

AI CHAT BOT REPORT

January 2, 2022

ARTIFICIAL INTELLIGENCE

CS-340

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Abstract

We as a team developed an AI chat bot. The problem was to build up an inter family relationship between the Khan's family. if we want to find anyone's relation with other person in khan's family, AI chat bot tells us the relationship between two persons. We can find 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. It is high level language. Prolog is a logic programming language and it is used as back-end language. It is used as a declarative language to build up khan's family relationships.

1 Problem Statement:

In the course of Artificial Intelligence, we were given family tree of Khan's family including different kind of relationships. We had to come up with an application that can find relationship between two persons given in requirement document.

2 Introduction:

2.1 Logic:

Artificial intelligence (AI) is the capacity for an artificial machine to act brilliantly. Logic programming is a technique that computer scientists are utilizing to attempt to allow machines to reason since it is valuable for information portrayal. In logic programming, logic is utilized to address information and surmise 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.[1] Categorical syllogism is 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 and/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]

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, we can easily and efficiently represent our knowledge in computer. Predicate logic is used for knowledge representation. 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. It was created by Alain Colmerauer. It is an attempt to make a programming language that enables the expression of logic instead of carefully specified instructions on the computer. Prolog uses a subset of predicate logic and draws its structures from the early work of logicians.

2.3 Features of Prolog:

Variables:

Variables in the prolog always start with capital letters or with underscore.

? - parent (X, kauser).

Here **X** is the variable name.

Facts:

A fact is a predicate expression that makes a declarative statement about the problem domain.

mianbiwi (chotekhan,chotirani).

In the above example **mianbiwi** is a relationship between **chotekhan** and **chotirani**.

Rules:

Rule is used to predicate or derive new facts from the old defined facts which is based on given knowledge stored in database.

beta (X, Y): - parent (Y, X), gins (male, X).

Queries:

Query is just a simple question which is asked in prolog to get information from the stored knowledge in database.

? - parent (X, kauser). Chotekhan, choterani.

3 Khan Family Tree:

Here is the given problem for Khan's family tree;

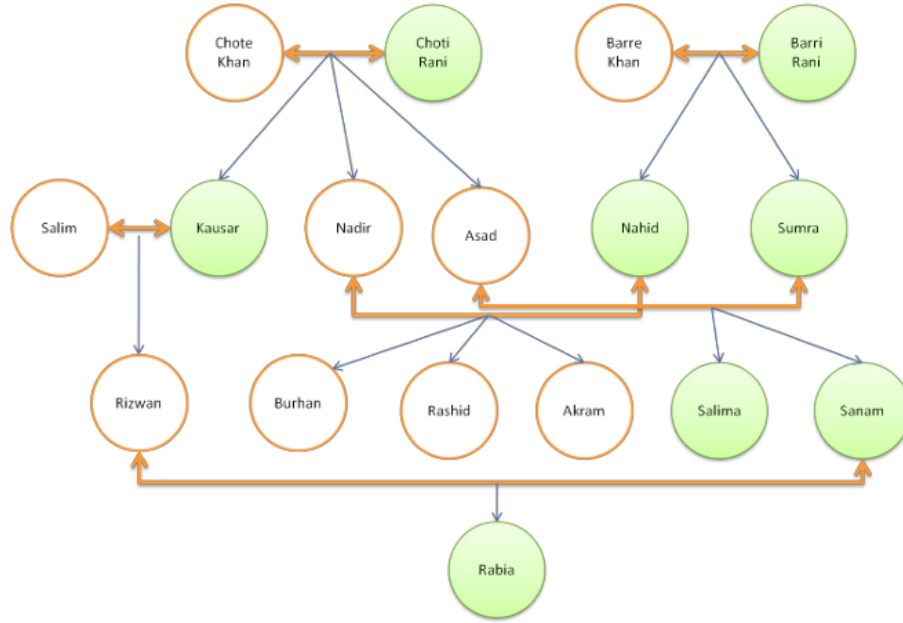


Figure 1: Khan's Family tree

4 Rules for Implementation:

- **baap**(Variable1, Variable2): - parent-of(Variable1, Variable2), gins(mard, Variable1).
- **maa**(Variable1, Variable2): - parent-of(Variable1, Variable2), gins(aurat, Variable1).
- **beti** (Variable1, Variable2):-parent-of(V2,V1) , gins(aurat,V1).
- **beta** (Variable1, Variable2):- parent-of(V2,V1), gins(mard,V1).
- **dada** (Variable1, Variable2):- parent-of(V1,Z) , parent-of(Z,V2) , gins(mard,V1),gins(mard,Z).

