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Artificial Intelligence

AI-CHATBOT

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Abstract

We developed an AI chat bot to check the relationship between Khan's family. AI chat bot tells the relationship between two persons in Khan's family according to the given problem. The problem was to build up an inter family relationship between the Khan's family and if we want to find anyone's relation with other person in Khan's family. This chat bot helps to find relationship of **beti, beta, baap, dada, dadi, pota, poti, nawasa, nawasi, nana, nani, susar, saas, khala, mamu, bahu, ami** etc. This AI chat bot is developed in two different languages **python** and **prolog**. Python is used for front-end language and is used for high level programs. Prolog is a logic programming language, and it is used as back-end language to develop the chat bot. It is used as a declarative language to build up Khan's family relationships.

1 Problem Statement:

Using Khan Family Tree, Prolog and Python (pyswip), you must make a Python interface for a minimal chatbot that lets a user ask interesting questions about Khan Family, and in the process learn to bridge Prolog and Python.

2 Introduction:

2.1 Logic:

Artificial intelligence (AI) makes the machine able to work according to the requirement magnificently and provides the required result. Computer scientists are using the technique of Logic Programming that allows the machine many attempts to reason the given data set until it provides the required result that is valuable. In logic programming, logic is utilized to address information and surmise (suppose that something is true without having evidence to confirm it) is utilized to control it.

2.1.1 Categorical Syllogism:

A categorical syllogism is an argument consisting of exactly three categorical propositions (two premises and a conclusion) in which there appear a total of exactly

three categorical terms, each of which is used exactly twice. It is deductive form of argument and represented in different set quantities like A, E, I, O. A categorical syllogism in standard form always begins with the premises, major first and then minor, and then finishes with the conclusion.

2.1.2 Propositional Logic:

“Propositional logic, also known as sentential logic and statement logic, is the branch of logic that studies ways of joining or modifying entire propositions, statements or sentences to form more complicated propositions, statements or sentences, as well as the logical relationships and properties that are derived from these methods of combining or altering statements.”

2.1.3 Predicate Logic:

Predicate logic is also called first-order logic. We can develop information about the objects in a much simpler way and the relationship between objects can be easily expressed. Charles Pierce and Gottlob Frege are the inventors of predicate logic. In artificial intelligence by using predicate logic, is used to represent our knowledge in computer. Predicate logic is helpful to get the actual statement We can easily capture the actual meaning of statements by using predicate logic as compared to propositional logic.

2.2 Prolog:

Prolog is a declarative logic programming language. Alain Colmerauer invented it. The goal is to create a programming language that allows logic to be expressed on the computer rather than precisely written instructions. A portion of predicate logic is used by Prolog, and it draws its structural ideas from the previous stuff of logicians.

2.3 Features of Prolog:

Variables:

In prolog, **variables** start with capital letters or under-score (_).

? - parent (X, “Kausar”). Here X is the variable name.

Rules:

Based on predetermined knowledge that has been entered in a database, **rules** are used to predicate or derive new facts from the old defined facts.

beta (X, Y): -

parent (Y, X), gins (male, X).

Facts:

A fact is a predicate expression that expresses a declarative opinion regarding the subject matter of the problem.

mianbiwi (Chote Khan, Choti Rani).

In the above example mianbiwi is a relationship between Chote Khan and Choti Rani. It tells us that Chote Khan and Choti Rani are mianbiwi by relation.

Queries:

In prolog, query is a question that is asked to get information from the stored data in database.

? - parent (X, kauser).

Chote Khan;

Choti Rani.

3 Khan Family Tree:

Below is the Khan's family tree:

