11

SENIOR HIGH SCHOOL

DEPARTMENT OF EDUCATION
SCHOOLS DIVISION OF NEGROS ORIENTAL
REGION VII
Kagawasan Ave., Daro, Dumaguete City, Negros Oriental

Trends, Networks and Critical Thinking in the 21st Century

Quarter 4 – Module 6:

Parallelism between Neural and Social Networks

ALTERNATIVE DELIVERY MODE

ADM

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Alternative Delivery Mode
Quarter 4 – Module 6: Parallelism between Neural and Social Networks
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What I Need to Know

Hello learner!!! Welcome to this another exciting module on parallelism between neural and social networks.

As you have noticed in our daily lives, we are always confronted with situations that crack a part of our brain and we wonder why things happened that way. If we could not identify or recognize the pattern in that situation, we could not be able to understand and even tell what would probably happen next. This approach has become very useful in social sciences.

In your previous module, you have illustrated how our brain or neural network works, right?

This module will surely be an exciting one because you will discover more of your networks in your community where you belong. Are you ready?

Most Essential Learning Competencies

At the end of this module you are expected to:

1. Compare neural networks with social networks **(HUMSS_MCT12-IIg-i-3)**
2. Establish linkages between self and the social networks **(HUMSS_MCT12-IIg-i-4)**

What I Know

Activity 1

Instructions: Read each statement and write the letter of the correct answer in your activity notebook. Do not write anything on this module.

1. What are the two types of Neural Networks?
    a. Biological Neural network and Artificial Neural Network
    b. Chemical Neural Network and Biological Neural Network
    c. Geological Neural Network and Artificial Neural Network
    d. Chemical Neural Network and Geological Neural Network

2. What is the main function of ANNs?
    a. Reproduce Human Spinal Functions
    b. Reproduce Human Foot Functions
    c. Reproduce Human Nervous System
    d. Reproduce Human Brain Functions

3. What are the Three Parts of a Neuron?
    a. Dendrite, Saxon, Aoma
    b. Gamio, Saxio, Dendrition
    c. Dendrite, Soma, Axon
    d. Dęndrìtē, Âxòn, Sómä

4. Which of the following is beyond the control of ANNs?
    a. Geometric problems
    b. Science problems
    c. Industry problems
    d. Financial problems

5. What futuristic actions cannot be performed by ANNs? ANNs is capable of performing the following futuristic actions except _____.
    a. Pattern Recognition
    b. Function Approximation
    c. Pattern Classification
    d. Facial Recognition

What's In

Activity 2

Instructions. In your activity notebook, create a social map showing your own social network. Follow the sample map of AJ in Figure 1.

