Awareness about Artificial Neural Network (ANN) use in health system among physicians in Benghazi

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Abstract—**Artificial neural networks are computational paradigms based on mathematical models that unlike traditional computing have a structure and operation that resembles that of the mammal brain. One of the original aims of artificial neural networks (ANN) was to understand and shape the functional characteristics and computational properties of the brain when it performs cognitive processes such as sensorial perception, concept categorization, concept association and learning. However, today one of the most uses of ANN in the health system are Diagnosis, predication and classification by using different and recent techniques.**

This is a paper pilot orientation use of ANN in the health system among physicians in Benghazi as a tool in their diagnostic field. Our target population was physicians in the Benghazi medical center and polyclinics with different professions, where the participates 200 with different age groups by filling one of two types of survey (online- in person). Based on the results of survey

Based on the results of survey we found 89% of physicians didn't have any information about ANN, 95% didn't read any paper about ANN technology, 98% didn't use ANN as tool in diagnostic field, in addition, 60% they think it has value in using as tool in diagnostic field.

Index Terms: **Artificial Neural Network, Health system Artificial Intelligence, Machine Learning, Awareness**

I.   INTRODUCTION

The rapid development of computer technology has led to the automation of many processes that were pre- viously done by professionals. Technique development based on artificial intelligence (AI) as a major is an important re- quirement to solve complex problems. Medical diagnosis, due to the complexity of the human body and mind and vague knowledge in this field, is a good example of a class of com- plex problems and also the existent knowledge are different between people with various experiences [1]. The physicians 'ex-

perience role in the diagnostic process is undeniable, and to avoid wasting time in the diagnosis, techniques based on artificial intelligence are required, so that detect it so rapidly, reliably, accurately and knowledge base (8). In particular, artificial intelligence is a branch of data mining that uses automated pro- cess for finding information and patterns between the data[2]. Data mining is used in a wide range of various purposes, but one of its most obvious applications is in the process of med- ical diagnosis based on clinical findings, which is used in order to explore the relationship between clinical findings and di- agnostic results. Designing optimized intelligent systems in addition to the structure of the system depends on the input data. The garbage in garbage out phrase particularly empha- sized this point that achieving to optimal system, accurate in- formation and best use of the relevant data, are necessary

Machine learning technology provides an essential function for intelligent data analysis. The main important type of machine learning which is used to solve complex problems by providing faster processing and classification of the data is Artificial Neural Network ANN.ANN is similar to statistical techniques [3]. Which is a modeling tool that has the ability to learn and produce reliable and logical new data from general information by using the different processing and rules to earn their knowledge. ANN is designed to think and learn in the same way as humans. The most important field of (ANN) used in the last decades in healthcare that is proven by researchers is diagnosis and deeper understanding, also ANN based at the nexus of new technologies to provide a high level of healthcare with accurate , real time ,effective and efficient classification and diagnosis of medical data.

The structure of ANN consist of interconnected single or multiple layers and processing units [4], in general ANN structure divided into three layers:

- **Input layer :**responsible for learn and analysis from external received data
- **Hidden layer:** transform data from input to output

- **Output layer:** information which has learned

There are two types of ANN feed-forward and recurrent neural networks, also the most common type that is used in medical applications is feed-forward networks [6, 7].

The present successful uses of Artificial Neural Network ANN in the healthcare system have reached their full potential due to the constantly increasing accessibility of healthcare medical data and the advancements of big data diagnostic tools. Potential artificial intelligence (ANN) techniques can separate healthcare-appropriate information hidden in the massive amount of data with the help of critical medical inquiries, which can maintain healthcare decision-making. Modern healthcare technology has extended to countless pioneering organizations around the world, allowing people to live better and longer lives.The most common uses of ANN in healthcare system were classification [10], prediction [11], and diagnosis [12]

In this paper, a brief of pilot study of awareness about ANN use in health system among physicians in Benghazi.

II.   AIM OF THE STUDY

The aim of this study is to see if there is awareness among physicians in Benghazi about the existence of ANN and their uses in the health system.

