the evolution of somewhat realistic mesoscale features such as rainbands and eddies on the outflow layer that were not present in the initial conditions [3].

In 2022, Shen, Bo-Wen and Pielke, Roger A. and Zeng, Xubin and Cui, Jialin and Faghih-Naini, Sara and Paxson, Wei and Atlas, Robert in their paper "Three Kinds of Butterfly Effects within Lorenz Models" discussed about the

three major kinds of butterfly effects within Lorenz models: (1) butterfly effects of the first kind (BE1) represent the sensitive dependence of solutions on initial conditions (SDIC); (2) butterfly effects of the second kind (BE2) represent the hypothetical role of initial tiny perturbations in producing an organized large-scale system at large distances; and (3) butterfly effects of the third kind (BE3), or the so-called real butterfly effect, represent the role of small scale processes in contributing to the finite predictability of large scale processes. The paper also provides a brief summary of the three kinds of butterfly effects and their differences. Additionally, the paper discusses the features of classical Lorenz models and a generalized Lorenz model [4].

In 2021, Rui Liu and Berrak Sisman and Haizhou Li in their paper "Reinforcement Learning for Emotional Text-to-Speech Synthesis with Improved Emotion Discriminability" proposes a new interactive training paradigm for Emotional Text-to-Speech Synthesis (ETTS) called i-ETTS, which aims to improve the emotion discriminability of the generated voice by interacting with a Speech Emotion Recognition (SER) model. The proposed i-ETTS outperforms the state-of-the-art baselines by rendering speech with more accurate emotion style. The authors formulate an iterative training strategy with reinforcement learning to ensure the quality of i-ETTS optimization. The proposed i-ETTS achieves remarkable performance by consistently outperforming the ETTS baseline systems in terms of voice quality and emotion discriminability [5].

In 2020, Takatsu, Hiroaki and Ando, Ryota and Matsuyama, Yoichi and Kobayashi, Tetsunori in their paper "Sentiment Analysis for Emotional Speech Synthesis in a News Dialogue System" proposes a method to control emotional parameters of speech synthesis in a news dialogue system by constructing a news dataset with emotion labels annotated for each sentence. They use a model combining BERT and BiLSTM-CRF to identify emotion labels and evaluate its effectiveness using the constructed dataset. The model performance can be improved by preferentially annotating articles with low confidence in the human-in-the-loop machine learning framework. The future work includes developing a speech synthesis system that can control emotional parameters using the emotion label estimated by the proposed model and confirming whether speaking with emotion promotes user's understanding in news delivery tasks [6].

In 2020, Dang, Nhan Cach and Moreno-García, María N. and De la Prieta, Fernando in their paper "Sentiment Analysis Based on Deep Learning: A Com-

parative Study" discusses the use of deep learning models for sentiment analysis on social network data. The authors review the latest studies that have employed deep learning to solve sentiment analysis problems, such as sentiment polarity. They used word embedding and TF-IDF to transform input data before feeding that data into deep learning models. The architectures of DNN, CNN, and RNN were analyzed and combined with word embedding and TF-IDF to perform sentiment analysis. The authors conducted experiments to evaluate DNN, CNN, and RNN models on datasets of different topics, including tweets and reviews. Finally, a comparative study has been conducted on the experimental results obtained for the different models and input features [7].

In 2020, Paul Clements in their paper "Astrology, modernity and the project of self-identity" discusses Western and UK astrology as a fluid divinatory practice that accommodates modern, linear, and literal symbolism while still retaining its pre-modern 'magical' roots. It offers a spiritual understanding, self-knowledge, and self-determination, and encourages elective biography and self-identity. The practice of astrology today is a permutation of esoteric, individual DIY, and sun-sign formats, which offers multiple levels of engagement, from everyday meanings to more personal and philosophical insights. The astrologer mediates psychic hunches embedded in learnt craft, and it grounded some of the ideas presented, including the difficult choices surrounding individual definition and responsibility. The paper concludes that astrology embeds a spiritual outlook that co-exists with profane individualism and materiality highlighting dissonant modernity [8].

In 2020, Hajarolasvadi, Noushin and Arjona Ramírez, Miguel and Demirel, Hasan in their paper "Generative Adversarial Networks in Human Emotion Synthesis:A Review" reviews recent advances in human emotion synthesis using generative adversarial network (GAN) models. GAN models consist of a generator and a discriminator, which are trained iteratively in an adversarial learning manner, approaching Nash equilibrium. The core idea of GANs is based on a zero-sum game in game theory. Instead of estimating the distribution of real data samples, GANs learn to synthesize samples that adapt to the distribution of real data samples. The paper discusses facial expression synthesis, speech emotion synthesis, and audio-visual (cross-modal) emotion synthesis under different application scenarios. The authors also highlight open research problems to push the boundaries of this research area for future works [9].

In 2019, Abbasi, Mohsin and Beltiukov, Anatoly in their paper "Summa-

rizing Emotions from Text Using Plutchik's Wheel of Emotions" discusses the analysis of emotions expressed by people on the internet using Plutchik's wheel of emotions. The wheel is used as a tool to identify and summarize emotions to their primary classes. The methodology involves allocating a weight to each emotion depending on the class it belongs to and its distance from the center of the wheel. These weights are then multiplied by the frequencies of emotions in text to identify their intensity level. The intensity of each emotion is summed up with the intensity of its primary emotion while summarizing it. The paper concludes that the methodology effectively summarizes emotions in the text, but neutral emotions and feelings described in Plutchik's wheel of emotion complicate the process of summarization. In future, the authors plan to propose a mechanism to avoid complications while summarizing neutral emotions [10].

In 2019, Sahiti S. Magapu, Sashank Vaddiparty in their paper "The Study of Emotional Intelligence in Artificial Intelligence" discusses the role of Emotional Intelligence in Artificial Intelligence and its potential applications in various fields such as healthcare, education, consultation, and construction. The use of Emotional Artificial Intelligence can help machines to better understand and respond to human emotions, which can lead to more advanced solutions to complicated problems. It can also help to close the barriers between humans and machines, providing new opportunities for equal treatment. The conclusion of the paper is that the use of Emotional Artificial Intelligence gives a much more profound view on how machines can help humans compared to traditional AI today [11].

