

Implementing Chatbots in Education

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Introduction

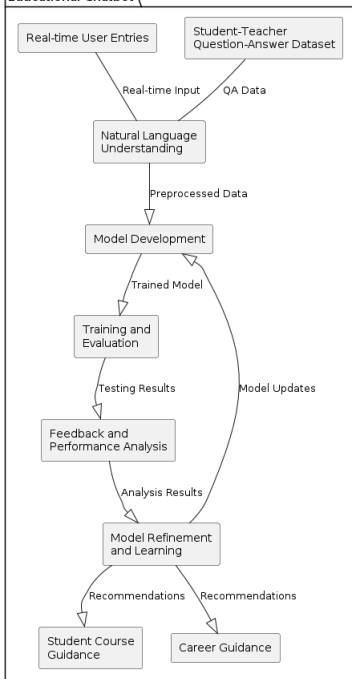
The educational chatbot is designed to provide interactive career guidance and facilitate student-teacher communication.

Objectives

- The chatbot aims to provide personalized career guidance based on user interests, skills, and goals.
- The chatbot aims to facilitate seamless communication between students and teachers for academic queries and support.
- The chatbot aims to assist students in selecting suitable courses and educational paths aligned with their aspirations.

- The chatbot uses a sequence-to-sequence model with LSTM layers for natural language understanding and generation.
- The chatbot is trained on question-answer pairs and evaluated using test datasets and real user interactions.
- The chatbot is designed to understand and respond to user queries and requests.

- The chatbot consists of the following components:
 - Input module: Collects user queries and requests.
 - NLP module: Processes and understands natural language inputs.
 - Dialogue management: Generates appropriate responses and maintains context.
 - Career guidance module: Provides personalized recommendations based on user preferences and career profiles.
 - Student-teacher communication module: Enables seamless interactions between students and teachers for academic support.



Components and Tools Used

- The chatbot uses the following components and tools:
 - TensorFlow and Keras for building and training the neural network model.
 - Natural language processing libraries for text preprocessing and understanding.
 - Chatbot interface for user interactions and feedback collection.

Implementation

- The chatbot is implemented using the following steps:
 - Data preprocessing: Tokenization, sequence conversion, and padding of input data.
 - Model development: Building a sequence-to-sequence model using TensorFlow and Keras.
 - Training: Training the model on educational datasets and fine-tuning for career guidance and student-teacher communication.
 - Integration: Integrating the trained model with a chat interface for user interactions.
 - Testing and refinement: Testing the chatbot with real users and refining its responses based on feedback.

Final Prototype and Results

- The final prototype of the chatbot is designed to provide interactive career guidance and facilitate student-teacher communication.
- The chatbot is tested with real users and refined based on feedback.

KeyError: 'Student ID'

jayaabrota_vm@JAYABROTA:/mnt/c/Users/jbtfff/OneDrive/Documents\$ python3 educationalchatbot.py

2024-05-12 14:27:06.324159: I external/local_tsl/tsl/cuda/cudart_stub.cc:32] Could not find cuda drivers on your machine, GPU will not be used.

2024-05-12 14:27:06.327699: I external/local_tsl/tsl/cuda/cudart_stub.cc:32] Could not find cuda drivers on your machine, GPU will not be used.

2024-05-12 14:27:06.371044: I tensorflow/core/platform/cpu_feature_guard.cc:210] This TensorFlow binary is optimized to use available CPU instructions in your environment. To enable the following instructions: AVX2 AVX512F AVX512_VNNI FMA, in other operations, rebuild TensorFlow with the appropriate compiler flags.

2024-05-12 14:27:07.215821: W tensorflow/compiler/tf2tensorrt/utils/py_utils.cc:38] TF-TRT Warning: Could not find TensorRT

/usr/lib/python3/dist-packages/scipy/_init_.py:146: UserWarning: A NumPy version >=1.17.3 and <1.25.0 is required for this version of SciPy (detected version 1.24.3)

warnings.warn(f"A NumPy version >={np_minversion} and <{np_maxversion}")

/home/jayaabrota_vm/.local/lib/python3.10/site-packages/keras/src/layers/core/dense.py:87: UserWarning: Do not pass an 'input_shape'/'input_dim' argument to the 'Input(shape)' object as the first layer in the model instead.

super().__init__(activity_regularizer=activity_regularizer, **kwargs)