III.   METHODS

We conducted a cross sectional survey which was carried out between August 1st and September 30th 2021, the target population was physicians in Benghazi medical center and polyclinics.

The questionnaire was anonymous and it was in English and a pilot test was conducted to test the validity of the questioner, the data from the pilot study was included in the final analysis. The survey was both online and in person. The online survey was conducted using a survey link created by using Google form .A total of 200 completed both surveys of those 50 were excluded due to missing data.

Socio-demographic on the survey measure the: age and profession,

Ethics we start the survey by explaining the main idea also the purpose and the benefit of it. In addition, we explain in details the goal of the survey to all participate basis of participation is 100% voluntary,

We use the Statistical Package for the Social Sciences SPSS Software which used for Statistical analysis to analyze the data of the survey

IV.   DISCUSSION AND RESULTS

The most commonly used of ANN in the field of healthcare systems are diagnosis, classification, interpretation and predication [5]. In addition, the main advantage of ANN in these aspects is based on the ability and simplicity of ANN to solve very complex problems. Also, problems do not have available solutions.

This pilot study provides a simple view of the current status and awareness of using ANN in the healthcare system among physicians in Benghazi, especially in the field of diagnosis. To our knowledge, this is the first study in Libya intend to orient ANN technology in the health system among physicians.

We faced some difficulty to reach our target number in filling the survey forms by some of doctors listed blew:

1. Some of them were not passionate in filling the survey without any logical reason
2. Most of the questions have "NO" answers, therefore they said "we are doctors so we cannot say "NO" that means we don't have knowledge".

Also we had some positivity from doctors listed below:

1. Some doctors have a very good oriented background of ANN technology, due to their past experience in using ANN technology when they were living abroad.
2. Some doctors are passionate knowing more about the ANN technology. They took some time to search about the technology and we had a good conversation with them.

A total of 200 completed both (online and paper) surveys, "Figure. 1" shows different percentages of participating age groups. With the participants of the age groups (30-35) having the highest percentage (32%) while the participants of the age groups (35-40) having the lowest percentage (21%).
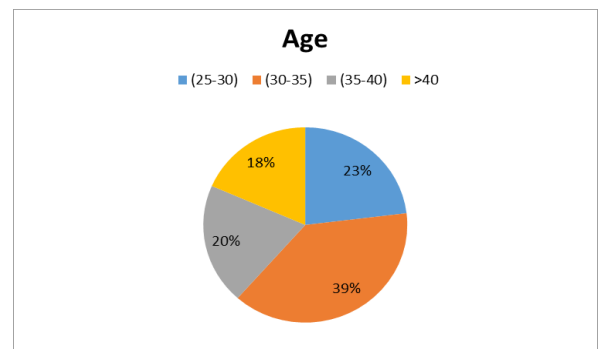

Figure 1. Different percentages of participating age groups

Although, "Figure. 2" shows the percentage of physicians who have knowledge or don't know about ANN technology, where the highest percentage of 89 % indicating they don't know about ANN technology.
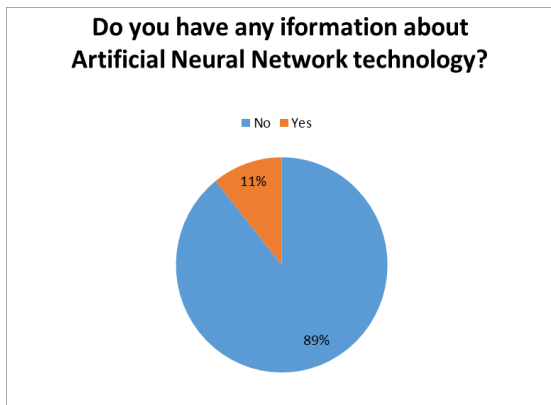
Do you have any iformation about Artificial Neural Network technology?

