Fuzzy Systems and Soft Computing
ISSN : 1819-4362

WIRELESS ADHOC NETWORKS: CACHE MANAGEMENT AND CONSISTENCY

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ABSTRACT

Internet access is widely available because to wireless ad hoc network technologies. There is no support for fixed infrastructure in a wireless ad hoc network setting. The multichip pathways are used for communication between the network nodes. Because wireless communication is broadcast, a wireless node may be able to overhear a packet. Data caching isfrequently used to effectively lower the cost of data access. For quick data delivery, Caches for data can be used to store overheard data values To maximize cache and replies are overheard. Data is assigned beneath cache nodes using the cache placement technique. The overheard nodes are equipped withcache storage. To find the desired data in the cached data collection, utilize the cache discovery method. Recent data values were aided by Overhear. The cache storage levels are maintained by the use of cache management technique. Node movement factors are used to manage cache storage. Primary and secondary cache models maintain multiple cache copies.

INTRODUCTION

A mobile adhoc network is a group of wireless nodes that can be quickly and easily deployed anywhere at any time without requiring any kind of network infrastructure that already exists. This autonomous system allows mobile hosts connected by wirelessnetworks to move at random and frequently serve as routers simultaneously.

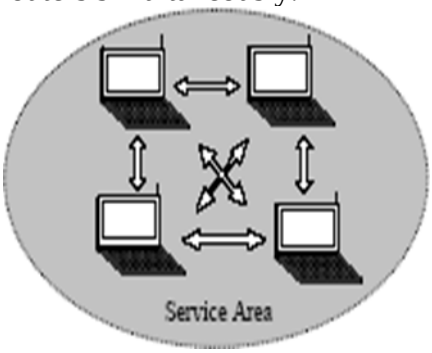

Figure1.1 Adhoc Wireless Network

Mobile adhoc networks are self- contained systems of mobile routers linked together by wireless links, which together create any kind of graph. The network topology might change quickly and unexpectedly because these routers have no mobility limitations and can arrange themselves anyway they choose. It is possible for a mobile adhoc network to function independently or in conjunction with the internet.

The properties of mobile adhoc networks include being autonomous, dynamic, and purpose-specific. A master- slave relationship is absent from mobile ad hoc networks as opposed to fixed wireless networks. All nodes function as routerssince they depend on one another toestablishcommunication.Ina mobileadhoc Figure1.2WirelessFixedNetworkandIna

Mobile Ad Hoc Network (MANET), a packet can travel directly from its source to its destination or pass through a series of intermediate nodes that forward it. Thenodes also collaborate to perform essential network functions, such as ensuringsecurity. The high degree of mobility of nodes in mobile adhoc networks leads to unpredictable and quick changes in network structure. To establish a trust connection between nodes, key management is utilized. Key management can be broadly divided into three classes: key distribution, key agreement, and key pre-distribution. Theyall have restrictions when employed in an adhoc network.

EXISTING SYSTEM

Wireless ad hoc networks have gained significant attentionfrombothacademiaand industry as a promising technology for providing ubiquitous Internet access. Their versatility, cost-effectiveness, and ease of maintenance make them well-suited for scenarios such as disaster recovery, outdoor gatherings, and battlefields, where establishing traditional network infrastructure is either too costly or unfeasible.

However, data access costs are a big concern because wireless ad hoc networks havelimitedresources,suchaspowerand
bandwidth. Data caching is a common method used to reduce the cost of dataaccess in traditional computer networks. In wireless ad hoc networks, it works far better and is far more desirable. When using multichip data, Storing data at intermediary nodes may drastically decrease transportation expenses and conserve various resources, includingbattery power and network bandwidth. Additionally, data access delay (AD) can be decreased by accessing data at the cache node.

A significant amount of research has been done on cache placement, cache detection, and cache consistency in wireless ad hoc networks. Deciding where and what data to cache is referred to as cache placement. Locating and retrieving a cached data item is known as cache discovery. Ensuring that the cached data remains consistent with the source data on the server is referred to as cache consistency. Because oftheirtight relationship,thefirsttwoissues are typically studied together.

