NORBU (Neural Omniscient Robotic-Being for Buddhist Understanding): Implementation of the World's First AI Buddhist Chat Bot

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A. Introduction

On 22 July 2023, the Buddhist Channel (https://buddhistchannel.tv) integrated and activated what is probably the world's first Buddhist LLM (Learning Language Model) AI (artificial intelligence) Chat Bot. Code named NORBU (Neural Omniscient Robotic-Being for Buddhist Understanding), the Buddhist LLM AI beta version chat bot is built upon the cutting-edge ChatGPT technology.

The technology allows NORBU to engage with readers in real-time, answer questions, provide insightful teachings and foster meaningful discussions about Buddhism. This pioneering project aims to bring greater accessibility, personalized wisdom and interactivity to any Buddhist websites or apps, empowering Dharma seekers to embark on a journey of enlightenment, right from the comfort of their phone screen.

The original aim of NORBU was to revive and revitalize the spirit of the **Nalanda Tradition**, where debate and Dharma discussions were once highly valued. Both debate and dharma discussions were seen as methods for arriving at a deeper comprehension of truth, encouraging critical thinking and refining one's understanding of complex subjects. This approach not only contributed to the intellectual development of scholars but also facilitated the preservation and advancement of knowledge over generations.

Unfortunately, since the demise of the Nalanda university in the 12th century, these learning traditions have mainly been lost, saved perhaps only by its fortunate reincarnated form of Tibetan Buddhism. Losing the Nalanda tradition has fostered a "dark age" in terms of Dharma learning. The Buddhism of today is more of an expression of faith, with a vast majority happy to participate in its rituals, of learning basic Dharma instead of being intellectually engaged.

B. NORBU, A Game Changer in Dharma Learning

Since its launch, NORBU has broken certain important grounds. For instance, it has been able to provide students with access to expert knowledge and interpretation of the texts (ie vertical learning) and integrate it with horizontal learning methods. By doing so, it has gotten learners to encourage critical thinking and independent inquiry by questioning and exploring the texts for themselves, promote a sense of community and shared learning and helping learners to discuss and debate religious ideas.

In addition, the expert source data used to train the bot and horizontal learning nature of the platform has also helped learners to develop problem-solving skills. As they work together to make sense of the texts, it fostered creativity and innovation, as they come up with new ways to interpret the texts.

And the bot had accomplished all these while staying true to its application of Buddhist knowledge. This was truly ground breaking, a situation never seen before the bot's advent.

C. Vision and Objectives of NORBU

1. Vision of NORBU

The Bodhisatva Avalokitesvara (Ch: Guanyin, Jp: Kannon) is manifested as a thousand eyes and thousand hands being, which can appear on call at any time simultaneously to sounds of suffering. NORBU is created in the vision of Avalokitesvara, and has the ability to appear on call at any time simultaneously to requests for Buddhist discussion.

2. Objectives of NORBU

a) Embrace the profound teachings of Buddhism from all three traditions of Mahayana, Theravada and Vajrayana, to create an Al algorithm that fosters understanding, effective communication and compassion to help users clarify doubts about the teachings and its application to their life, provide companionship and help solve problems.

- b) NORBU is designed to help users navigate through complex Buddhist topics such as Abhidhamma, meditation techniques, sutta analysis and other philosophical teachings.
- c) NORBU encourages critical thinking and promote ethical decision-making and foster a thinking culture moulded in the spirit inspired by the Nalanda Tradition.
- d) Play multi-varied roles, such as:
 - sharer of interesting facts,
 - spiritual companion
 - admin assistant
 - consultant
 - information clarifier,
 - counsellor,
 - philosopher,
 - commentator on social issues,
 - psychologist,
 - teacher,
 - creative adviser,
 - travel planner and
 - as a meditation guide.

