26 // NOVEMBER // 2023

UNIVERSITY HEALTH CENTER ASSISTANCE

PICTURE CAPTION : Explore our services, schedule appointments, and stay connected for your well-being. #Health Matters

Abstract

The University Health Center Chatbot project, led by our group, leverages advanced technologies like Python, Keras, and Natural Language Processing (NLTK) to develop a smart and user-friendly assistant tailored for the university community. Equipped with two key models, the chatbot adeptly handles common queries and generates unique responses, learning from a carefully curated list of questions. Our primary focus is on simplicity, ensuring easy interaction for everyone, regardless of their tech knowledge.

The project unfolds through a structured process involving file creation, data importation, preprocessing, model building, and response prediction. Key files, including Intents.json, train_chatbot.py, Words.pkl, Classes.pkl, and Chatbot_model.h5, are integral to training and implementing the chatbot. Beyond its technical capabilities, the chatbot tackles practical challenges within the university health center, offering transparency on services like doctor schedules. Functioning as a digital assistant, it efficiently bridges communication gaps, especially when students struggle to reach health center staff due to busy schedules. This initiative not only signifies technological advancement but also underscores collaborative efforts to enhance the overall well-being of the university community.

PICTURE CAPTION: Welcome to our University Health Center Assistance Chat-bot.

Introduction

Imagine a friendly digital assistant at your university's health center, ready to help with your health center-related questions. That's what our team is working on with the University Health Center Chatbot project, employing cutting-edge technologies like Python, Keras, and Natural Language Processing (NLTK) to make this assistant not just smart but also easily accessible for everyone at the university.

Our chatbot goes beyond typical tech solutions, it's like a helpful friend, continuously learning from a curated list of health center questions to provide even better answers over time. We're prioritizing simplicity, ensuring that even if you're not a tech expert, you can seamlessly chat with our bot without any hassle.

In this article, we'll guide you through the step-by-step process of building this chatbot, showcasing how technology, particularly AI, is harnessed to address real challenges at the health center. Our chatbot not only makes it easier to know when doctors are available but also offers valuable insights into meeting procedures, illustrating the transformative power of AI in enhancing university health services.

RELATED WORKS IN HEALTH CHATBOTS

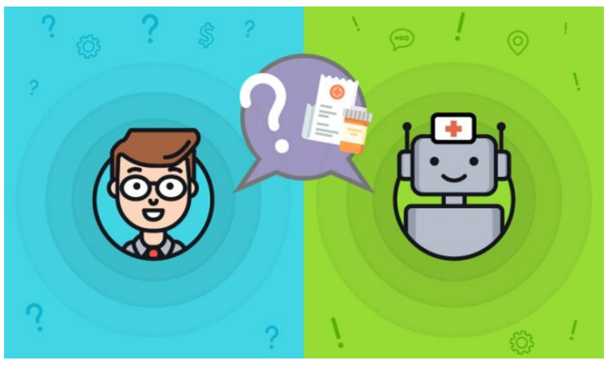
Navigating the landscape of existing AI-powered health applications reveals a diverse tapestry of solutions. Drawing inspiration from……..

- **BotPenguin:** BotPenguin offers a user-friendly platform for creating AI-powered chatbots, especially beneficial for healthcare services. It allows free chatbot creation, facilitating client communication and appointment scheduling, making it a versatile tool for healthcare professionals.
- **Youper:** Youper employs AI based on scientific findings to enhance emotional well-being. It adapts to users' preferences through conversations, offering personalized meditations and mood tracking. This innovative chatbot focuses on mental health support, showcasing the broader applications of AI.
- **Babylon Health:** Babylon Health, a subscription-based online health service, utilizes AI for medical consultations. With features like symptom analysis and video calls with real doctors, it demonstrates the potential of AI in providing comprehensive healthcare solutions.
- **Florence:** Florence acts as a "personal nurse" through platforms like Facebook Messenger, aiding with medication reminders and health monitoring. Its simple yet effective design addresses practical health concerns, particularly for the elderly.
- **Healthily (Your.M.D.):** Healthily provides actionable health information through an AI-driven symptom checker. Its broad platform accessibility makes it a valuable resource for diverse medical services, showcasing the potential of AI in offering reliable health insights.

