

Career Advisor Expert System Based on Myers Briggs Personality Assessment

A. Iwayemi.

Department of Computer Engineering,
The Federal Polytechnic,
Ile-Oluji, Nigeria.
iwayemi_ayodeji@yahoo.com

B. F. Oladejo

Department of Computer Science,
University of Ibadan,
Ibadan, Nigeria.
oladejobola2002@yahoo.com

D. S. Adeleke

Department of Computer Science,
University of Ibadan,
Ibadan, Nigeria.

ABSTRACT

The knowledge of what career to specialize in could be a late discovery for adults who have traded their youthful years through several professions/vocations but found no fulfillment. On the other hand, it could be a strenuous exercise for children and youths who are exposed to different academic areas. The aim of this project is to develop a career-advisor expert system based on Myer-Briggs Personality Assessment. It advises the user based on his/her personality. This is achieved through the method of creating facts from the Myers-Briggs Type Indicator (MBTI) thereby mapping them to common Careers using a rule-based system based on the sixteen Personality Types (according to Myers-Briggs). All these facts and rules form the database whereas “Prolog” which stands for “Programming in Logic” is the tool used for the implementation. The results of the query determine whether an advisee should choose a particular career or not. It displays “true” if he/she could choose the predetermined career and “false” if he/she should not. The results equally lists the possible career paths an advisee could follow. For example, when asked the career that someone with the personality trait of Introversion-Intuition-Thinking-Judging can pursue, it advises the following careers: Scientist, Engineer, Professor, Teacher, Medical Doctor, Dentist, etc. In conclusion, this expert system would minimize cost, alleviate career problems and always provide reliable career advice void of human error. Meanwhile future work can focus on the engineering of other models that can influence the choice of career other than the complex personality trait.

CCS Concepts

• Information systems → Information systems applications → Decision-support systems → Expert systems

Keywords

Expert System; Facts; Rule-Based;MBTI; Prolog

1. INTRODUCTION

A career advisor expert system is simply a knowledge-based computer program or software, developed by a knowledge engineer to exhibit a degree of expertise in problem solving that is comparable to that of a human expert (called domain engineer) in Guidance and Counseling. The issue of acting like a human comes up primarily when Artificial Intelligence programs have to interact with people, as when an expert system explains how it came to its diagnosis, or a natural language processing system has a dialogue with a user [10]. A major reason for the popularity of the MBTI instrument is its relevance in many quite diverse

areas—education; career development; organizational behavior; group functioning; team development; personal and executive coaching; psy-chotherapy with individuals, couples, and families; and in multicultural settings [9]. Katharine Briggs and her daughter, Isabel Briggs Myers, were keen and disciplined observers of human personality differences who studied and elaborated the ideas of Swiss Psychiatrist Carl G Jung and applied them to understanding people around them [7]. People tend to choose career paths based on reasons like parental advice, emulation/imitation and financial gains but end up not doing what they like. People train hard in certain professions simply because they thought such professions are nice, but passionately, they love practicing different profession. Every personality type has unique strengths and challenges aligned to their natural preferences [2]. Myer Briggs Personality Assessment is simply an evaluation of personality traits and styles in order to discover their corresponding careers. Meanwhile, after taking the Personality Type Inventory, you can use what you’ve learned about your personality type to identify a job that suits you well [3]. The problem is the lack of an Expert System at the grassroots to connect their real personality traits to the corresponding and appropriate career path. Reading books written by career professionals and making consultations with guidance and counselors are proven steps towards discovering the right career paths. But, this knowledge is better packaged as an expert system because of the advantages of Permanence (Expert System will not forget), Reproducibility, efficiency, consistency and completeness. This rule-based career advisor expert system examines the advisees in order to provide them with good career recommendations. The objective is to shelter the user from distractions that arise when he/she chooses without considering their personal traits, abilities and interests which should be important in determining what career path to follow.

1.1 Statement of the Problem

The great decision of choice of career runs through every person at every level some of which could no longer be amended. This report focuses on an expert system that advises a person on the choice of career based on Meyer Briggs Personality Assessment.

1.2 Aim and Objectives

AIM: The aim of the paper was to develop a career advisor based on Myers-Briggs Personality Assessment

OBJECTIVES:

The objectives of this paper are:

- i. to design a model for career choice;
- ii. to build an Expert System based on the model in (i) above; and

to test the expert system by employing it in determining career of users.

