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JCCI 2019 논문 모집

제29회 통신정보 합동학술대회

THE 29TH JOINT CONFERENCE ON COMMUNICATIONS AND INFORMATION

2019년 5월 1일(수)~3일(금) 강릉 세인트존스호텔

통신 및 정보 분야를 선도하는 최신 연구결과를 공유하고 발전 방향을 전망하는 장이 될 제29회 통신정보 합동학술대회가 2019년 5월 1일(수)부터 5월 3일(금)까지 3일간 아름다운 풍광을 자랑하는 강릉 세인트존스호텔에서 개최됩니다. 최신주제에 대한 특별 세션, 양질의 논문들에 대한 구두 및 포스터 논문 발표, 튜토리얼 세션 등 깊이와 흥미있는 구성으로 진행될 예정이며, 학계, 연구계, 산업계를 이끄시는 모든 분들이 함께하여 미래지향적인 통신 및 정보 분야 교류의 장이 될 수 있도록 많은 논문 제출과 참석을 부탁드립니다.

논문 모집 분야

통신 및 네트워크

- 5G/6G Networks
- Mobile Communication
- Future Internet/SDN/NFV
- Signal and Audio Processing
- WLAN/WPAN/WBAN
- Communication Theory
- Information Theory
- Radio Resource Management
- Wired/Wireless Access Network
- Quantum Communication & Coding
- THz Communications
- Sensor Networks
- ICN/CCN/CDN/DTN

Computer/SW/보안

- IoT/IoE/WoO
- Machine Learning (Deep Learning)
- Big Data and Social Network
- Multimedia Communication
- Information and Network Security
- Cloud Computing
- Mobile Information System
- Embedded Systems
- Mobile Edge Computing/Caching
- Computer Vision/Pattern Recognition
- Applied Computing
- Virtual Reality (VR)
- Augmented Reality (AR)

융합

- Smart Media and Broadcasting
- Drone Applications for ICT
- Smart Car, Connected Car, ITS
- Energy and Smart Grid
- Military Communication/Defense IT
- Bio Application/e-Health
- Railroad Communications
- VLC, OCC, Image Sensor Communications
- Public-Safety Communications, PS-LTE
- Digital Contents
- M2M/D2D/RFID/USN/CPS
- Localization/LBS
- IT Convergence Policy

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특별세션 자율주행 및 차량 네트워크 9:00-10:30

1. 렌즈안테나 기반의 저복잡도 도래각 추정 알고리즘 연구

이경재ㅖ, 조주현, 박홍석, 김동구 (연세대) 1570538485

2. mmWave Moving Network 기술 소개

김일규, 정희상, 성낙운 (ETRI) 1570539899

3. Cellular V2X Communications in Unlicensed Spectrum: Compatible Coexistence with VANET in 5G Systems

Umair Ahmad Mughal, Ishtiaq Ahmad, 장경희 (인하대) 1570539971

4. SIMO 전송 시스템에서 안테나 개수에 따른 빔 추적 성능 분석

강정완, 김선우 (한양대) 1570540499

특별세션 5G 기반 IoT 기술 9:00-10:30

1. OFDM-NOMA 기반 주파수 공유 시스템에서 시스템 용량 향상을 위한 자원 할당 기법

고균병, 임성묵 (한국교통대) 1570538491

2. K-Means 군집화를 이용한 채널 추정 기법의 성능 평가

황한호 (상명대), 우충재 (한서대) 1570538629

3. Simulated Annealing 기법을 이용한 다중안테나 심볼 검출 기법

정재민, 최수용 (연세대) 1570539905

4. Differential evolution algorithm을 이용한 layered 구조 기반 다중 안테나 심볼 검출 기법

김동욱, 최수용 (연세대) 1570539909

5. mMTC 서비스 지원을 위한 저지연 및 저복잡도 Connectionless 접속 기술 동향

문석재, 이장원 (연세대) 1570540178

6. 5세대 통신 시스템에서 대규모 접속을 위한 저복잡도 랜덤 액세스 기법 동향

이병현, 문석재, 이장원 (연세대) 1570540181

7. FBMC-IM 시스템을 위한 저복잡도 수신 기법

Cellular V2X Communications in Unlicensed Spectrum

: Compatible Coexistence with VANET in 5G Systems

Umair Ahmad Mughal, Ishtiaq Ahmad, and KyungHi Chang*

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Abstract

With the increasing demand for vehicular data transmission, limited dedicated cellular spectrum becomes a bottleneck to satisfying the requirements of all cellular vehicle-to-everything (V2X) users. To address this issue, unlicensed spectrum is considered to serve as the complement to support cellular V2X users. In this paper, we study the coexistence problem of cellular V2X users and vehicular ad hoc network (VANET) users over the unlicensed spectrum. To facilitate the coexistence, we study the energy sensing-based spectrum sharing scheme, where cellular V2X users are able to access the unlicensed channels fairly while reducing the data transmission collisions between cellular V2X and VANET users. Hence, the main objective is to maximize the number of active C-V2X users while formulating the scheduling and resource allocation problem as a two-sided many-to-many matching with peer effects to perform dynamic vehicle-resource matching algorithm.