No   Yes

11%

89%

Figure 2. Different percentage of knowledge about ANN

In addition, "Figure. 3" shows the percentage of physicians who read or don't read about ANN technology, where the highest percentage of 95 % of participant indicates that they didn't read about ANN technology.
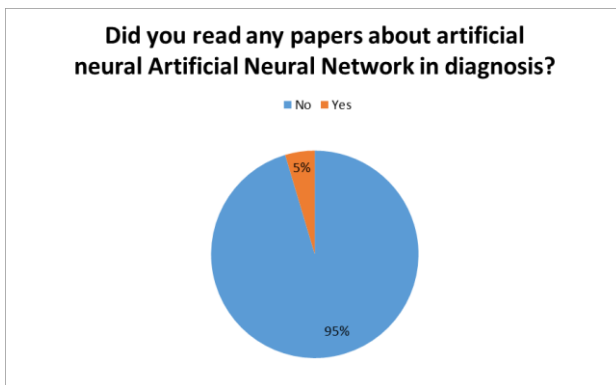
Did you read any papers about artificial neural Artificial Neural Network in diagnosis?

No   Yes

5%

95%

Figure 3. Different percentage of reading Papers about ANN in diagnosis

Also, "Figure. 4 "shows the percentage of physicians who used or don't use of ANN technology as a diagnostic tool, where the highest percentage of 98% participants indicate that they don't use ANN.
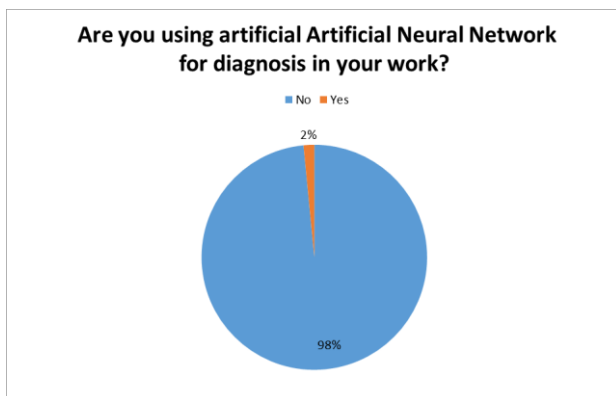
Are you using artificial Artificial Neural Network for diagnosis in your work?

No   Yes

2%

98%

Figure 4. Different percentage of using ANN as a tool in diagnostic

Finally, "Figure. 5" shows the percentage of physicians who think using of ANN technology in diagnosis has a value or not, where the highest percentage of 60 % participants indicate that they think it has a value.

Do you think there is any value of using Artificial Neural Network technology in diagnosis
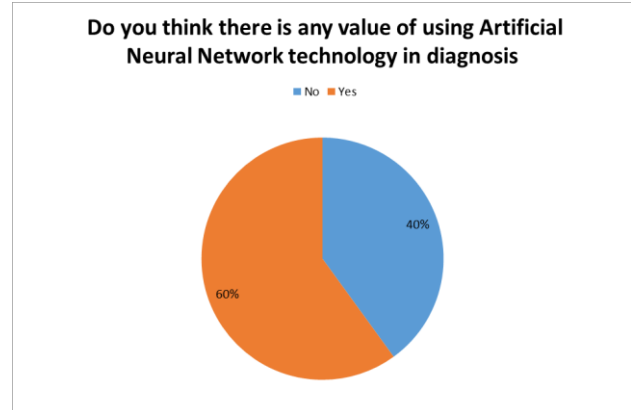
No   Yes

40%

60%

Figure 5. Different percentage of using ANN Has Avalue

V.   CONCLUSION

Prediction, classification and diagnosis are one of the most commonly used of ANN in health system. In this paper we study a pilot of awareness among physicians in Benghazi about the existence of ANN and their uses as a tool in the health system. Based on the results of survey We found 89% didn't have any information about ANN, 95% didn't read any paper about ANN technology, 98% didn't use ANN as tool in diagnostic field, in addition, 60% they think it has value in using as tool in diagnostic field. For that, we suggest to use ANN as tool for help physician to get accurate result especially in diagnostic field

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