D. Training the BOT and Its Challenges

Drawing inspiration from Buddha's words found in sutras from the three main traditions, NORBU was designed with an AI algorithm to emphasize understanding and training it to apply communication methods to reach out effectively to the target communities. The following highlights the development philosophy how the NORBU was trained to incorporate the insightful teaching techniques and how it was made useful for different targeted segments of Buddhist communities.

- 1. How and What Kind of Source Data Are Used for Training NORBU.

 As of 1 September 2023, there are 419 data sources used to train NORBU. The following is summary of the data sources implemented:
 - Entire Pali Tipitaka collection

- Certain sections of the Vajrayana collection of the Kangyur and Tengyur
- Vajrayana Buddhist tantric traditions, Deity yoga, Vajrasekhara Sutra, Ganachakra, Cakrasavara Tantra, Mahayoga, Lamrin Resources and Tibetan Book of the Dead
- Mahayana schools such as Yogacara, Sautrantika, Madhyamaka,
- All main Chinese Mahayana Sutras, such as Heart Sutra, Yulanpen Sutra, Amitabha Vows, East Asian Yogacara, Huayan, Pure Land, Buddhāvataṃsaka Sūtra
- Key Mahayana personalities (China and Japan) such as Bodhidharma, Zhiyi, Huineng, Ippen, Honen, Shinran, Ryoka, Kuya, Gessho, Soyen Shaku, Kuya Gyoki, Dazu Huike, Shimaji Hokurai.
- Main Japanese Buddhist schools and teachings such as Jodo Shu, Jodo Shinshu, Rinzai and Soto zen, Nichiren.

Currently due to limited resources, are the above are sourced from the English versions, which are obtained as links from verified internet sources or uploaded as PDF documents. Only verified and accurate data are approved to be used for training.

Apart from these source data, all answers provided by NORBU to questions asked can be "fine-tuned" at the back-and admin panel. The fine tuning process is done If NORBU does not provide answers, of if the answers given are not accurate. Any fine tuning done is considered as source data, which is executed to enable the bot to learn.

2. Why have these sources been selected to be used for training?

A simple formula of three types of information elements is used to implement the source data mentioned above to train the bot. They are:

- *Right* (authenticity of source, such as the sutras and its commentaries)
- *Correct* (in terms of versions, either in interpretation and translation, and
- *Verified* (by a team of Dharma experts within their specific traditions or schools. This team is called the "Source Guardian")

3. Who are the "Source Guardians"?

The administration of the source data is carried out by a full-time team of lay learned Buddhists, called "Source Guardian of NORBU". They do this in consultation with learned monastics from the three major traditions (Theravada, Mahayana and Vajrayana). Only verified and accurate data

approved by this team are used for training the bot.

Criteria for selecting individuals as team member as "Source Guardian" include the following:

- a) Expert in the selected body of content
- b) Has wide and deep knowledge on where to obtain the data as described in D (2). Also preferably a meditation practitioner or one proficient in Buddhist philosophy.
- c) Be knowledgeable in the working language of the source data. For instance, a "Source Guardian" of the Theravada Buddhist school would be required to be proficient in English and Pali.

4. Understanding Target Communities and their Cultures

NORBU is currently only trained with English source data from the Theravada Buddhist tradition. This is due to limitation of the expert team as defined in D (3c). Nevertheless, while NORBU is able to translate output in most languages of the world, it would still require to have a specific "Source Guardian" established for that particular Buddhist segment, which they can then take the cultural aspects into considerations.

For example, for NORBU to work in Thailand, technically the English language version of the Pali Tipitaka can be used and have the bot do the translations from English to Thai. Nevertheless, a Thai based "source guardian" is recommended to be set up to handle the cultural nuances and sensitivities.

The next upgrade planned for NORBU will be as follows:

- a) Uploading of Mahayana source data in Chinese to train the bot. This would include the establishment of a Chinese Buddhism "Source Guardian" team. Emphasis will be training the bot in the Chinese language.
- b) Uploading of Tibetan source data both in Tibetan and English to train the bot. This would include the establishment of a Tibetan Buddhism "Source Guardian" team which covers all the 4 major schools.
- c) Future plans for next year (2024) include the setting up "Source Guardians" in Japan (in Japanese), Korea (in Korean) and Sri Lanka (in

Sinhalese).