In 2019, Piletsky, Eugene in their paper "Consciousness and Unconsciousness of Artificial Intelligence" discusses the need to understand the problem of multilevel mind in artificial intelligence systems. It proposes that consciousness and the unconscious are not equal in natural mental processes and that the alleged mental activity of Artificial Intelligence may be devoid of the evolutionary characteristics of the human mind. The paper presents several scenarios for the possible development of a 'strong' AI through the prism of creation (or evolution) of the machine unconscious. It also proposes two opposite approaches regarding the relationship between the unconscious and the conscious. The conclusion raises interesting questions about whether a machine can have a phenomenal experience or something remotely resembling it, and whether there is a fundamental difference between the imitation of rational behavior and the rational behavior itself [12].

In 2019, Chen, Ruiqi and Zhou, Yanquan and Zhang, Liujie and Duan, Xiuyu in their paper "Word-level sentiment analysis with reinforcement learning" proposes a new framework named Word-level Sentiment LSTM (WS-LSTM) that uses reinforcement learning to realize text sentiment analysis. The framework uses three different LSTM tunnels for each action (Positive, Neutral, and Negative) to get sentiment tendency for each word in a sentence. The model can get word-level sentiment sequence with a relatively good result through reinforcement learning. The conclusion of the paper is that the proposed method can successfully combine text sentiment analysis with reinforcement learning and can get sentiment for each word in a specific task [13].

In 2017, Sharma, Raksha and Somani, Arpan and Kumar, Lakshya and Bhattacharyya, Pushpak in their paper "Sentiment Intensity Ranking among Adjectives Using Sentiment Bearing Word Embeddings" proposes a semi-supervised technique that uses sentiment bearing word embeddings to produce a continuous ranking among adjectives that share common semantics. The system demonstrates a strong Spearman's rank correlation of 0.83 with the gold standard ranking. The use of sentiment embeddings reduces the need for sentiment lexicon for identification of polarity orientation of words. Results show that Sentiment Specific Word Embeddings (SSWE) are significantly better than word2vec and GloVe, which do not capture sentiment information of words for intensity ranking task. The sentiment intensity information of words can be used in various NLP applications, for example, star-rating prediction, normalization of over-expressed or under-expressed texts, etc [14].

In 2017, Zhou, Hao and Huang, Minlie and Zhang, Tianyang and Zhu, Xiaoyan and Liu, Bing in their paper "Emotional Chatting Machine: Emotional Conversation Generation with Internal and External Memory" proposes Emotional Chatting Machine (ECM) that can generate appropriate responses not only in content but also in emotion. The model addresses the emotion factor using three new mechanisms that respectively (1) models the high-level abstraction of emotion expressions by embedding emotion categories, (2) captures the change of implicit internal emotion states, and (3) uses explicit emotion expressions with an external emotion vocabulary. The proposed model can generate responses appropriate not only in content but also in emotion, as shown by objective and manual evaluation [15].

In 1997, Hochreiter, Sepp and Schmidhuber, Jürgen showed in their paper "Long Short-term Memory" introduces a novel, efficient, gradient-based

method called Long Short-Term Memory (LSTM) to solve long time lag problems. LSTM is local in space and time, its computational complexity per time step and weight is O(1). Each memory cell's internal architecture guarantees constant error flow within its constant error carrousel (CEC), provided that truncated backprop cuts off error flow trying to leak out of memory cells. Two gate units learn to open and close access to error flow within each memory cell's CEC. The multiplicative input gate affords protection of the CEC from perturbation by irrelevant inputs. Likewise, the multiplicative output gate protects other units from perturbation by currently irrelevant memory contents [16].

Surya Siddhanta is a significant ancient mathematical text in Vedic Astrology and Astronomy. It is believed to have been written around the 4th or 5th century CE, although some scholars date it as early as 200 BCE. The text contains detailed calculations of astronomical phenomena, such as the movements of the planets, eclipses, equinoxes, planetary positions, and timekeeping methods.It also contains formulas and algorithms for the Earth's axial tilt, the length of the solar year, and other astronomical parameters. It describes various instruments and techniques used for observing and predicting celestial events [17, 20].

The Brihat Parashara Hora Shastra is one of the most important and comprehensive texts in Vedic astrology. It is considered one of the foundational texts in Vedic astrology, also known as Jyotish. The word "Hora" refers to the branch of astrology that deals with the interpretation of planetary positions and their effects on individuals and events. The text provides detailed guidelines and principles for analyzing a person's horoscope to determine their personality traits, strengths, weaknesses, and future prospects. It explores topics such as the significance of the twelve houses, the nature and characteristics of the nine planets (including the Sun, Moon, Mars, Mercury, Jupiter, Venus, Saturn, Rahu, and Ketu), and the impact of planetary periods (dashas) on a person's life. The Brihat Parashara Hora Shastra is highly revered among astrologers and is studied and referenced extensively for astrological predictions and consultations. It is a comprehensive guide that offers insights into the principles and practices of Vedic astrology, helping practitioners gain a deeper understanding of the cosmic influences on human life [18, 19, 21].

An article on wikipedia gives an example of a geometric series that converges absolutely. This infinite series is related to some philosophical questions considered in antiquity, particularly to Zeno's paradoxes. It can be very useful in understanding the relationship between the belief systems of human mind and

concept of convergence which is one the very important concept in the theories of dynamical systems, control systems and artificial neural networks [22].

Ramanujan summation is an infinite divergent series which is a technique invented by the mathematician Srinivasa Ramanujan for assigning a value to divergent infinite series. Although the Ramanujan summation of a divergent series is not a sum in the traditional sense, it has properties that make it mathematically useful in the study of divergent infinite series, for which conventional summation is undefined [23].

In 1980, Robert Plutchik proposed a psychoevolutionary classification approach for general emotional responses. He considered there to be eight primary emotions—anger, fear, sadness, disgust, surprise, anticipation, trust, and joy and discussed about the bipolar relationship between them. He also created a wheel of emotions to illustrate different emotions which is known as the Plutchik's Wheel of Emotions [24].

In 2017, Jon Miles published an article on his blog. In this article, named "Emotion Dynamics, Equation of Emotions", he discussed about the mathematical modelling of human sentiments and different states of human mind which is based on the analogy of human mind with an electrical dynamical system. According to his blog, the three phenomenas of mind, craving, anger and attachment are related to each other as like the inductance, resistance and capacitance in an electrical network by a second order ordinary linear differential equation [25].

