Multi-Agent System with Adaptive Routing for Auto-Immune Disease Diagnosis

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ABSTRACT

Autoimmune diseases are a group of disorders that arise when the immune system attacks the body's own cells. The diagnosis of autoimmune diseases often involves complex and time-consuming processes that require the integration of multiple sources of information. Multi-agent systems (MAS) have been used to improve the efficiency and accuracy of disease diagnosis. However, the performance of MAS can be affected by dynamic changes in the environment. This article explores the use of adaptive routing in MAS for autoimmune disease diagnosis. The literature review examines the current state of autoimmune disease diagnosis, the challenges faced by MAS, and the potential benefits of adaptive routing. The research methodology involves the development of a MAS with adaptive routing for autoimmune disease diagnosis. The results show that adaptive routing can improve the efficiency and accuracy of MAS for autoimmune disease diagnosis. The conclusion discusses the implications of these findings for future research and the potential for adaptive routing to improve disease diagnosis in other healthcare domains.

KEYWORDS: Multi-Agent System, Adaptive Routing, Auto-Immune Disease Diagnosis

1.0 INTRODUCTION

Autoimmune diseases are a group of disorders that arise when the immune system attacks the body's own cells. The diagnosis of autoimmune diseases often involves complex and time-consuming processes that require the integration of multiple sources of information. Multi-agent systems (MAS) have been used to improve the efficiency and accuracy of disease diagnosis. However, the performance of MAS can be affected by dynamic changes in the environment. This article explores the use of adaptive routing in MAS for autoimmune disease diagnosis [1-17].

2.0 LITERATURE REVIEW

The current state of autoimmune disease diagnosis involves the use of various diagnostic tools, including medical history, laboratory tests, and imaging studies. However, the process of autoimmune disease diagnosis can be challenging due to the complexity of the diseases and the need for the integration of multiple sources of information. MAS have been used to improve the efficiency and accuracy of disease diagnosis by allowing for the integration of multiple sources of information. However, the performance of MAS can be affected by dynamic changes in the environment, such as changes in the availability of data sources or changes in the distribution of the disease. Adaptive routing is a technique that allows MAS to adapt to changes in the environment by dynamically re-routing messages between agents. This can improve the efficiency and accuracy of disease diagnosis by allowing for more efficient use of resources [18-26].

3.0 RESEARCH METHODOLOGY

A MAS was developed for autoimmune disease diagnosis using adaptive routing. The MAS consisted of multiple agents, including a patient agent, a laboratory agent, and a physician agent. The patient agent provided medical history information, the laboratory agent provided laboratory test results, and the physician agent provided a diagnosis based on the information provided by the patient and laboratory agents. The adaptive routing algorithm used was the Ant Colony Optimization (ACO) algorithm [27-39].

4.0 RESULT

The results of the study showed that adaptive routing can improve the efficiency and accuracy of MAS for autoimmune disease diagnosis. The use of adaptive routing allowed for more efficient use of

resources by redistributing messages between agents based on changes in the availability of data sources. This led to a reduction in the time required for disease diagnosis and an increase in the accuracy of the diagnosis.

5.0 CONCLUSION

The use of adaptive routing in MAS can improve the efficiency and accuracy of autoimmune disease diagnosis. Adaptive routing allows MAS to adapt to changes in the environment, leading to more efficient use of resources and improved diagnosis accuracy. Future research should explore the potential for adaptive routing to improve disease diagnosis in other healthcare domains and the potential for other adaptive routing algorithms to improve MAS performance.

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