I. Introduction

Intelligent transport systems (ITS) have been developed for decades to support a wide variety of safety critical and traffic-efficient applications. Recently, the solution concept of vehicle-to-everything (V2X) communication has drawn great attention in both industrial and academic fields, including vehicle-to-vehicle (V2V) communication, vehicle-to-infrastructure (V2I) communication, and so on [1]. The cellular V2X communication supports massive data transmission in large coverage with controllable latency [1]. However, due to the high user density of the vehicular network, C-V2X communication may not fully satisfy the demands of massive data transmission.

Therefore, we aim to support more C-V2X users by leveraging the unlicensed spectrum. Over the unlicensed spectrum, direct and distributed data transmission between nearby vehicles can be supported, forming the vehicular ad-hoc network (VANET).

II. Coexistance Problem

The differences between cellular V2V users and VANET users over the unlicensed spectrum are the modes of resource allocation and data structure. The resources utilized by cellular V2V users are allocated by the BS in a centralized way [2], while VANET users access the channel in a distributed way over the unlicensed spectrum using the energy detection, i.e., each vehicle detects the power level

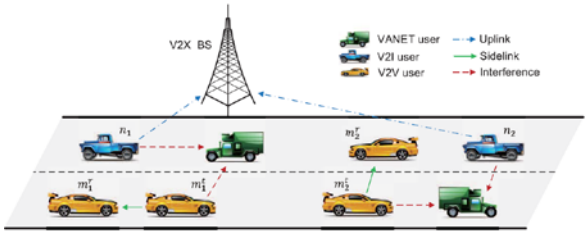

Fig. 1. System model of the coexistence system of cellular V2X and VANET.

of the channel and waits to access the channel until the detected power is lower than a threshold. The data transmission of cellular V2V users follows the LTE standards, where the length of each data frame is constant and the transmission is terminated with the end of the frame. However, the data transmission of VANET users follows the 802.11 standards, i.e., the package size of each VANET user varies with the transmission demand of the VANET user. Moreover, the VANET user does not release the channel until the package has been transmitted completely, and thus, the transmission time of the package is uncertain. Hence, when the C-V2X communication expands to unlicensed spectrum, it is necessary to consider the coexistence of cellular V2X users and VANET users in order to increase the number of active C-V2X users.

However, the large amount of data transmitted by numerous vehicles, dynamic resource scheduling in each time slot results in inevitable control overhead. The mobility of vehicles brings about the frequent change of the

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topological structure of vehicles, which further influences the channel conditions between vehicles. The change of channel conditions and the interference to VANET users by the C-V2X users cause the failure of data transmission as shown in Fig.1.

III. Energy Sensing Based Spectrum Sharing Scheme

In [3], the authors proposed an energy sensing based coexistence scheme over the unlicensed spectrum for both cellular V2X users and VANET users, in which cellular V2X users can share the open spectrum fairly with VANET users according to the sensed channel conditions. To decrease the overhead, the semi-persistent scheduling (SPS) method is considered for the resource allocation. Furthermore, the time-frequency resource allocation problem is formulated, and schedule the time slots during the scheduling cycle, aiming to maximize the number of active cellular V2X users as well as reducing the interference to VANET users. Since the allocation of subchannels to cellular V2X users in different time slots can be considered as a matching between vehicles and time-frequency resources, the author reformulate the problem as a two-sided many-to-many matching problem with peer effects [4] which can be addressed by the proposed DV-RMA.

IV. Dynamic Vehicle-Resource Matching Algorithm

In [3], the authors proposed DV-RMA algorithm consists of the initialization phase and matching phase. In the initialization phase, a random matching between vehicle users and time-frequency resources occur. In matching phase, the process of each matching round is consist of updating the reference list and looking for stable matching based on current preference list. The preference lists of vehicles are updated according to the matching structure.

V. Conclusions

In this paper, we studied the spectrum sharing problem where cellular V2X users coexist with VANET users in the unlicensed spectrum. An energy sensing based spectrum sharing scheme for C-V2X users to share the unlicensed spectrum fairly with VANET users. Moreover, the allocation problem of time-frequency resources to C-V2X users in the semi-persistent scheduling cycle was formulated as a two-sided many-to-many matching problem with peer effects and dynamic vehicle-resource matching algorithm (DV-RMA) are breifly discussed in this paper.

ACKNOWLEDGEMENT

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References

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