In 2023, Deepanshu Giri published an article on his blog. In this article, named "Understanding Conjunction in Vedic Astrology", he discussed the analogy between some concepts of an electrical circuit like source, sink, active and passive with different kinds of energies associated with the nine planets in Vedic astrology [26].

3 Theoretical Framework

3.1 What is Artificial Intelligence?

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to perform tasks that normally require human intelligence such as learning, problem-solving, decision-making, perception, lan-

guage understanding, and more [11]. AI systems use algorithms and statistical models to analyze data, recognize patterns, and make predictions, without explicit instructions from human operators.

3.1.1 Limitations of AI

Although artificial intelligence (AI) has made significant advancements in recent years, there are still some limitations to the technology. Some of the limitations are:

- **Lack of Common Sense:** AI systems lack the common sense that humans have, which can make it difficult for them to understand complex situations and make appropriate decisions.
- **Limited Creativity:** AI systems are designed to operate within the parameters set by their algorithms and data, which limits their ability to generate truly creative solutions or ideas.
- **Lack of Emotional Intelligence:** AI systems are not capable of experiencing emotions, which limits their ability to understand and respond to emotional cues in human interactions.

Limitations of AI highlight the need for continued research and development to address these issues and improve the capabilities of these systems.

3.2 What is Emotional Intelligence?

Emotional Intelligence (EI) refers to the ability to recognize, understand and manage one's own emotions as well as the emotions of others. It involves being able to use emotional information to guide thinking and behavior, and to navigate social situations effectively [11].

EI is often described as having four components: self-awareness, self-management, social awareness, and relationship management. Self-awareness involves recognizing and understanding one's own emotions, strengths, and weaknesses. Self-management involves being able to regulate one's own emotions and behaviors in response to different situations. Social awareness involves recognizing and understanding the emotions of others, as well as the social norms and expectations of different situations. Relationship management involves using emotional information to communicate effectively, build and maintain relationships, and resolve conflicts.

EI is considered an important factor in personal and professional success, as it can help individuals navigate social interactions, build strong relationships, and manage stress and challenges effectively.

3.3 What is Emotional Artificial Intelligence?

Emotional Artificial Intelligence (EAI) is the ability of AI systems to recognize, understand, and respond appropriately to human emotions. It is an emerging field of AI that focuses on building machines that can perceive, interpret, and express emotions similar to human beings.

Emotional AI uses various techniques such as natural language processing, sentiment analysis, and facial recognition to detect emotions in human interactions. These techniques are then used to train algorithms and models that can predict and respond to human emotions in real-time.

Emotional AI has numerous potential applications, such as improving customer service, enhancing human-robot interactions, and providing mental health support.

3.4 Why Truly Intelligent Machines Need Emotions?

Many machines are in our household items such as kitchen, bedroom, which are artificially intelligent to help us with our daily tasks, however, they are emotionally unintelligent to adapt to our fulfillment. If one desires an Artificial Intelligence, the Artificial Intelligence should be able to adapt to the individual's state of mind. At the present time, many leading companies have expanded the idea of Emotional Artificial Intelligence into their AI systems [11].

The need of EIM's are can be seen due to their numerous applications which are expanding rapidly. Some of the common applications of EIM's include:

- **Social Media:** They can be used in social media to analyse user's emotions and provide more personalized content.
- **Business Intelligence(BI) & Operational Research(OR):** EIM's are more intelligent than the traditional machines as a result they can help in Decision Making which is involved in Business Intelligence & Operational Research.
- **Human Resources:** In human resources to analyse employee's emotions and improve the work environment and productivity.
- **Development of Machine Ethics & Computational Morality:** Emotional AI can play a vital role in the development of machine ethics and

morality. It will allow machines to understand and respond to human emotions, which is an important component of ethical and moral decision-making.

- **Human-Computer Interaction(HCI):** Emotional AI is extremely helpful in HCI, as it enables computers to understand and respond to human emotions, making the interaction more natural, intuitive, and empathetic. Here are some ways in which Emotional AI can be useful in developing machine ethics and morality:

  – **Understanding Human Emotions:** EAI can help machines to understand human emotions, which is an important component of ethical decision-making. For example, a machine that can detect when a human is experiencing fear or pain could adjust its behavior accordingly to avoid causing harm.

  – **Ethical Decision-Making:** EAI can help machines to make more ethical decisions by taking into account human emotions and responses. For example, a self-driving car that can detect when a passenger is feeling anxious or stressed could adjust its driving style to provide a safer and more comfortable ride.

  – **Morality and Empathy:** Emotional AI can help machines to exhibit more empathy towards humans, which is an important component of moral decision-making. For example, a robot that can detect when a human is feeling sad or lonely could provide comfort or companionship.

  – **Human-Machine Collaboration:** Emotional AI can help facilitate collaboration between humans and machines by allowing machines to understand and respond to human emotions. This could lead to more effective and productive collaborations, as well as greater trust between humans and machines.

- **Customer Service:** EAI can be used in customer service to understand customer's emotions and respond accordingly, improving customer satisfaction. It can also be used in getting customer reviews, feedbacks & and conducting surveys.

- **Healthcare:** EAI could be very useful in healthcare sector to detect patient's emotions and provide appropriate treatment and care. They could be a great blessing for the treatment of psychic patients and for counselling

of persons suffering form depression & anxiety or even having suicidal tendency.

- **Education:** EAI can be used in education sector to improve the effectiveness of teaching by understanding the emotional state of the students and adapting the teaching method accordingly.
- **Marketing, Sales & Advertisement:** EAI can be used in marketing to analyze customer's emotions and tailor marketing messages to maximize their impact which leads in increment of sales conversion rate.
- **Art & Culture:** AI which can generate creative artistic content like Melodies & Progressions in Music, Paintings & Poetry is currently based on logical reasoning. By the development of Emotional AI, generation of this type of content can reach the next level of the arts which can also be used by the artists as a reference for their work.
- **Media & Communication:** EAI has a huge potential to do great in the field of media as it can be used as a NEWS anchor or an interactive agent which can communicate with their listeners emoitionally.
- **Entertainment:** Emotionally Intelligent Machines can be used in the entertainment industry to create more immersive experiences for users by understanding their emotional responses, in gaming industry to create more engaging games that respond to the player's emotions also create the dynamic gaming environment accordingly, in movies industry to create ambience, environments and also in writing scripts.