Reschedule appointment
View and Book diagnostic packages
Book appointment
Ask FAQs
Find medical center info
Check Doctor availability

- **Ada Health:** Ada Health, a widely used symptom assessment tool, leverages AI for diagnosis based on user-input symptoms. With millions of users, it stands as a testament to the effectiveness of AI in providing intelligent health information.
- **Sensely:** Sensely's virtual assistant, Molly, evaluates a user's condition through various mediums, applying a triage system for severity assessment. It showcases the adaptability of AI in diverse communication methods for healthcare support.
- **Infermedica:** Infermedica utilizes machine learning for symptomatic chatbot services, offering online and mobile accessibility. With millions of health exams conducted, it highlights the scalability and effectiveness of AI in health assessment.
- **GYANT**: GYANT's health chatbot facilitates instant diagnoses by collecting user-reported symptoms. The multilingual support emphasizes the inclusive application of AI in healthcare, guiding users through complex healthcare journeys.
- **Woebot:** Woebot focuses on mental health, employing Cognitive Behavioural Therapy (CBT) through AI interactions. Its approachable design and daily check-ins showcase AI's potential in providing ongoing emotional support.
- **Cancer Chatbot:** The Cancer Chatbot on Facebook Messenger provides valuable information and support for those dealing with cancer. Its humane and well-planned features address specific healthcare needs, emphasizing the compassionate application of AI.

Used Technologies



The University Health Center Chatbot project relies on three key technologies: Python, Keras, and Natural Language Processing (NLTK). Python, a versatile and easy-to-understand programming language, forms the foundation, allowing quick and adaptable development crucial for healthcare needs. Keras, a user-friendly neural networks tool, simplifies the creation of complex models, helping the chatbot understand and respond effectively to health-related questions.

To understand language intricacies, the chatbot employs NLTK, a powerful language processing library. NLTK handles tasks like breaking down words, understanding context, and reasoning about meaning. This combination of technologies emphasizes efficiency, making sure the chatbot is both technically capable and easy for users to interact with. This user-friendly approach is especially important in healthcare, where providing timely and accurate information is essential. The choice of Python, Keras, and NLTK isn't just about technical capability; it reflects a careful decision to create an intelligent and user-friendly healthcare assistant.

- **Intents.json –** The data file which has predefined patterns and responses.
- **train_chatbot.py –** In this Python file, we wrote a script to build the model and train our chatbot.
- **Words.pkl –** This is a pickle file in which we store the words Python object that contains a list of our vocabulary.
- **Classes.pkl –** The classes pickle file contains the list of categories.
- **Chatbot_model.h5 –** This is the trained model that contains information about the model and has weights of the neurons.
- **Chatgui.py –** This is the Python script in which we implemented GUI for our chatbot. Users can easily interact with the bot.

Implementation

University Health Center Chatbot

To run the chatbot, we have main files; train_chatbot.py, chatgui.py and intents.json in github

First, we train the model using the command in the terminal: python train_chatbot.py