4 Rules for Implementation:

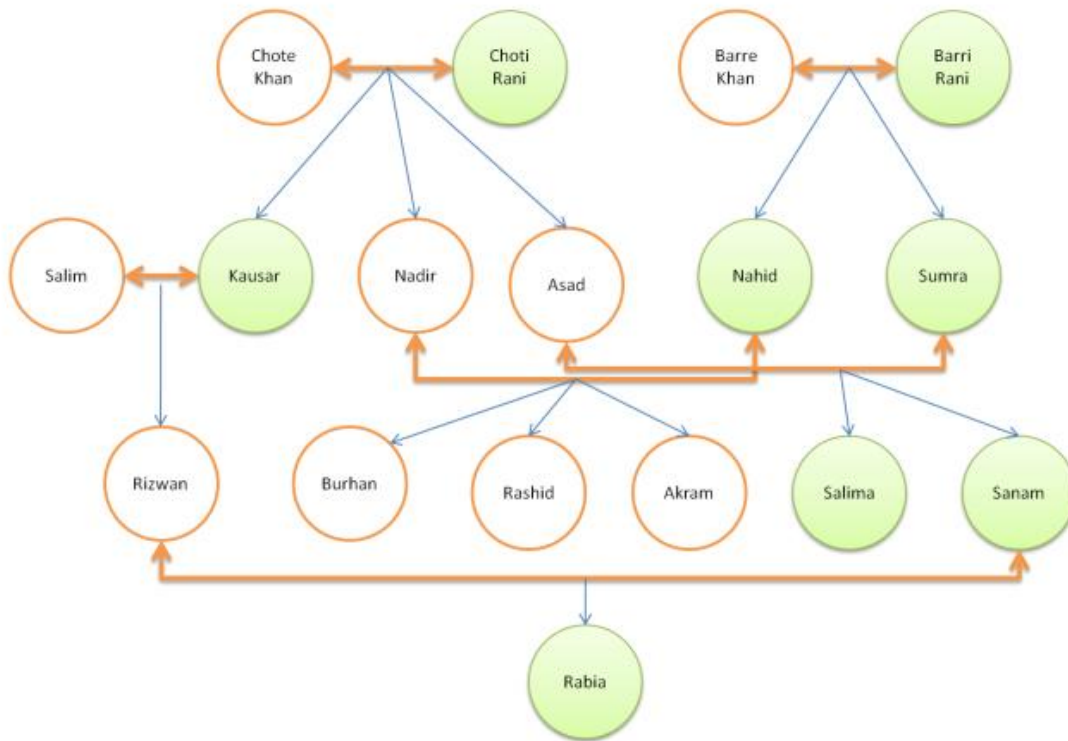


Figure 1: Khan's Family Tree

baap(Variable1, Variable2):-

parent(Variable1, Variable2),gins(mard, Variable1).

maa(Variable1, Variable2):-

parent(Variable1, Variable2),gins(aurat, Variable1).

beti(V1, V2):-

parent(V2, V1), gins(aurat, V1).

beta(V1, V2):-

parent(V2, V1), gins(mard, V1).

dada(V1, V2):-

parent(X, V2), gins(mard, X), gins(mard, V1),parent(V1, X).

nana(V1, V2):-

parent(X, V2), gins(aurat, X), gins(mard, V1), parent(V1, X).

dadi(V1, V2):-

parent(X, V2), gins(mard, X), gins(aurat, V1),parent(V1, X).

nani(V1, V2):-

parent(X, V2), gins(aurat, X), gins(aurat, V1), parent(V1, X).

behn(V1, V2):-

parent(X, V1),gins(mard, X), parent(X, V2), gins(aurat, V1), not(V1=V2).

bhai(V1, V2):-

parent(X, V1), gins('mard', X), parent(X, V2), gins('mard', V2), not(V1=V2).

sala(V1, V2):-

behn(X, V2), mianbiwi(V1, X).

bahu(V1, V2):-

parent(V2, X), mianbiwi(X, V1).

pota(V1, V2):-

dada(V2, V1); dadi(V2, V1), gins('mard', V1).

poti(V1, V2):-

dada(V2, V1); dadi(V2, V1), gins('aurat', V1).

sussar(V1, V2):-

mianbiwi(X, V2), parent(V1, X), gins('mard', V1).

saas(V1, V2):-

mianbiwi(X, V2), parent(V1, X), gins(aurat, V1).

chachataya(V1, V2):-

parent(X, V2), gins('mard', X), bhai(X, V1), gins('mard', V1).

khala(V1, V2):-

parent(X, V2), gins('aurat', X), behn(X, V1), gins('aurat', V1).

baapdada(X, Y):-

parent(X, Y), gins('mard', X).

baapdada(X, Y):-

parent(X, Z), baapdada(Z, Y), gins('mard', Z), gins('mard', X).

nawasa(V1,V2):-

nani(V2, V1); nana(V2, V1), gins('mard', V1).

nawasi(V1,V2):-

nani(V2, V1); nana(V2, V1), gins(aurat, V1).

ALLOWED FACTS:

mianbiwi(fact1,fact2). % fact1 is mian of fact2, who is biwi

parent(fact1, fact2). % fact1 is parent of fact2

gins(fact1,fact2). % fact1 can either be mard or aurat, fact2 is the name of the person

CODE EXPLANATION:

We have designed our backend code in prolog. Now, we have to interact prolog with python.

We used IDE visual studio code. Visual Studio Code is a lightweight yet capable source code editor for Windows, mac-OS, and Linux that runs on desktop. It features JavaScript support built-in, as well as a large ecosystem of extensions for other languages (such as C++, C, Java, and Python).

LIBRARIES:

We used pyswip library to use prolog in python. PySwip is a Python library - SWI-Prolog bridge enabling to query in python programs. It provides us a utility that makes it easy to query with the back-end Prolog using a python interface.

FUNCTIONS IN CODE:

Our code consists of limited number of functions. AI is a use if else-if statement to solve some problem. So same is the case with our problem here.

DisplayKhanFamily():

```
def display_khanFamily():
    print("Please Select Any choice To Find Relationship:\n")
    print("Enter 1 for Baap ----- Enter 2 for Maa")
    print("Enter 3 for Beti ----- Enter 4 for Beta")
    print("Enter 5 for Dada ----- Enter 6 for Nana")
    print("Enter 7 for Dadi ----- Enter 8 for Nani")
    print("Enter 9 for Sala ----- Enter 10 for Bahu")
    print("Enter 11 for Pota ----- Enter 12 for Poti")
    print("Enter 13 for Nawasa ----- Enter 14 for Nawasi")
    print("Enter 15 for Sussar ----- Enter 16 for Saas")
    print("Enter 17 for Bapdada ----- Enter 18 for Khala")
    print("Enter 19 for Chachataya ----- Enter 0 for Exit: \n")
```

Figure 2:Display Function

This function will display option selection for user to select their relation of any choice. In above picture number against every relationship is set. So, user can pick any of their choice.