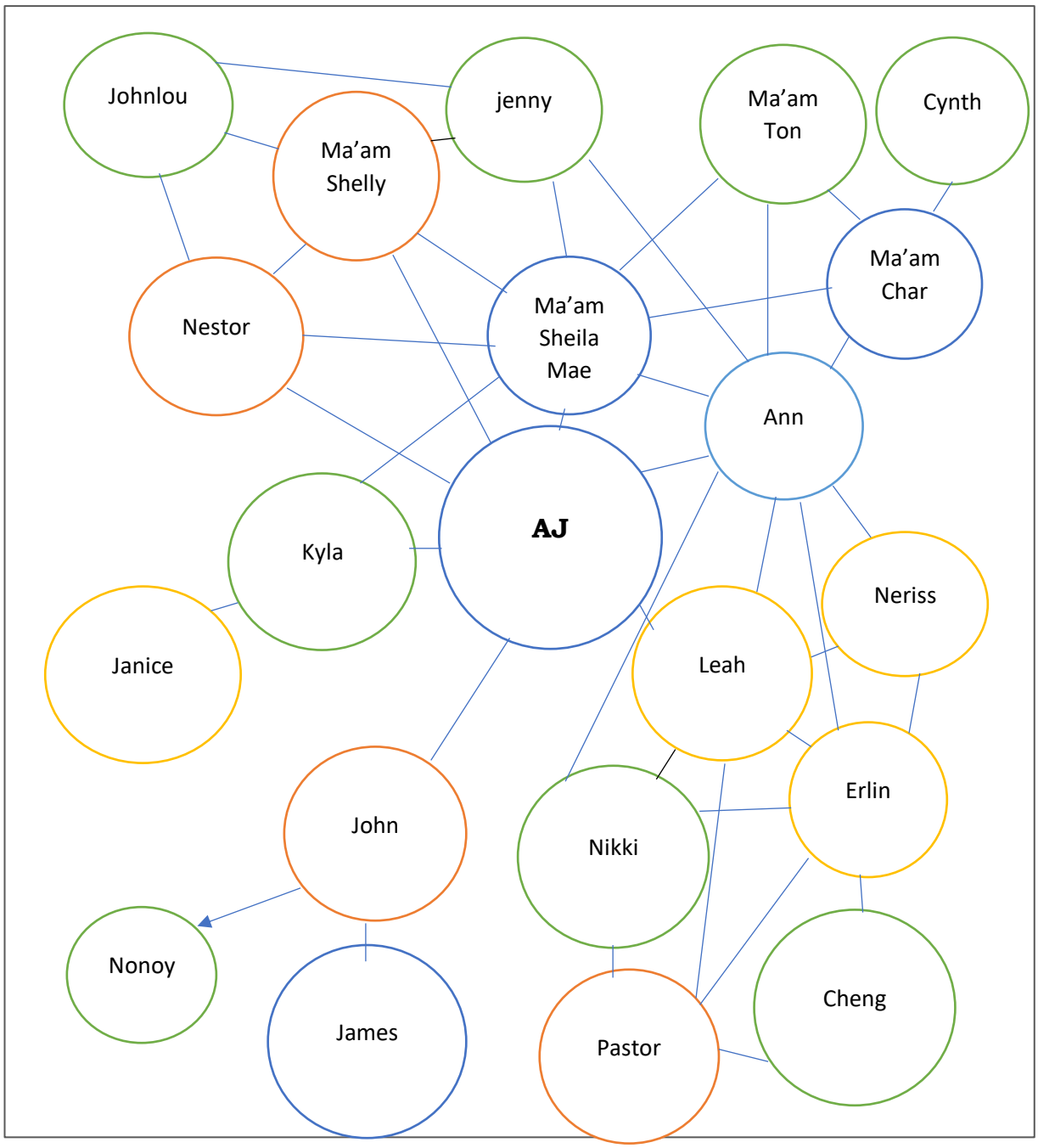


Figure 1. *A sample illustration of Social Network of a High School Student whose mother is a teacher*

What's New

Activity 3.

Instructions: Refer to Figure 1 in answering the following:

1. Identify at least three (3) people from your network who have similar interests with one another.
2. Are some of those interests beneficial for the society? Support your answer.

What is It

NEURAL NETWORK

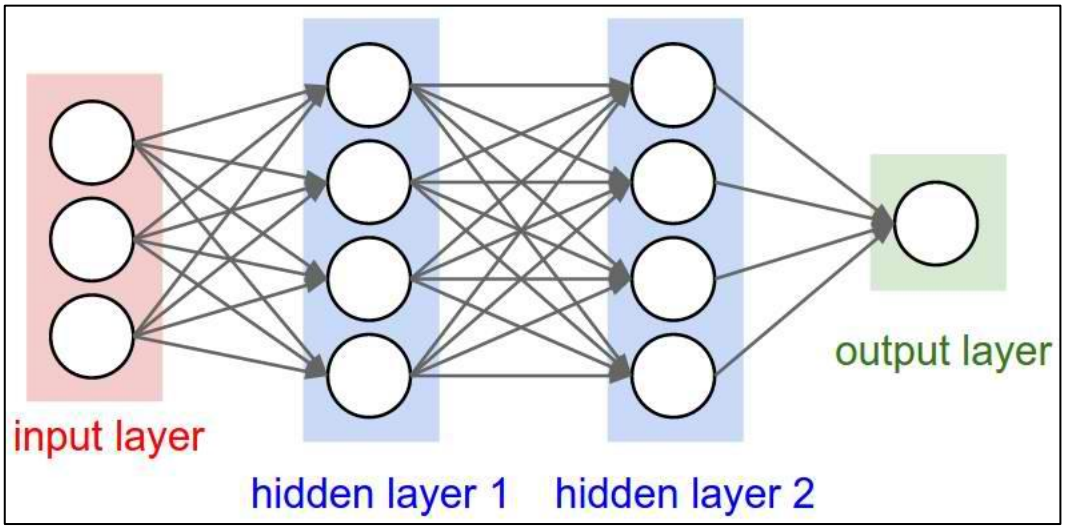
Neural networks referred to as connectionist systems (Garson, 2018) are a computational approach, which is based on a large collection of neural units (AKA artificial neurons), loosely modeling how the brain of a human solves problems with a large clusters of biological neurons connected by *axons* (Garson, 2018).

Each neural unit is linked with many others, and links can be enforcing or inhibitory in their effect on the activation state of connected neural units. Each individual neural unit may have a summation function which combines the values of all its inputs together. There may be a threshold function or limiting function on each connection and on the unit itself; such that the signal must surpass the limit before propagating to other neurons. These systems are self-learning and trained, rather than explicitly programmed, and excel in areas where the solution or feature detection is difficult to express in a traditional computer program.

Neural networks typically consist of multiple layers or a cube design, and the signal path traverses from front to back. Back propagation is where the forward stimulation is used to reset weights on the "front" neural units and this is sometimes done in combination with training where the correct result is known. More modern networks are a bit freer flowing in terms of stimulation and inhibition with connections interacting in a much more chaotic and complex fashion. *Dynamic neural networks* are the most advanced in that they dynamically can, based on rules, form new connections and even new neural units while disabling others.