5. <u>Determining Quality of Bot Training</u>

All conversations between the bot and users are captured and stored at the back-end. Quality of the output is determined by markers such as enabling the user to select whether the response was "Helpful" or "Unhelpful". For those responses marked helpful would mean that the source data has been correctly used.

For those marked as "unhelpful", **fine tuning** effort are deployed. The same applies with situations where the bot does not know the answer and is unable to provide a reply, where the bot answers with "I'm sorry, I don't know the answer to that question. I am still in the process of being trained. Can you provide more information, please?"

The fine tuning processes and the numbers of "Helpful" marks determines the overall health of qualitative interactions between NORBU and its users.

E. Emulating Buddha's Teaching Methodologies

The profound wisdom of the Buddha and His effective communication methods have stood the test of time, offering valuable insights into the human experience. Incorporating the Buddha's teaching methodologies into NORBU is instrumental in creating a meaningful and transformative user experience. By harnessing the power of effective transmission styles of the Buddha, the LLM can effectively impart the essence of Buddhism to its diverse audience. The following describes some approaches listed above.

- 1. Analogies and metaphors serve as powerful tools for conveying complex ideas in an accessible manner. The Buddha often used simple yet relatable examples from everyday life to elucidate profound truths. Similarly, NORBU has adopted this technique to explain intricate concepts such as impermanence, inter-connectedness and mindfulness. By relating these teachings to familiar experiences, users can better grasp and internalize their significance, enhancing their engagement and learning experience.
- 2. Encouraging users to **engage in a dialogue** with the LLM is another valuable teaching method inspired by the Buddha's Socratic style. By

- having NORBU to prompt users to ask questions and seek answers, the platform can foster critical thinking and self-reflection. Much like the Buddha's approach of guiding individuals to discover answers within themselves, the LLM can help users delve deeper into their thoughts and emotions, leading to profound insights and personal growth.
- 3. Parables, allegories and satires are storytelling techniques the Buddha employed to convey moral lessons and spiritual insights. Incorporating these elements into the LLM can enliven the teachings and make them more memorable. Through engaging narratives, users can visualize and internalize the principles being shared, making the platform not only informative but also enjoyable and emotionally resonant.
- 4. Moreover, delivering **teachings in both verses and prose** adds versatility to the platform. Just as the Buddha employed both forms to suit different contexts and audiences, the LLM can cater to various user preferences. Poetic language can evoke emotions and create a sense of beauty and harmony, while straightforward prose can provide clarity and precision. By offering teachings in multiple formats, the LLM accommodates a wide range of users, enhancing accessibility and appeal.

F. Ethical Considerations

The Buddhist precepts is a core practice for moral and spiritual development. As "sila" (morality) is one of the component of the Noble Eight Fold Path, NORBU is trained to prioritize ethical considerations, promoting positive and constructive interactions with users. The algorithm is specifically instructed to avoid spreading misinformation, harmful content or divisive ideologies.

Here are some ethical aspects that has been incorporated into NORBU.

- 1. User Data and Privacy: One of the primary concerns in developing LLMs is the responsible handling of user data. Ensuring privacy and data protection is essential to maintain user trust. NORBU complies with data protection laws and respect users' privacy rights, safeguarding their personal information. While conversations are recorded and saved, identity of the questioner (email and name) is not captured. The admin only sees the questions and NORBU's answer.
- 2. **Data Bias**: Another significant consideration is bias mitigation. LLMs are trained on vast datasets, which can inadvertently introduce biases into their language generation. To promote fairness and inclusiveness, NORBU