3.5 Cognitive Psychology

Human mind is one of the most important part of the entire human body which contains thoughts, imagination, memory, will power & sensation. Every human being has it's own personality. Some have similar personalities, some have not. The individual's own mindset is responsible for it's own personality and behaviour.

In psychology, according to Sigmund Freud, human mind is classified majorly into three categories. Conscious, subconscious & unconscious mind. All the events around us which we are experiencing at the current instant which is also known as the "awareness", comes due to the conscious mind whereas all of our habits and routines which are formed due to the repetition of different task and our experiences are stored in the subconscious.

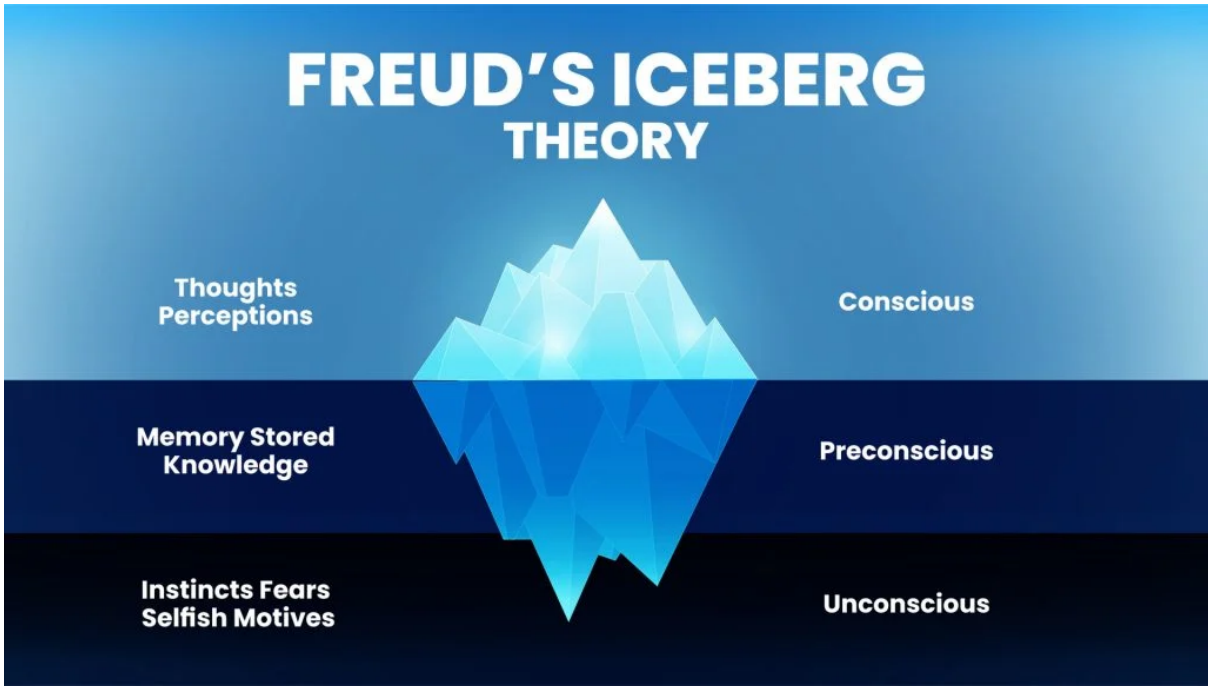

Figure 1: Sigmund Freud's Iceberg Theory

The third type of category of mind is the most mysterious and powerful which is the unconscious mind. It operates beyond our conscious awareness. It is the part of our mind which contains thoughts, memories and emotions that we are not aware of, but that still influence our behaviour and feelings drastically. Conscious mind contains short-term memory. The content stored inside this type of mind can be changed easily on the other hand, the subconscious mind has long-term memory. It can store thoughts longer than the conscious mind which are difficult to change and involves practising something continuously, developing habits by doing continuous efforts in order to change the mindset. The unconscious mind has permanent memory which is almost impossible to be changed by any type of effort. It is the primary source of the human behaviour and personality. It is just like the default personality of a person. These three levels of mind can be understood by the Sigmund Freud's Iceberg Theory as shown in the figure 1.

3.6 Plutchik's Wheel of Emotions

In 1980, Robert Plutchik proposed a psychoevolutionary classification approach for general emotional responses. He considered there to be eight primary emotions—anger, fear, sadness, disgust, surprise, anticipation, trust, and joy. He also discussed about the bipolar relationship between them and created a two dimensional wheel model to illustrate different emotions which is known as the

Plutchik's Wheel of Emotions as shown in figure 2.

