University of M'sila,

Faculty of Mathematics & Computer Science (CS),

Department of CS.

Course: Diagnostic Methods for Master1 (AI) **Date: 29/06/2022**

Duration: 1:30

Final Exam

Q1. (5 pts)

-What are the two categories of diagnostic methods?

- Model based methods
- Non model methods

-Give and explain three criteria used to evaluate the diagnostic methods.

Students can select any 3/10 criteria explained before in the class such as:

1. Robustness: In the sense of tolerance to noise and uncertainties, performance should degrade step by step and not suddenly fail in the event of anomalies.
2. Separability: It is the ability to distinguish between different failures.
3. Rapid detection and diagnosis: The diagnostic system must respond quickly to detect and diagnose process failures.

Q2. (7 pts)

Select one choice from the following:

1. It is the space of inputs without any a priori knowledge of the links between them:
    a. Decision space
    b. Testing phase
    c. Measurements space
    d. Class space
    e. None of the mentioned
2. It is an intermittent irregularity in the fulfillment of a system's desired function.
    a. Malfunction
    b. Fault
    c. Neuron
    d. Failure
3. It limits the amplitude (range) of the output of the neuron:
    a. Artificial neuron
    b. Activation function
    c. Learning Algorithm
    d. All of the mentioned

4. Approaches that use an analytic or physical model of the system:
    a. Fault Tree
    b. External fault
    c. Networking
    d. None of the mentioned
5. The system must be able to provide information on the degradation of the system in the current state. This is called:
    a. Separability
    b. Identification of new modes of malfunction
    c. Adaptability
    d. Ease of explanation
6. In SADT, means used to effect the transformation are represented by:
    a. Upper arrow
    b. Lower arrow
    c. AND gate
    d. All
7. We say that the neuron "fires" if:
    a. its output is greater than zero
    b. its output is equal to zero
    c. its output is lower than zero
    d. None of the mentioned

Q3. (8 pts)

KNN algorithm can be used in many medical diagnosis applications.

-Suggest one disease where KNN algorithm can be applied.

- Covid-19.

-Suggest three symptoms that can be used as features/inputs to this algorithm.

- Age
- Weight
- Temperature

-List three advantages of KNN algorithm.

- Simple to implement and use.
- Robust to noisy data by averaging k-nearest neighbors.
- KNN classification is based solely on local information.

-List three disadvantages of KNN algorithm.

- Curse of dimensionality: distance can be dominated by irrelevant attributes.
- O(n) for each instance to be classified.
- Large memory requirements.