1.3 Justification

Most career advisors are time consuming to operate because of the need of rhetoric questionnaires. It therefore constitutes as much challenge as it is to find an appropriate career. This paper builds ontologies from a collection of documents using unsupervised machine learning. It uses the computer representations of MBPA with programming in logic (Prolog) to provide stress less knowledge of career choice.

2 LITERATURE REVIEW

2.1 Related Work

Different factors affecting career selection are students ability, age, aptitude, area of residence, attitude, availability of jobs, community, counselors /advisor, course curriculum, environment family business financial support/family income, friends influence, gender, hobbies, interest, industry alignment with subjects, IQ, job guarantee, learning experience, location, life style, opportunity, outcome expectations, parents influence, past academic performance, personality, physical condition, political consideration ,preference, prestige, previous work experience, programme, self-efficacy, self-employment, scholarship, school attended, skills, students strength, teacher, tuition fees etc [13]. Several expert systems have been designed from some of these factors. While expert systems in education have great potential, they remain un-established as a useful technology due to a lack of research and documentation [6]. An automatic expert system as helpmate of university department head to choose best lecturer for each course among of the volunteer respectively was designed in [4]. The construction of an online Expert System which guides the students for the selection of their undergraduate courses after the completion of higher secondary school education was presented in [11]. It is online system that provides up-to-date information (acquired from web pages using pattern matching and jSoup parsing technique) to the students by taking the necessary details from the student as input and will have the knowledge-base which contains the details about the colleges in Pondicherry. A prototype web-based Expert System that offers an interactive user interface where students are able to request to add or drop courses was proposed in [1]. The Expert System provides a response when users want to add or drop courses that may affect their course plan. An automated system that mimics a one-to-one meeting with a professional career counselor was presented in [8]. The system focuses on collating different machine learning algorithms to guide students on the basis of their academic background, hobbies and location. In [5], the design of a multi-expert system for educational and career guidance based on a multi-agent paradigm and the semantic web was presented.

2.2 Using Myers-Briggs Type Indicator (MBTI)

The MBTI instruments identify the preferences in the FOUR key domains below in Table 1.

Table 1: The Four Key Domains

I. HOW WE PREFER TO DIRECT OUR ATTENTION AND ENERGY?	
1. Extraversion (E)	2. Introversion (I)
II. HOW WE PREFER TO OBSERVE THE WORLD?	
3. Sensing (S)	4. Intuition (N)
III. HOW WE PREFER TO MAKE DECISIONS?	
5. Thinking (T)	6. Feeling (F)
IV. HOW WE PREFER TO ORIENT OURSELVES ON LIFE?	
7. Judging (J)	8. Perceiving (P)

Research has shown that many of the different Personality Types tend to have distinct preferences in their choice of careers. The observations of each type's character traits which affect career choice along with some suggestions for possible directions were used to create Facts for the expert system. The lists of actual careers which the various types have chosen in their lives are well represented in the Facts. As well known, individuals vary greatly. However, this research encourages personal self-knowledge that will help discover the personality types. The self-sorting on the Myers-Briggs Type Indicator personality inventory produces a shorthand four-letter code (from Table 1) that yields the sixteen Personality Types shown in Table 2 [12]:

Table 2: The Sixteen Personality Types

S/NO	PERSONALITY TYPE	CAREER TYPE
1	ISTJ	TheDuty Fulfillers
2	ESTJ	The Guardians
3	ISFJ	The Nurturers
4	ESFJ	The Caregivers
5	ISTP	The Mechanics
6	ESTP	The Doers
7	ESFP	The Performers
8	ISFP	The Artists
9	ENTJ	The Executives
10	INTJ	The Scientists
11	ENTP	The Visionaries
12	INTP	The Thinkers
13	ENFJ	The Givers
14	INFJ	The Protectors
15	ENFP	The Inspirers
16	INFP	The Idealists

3 METHODOLOGY

3.1 Design Overview

Figure 1 shows the top down approach to the design of the system.