Epoch 1/100

1/1 1s 991ms/step - accuracy: 0.0000e+00 - loss: 2.3026 - val_accuracy: 0.0000e+00 - val_loss: 2.3042

Epoch 2/100

1/1 0s 50ms/step - accuracy: 0.1250 - loss: 2.3022 - val_accuracy: 0.0000e+00 - val_loss: 2.3058

Epoch 3/100

1/1 0s 47ms/step - accuracy: 0.1250 - loss: 2.3018 - val_accuracy: 0.0000e+00 - val_loss: 2.3074

Epoch 4/100

1/1 0s 45ms/step - accuracy: 0.1250 - loss: 2.3014 - val_accuracy: 0.0000e+00 - val_loss: 2.3090

Epoch 5/100

1/1 0s 45ms/step - accuracy: 0.1250 - loss: 2.3010 - val_accuracy: 0.0000e+00 - val_loss: 2.3106

Epoch 6/100

1/1 0s 47ms/step - accuracy: 0.1250 - loss: 2.3006 - val_accuracy: 0.0000e+00 - val_loss: 2.3122

Epoch 7/100

1/1 0s 47ms/step - accuracy: 0.1250 - loss: 2.3002 - val_accuracy: 0.0000e+00 - val_loss: 2.3138

Epoch 8/100

1/1 0s 48ms/step - accuracy: 0.1250 - loss: 2.2998 - val_accuracy: 0.0000e+00 - val_loss: 2.3154

Epoch 9/100

1/1 0s 49ms/step - accuracy: 0.1250 - loss: 2.2994 - val_accuracy: 0.0000e+00 - val_loss: 2.3170

Epoch 10/100

1/1 0s 46ms/step - accuracy: 0.1250 - loss: 2.2990 - val_accuracy: 0.0000e+00 - val_loss: 2.3186

Epoch 11/100

1/1 0s 48ms/step - accuracy: 0.1250 - loss: 2.2986 - val_accuracy: 0.0000e+00 - val_loss: 2.3202

Epoch 12/100

1/1 0s 47ms/step - accuracy: 0.1250 - loss: 2.2982 - val_accuracy: 0.0000e+00 - val_loss: 2.3218

Epoch 13/100

1/1 0s 48ms/step - accuracy: 0.1250 - loss: 2.2978 - val_accuracy: 0.0000e+00 - val_loss: 2.3234

Epoch 14/100

1/1 0s 48ms/step - accuracy: 0.1250 - loss: 2.2974 - val_accuracy: 0.0000e+00 - val_loss: 2.3250

Epoch 15/100

1/1 0s 43ms/step - accuracy: 0.1250 - loss: 2.2971 - val_accuracy: 0.0000e+00 - val_loss: 2.3266

Epoch 16/100

1/1 0s 49ms/step - accuracy: 0.1250 - loss: 2.2967 - val_accuracy: 0.0000e+00 - val_loss: 2.3282

Epoch 17/100

1/1 0s 48ms/step - accuracy: 0.1250 - loss: 2.2963 - val_accuracy: 0.0000e+00 - val_loss: 2.3298

Epoch 18/100

1/1 0s 45ms/step - accuracy: 0.1250 - loss: 2.2959 - val_accuracy: 0.0000e+00 - val_loss: 2.3314

Epoch 19/100

1/1 0s 50ms/step - accuracy: 0.1250 - loss: 2.2955 - val_accuracy: 0.0000e+00 - val_loss: 2.3330