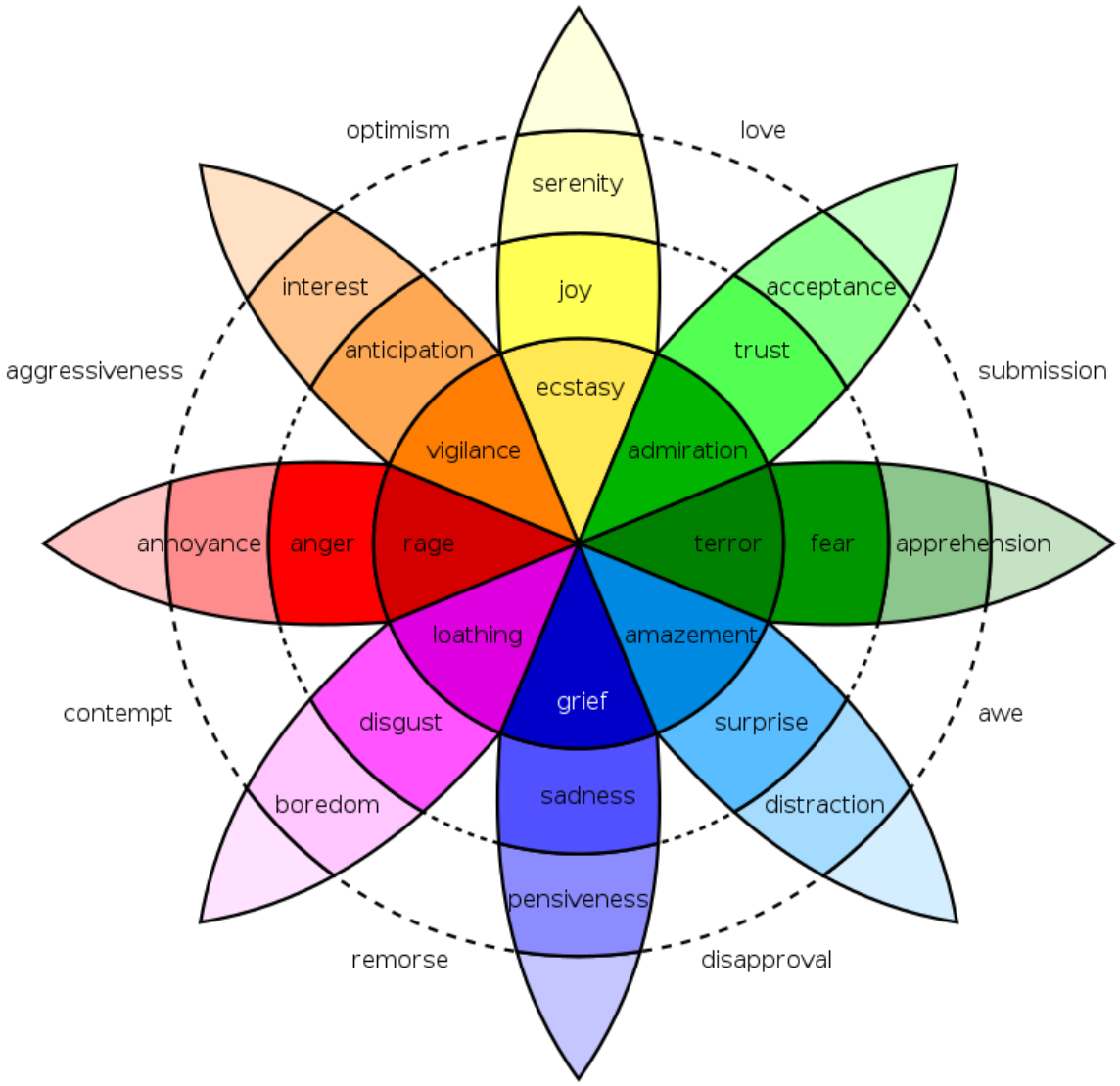

Figure 2: Plutchik's Wheel of Emotions

According to Plutchik, the petals which are opposite to each other in this 2D represiontation, represents the bipolar or opposite emotion. For example, anger is opposite to fear, grief is opposite to ecstacy, and so on. Some emotions are made by the combination or addition of the emotions represented by the two adjacent leaves of this wheel. For example, love is the addition of joy and trust, optimism is created by the combination of anticipation and joy. Also, the intensity of emotions will increase as we go towards the center of this wheel and vice versa [24].

3.7 Logical Thinking V/S Intuitive Thinking

Logic and intuition are two different ways of acquiring knowledge and making decisions.

Logic is a systematic and rational way of thinking that relies on rules, principles, and evidence to arrive at a conclusion. It involves reasoning and analysis, and is based on the assumption that true knowledge can be acquired through objective observation and testing. Logical thinking is often associated with science, mathematics, and philosophy, and is used to solve problems and make decisions in a wide range of fields.

Intuition, on the other hand, is a more subjective and immediate way of knowing that is based on a person's instinct or "gut feeling" about a situation. It is often described as a kind of unconscious or automatic mental process that occurs without conscious awareness or reasoning. Intuitive thinking is associated with creativity, innovation, and quick decision-making, and is often used in fields such as art, design, and entrepreneurship.

While both logic and intuition can be useful in different contexts, they have different strengths and weaknesses. Logical thinking is often more reliable and accurate in situations where objective evidence and analysis are important, but it can be slow and cumbersome. Intuitive thinking is often faster and more flexible, but it can also be less reliable and more prone to bias and error. The most effective approach to problem-solving and decision-making often involves a combination of both logical and intuitive thinking, depending on the situation and the available information.

3.8 Emotion Dynamics

In 2017, Jon Miles published a blog on his website. In this blog named emotion dynamics or equation of emotions, he discussed about the mathematical modelling of human sentiments and different states of human mind which is based on the analogy of human mind with an electrical dynamical system. According to his blog, the three phenomenas of mind, craving, anger and attachment are related to each other as like the inductance, resistance and capacitance in an electrical network as shown in figure 3 by a second order ordinary linear differential equation 1.

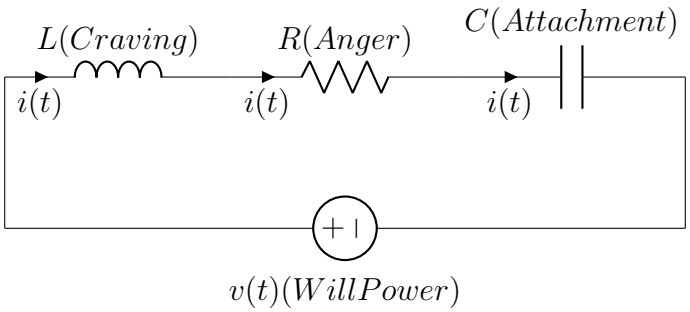

Figure 3: Analogy of Emotion Dynamics with an Electrical System

$$\boxed{v(t) = L\frac{di(t)}{dt} + Ri(t) + \frac{1}{C}\int i(t)dt} \tag{1}$$

If we convert this electrical system into its frequency domain equivalent by using Continous Time Fourier Transform, then equation 1 will be transformed into an algebraic equation 2. According to the miles blog, the R, X_L and X_C in equation 2 represents the habit, denial and doubt [25].

$$\boxed{Z = R + j(X_L - X_C)} \tag{2}$$

where, $R =$ Emotive Resistance,
$X_L =$ Emotive Inductive Reactance,
$X_C =$ Emotive Capacitive Reactance,
and $j = \sqrt{-1}$ (Imaginary Unit)

On the other hand, in 2023, Deepanshu Giri, one of the famous astrologer of India discussed in an article of his blog about the analogy between some concepts of an electrical circuit like source, sink, active and passive with different kinds of energies associated with the nine planets in Vedic astrology. According to him, the active energy planets are Mars, Mercury and Venus whereas passive energy planets are Saturn and Jupiter. Also, he mentioned that the Sun and Moon are the continuous sources of energy combustion while Rahu and Ketu are the continuous sources of consumption in terms of electrical source and sink connection types [26].

