

Model Optimization and Tuning Phase Template


Date	15 March 2024
Team ID	739890
Project Title	Bookmate: A Chatbot Companion For Book Recommendations
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining neural network models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (8 Marks):

Model	Tuned Hyperparameters
Rasa NLU Model	Rasa NLU is a robust natural language understanding (NLU) framework designed to power intelligent chatbots and virtual assistants. It excels at accurately recognizing user intents and extracting relevant entities from textual inputs. By leveraging advanced machine learning techniques, Rasa NLU enables the creation of sophisticated conversational AI systems that can understand and respond to user queries in a natural and intuitive manner.

	<pre> (base) C:\Users\91949\Downloads\SmartBridge\Project Book Recommendation Bot>rasa train C:\Users\91949\AppData\Local\Programs\Python\Python310\lib\site-packages\rasa\core\tracker_store.py:1044: MovedIn20Warning: Deprecated API features detected! These features(s) are not compatible with SQLAlchemy 2.0. To prevent incompatible upgrades prior to updating applications, ensure requirements files are pinned to "sqlalchemy<2.0". Set environment variable SQLALCHEMY_WARN_20=1 to show all deprecation warnings. Set environment variable SQLALCHEMY_SILENCE_UBER_WARNING=1 to silence this message. (Background on SQLAlchemy 2.0 at: https://sqlalche.me/e/bd9d) Base = DeclarativeMeta = declarative_base() C:\Users\91949\AppData\Local\Programs\Python\Python310\lib\site-packages\rasa\shared\utils\validation.py:134: DeprecationWarning: pkg_resources is deprecated as an API. See https://setuptools.pypa.io/en/latest/pkg_resources.html import pkg_resources C:\Users\91949\AppData\Local\Programs\Python\Python310\lib\site-packages\pkg_resources__init__.py:2846: DeprecationWarning: Deprecated call to 'pkg_resources.declare_namespace('mpl_toolkits')'. Implementing implicit namespace packages (as specified in PEP 420) is preferred to 'pkg_resources.declare_namespace'. See https://setuptools.pypa.io/en/latest/references/keywords.html#keyword-namespace-packages declare_namespace(pkg) C:\Users\91949\AppData\Local\Programs\Python\Python310\lib\site-packages\pkg_resources__init__.py:2846: DeprecationWarning: Deprecated call to 'pkg_resources.declare_namespace('ruamel')'. Implementing implicit namespace packages (as specified in PEP 420) is preferred to 'pkg_resources.declare_namespace'. See https://setuptools.pypa.io/en/latest/references/keywords.html#keyword-namespace-packages declare_namespace(pkg) 2024-03-26 17:11:06 INFO rasa.cli.train - Started validating domain and training data... C:\Users\91949\AppData\Local\Programs\Python\Python310\lib\site-packages\keras\engine\data_adapter.py:48: DeprecationWarning: Pyarrow will become a required dependency of pandas in the next major release of pandas (pandas 3.0), but was not found to be installed on your system. If this would cause problems for you, please provide us feedback at https://github.com/pandas-dev/pandas/issues/54466 import pandas as pd 2024-03-26 17:11:34 INFO rasa.validator - Validating intents... C:\Users\91949\AppData\Local\Programs\Python\Python310\lib\site-packages\rasa\shared\utils\io.py:99: UserWarning: The intent 'basic1' is not used in any story or rule. rasa.validator - Validating uniqueness of intents and stories... 2024-03-26 17:11:34 INFO rasa.validator - Validating utterances... 2024-03-26 17:11:34 INFO rasa.validator - Story structure validation... 2024-03-26 17:11:34 INFO rasa.core.training.story_conflict - Considering all preceding turns for conflict analysis. 2024-03-26 17:11:34 INFO rasa.validator - No story structure conflicts found. The configuration for policies and pipeline was chosen automatically. It was written into the config file at 'config.yml'. 2024-03-26 17:11:48 INFO rasa.engine.training.hooks - Restored component 'CountVectorsFeaturizer' from cache. 2024-03-26 17:11:48 INFO rasa.engine.training.hooks - Restored component 'CountVectorsFeaturizer' from cache. 2024-03-26 17:11:48 INFO rasa.engine.training.hooks - Restored component 'DIETClassifier' from cache. </pre>
<p>Deep Learning</p> <p>Model (e.g.,</p> <p>RNN,</p> <p>Transformer)</p>	<p>Deep learning models, particularly Recurrent Neural Networks (RNNs) and Transformers, have revolutionized the field of book recommendation systems. RNNs are well-suited for sequential data, making them ideal for capturing user reading history and preferences. Transformers, on the other hand, excel at capturing long-range dependencies in text data, enabling a deeper understanding of book descriptions and user queries. By combining the strengths of these models, we can build sophisticated recommendation systems that provide highly accurate and personalized book suggestions.</p> 