DisplayFamilyMember:

```
def khanFamilyMembers():  
    print("Select Any Member of Khan Family: \n")  
    print("ChoteKhan,    ChotiRani,    BarreKhan,    BarriRani")  
    print("Salim,        Kausar,        Nadir,        Asad")  
    print("Nahid,        Sumra,        Rizwan,        Burhan")  
    print("Rashid,        Akram,        Salima,        Sanam,")  
    print("Rabia")
```

Figure 3:Display Members Function

Here we can see that every family member name of Khan's Family is shown to user, so that user can easily find relationship of one another in Khan's Family.

Then we use a while loop to run our code continuously until stop by user. In every loop khan family is shown to user and they can find relation or ask questions to out chatbot regarding Khan's Family.

Then many If statement can be seen in our code. For example, if user enter 13, then user can find relation of nawasa with any family member if available. In backend our prolog query is run which we have wrote for nawasa.

```
***  WELLCOME TO 2 in 1 Chatbot OF KHAN FAMILY  ***  
  
Please Select Any choice To Find Relationship:  
  
Enter 1 for Baap ----- Enter 2 for Maa  
Enter 3 for Beti ----- Enter 4 for Beta  
Enter 5 for Dada ----- Enter 6 for Nana  
Enter 7 for Dadi ----- Enter 8 for Nani  
Enter 9 for Sala ----- Enter 10 for Bahu  
Enter 11 for Pota ----- Enter 12 for Poti  
Enter 13 for Nawasa ----- Enter 14 for Nawasi  
Enter 15 for Sussar ----- Enter 16 for Saas  
Enter 17 for Bapdada ----- Enter 18 for Khala  
Enter 19 for Chachataya ----- Enter 0 for Exit:
```

Figure 4:Terminal Screenshot

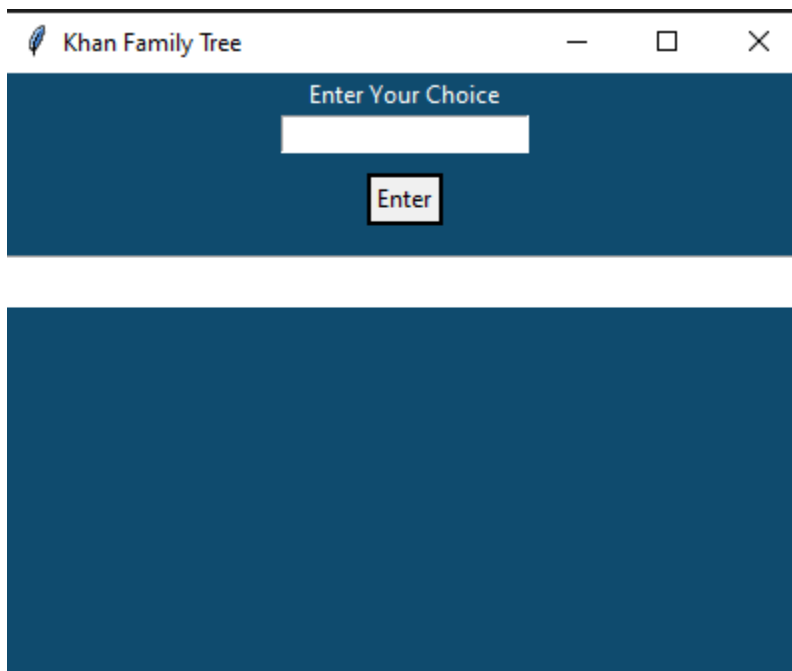
```
Enter your Choice: 13
Select Any Member of Khan Family:

ChoteKhan,  ChotiRani,  BarreKhan,  BarriRani
Salim,      Kausar,     Nadir,     Asad
Nahid,      Sumra,     Rizwan,    Burhan
Rashid,     Akram,     Salima,    Sanam,
Rabia
Enter name of person to find His/Her Nawasa: |
```

Figure 5: Terminal Screenshot

GUI INTERFACE:

We have designed a very basic GUI interface for our chatbot in python. This interface need a lot of improvement but in interest of time we can test or run our code in terminal.



CONCLUSION:

In the world of Artificial Intelligence, prolog plays a very important role.

Prolog is a logic programming language. It has important role in artificial intelligence. Unlike many other programming languages, Prolog is intended **primarily as a declarative programming language**. In prolog, logic is expressed as relations (called as Facts and Rules). One of the big examples we can see today is ChatGPT which is going to change internet world. What is special in ChatGPT?

It interacts with human query just like real human and try to answer them based on machine learning algorithm in backend.

So, we made an AI chat bot which gets your query and respond back according to it using prolog.