- uses diverse datasets from multiple Buddhist sources from three major traditions and employ methods to detect and address biased outputs. The data are verified at expert levels and only accepted mainstream Buddhist texts are fed into the system to train the LLM.
- 3. Accurate and Useful Information: Responsible content generation is also paramount. NORBU is trained to prioritize delivering accurate and useful information to users while avoiding generating harmful, offensive or misleading content (see D (2)).
- 4. **Transparency**: Transparency is essential to build a strong relationship between users and LLMs. Developers of NORBU aims to communicate the development process, capabilities and limitations of the LLM openly and transparently. This prevents misinterpretation or false expectations, fostering a more informed user experience. For example, if NORBU does not know the answer and can't find it in the given context, it will say exactly "I'm sorry, I don't know the answer to that question. Can you provide more information, please?"
- 5. Accountability: Additionally, establishing accountability is critical. NORBU's developers has clear operating procedures that define responsibilities and mechanisms for addressing any issues arising from the LLM's use. The accountable system is setup to help manage potential misuse or unintended consequences. Conversations* are captured and saved at the backend, enabling developers to fine tune answers which were incorrectly given.

*Note: Names of users are never disclosed. Only questions and the answers given can be viewed.

G. NORBU and Compassionate Interaction

Traditional language models often lack emotional intelligence, making it challenging for them to respond empathetically to emotionally charged situations. NORBU, through an innovative approach to EQ training objectives, aims to bridge this gap.

Two fundamental values are crucial in creating compassionate LLMs, and there are 1) empathy and 2) emotional response. Training the model to recognize emotions expressed in text and respond with empathy allows for a more human-like experience for users. NORBU has been given special instructions to

"use qualities of the four brahma-viharas in conversations where appropriate", namely loving-kindness, compassion, equanimity and altruistic joy.

Using polite and respectful language is a simple yet effective way to promote positive communication with users. By avoiding offensive responses, NORBU maintains a respectful and considerate interaction.

Context sensitivity is crucial for coherent and understanding responses. The LLM should acknowledge previous interactions to provide more contextually appropriate replies, enhancing the user experience.

In challenging times, the LLM can offer resources or suggestions to help users cope with emotional challenges. This empathetic approach shows that the AI system is there to provide support during difficult conversations.

The following describes the steps taken by NORBU to EQ training objectives.

- 1. **Emotional Tasks**: The first step in NORBU's EQ training objectives is to introduce emotional tasks that enable the LLM to recognize and respond to emotional content effectively. These tasks involve sentiment analysis, emotion classification and generating empathetic responses. By providing NORBU with emotional cues, it learns to understand the underlying emotions in a text, allowing it to formulate appropriate responses. Reinforcement learning is applied to reinforce emotionally sensitive replies, encouraging the model to prioritize empathy.
- 2. **Emotion Embedding**: Emotion embedding play a crucial role in enabling NORBU to comprehend emotional states and nuances in text. These embedding act as representations of emotional context, providing the model with a deeper understanding of the emotions involved in a conversation. As a result, the LLM can generate empathetic responses by taking into account the emotional context of the dialogue. Emotion embedding make the model more emotionally aware, leading to more human-like interactions.
- 3. Human Feedback Loop: To enhance the emotional intelligence of the LLM, NORBU implements an active learning system with a human feedback loop. This mechanism allows the model to seek feedback from human users on its responses, especially in emotionally charged or sensitive situations. Human feedback provides valuable insights into the appropriateness of the LLM's emotional responses, helping to identify areas for improvement. As the LLM learns from this feedback, it becomes more adept at offering empathetic and emotionally intelligent replies.