3.9 Butterfly Effect & Chaos Theory

Richard A. Anthes in 2022 by his paper "Predictability & Predictions" showed his experiences with predictability theory and weather predictions began as an undergraduate student at the University of Wisconsin in Madison in the early 1960s. His interest in numerical simulations led to the development of a simple nonlinear one-dimensional gravity wave model and later a nonlinear, baroclinic, three-dimensional model of the tropical cyclone. His experiences highlighted the challenges of numerical and physical instabilities in weather prediction models [3,4]. In chaos theory, the butterfly effect is the sensitive dependence on initial conditions in which a small change in one state of a deterministic nonlinear system can result in large differences in a later state.

3.10 Long-Short Term Memory(LSTM)

Long Short-Term Memory (LSTM) is a type of recurrent neural network (RNN) architecture that has gained significant popularity in the field of deep learning. It addresses the limitations of traditional RNNs in capturing long-term dependencies by introducing a memory cell that allows the network to retain information over long sequences.

LSTM networks were introduced by Hochreiter and Schmidhuber in 1997 and have since become a fundamental component in various applications, particularly in natural language processing, speech recognition, and time series analysis [16].

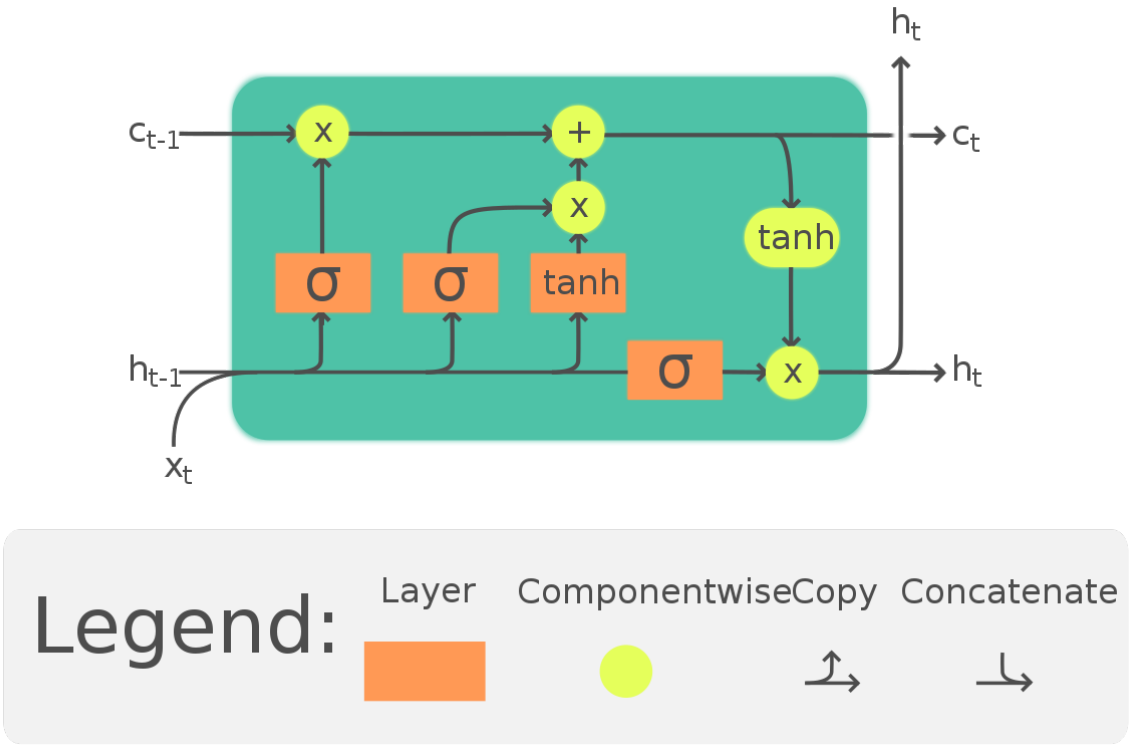

Figure 4: LSTM as Conscious & Subconscious of AI

The LSTM architecture consists of several specialized gates that control the flow of information as show in figure 4. These gates include the input gate, forget gate, output gate, and cell update gate. Each gate is composed of a sigmoid activation function, which determines the amount of information to be passed through. If we observe the working of the LSTM-RNN, we can understand that when a sequential data pattern repeats frequently, the LSTM stores it in a separate cell known as the memory cell(c_{t-1}) present within its architecture, just like the human subconscious mind forms habits by performing consciously repeating actions and patterns of life.

3.11 Vedic Astrology

Vedic astrology, also known as Jyotish, is an ancient system of astrology that originated in the Indian subcontinent. It is considered one of the oldest astrological systems in the world and has its roots in the Vedas, the ancient sacred texts of Hinduism. Vedic astrology(Jyotish) is one of the most important limb(Vedanga) out of the total six limbs(Vedangas) found in the ancient Indian scriptures. The origins of Vedic astrology can be traced back to around 1500 BCE, during the late Vedic period. It is classified into the three major branches or disciplines

known as the Siddhanta, Samhita and Hora. These branches provide different approaches and methods for studying and practicing astrology.

- **Siddhanta:** Siddhanta deals with all the mathematical calculations of space & time which is involed in the study of planets, stars, comets and contellations present in the space. It is also referred as the Astronomy in modern days.
- **Samhita:** Samhita, also known as Muhurtha, is the branch of Vedic astrology that deals with collective or mundane astrology. It focuses on predicting and analyzing events and phenomena on a broader scale, such as natural disasters, weather patterns, political developments, and societal events.
- **Hora:** Hora or horarian astrology is the branch of Vedic astrology that specifically deals with individual horoscopes or birth charts (Jataka).

There are many ancient texts and scriptures about all these three branches of the vedic astrology, that were written by Maharishies. But here, we are only considering the Surya Siddhanta [17,20] and Brihat Parashara Hora Shastra [18, 19,21] which are the most popular texts that are used by most of the astrologers today for astrological predictions and consultations. We also discuss some of rules and priciples described by the dictums found in these texts.