- **nana** (Variable1, Variable2):- parent-of(V1,Z), parent-of(Z,V2), gins(mard,V1), gins(aurat,Z).
- **dadi** (Variable1, Variable2):- parent-of(V1,Z),parent-of(Z,V2) , gins(aurat,V1), gins(mard,Z).
- **nani** (Variable1, Variable2):- parent-of(V1,Z),parent-of(Z,V2) , gins(aurat,V1), gins(aurat,Z).
- **sala** (Variable1, Variable2):- mian-of(V2,Z) , parent-of(A,Z) , gins(aurat,Z), parent-of(A,V1) , gins(mard,A), gins(mard,V1).
- **bahu** (Variable1, Variable2):- parent-of(V2,Z) , gins(aurat,V1) , gins(mard,Z) , mian-of(Z,V1).
- **pota** (Variable1, Variable2):- parent-of(V2,Z), parent-of(Z,V1), gins(mard,V1),gins(mard,Z).
- **poti** (Variable1, Variable2):- parent-of(V2,Z), parent-of(Z,V1), gins(aurat,V1),gins(mard,Z).
- **nawasa** (Variable1, Variable2):- parent-of(V2,Z), parent-of(Z,V1) , gins(mard,V1), gins(aurat,Z).
- **sussar** (Variable1, Variable2):- mian-of(V2,Z) , parent-of(V1,Z) , gins(mard,V1), gins(aurat,Z), gins(mard,V2).
- **chachataya** (Variable1, Variable2):-parent-of(A,Z),parent-of(A,V1),parent-of(Z,V2),gins(mard,V1),gins(mard,Z),not(Z=V1).
- **khala** (Variable1, Variable2):-parent-of(A,Z),parent-of(A,V1),parent-of(Z,V2),gins(aurat,V1),gins(aurat,Z),not(Z=V1).
- **baapDada** (Variable1, Variable2):- parent-of(X,Z) ,bapdada(Z,Y), gins(mard,Z),gins(mard,X).

4.1 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

5 Methodology and Implementation for Front-End:

Once a problem is given, its first step is to define the problem. What is real problem or what we have to develop? and how to find the optimal solution for that specific problem. In this project we had to develop an AI chat bot which helps us to find any relation between two persons of khan's family. Following methods and tools are used for AI chat bot;

5.1 Visual Stdio Code:

For image classification we have to write code. For this we had installed 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).

5.2 Python and its Libraries:

Python is a programming language which is almost being used in every field of computer science. Python is used for web development, game development, machine learning, implementation of GUI's and to solve scientific and numerical problems.

For specific problem we had used PySwip library. 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.

5.3 JavaScript:

JavaScript (JS) is a lightweight, interpreted, or just-in-time compiled programming language with first-class functions. While it is most well-known as the scripting language for Web pages, many non-browser environments. It is used in order to make interface interactive with respect to user response.

6 Functions in Code:

We used different kind of terms and function for AI chat bot;

6.1 DisplayKhanFamily()

In this function, there are multiple choices in order to select the relationship between any two persons of khan's family.

6.2 KhanFamilyMembers()

This function is used to select any member of Khan's family.

6.3 Main()

In this function, Queries will run against the selected choice in order to find the relationships in which you are interested.

6.4 Flask Interface:

6.4.1 Index()

It will render templates of html.

6.4.2 ProcessUserInfo()

This function will communicate between python and JavaScript for input and output result.

7 Interfaces:

There are two interfaces, one is wen interface and second is back-end terminal interface. You can ask certain queries on the interfaces by selecting the option to find any relationship among khan's family.

7.1 Terminal Interface:

Once you run the program, it will show you a welcome screen on which certain options will be given to ask your queries. By following them you can find your specific query.

```
***-- (: WELLCOME TO 2 in 1 Chatbot OF KHAN FAMILY :)--***
#####
*Please Select Any choice/Alphabet Below In Order 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 'a' for Bahu
*Enter 'b' for Pota     *Enter 'c' for Poti
*Enter 'd' for Nawasa   *Enter 'e' for Nawasi
*Enter 'f' for husband side sussar *Enter 'g' for wife side sussar*
*Enter 'h' for bapdada  *Enter 'i' for khala
*Enter 'j' for chachataya *Enter 0 for Exit*
**
#####
--> Enter your Choice for the Relationship that you are interested in <--
1
#####
* 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 whose Baap is required : rabia
=====
Mr.rizwan is the baap of rabia.
=====
```