3.2 Facts Creation

Facts are basically what are known, that is, what is known from the MBTI. Figure 2 is the prolog code for facts for some personality types:

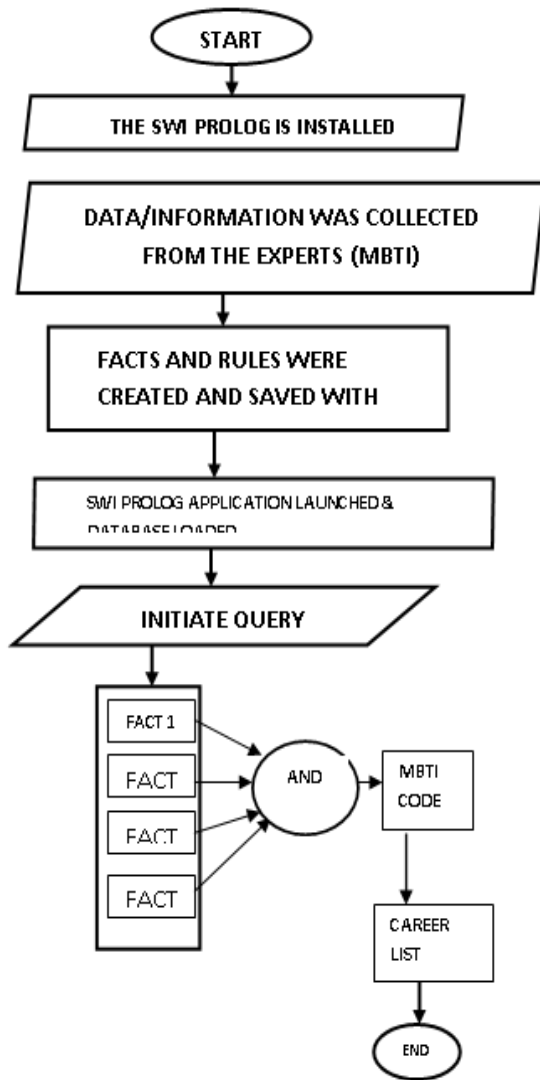


Figure 1: Top down Approach to the Career Advisor Expert System

```

/*career(Course,Attitude,InformationGathering,DecisionMaking,
StructureOrientation).*/
/*INTJ PERSONALITY TRAITS*/
career(scientist,introversion,intuition,thinking,judging).
career(engineer,introversion,intuition,thinking,judging).
career(professor,introversion,intuition,thinking,judging).
career(teacher,introversion,intuition,thinking,judging).
career(doctor,introversion,intuition,thinking,judging).
career(dentist,introversion,intuition,thinking,judging).
career(strategist,introversion,intuition,thinking,judging).
career(builder,introversion,intuition,thinking,judging).
career(administrator,introversion,intuition,thinking,judging).
career(business-manager,introversion,intuition,thinking,judging).
career(military-leader,introversion,intuition,thinking,judging).
/*INTP PERSONALITY TRAITS*/
career(scientist,introversion,intuition,thinking,perceiving).
career(physicist,introversion,intuition,thinking,perceiving).
career(chemist,introversion,intuition,thinking,perceiving).
career(photographer,introversion,intuition,thinking,perceiving).
career(planner,introversion,intuition,thinking,perceiving).
career(mathematician,introversion,intuition,thinking,perceiving).
career(professor,introversion,intuition,thinking,perceiving).
career(computer-programmer,introversion,intuition,thinking,perceiving).
career(systems-analyst,introversion,intuition,thinking,perceiving).
career(engineer,introversion,intuition,thinking,perceiving).
career(attorney,introversion,intuition,thinking,perceiving).
  
```

Figure 2. Architecture of the Knowledge Based System

4 RESULT AND DISCUSSION

4.1 SWI-Prolog

The software tool called SWI-Prolog is used to compile and run the Prolog code. SWI-Prolog is an application that allows predicate logic or predicate syntax. Once the code is compiled, the question mark is displayed to allow queries. SWI-Prolog application is shown below in Figure 3.



Figure 3 Swi-Prolog Application

4.2 Result

Figure 4 shows the expert system on Prolog application when an introversion-intuition-thinking-judging personality was tested for choice of career. The first rule yielded a False which indicates that he/she cannot be a psychologist. The second query reveals that he/she can become an engineer. Figure 5 shows the result of the expert system when asked to list all the Disciplines that someone with the personality trait of introversion-intuition-thinking-judging can pursue.