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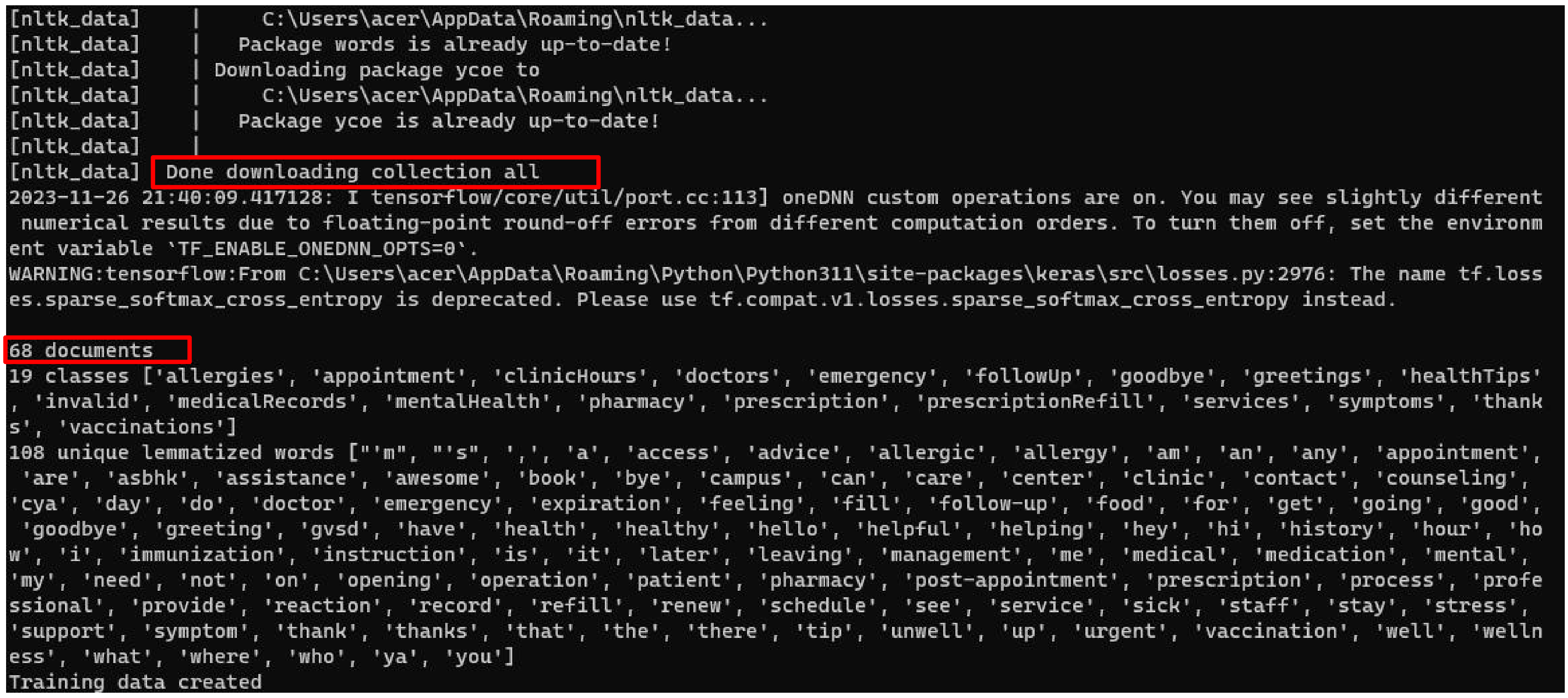
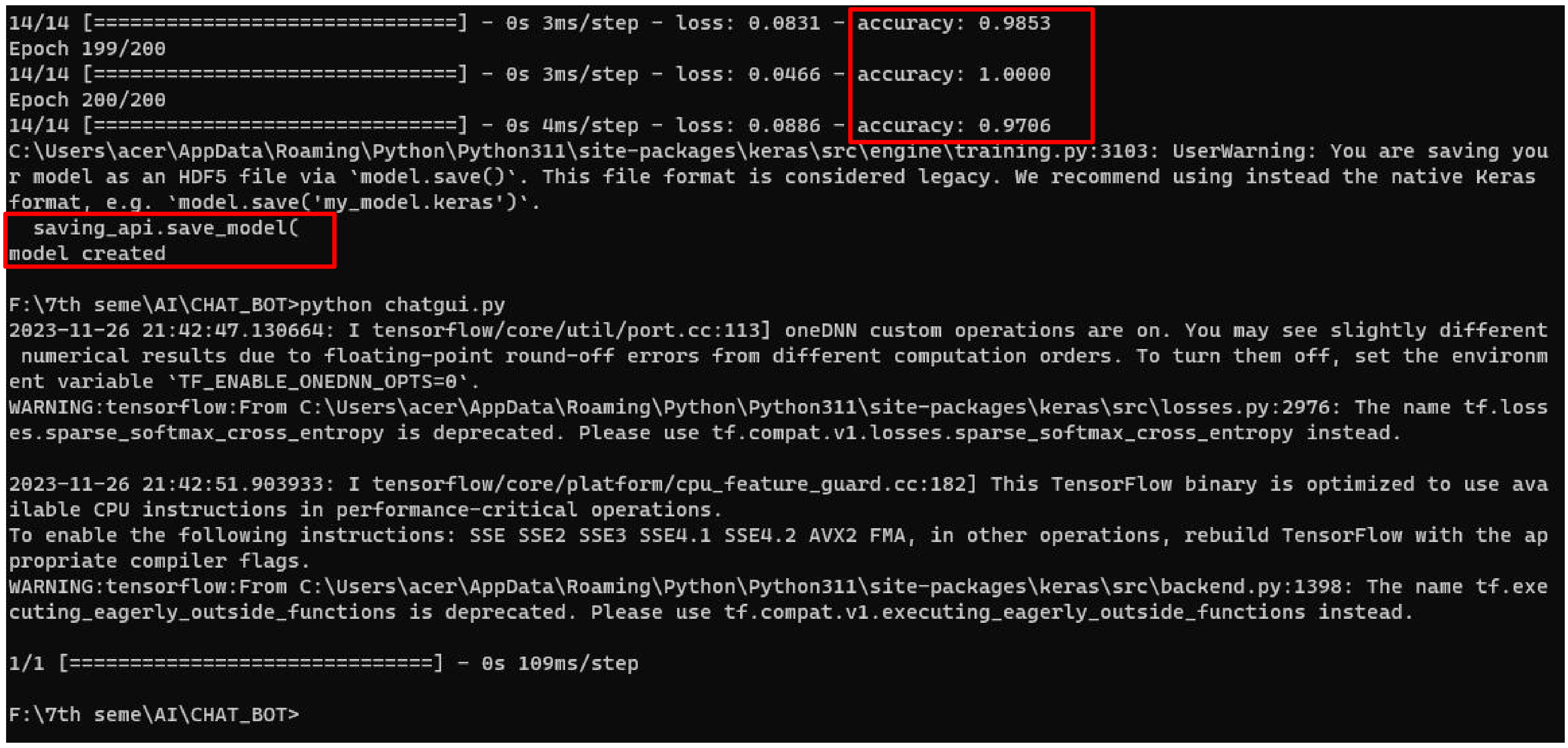


```
[nltk_data]    |     C:\Users\acer\AppData\Roaming\nltk_data...
[nltk_data]    |   Package words is already up-to-date!
[nltk_data]    | Downloading package ycoe to
[nltk_data]    |     C:\Users\acer\AppData\Roaming\nltk_data...
[nltk_data]    |   Package ycoe is already up-to-date!
[nltk_data]    |
[nltk_data]  Done downloading collection all
2023-11-26 21:40:09.417128: I tensorflow/core/util/port.cc:113] oneDNN custom operations are on. You may see slightly different
 numerical results due to floating-point round-off errors from different computation orders. To turn them off, set the environm
ent variable `TF_ENABLE_ONEDNN_OPTS=0`.
WARNING:tensorflow:From C:\Users\acer\AppData\Roaming\Python\Python311\site-packages\keras\src\losses.py:2976: The name tf.loss
es.sparse_softmax_cross_entropy is deprecated. Please use tf.compat.v1.losses.sparse_softmax_cross_entropy instead.

68 documents
19 classes ['allergies', 'appointment', 'clinicHours', 'doctors', 'emergency', 'followUp', 'goodbye', 'greetings', 'healthTips'
, 'invalid', 'medicalRecords', 'mentalHealth', 'pharmacy', 'prescription', 'prescriptionRefill', 'services', 'symptoms', 'thank
s', 'vaccinations']
108 unique lemmatized words ["'m", "'s", ',', 'a', 'access', 'advice', 'allergic', 'allergy', 'am', 'an', 'any', 'appointment',