3.11.1 Significance of Houses

The concept of houses plays a significant role in interpreting a person's birth chart or horoscope. The chapters 13 to 24 of Brihat Parashara Hora Shastra [18, 19, 21] discusses in detail about all these houses. We can understand the concept of the houses by the following dictum:

गच्छन्तो भानि गृह्णन्ति सततं ये तु ते ग्रहः । भचक्रस्य नगश्व्यंशा
अश्विन्यादिसमाह्वयाः ॥३ :४ ॥ [18, 21] तद्द्वादशविभागास्तु तुल्य मेषादिसंज्ञकाः । प्रसिद्धा
राशयः सन्ति ग्रहास्त्वर्कादिसंज्ञकाः ॥३ :५ ॥ [18, 21] राशीनामुदयो लग्नं तद्वशादेव
जन्मिनाम् । ग्रहयोग्वियोगाभ्यां फलं चिन्त्यं शुभाशुभम् ॥३ :६ ॥ [18, 21]

The space is divided into twelve houses, also known as "Bhavas," which represent different aspects of an individual's life. Each house is associated with specific areas of life, such as personality traits, relationships, career, wealth, health, spirituality, and more. Here's a brief introduction to the twelve houses in Vedic astrology:

Those planets that constantly move and grab the houses, they are the celestial bodies. The divisions of the zodiac are the angles of the chariot, starting with Ashvini and others.

The twelve divisions are known as equal signs, starting with Aries and others. The well-known zodiac signs are the celestial bodies, starting with the Sun and others.

The rising sign of the zodiac is the Ascendant for individuals. By the combination or separation of the planets, the auspicious and inauspicious results should be contemplated.

- **First House (Lagna or Ascendant):** Represents the self, physical appearance, personality, and overall life path.
- **Second House:** Pertains to wealth, possessions, speech, family, values, and self-worth.
- **Third House:** Governs communication, siblings, skills, short trips, courage, and intellect.
- **Fourth House:** Represents home, mother, comfort, real estate, ancestral property, and emotional foundation.
- **Fifth House:** Relates to creativity, intelligence, children, education, romance, and speculative endeavors.
- **Sixth House:** Deals with health, daily routine, enemies, debts, conflicts, and service to others.
- **Seventh House:** Focuses on partnerships, marriage, relationships, business collaborations, and public image.
- **Eighth House:** Associated with transformations, secrets, inheritances, spirituality, life and death, and occult sciences.
- **Ninth House:** Relates to higher knowledge, beliefs, philosophy, long-distance travel, luck, and spiritual pursuits.
- **Tenth House:** Governs career, reputation, social status, achievements, authority, and public recognition.
- **Eleventh House:** Pertains to gains, friendships, social networks, aspirations, goals, and humanitarian activities.
- **Twelfth House:** Represents solitude, spirituality, hidden enemies, subconscious mind, losses, and liberation.

Each house is further influenced by the planetary positions and aspects, providing insights into different areas of life and their interconnections. Analyzing the houses and their interactions helps astrologers interpret a person's life circumstances, potential challenges, and opportunities for growth and fulfillment.

3.11.2 Properties of Zodiac Signs

अथ खेटा रविश्चन्द्रो मङ्गलश्च बुधस्तथा ।
गुरुः शुक्रः शनि राहुः केतुश्चैते यथाक्रमम् ॥३ :११ ॥ [18, 21] मेषो वृषश्च मिथुनः
कर्कसिंहकुमारिकाः ।
तुलालिऽश्च धनुर्नक्रे कुम्भो मीनस्ततः परम् ॥४ :३ ॥ [18, 21]

Sun, Moon, Mars, Mercury, Jupiter, Venus, Saturn, Rahu, and Ketu, these are mentioned in order, one by one.3.11.2 Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius and Pisces are the twelve contellations also known as the zodiac signs.3.11.2 However, the main source of all these things are the four basic elements which are the Fire, Water, Wind, Earth & Sky. However, describing all the shlokas here is not possible but properties of the twelve zodiac signs are described in shloka number 7 to 23 of BPHS [18,21] which are interpreted by the astrologers as follows: Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius and Pisces.

3.11.3 Properties of Planets

सर्वात्मा च दीवानाथो मनः कुमुदबान्धवः ।
सत्त्वं कुजो बुधैः प्रोक्तो बुधो वाणीप्रदायकः ॥३ :१३ ॥ [18, 21]

देवेज्यो ज्ञानसुखदो भृगुर्वीर्यप्रदयकः ।
ऋषिभिः प्राक्तनैः प्रोक्तश्छायासूनुश्च दुःखदः ॥३ :१४ ॥ [18, 21]

Jupiter(Brihaspati) is the significator of wisdom. Venus(Shukra) is resposible for joy & ecstacy.

रविचन्द्रौ तु राजानौ नेता ज्ञेयो धरात्मजः ।
बुधो राजकुमारश्च सचिवौ गुरुभार्गवौ ॥३ :१५ ॥ [18, 21]

Mars(Mangal) is responsible for the strength of a native which leads to the emotion of anger. Rahu

3.11.4 Dashas & Transits

विकलानाम् कला षष्ट्या तत्षष्ट्या भाग उच्यते।
तत्त्रिम्शता भवेद् राशिर् भगणो द्वादशैव ते ॥१:२८॥ [17, 20]

60 Vikalas make one kala and 60 kalas make one degree(°) or one amsa. 30°(degrees or amsa) make one rashi(one zodiac sign) and twelve such rashies(zodiac signs) make one revolution(bhagana) of the zodiac.

Graha(Planet)	Angular Speed(°/Day)	Time For One Zodiac Sign
Surya(Sun)	1	1 Month
Chandra(Moon)	13	2.25 Days
Brihaspati(Jupiter)	1/12	1 Year
Shani(Saturn)	1/30	2.5 Years
Budh(Mercury)	1	1 Month
Shukra(Venus)	1	1 Month
Mangal(Mars)	2/3	1.5 Month
Rahu	-1/18	18 Months
Ketu	-1/18	18 Months

Table 1: Time required by all planets to complete one zodiac sign

Table 1 represents the time required by all nine planets to complete one zodiac sign which is calculated in chapter 1, verse 29 to 34 of Surya Siddhanta [17, 20].