The cache placement problem in ad hoc networks has been proven to be NP- hard, even when dealing with a single data item. The primary focus of previous cache placement research has been on how to topology and data access frequencystatistics. Recent studies have concentrated on merging passive and active query techniques for cache detection.

Despite the existence of numerous algorithms for ad hoc networks, the vulnerability of wireless links has not been addressed inthedevelopment ofcooperative caching systems. In wireless networks, a network node inherently broadcasts data, allowing any node within its transmission range to receive the packet, even if it is not the intended recipient. In such cases, the node "overhears" the packet. The intended recipient, referred to as the target node, isthe node specified as the receiver in the MACaddress. Thistarget nodecanbeeither the final destination of the packet or an intermediate node along the routing path.

In this system, a novel cooperative caching method that takes overhearing into account is developed for wireless ad hoc networks. The overhearing property is utilized by our method to greatly enhance data caching performance in a number of ways. Arequesting node canreducethe cost of data access by overhearing and retrieving data copies from an intermediary node transmitting the data. Second, in order to make decisions about cache placement, Overhearing helps in collecting additional data access information, such as the frequency of access.

It is not an easy process to apply overhearing in data caching, nevertheless. Utilizing overhearing requires addressing a numberofconcerns.Amajorconcernisfirst of all what requests may be fulfilled via overhearing. The cache finding process needs to be carefully crafted to catch as data as possible.

The second key factor in determining cache locationishowtodefineandevaluateaccess cost. In previous research, access cost was typicallydefined asthe distance betweenthe requesting node and the nearest cache node. However,thisconcept becomeslessrelevant with the use of overhearing, as an intermediary node can fulfill a request by overhearing data from responses intendedfor other nodes.

Our algorithm for overhearing- assisted data caching addresses both cache placement and cache discovery, incorporating the observations and factors discussed earlier. Instead of using the cache

node, Using the distance that exists fromthe applicant to the respondent, we create a function that calculates the cost ofaccessing datawithoverhearing. Established. Because mobility is not a top priority in our design, we essentially assume a static ad hoc network.

To evaluate the effectiveness of our proposed algorithm, we conducted comprehensive simulations. We compared our approach with the best-known distributed caching algorithm for ad hoc networks, considering various scenarioswith different parameter values. Additionally, we simulated a basic overhearing method as a baseline for overhearing caching to highlight the advantages of our placement metric. Our proposed approach outperformed both the existing algorithm and the baseline in terms of message cost and data access delay. according to the simulation findings. The system has been shown to have the current following short comings.

Inoverhear environments,

1. There is no control over node movement.
2. Cache consistency is lost.
3. There is no control over cache storage or the cache duplication process..

1. PROPOSEDSYSTEM

Ad-hoc networks that are wirelessare used to share the Internet goal of cache storage is to improve the data delivery process. Cache storage is maintained using a cache placement method that is assisted by Overhear. The system incorporates features for storage management and cache consistency. To manage cache updates with recent data values, the Overhear-assisted cache management technique has been improved. The cache storage levels are maintained by the use of a cache management technique. Node movement factors are used to manage cache storage. Primary and secondary cache models maintain multiple cache copies.

1.1 ADVANTAGES

The system reduces access latency.

a. It manages traffic overhead.
b. It decreases message costs.
c. It consumes less energy.

2. CONCLUSION

In this study, we present the first that uses overhearing. Many obstacles need to be overcome before overhearing in caching can be further investigated. First, managing node mobility remains a difficult problem. In terms of message cost, our suggested improvement strategyformanagingmobilityisinefficient. Boththe placement measure and the finding procedure need to be improved because mobility may have an impact on the likelihood of overhearing. Second, cache consistency maintenance has not yet taken overhearing into account. Although it is not easy to implement, overhearing can assist lower the cost of cache updates.

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