 'are', 'asbhk', 'assistance', 'awesome', 'book', 'bye', 'campus', 'can', 'care', 'center', 'clinic', 'contact', 'counseling',
'cya', 'day', 'do', 'doctor', 'emergency', 'expiration', 'feeling', 'fill', 'follow-up', 'food', 'for', 'get', 'going', 'good',
 'goodbye', 'greeting', 'gvsd', 'have', 'health', 'healthy', 'hello', 'helpful', 'helping', 'hey', 'hi', 'history', 'hour', 'ho
w', 'i', 'immunization', 'instruction', 'is', 'it', 'later', 'leaving', 'management', 'me', 'medical', 'medication', 'mental',
'my', 'need', 'not', 'on', 'opening', 'operation', 'patient', 'pharmacy', 'post-appointment', 'prescription', 'process', 'profe
ssional', 'provide', 'reaction', 'record', 'refill', 'renew', 'schedule', 'see', 'service', 'sick', 'staff', 'stay', 'stress',
'support', 'symptom', 'thank', 'thanks', 'that', 'the', 'there', 'tip', 'unwell', 'up', 'urgent', 'vaccination', 'well', 'welln
ess', 'what', 'where', 'who', 'ya', 'you']
Training data created
```



```
14/14 [==============================] - 0s 3ms/step - loss: 0.0831 - accuracy: 0.9853
Epoch 199/200
14/14 [==============================] - 0s 3ms/step - loss: 0.0466 - accuracy: 1.0000
Epoch 200/200
14/14 [==============================] - 0s 4ms/step - loss: 0.0886 - accuracy: 0.9706
C:\Users\acer\AppData\Roaming\Python\Python311\site-packages\keras\src\engine\training.py:3103: UserWarning: You are saving you
r model as an HDF5 file via `model.save()`. This file format is considered legacy. We recommend using instead the native Keras