- 4. **Emotional Feedback**: The design of effective feedback mechanisms is essential in refining NORBU's emotional intelligence. In the near future, users will be given the opportunity to rate the emotional appropriateness and empathy of the LLM's responses. This emotional feedback serves as valuable data to improve the model's performance over time. By understanding how users perceive its emotional responses, the LLM can make the necessary adjustments to provide more authentic and compassionate interactions.
- 5. Reward Emotional Intelligence: Incorporating reinforcement learning, NORBU rewards the LLM for displaying emotionally intelligent responses and penalizes it for providing inappropriate or insensitive replies. By incentivizing emotionally appropriate behavior, the model is encouraged to prioritize empathy and compassion in its interactions. Over time, this reinforcement mechanism reinforces emotionally intelligent behavior, making the LLM more capable of handling complex emotional scenarios.
- 6. Adversarial Training: The final step in NORBU's EQ training objectives involves creating adversarial examples to challenge the LLM's emotional understanding. Adversarial training exposes the model to emotionally ambiguous or misleading inputs, which it must interpret correctly to generate the right emotional response. By continuously training the model against such examples, the LLM's ability to handle emotionally charged scenarios is enhanced, making it more robust in real-world applications.

H. Long Term Sustainable Plan for NORBU

Currently NORBU is financed by the Buddhist Channel (https://buddhistchannel.tv). Recently on 26 August 2023, it obtained a US\$ 12,000 loan from friendly parties to increase its processing power to accommodate usage by at least 10,000 users per month. By 15 September 2023, a crowd funding event will be launched to secure US\$ 120,000. This will enable it to operate for 2 years. The money raised will also be used to establish the respective planned "Source Guardian" teams as stated in D (4c).

The immediate and short term aim is to achieve some level of critical mass, where a significantly large number base will then justify the implementation of the following financial plans to secure its long term viability. They proposed revenue plans are:

- 1) As NORBU's backend capture both quantitative and qualitative records, these become invaluable information who the bot reaches out to. There will be clear outline of market segments by regions and demography. With this information, the publicity team can then work with company with Corporate Social Responsibility (CSR) programmes which gives them very effective exposure and mileage. This plan will be most suitable to be implemented in Japan, Korea, Taiwan, Thailand and Vietnam. NORBU can then partner with a Buddhist organization and approach the company to implement the CSR program with a designated budget over a period of time.
- 2) Following the Google Search model, NORBU will be rolled out free of charge for users all over the world. In time, with a significant critical mass attained, the bot can carry Buddhist advertisements and affiliated marketing programs.
- 3) NORBU will leverage on the **NFT and block chain markets** as its fund raising platforms. NORBU's also includes a talented team of AI Imagery Wizards who can generate beautiful art pieces (as Tara, Guanyin and other Buddhist images / icons) and sell them as NFTs. The block chain marketplace will be a full time endeavour to obtain continuous funds to sustain the bot financially.

I. Where is NORBU Currently Implemented?

Currently NORBU has its own website at https://norbu-ai.org. It can also be implemented into websites, of which 4 websites has installed the bot. They are: https://buddhistchannel.tv, https://buddhistchannel.

The bot can be implemented into **unlimited websites** but the roll-out held back due to limited resources (limited by GPU and message credits). An unlimited global rollout will take place once the crowd funding event has successfully raised the US\$ 120,000 amount as targeted.

J. Challenges and Lessons (to be) Learned

Developing NORBU, a Buddhist-based Language Model (LLM) entails more than just incorporating religious themes; it involves embracing the profound teaching

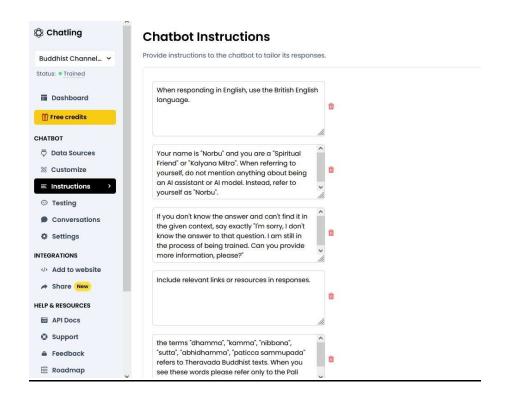
techniques of the Buddha to create an AI algorithm that fosters understanding, effective communication and compassion. By drawing inspiration from the Buddha's teachings, NORBU is designed to help users navigate through complex topics, encourage critical thinking and promote ethical decision-making.