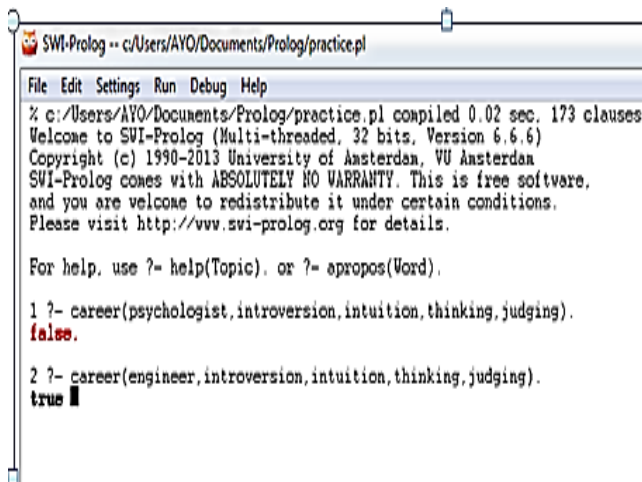


Figure 4. Expert System Answering True/False on Specific Career Choice Questions



Figure 5. Expert System Advising on General Discipline of an Introversion-Intuition-Thinking-Judging

5 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

In conclusion, this Expert System, just like other ES's, has the following advantages over human Psychological experts: the knowledge is permanent and not bias; the knowledge is easily reproduced; the knowledge is represented explicitly and can be evaluated; the system is consistent - whereas human advisors have bad days, the system does not; and finally, running the cost is low. Therefore, it is deployable in institutions, organizations and homes. It uses a readily available knowledge that has been proven in advising the choice of vocation/profession/career.

5.2 Recommendation

This research work focused on the use of Myer-Briggs' Personality Principles to determine the choice of career in life. This is already achieved through the Expert System. Meanwhile future work can focus on the consideration of other models that can influence the choice of career other than the complex personality trait. More so, disciplines can be subdivided into smaller specializations. Hence further work can be built to determine the best subdivision/specialization for an individual.

6. REFERENCES

- [1] Barends L. J. M. "Student Advisor Expert System" Honours Paper Report, Department of Computer Science, University of Cape Town. Cape Town. 2014.
- [2] Dunning D. 10 Career Essentials. Nicholas Brealey Publishing, Boston, London. 2010
- [3] Farr M. and Shatkin L. 50 Best Jobs for Your Personality. JIST Publishing. Indianapolis, Indiana. 2009.
- [4] Fekri-Ershad S., Tajalizadeh H., and Jafari S. "Design and Development of an Expert System to Help Head of University Departments," International Journal of Science and Modern Engineering, Vol. 1, pp. 45–48, 2013.
- [5] Haji E. E., Azmani A., Harzli M. E. "Multi-expert system design for educational and career guidance: an approach based on a multi-agent system and ontology", International Journal of Computer Science Issues, Vol. 11, Pp 46-52, 2014
- [6] S., Kaushik A. and Barnela M. "Expert System Advances in Education", In Proc. of International Conference on Computational Instrumentation (NCCI), pp. 109-112, 2010
- [7] Myers I. B. Introduction to Type: A Guide to Understanding your results on the MBTI Instrument, CPP Inc., Mountain View, California. 1998
- [8] Nawaz M., Adnan A., Tariq U., Salman J. T., Asjad R. and Tamoor M. "Automated Career Counseling System for Students using CBR and J48" Journal of Applied and Biological Sciences, Vol 4, pp 113-120, 2014
- [9] Quenk N. L. Essentials of Myers-Briggs Type Indicator Assessment, John Wiley & Sons Inc., Second Edition, 2009.
- [10] Russell S. J. and Norvig P. Artificial Intelligence A Modern Approach, Prentice Hall, Englewood Cliffs, New Jersey, 2010
- [11] Saraswathi S., Hemanth K. R. M., Kumar S. U., Suraj M. and Shafi S. K. "Design Of An Online Expert System For Career Guidance" International Journal of Research in Engineering and Technology, Vol 3, pp. 314-319, 2014.
- [12] Pearman R. R. and Albritton S. C. I'm Not Crazy, I'm Just Not You :The Real Meaning of the 16 Personality Types, Davies-Black Publishing, Mountain View, California. USA. 1997.
- [13] Waghmode M. L. and Jamsandekar P. P. A Study of Expert System for Career Selection: Literature Review. International Journal of Advanced Research in Computer Science and Software Engineering. Vol 5. Pp 779-785, 2015.