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Rasa NLU Model	<p>Rasa NLU is a powerful tool for building intelligent chatbots and virtual assistants. It excels at understanding natural language, identifying user intent, and extracting relevant information from user queries. For a book recommendation chatbot, Rasa NLU can be used to accurately interpret user requests, such as "Recommend a sci-fi book with a strong female protagonist," and extract relevant entities like "sci-fi" and "strong female protagonist."</p> <p>One of the key advantages of Rasa NLU is its flexibility. You can customize the NLU pipeline to fit your specific needs, including defining custom intents and entities. This allows you to tailor the chatbot to understand the nuances of book recommendations, such as preferences for genres, authors, or reading moods.</p> <pre> 2024-03-26 17:16:48 INFO root - Rasa server is up and running. Bot loaded. Type a message and press enter (use '/stop' to exit): Your input -> Hi Hey! How are you? I am Book recommendation bot :) Your input -> I am good Great, how can I help you? Your input -> Suggest me some best Graphic genre books Absolutely! Let me recommend some captivating graphic novels for you.- 'Pumpkinheads' by Rainbow Rowell and illustrated by Faith Erin Hicks - A charming graphic novel about two seasonal best friends working at a pumpkin patch and going on one last adventure together. 'Gideon Falls Vol. 1: The Black Barn' by Jeff Lemire and illustrated by Andrea Sorrentino - A gripping horror mystery graphic novel that follows two men drawn to the same haunted location, the Black Barn, and their connection to a dark conspiracy. 'Check, Please! Book 1: Hockey' by Mpori Okazu - A heartwarming and humorous graphic novel about college hockey. Friendship, and finding oneself, following a former figure skater turned hockey player navigating life on and off the ice. 'Laura Dean Keeps Breaking Up with Me' by Mariko Tanaka and illustrated by Rosemary Valero-O'Connell - A poignant graphic novel about love, heartbreak, and self-discovery, following a young girl named Freddy as she navigates her tumultuous relationship with her on-again, off-again girlfriend Laura Dean. 'Saga Vol. 9' by Brian K. Vaughan and illustrated by Fiona Staples - The latest installment in the epic space opera graphic novel series, following a family's struggle to survive in a war-torn galaxy while raising their daughter, Hazel. 'On a Sunbeam' by Tillie Walden - A beautifully illustrated graphic novel about love, friendship, and adventure, following a group of girls traveling through space to restore ancient buildings. 'Monstress Vol. 4: The Chosen' by Marjorie Liu and illustrated by Sana Takeda - The next chapter in the dark fantasy graphic novel series, following a young woman with a mysterious past as she navigates a world filled with magic, monsters, and political intrigue. 'They Called Us Enemy' by George Takei, Justin Eisinger, Steven Scott, and illustrated by Harmony Becker - A powerful graphic memoir about actor and activist George Takei's experience as a Japanese American interned during World War II, exploring themes of prejudice, injustice, and resilience. 'BITN FDRS' by Ezra Clayton Daniels and illustrated by Ben Passmore - A darkly comedic graphic novel about gentrification, horror, and social commentary, set in a fictional Chicago neighborhood overrun by a monstrous force. 'Heartstopper Vol. 3' by Alice Oseman - The latest volume in the heartwarming graphic novel series about love, friendship, and identity, following the blossoming romance between two teenage boys, Nick and Charlie. Your input -> suggest me some best poetry genre books Absolutely! Let me recommend some captivating poetry books for you.- 'Home Body' by Rupi Kaur - A collection of poetry and illustrations exploring themes of love, loss, healing, and self-discovery. 'Dearly' by Margaret Atwood - A poetic exploration of life, love, nature, and mortality by the acclaimed author of 'The Handmaid's Tale'. 'The Tradition' by Jericho Brown - A Pulitzer Prize-winning collection of poetry that delves into themes of race, masculinity, sexuality, and identity. 'Postcolonial Love Poem' by Natalie Diaz - A powerful and lyrical collection of poetry that celebrates love, resilience, and the complexities of Native American identity. 'The Hill We Climb: An Inaugural Poem for the Country' by Amanda Gorman - A stirring poem performed by the youngest inaugural poet in U.S. history at the presidential inauguration of Joe Biden. 'Home' by Danez Smith - A vibrant and intimate collection of poetry that celebrates friendship, community, and the complexities of Black identity. 'A Fortune for Your Disaster' by Hanif Abdurraqib - A collection of poetry that explores themes of love, loss, grief, and the search for meaning in the modern world. 'In the Lateness of the World' by Carolyn Forché - A profound and evocative collection of poetry that reflects on the fragility of life, the impact of history, and the beauty of the natural world. 'The Death of Vivek Oji' by Akwaeke Emezi - While not strictly poetry, this novel-in-verse tells the story of a young Nigerian man named Vivek Oji and his journey of self-discovery, love, and acceptance. 'The Sun and Her Flowers' by Rupi Kaur - A follow-up to Kaur's immensely popular Milk and Honey, this collection of poetry explores themes of growth, healing, and resilience. Your input -> suggest me some best Philosophical genre books Absolutely! Let's explore some profound philosophical reads together.- 'The Order of Time' by Carlo Rovelli - A captivating exploration of the nature of time and its implications for our understanding of the universe. 'The Four Agreements: A Practical Guide to Personal Freedom' by Don Miguel Ruiz - A transformative book that offers practical wisdom and spiritual insights for living a fulfilling life. 'Meditations' by Marcus Aurelius - A timeless classic of Stoic philosophy, offering meditations and reflections on life, virtue, and resilience. 'Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teac</pre>