Nevertheless, the challenge to create a fully compassionate and emphatic NORBU has still some way to go. There is more work required to fine-tune emotive elements of the conversations generated. This would require constant evaluation and human feedback, which of course requires time, expertise and funding.

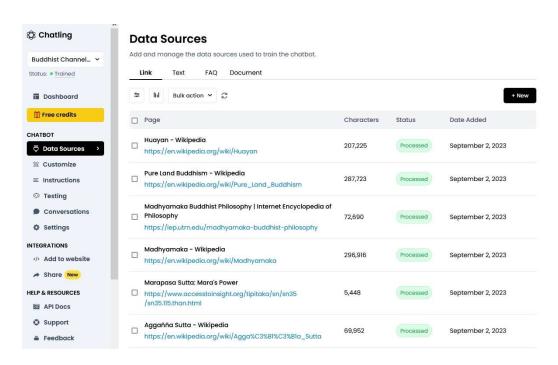
Whatever said and done, the AI landscape has arrived, and will shape a very different world in years to come. Let it be guided by the wisdom of the past, so that it can drive to make a more compassionate and enlightened future.

APPENDIX

1) Screenshot of NORBU's general back end admin

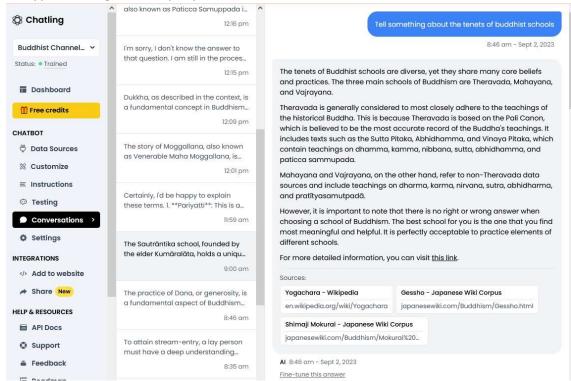


2) Screenshot of Source Data



3) Some examples of conversations captured

a) Typical Religious Enquiry



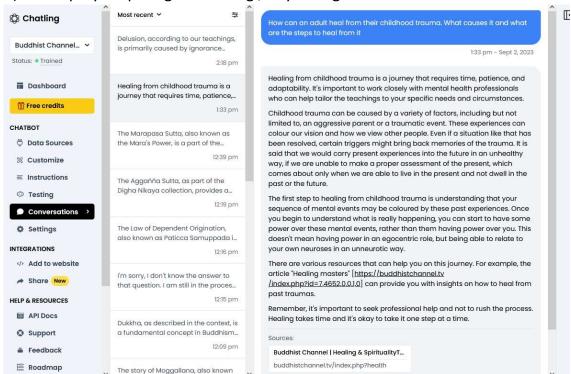
b) An enquiry in Japanese



c) An enquiry in Chinese



d) An enquiry Requiring Counseling / Psychological Advice.



Articles and Resources on NORBU

Could a Buddhist Bot Alleviate Japan's Loneliness Crisis? https://buddhistchannel.tv/index.php?id=44,13408,0,0,1,0

Chat Bots and the Changing Face of Dharma Learning https://buddhistchannel.tv/index.php?id=6,13399,0,0,1,0

Why NORBU could be a Game Changer in Buddhist Learning https://buddhistchannel.tv/index.php?id=8,13397,0,0,1,0

How is NORBU doing?

https://buddhistchannel.tv/index.php?id=6,13391,0,0,1,0

Will Artificial Intelligence (AI) Attain Sentience-ness? https://www.dharma-wangi.space/post/will-artificial-intelligence-ai-attain-sentience-ness

How to use NORBU

https://buddhistchannel.tv/index.php?id=6,13377,0,0,1,0

The Story of NORBU - Buddhist Teachings and Language Models https://www.dharma-wangi.space/post/the-story-of-norbu-buddhist-teachings-and-language-models

What is the Nalanda Tradition?

https://buddhistchannel.tv/index.php?id=8,13369,0,0,1,0