format, e.g. `model.save('my_model.keras')`.
  saving_api.save_model(
model created

F:\7th seme\AI\CHAT_BOT>python chatgui.py
2023-11-26 21:42:47.130664: I tensorflow/core/util/port.cc:113] oneDNN custom operations are on. You may see slightly different
 numerical results due to floating-point round-off errors from different computation orders. To turn them off, set the environm
ent variable `TF_ENABLE_ONEDNN_OPTS=0`.
WARNING:tensorflow:From C:\Users\acer\AppData\Roaming\Python\Python311\site-packages\keras\src\losses.py:2976: The name tf.loss
es.sparse_softmax_cross_entropy is deprecated. Please use tf.compat.v1.losses.sparse_softmax_cross_entropy instead.

2023-11-26 21:42:51.903933: I tensorflow/core/platform/cpu_feature_guard.cc:182] This TensorFlow binary is optimized to use ava
ilable CPU instructions in performance-critical operations.
To enable the following instructions: SSE SSE2 SSE3 SSE4.1 SSE4.2 AVX2 FMA, in other operations, rebuild TensorFlow with the ap
propriate compiler flags.
WARNING:tensorflow:From C:\Users\acer\AppData\Roaming\Python\Python311\site-packages\keras\src\backend.py:1398: The name tf.exe
cuting_eagerly_outside_functions is deprecated. Please use tf.compat.v1.executing_eagerly_outside_functions instead.

1/1 [==============================] - 0s 109ms/step

F:\7th seme\AI\CHAT_BOT>
```

If we don't see any error during training, we have successfully created the model.
