《学术写作、规范与伦理》

标题： <u>Assignment2</u>

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Assignment

1. Please finish the assignment about "Build Your Arguments" (page 110-111, lesson_1-2.pdf).

   (5 categories: A. Paraphrasing, B. Summarizing, C. Synthesizing, D. Quoting, E. Booster)

   Please answer in the format "ABCDE".

2. Given the following words, please choose the comparably formal one from the pairs and

   answer the in the format "ABBABBAAB".

A. enquire	B. ask
A. tell	B. inform
A. receive	B. get
A. damage	B. hurt
A. use	B. utilize
A. but	B. however
A. verify	B. check
A. help	B. assist
A. reside	B. live

3. Please recommend an academic paper in your field and answer the following questions.

   (1) Please list the structure of the recommended paper (such as Introduction - Related Work -

   Method - Experiments - Discussion - Conclusion). Does this paper follow the hamburger-like

   structure?

   (2) Please give a case of how the evidence is incorporated in this paper?

   (3) Please write an abstract of this paper in your own words.

Answer

Question 1: Please finish the assignment about "Build Your Arguments" (page 110-111, lesson_1-2.pdf). (5 categories: A. Paraphrasing, B. Summarizing, C. Synthesizing, D. Quoting, E. Booster) Please answer in the format "ABCDE".

BACDE

Question 2: Given the following words, please choose the comparably formal one from the pairs and answer the in the format "ABBABBAAB".

ABAABBABA

Question 3: Please recommend an academic paper in your field and answer the following questions.

Recommend paper: "Xu S, Liu B, Yi S, et al. Analog spatiotemporal feature extraction for cognitive radio-frequency sensing with integrated photonics[J]. Light: Science & Applications, 2024, 13(1): 50."

(1) Please list the structure of the recommended paper (such as Introduction - Related Work - Method - Experiments - Discussion - Conclusion). Does this paper follow the hamburger-like structure?

Introduction - Related Work - Results - Discussion - Materials and methods.

This paper doesn't follow the hamburger-like structure.

(2) Please give a case of how the evidence is incorporated in this paper?

In the realm of RF sensing and detection, a large instantaneous bandwidth over several GHz is typically required to achieve a good resolution of target details[12,13]. The electronic RF circuit's bandwidth and reconfigurability bottlenecks have hindered the ability to extend the advantages of AFE to broadband cognitive RF sensing applications[14,15].

(3) Please write an abstract of this paper in your own words.

Analog Feature Extraction (AFE) has been extensively studied in the field of low-latency RF signal processing because it can extract sparse features below the Nyquist sampling rate. However, due to the limitations of bandwidth and programmability in analog electronic circuits, AFE has not been widely applied in broadband radio frequency (RF) scenarios.To address this issue, we have developed a photonics-based method for extracting spatiotemporal features from analog broadband RF signals. Our feature extractor is based on an optical convolutional neural network, capable of capturing RF signal features in both temporal and spatial dimensions. Additionally, our photonic feature extractor is programmable.Furthermore, we propose a hybrid analog-to-digital transfer learning method to efficiently train our photonic feature extractor. We conducted validation experiments using a radar target recognition task with a 4 GHz instantaneous bandwidth. The experimental results indicate that, based on the photonic analog feature extractor, we effectively utilize the sparsity of broadband RF signals, reducing the sampling rate of the backend electrical analog-to-digital converter to one-quarter of the Nyquist sampling rate, achieving a target recognition accuracy of 97.5%. This method is expected to advance the application of cognitive radio frequency sensing in fields such as radar and electronic reconnaissance.