Effect of dashaas of the different planets in Chapter number 53 of BPHS.

The planetary vibrations reflected or refracted along with solar radiations to the earth are of varying intensities as per planetary distance, size, and movement in the solar system. These vibrations impact our sensory nerves, mental attitudes, and moods. Thus, it's very likely that these planetary vibrations supply the energies to the body cells though our nerves. Since these vibrations differ in wavelength intensity and frequency as per the planetary properties and motion; these vibrations supply different sensory stimuli which impacts the human unconscious and personality at the time of birth [16].

4 Conclusion & Outlook

The human mind is a very complex dynamical system that evolves over time in responses to the various inputs from the environment. The more we attempt to understand it deeply, the more we find ourselves entangled in questions. However, this pursuit provides us with new knowledge that leads to innovation and

presents numerous challenges. The study of the human mind has been instrumental in the birth of artificial intelligence (AI), but there still exists a significant difference between AI and the human mind. To bridge this gap, psychology and Vedic astrology can play a crucial role, and by leveraging these theories, intuition-based EAI systems that can contribute in sentiment synthesis could be developed.

References

[1] P. Martins, "A Concise History of Hindu Astrology and Indian Spirituality," *Scholars Journal of Arts, Humanities and Social Sciences*, vol. 11, pp. 33–36, 02 2023.

[2] R. Bhardwaj and A. Pareek, "The Unconscious Mind and Planetary Influences on the Human Unconscious Mind and Personality," *Research Paper The International Journal of Indian Psychology*, 03 2023.

[3] R. A. Anthes, "Predictability and Predictions," *Atmosphere*, vol. 13, no. 8, 2022.

[4] B.-W. Shen, R. A. Pielke, X. Zeng, J. Cui, S. Faghih-Naini, W. Paxson, and R. Atlas, "Three Kinds of Butterfly Effects within Lorenz Models," *Encyclopedia*, vol. 2, no. 3, pp. 1250–1259, 2022.

[5] R. Liu, B. Sisman, and H. Li, "Reinforcement Learning for Emotional Text-to-Speech Synthesis with Improved Emotion Discriminability," in *Proc. Interspeech 2021*, pp. 4648–4652, 2021.

[6] H. Takatsu, R. Ando, Y. Matsuyama, and T. Kobayashi, "Sentiment Analysis for Emotional Speech Synthesis in a News Dialogue System," in *Proceedings of the 28th International Conference on Computational Linguistics*, (Barcelona, Spain (Online)), pp. 5013–5025, International Committee on Computational Linguistics, Dec. 2020.

[7] N. C. Dang, M. N. Moreno-García, and F. De la Prieta, "Sentiment Analysis Based on Deep Learning: A Comparative Study," *Electronics*, vol. 9, no. 3, 2020.

[8] P. Clements, "Astrology, modernity and the project of self-identity," *Culture and Religion*, vol. 21, no. 3, pp. 259–279, 2020.

[9] N. Hajarolasvadi, M. Arjona Ramírez, and H. Demirel, "Generative Adversarial Networks in Human Emotion Synthesis:A Review," *Arxiv*, 10 2020.

[10] M. Abbasi and A. Beltiukov, "Summarizing Emotions from Text Using Plutchik's Wheel of Emotions," *Atlantis-Press*, vol. 166, pp. 291–294, 05 2019.

[11] S. V. Sahiti S. Magapu, "The Study of Emotional Intelligence in Artificial Intelligence," *International Journal of Innovative Science and Research Technology (IJISRT)*, vol. 4, pp. 594–602, 01 2019.

[12] E. Piletsky, "Consciousness and Unconsciousness of Artificial Intelligence," *Future Human Image*, vol. 11, pp. 66–71, 03 2019.

[13] R. Chen, Y. Zhou, L. Zhang, and X. Duan, "Word-level sentiment analysis with reinforcement learning," *IOP Conference Series: Materials Science and Engineering*, vol. 490, p. 062063, 04 2019.

[14] R. Sharma, A. Somani, L. Kumar, and P. Bhattacharyya, "Sentiment Intensity Ranking among Adjectives Using Sentiment Bearing Word Embeddings," *Association for Computational Linguistics*, pp. 547–552, 01 2017.

[15] H. Zhou, M. Huang, T. Zhang, X. Zhu, and B. Liu, "Emotional Chatting Machine: Emotional Conversation Generation with Internal and External Memory," *Proceedings of the AAAI Conference on Artificial Intelligence*, vol. 32, 04 2017.

[16] S. Hochreiter and J. Schmidhuber, "Long Short-term Memory," *Neural computation*, vol. 9, pp. 1735–80, 12 1997.

[17] P. R. C. Pandey, *Surya Siddhanta of Mayasura by Prof. Ram Chandra Pandey*. Chaukhamba Surbharati Publications, 1999.

[18] D. S. C. Mishra, *Brihat Parashar Hora Shastra of Maharishi Parashar*, vol. 1. Ranjan Publications, 1996.

[19] D. S. C. Mishra, *Brihat Parashar Hora Shastra of Maharishi Parashar*, vol. 2. Ranjan Publications, 1996.

[20] wikisource, "SuryaSiddhanta - Wikisource," 2018.

[21] wikisource, "BrihatParasharaHoraShastra - Wikisource," 2023.

[22] Wikipedia contributors, "Geometric series — Wikipedia, the free encyclopedia." https://en.wikipedia.org/w/index.php?title=1/2_%2B_1/4_%2B_1/8_%2B_1/16_%2B_%E2%8B%AF&oldid=1123380424, 2022. [Online; accessed 28-April-2023].

[23] Wikipedia contributors, "Ramanujan summation — Wikipedia, the free encyclopedia." https://en.wikipedia.org/w/index.php?title=Ramanujan_summation&oldid=1148245424, 2023. [Online; accessed 28-April-2023].

[24] Wikipedia contributors, "Robert plutchik — Wikipedia, the free encyclopedia." https://en.wikipedia.org/w/index.php?title=Robert_Plutchik&oldid=1136521972, 2023. [Online; accessed 28-April-2023].

[25] J. Miles, "Emotion Dynamics - Equations of Emotion," 2017.

[26] D. Giri, "Understanding Conjunction in Vedic Astrology," 2023.

Appendix

List of Figures

List of Tables