Figure 2: Back-end Terminal Welcome Screen

Below given image is about to ask if you want to go to user interface then click on the link.

```
*****
Click the below link, It will take you to Web Interface
*****

*****
Please Select The Choices as Select In Terminal It Will Give You Correct Answer
*****

* Serving Flask app 'app' (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: off
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

Figure 3: Moving to user Interface

7.2 User Interface:

This interface is user friendly interface and it is more interactive then terminal interface. It works on the basis of one query at a time.

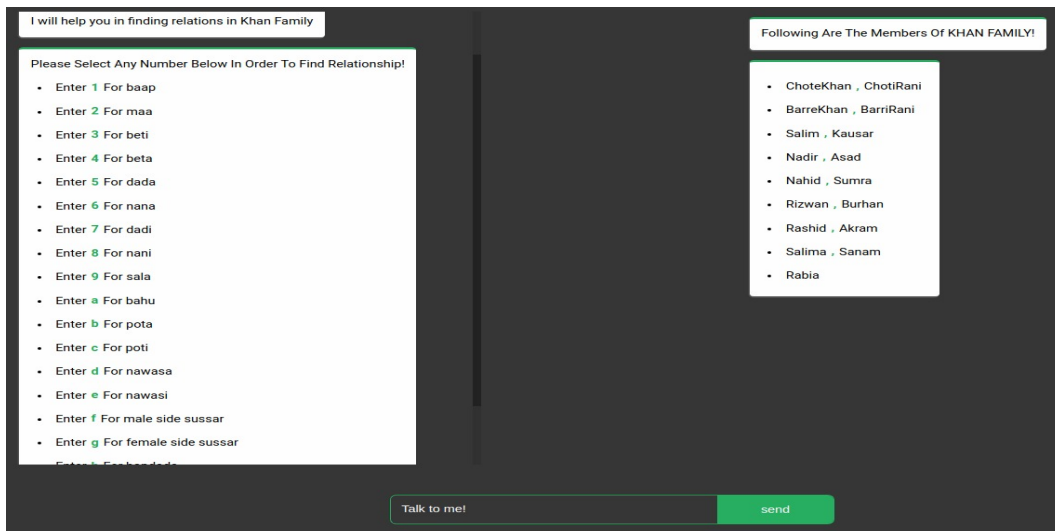


Figure 4: User Interface

When you type your query in the Talk to me bar then it gets your query and response back according to it.

Given below picture is the interactive session between chat bot and user.

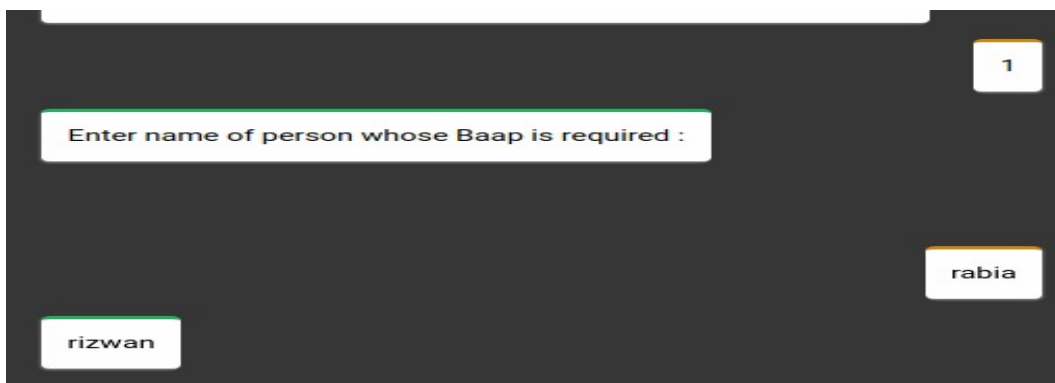


Figure 5: Interactive session of User Interface

8 Conclusion

In this report, we proposed an AI chat bot which gets your query and respond back according to it. We had designed this AI chat bot on the basis of Khan's family. The knowledge about khan's family was stored in the prolog and we had developed two types of interface of AI chat bot, one is terminal interface and second is user interface which is more friendly and interactive which finds any relationship between two persons of khan's family.

9 References:

1. <https://courses.lumenlearning.com/atd-epcc-introtophilosophy/chapter/categorical-syllogisms/>
2. <https://iep.utm.edu/prop-log/>