Epoch 20/100

```
Epoch 76/100
1/1 ██████████ 0s 46ms/step - accuracy: 0.1250 - loss: 2.2748 - val_accuracy: 0.0000e+00 - val_loss: 2.4237
Epoch 77/100
1/1 ██████████ 0s 45ms/step - accuracy: 0.1250 - loss: 2.2745 - val_accuracy: 0.0000e+00 - val_loss: 2.4252
Epoch 78/100
1/1 ██████████ 0s 45ms/step - accuracy: 0.1250 - loss: 2.2741 - val_accuracy: 0.0000e+00 - val_loss: 2.4268
Epoch 79/100
1/1 ██████████ 0s 49ms/step - accuracy: 0.1250 - loss: 2.2738 - val_accuracy: 0.0000e+00 - val_loss: 2.4284
Epoch 80/100
1/1 ██████████ 0s 45ms/step - accuracy: 0.1250 - loss: 2.2735 - val_accuracy: 0.0000e+00 - val_loss: 2.4300
Epoch 81/100
1/1 ██████████ 0s 47ms/step - accuracy: 0.1250 - loss: 2.2731 - val_accuracy: 0.0000e+00 - val_loss: 2.4315
Epoch 82/100
1/1 ██████████ 0s 44ms/step - accuracy: 0.1250 - loss: 2.2728 - val_accuracy: 0.0000e+00 - val_loss: 2.4331
Epoch 83/100
1/1 ██████████ 0s 46ms/step - accuracy: 0.1250 - loss: 2.2725 - val_accuracy: 0.0000e+00 - val_loss: 2.4347
Epoch 84/100
1/1 ██████████ 0s 46ms/step - accuracy: 0.1250 - loss: 2.2721 - val_accuracy: 0.0000e+00 - val_loss: 2.4362
Epoch 85/100
1/1 ██████████ 0s 50ms/step - accuracy: 0.1250 - loss: 2.2718 - val_accuracy: 0.0000e+00 - val_loss: 2.4378
Epoch 86/100
1/1 ██████████ 0s 50ms/step - accuracy: 0.1250 - loss: 2.2715 - val_accuracy: 0.0000e+00 - val_loss: 2.4394
Epoch 87/100
1/1 ██████████ 0s 48ms/step - accuracy: 0.1250 - loss: 2.2711 - val_accuracy: 0.0000e+00 - val_loss: 2.4409
Epoch 88/100
1/1 ██████████ 0s 46ms/step - accuracy: 0.1250 - loss: 2.2708 - val_accuracy: 0.0000e+00 - val_loss: 2.4425
Epoch 89/100
1/1 ██████████ 0s 43ms/step - accuracy: 0.1250 - loss: 2.2705 - val_accuracy: 0.0000e+00 - val_loss: 2.4440
Epoch 90/100
1/1 ██████████ 0s 45ms/step - accuracy: 0.1250 - loss: 2.2701 - val_accuracy: 0.0000e+00 - val_loss: 2.4456
Epoch 91/100
1/1 ██████████ 0s 44ms/step - accuracy: 0.1250 - loss: 2.2698 - val_accuracy: 0.0000e+00 - val_loss: 2.4472
Epoch 92/100
1/1 ██████████ 0s 42ms/step - accuracy: 0.1250 - loss: 2.2695 - val_accuracy: 0.0000e+00 - val_loss: 2.4487
Epoch 93/100
1/1 ██████████ 0s 51ms/step - accuracy: 0.1250 - loss: 2.2692 - val_accuracy: 0.0000e+00 - val_loss: 2.4503
Epoch 94/100
1/1 ██████████ 0s 44ms/step - accuracy: 0.1250 - loss: 2.2688 - val_accuracy: 0.0000e+00 - val_loss: 2.4518
Epoch 95/100
1/1 ██████████ 0s 45ms/step - accuracy: 0.1250 - loss: 2.2685 - val_accuracy: 0.0000e+00 - val_loss: 2.4534
Epoch 96/100
1/1 ██████████ 0s 48ms/step - accuracy: 0.1250 - loss: 2.2682 - val_accuracy: 0.0000e+00 - val_loss: 2.4550
Epoch 97/100
1/1 ██████████ 0s 47ms/step - accuracy: 0.1250 - loss: 2.2679 - val_accuracy: 0.0000e+00 - val_loss: 2.4565
Epoch 98/100
1/1 ██████████ 0s 46ms/step - accuracy: 0.1250 - loss: 2.2675 - val_accuracy: 0.0000e+00 - val_loss: 2.4581
Epoch 99/100
1/1 ██████████ 0s 48ms/step - accuracy: 0.1250 - loss: 2.2672 - val_accuracy: 0.0000e+00 - val_loss: 2.4596
Epoch 100/100
1/1 ██████████ 0s 47ms/step - accuracy: 0.1250 - loss: 2.2669 - val_accuracy: 0.0000e+00 - val_loss: 2.4612
Enter your question or 'quit' to exit: quit
```

Workplan and Task Allocation

- The work plan for developing the chatbot includes:
 - References to relevant literature, research papers, and resources used in developing the chatbot.