The goal of the neural network is to solve problems in the same way that the human brain would, although several neural networks are more abstract. Modern neural network projects typically work with a few thousand to a few million neural units and millions of connections, which is still several orders of magnitude less complex than the human brain and closer to the computing power of a worm.

NEURAL NETWORK



https://tinyurl.com/yxhuhh8p

SOCIAL NETWORK

A social network is a social structure made up of a set of social actors (such as individuals or organizations), sets of dyadic ties, and other social interactions between actors. The social network perspective provides a set of methods for analyzing the structure of whole social entities as well as a variety of theories explaining the patterns observed in these structures. The study of these structures uses social network analysis to identify local and global patterns, locate influential entities, and examine network dynamics.

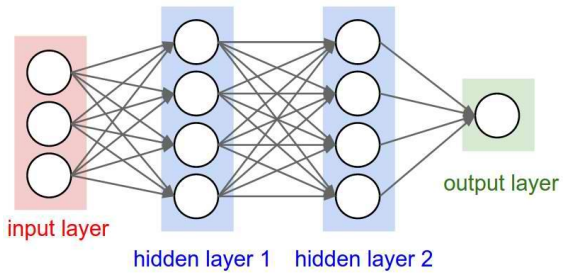
Social networks and the analysis of them is an inherently interdisciplinary academic field which emerged from social psychology, sociology, statistics, and graph theory. Georg Simmel authored early structural theories in sociology emphasizing the dynamics of triads and "web of group affiliations". Jacob Moreno is credited with developing the first sociograms in the 1930s to study interpersonal relationships. These approaches were mathematically formalized in the 1950s and theories and methods of social networks became pervasive in the social and behavioral sciences by the 1980s. Social network analysis is now one of the major

paradigms in contemporary sociology, and is also employed in a number of other social and formal sciences. Together with other complex networks, it forms part of the nascent field of network science.

What's More

Activity 4

Instructions: Give the difference in terms of network in the given illustrations below. Write your comparison in your Activity Notebook.



https://tinyurl.com/yxhuhh8p

VS

https://tinyurl.com/2sf76v9a

What I Have Learned

Activity 5.

Instructions: Answer the following questions in your activity notebook.

1. What have you learned from this module?

   I learned that _____
   _____

2. For you, what is the most challenging part in this module?

   The most challenging part is _____
   _____

3. Is there anything you want to say to your teacher for him/her to know about your experience in answering the activities in this module?

   I would like to tell my teacher that _____
   _____

What I Can Do

Activity 6.

Instructions. Name one person in your community that you wish to imitate or make as your inspiration in the near future. Give a few details on the process on how you are going to achieve or achieve more of what he/she has achieved in life. Include in your brief essay the social networks that you would be most likely to tap with.

Assessment

Activity 7.

Instructions. Give what is asked for in each item. Write your answers in your notebook.

1. _____ is referred to as connectionist systems.

2. Each _____is linked with many others, and links can be enforcing or inhibitory in their effect on the activation state of connected neural.

3. _____are the most advanced- in that they dynamically can, based on rules, form new connections and even new neural units while disabling others.

4. The goal of the neural network is to _____in the same way that the human brain would.

5. A _____is a social structure made up of a set of social actors (such as individuals or organizations), sets of dyadic ties, and other social interactions between actors.

6-10. Compare the neural networks with social networks. (5 POINTS).

Additional Activities

Activity 8.

Instructions: Provide a brief discussion on how COVID-19 affected your community, the country and the world as a whole. Use your activity notebook to write your answer.

Activity 1.

1. a
2. d
3. d
4. a
5. d

Activity 2. Answers may vary.

Activity 3. Answers may vary.

Activity 4. Answers may vary.

Activity 5. Answers may vary.

Activity 6. Answers may vary.

Activity 7.

1. *Neural networks*
2. neural unit
3. Dynamic neural networks
4. solve problems
5. social network

6-10. Neural Networks and social networks are both systems that are used to discover patterns and extract meanings from emerging trends. Both are used in analyzing scenarios that will challenge us to formulate our own stances on issues or concerns in our community and society.

Activity 8. Answers may vary.

Answer Key

Glossary

Neuron- The neuron is the basic working unit of the brain, a specialized cell designed to transmit information to other nerve cells, muscle, or gland cells. Neurons are cells within the nervous system that transmit information to other nerve cells, muscle, or gland cells.

Artificial neural network- An artificial neural network (ANN) is the piece of a computing system designed to simulate the way the human brain analyzes and processes information.

Behavioral science- A branch of science (such as psychology, sociology, or anthropology) that deals primarily with human action and often seeks to generalize about human behavior in society.

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Garson, James (27 November 2018). Zalta, Edward N. (ed.). The Stanford Encyclopedia of Philosophy. Metaphysics Research Lab, Stanford University – via Stanford Encyclopedia of Philosophy.

Pérez Sánchez, Rolando. (2011). Between neural networks and social networks: Between recognition and discrimination. Actualidades en Psicología. 22. 131. 10.15517/ap.v22i109.22.

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