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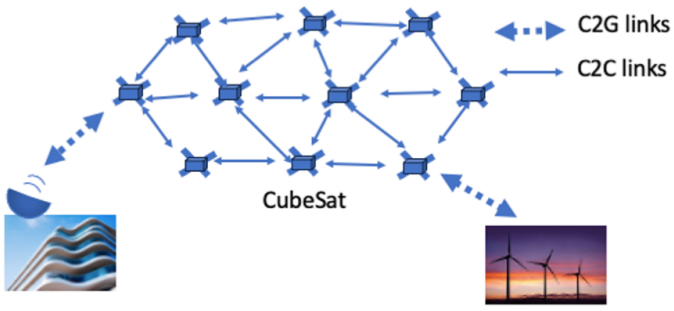
Bachelor/Master's Thesis

Performance evaluations of various cooperative spectrum sensing algorithms

Abstract

Design of cubesats plays a major role in various applications such as remote sensing, space exploration and interconnecting terrestrial networks. We propose to design various cognitive radio approaches for spectrum sensing and spectrum allocation in our current project Robust And seCure post quantum COmmunication fOr critical iNfrastructure (RACCOON) aids in optimal control of wind turbines using LEO satellites. Implementation of time synchronization and resource allocation algorithms will be explored in this thesis.



Guidelines of the project

1. Literature survey on Interweave, overlay, underlay cognitive radio schemes and different cooperative sensing algorithms.

2. Comparing state-of-the-art existing spectrum sensing algorithms with proposed novel sensing algorithms.

3. Developing the experimental testbed to demonstrate the algorithms.

If successful, this work may lead to a conference/journal paper.

Requirements

1. Basic telecommunication skills. 2. Knowledge of Matlab or GNURadio. 3. Interest in developing an experimental testbed.

Literature

1.Saeed, Nasir, Ahmed Elzanaty, Heba Almorad, Hayssam Dahrouj, Tareq Y. Al-Naffouri, and Mohamed-Slim Alouini. "CubeSat communications: Recent advances and future challenges." IEEE Communications Surveys & Tutorials 22, no. 3 (2020): 1839-1862.

2. Qu, Zhicheng, Gengxin Zhang, Haotong Cao, and Jidong Xie. "LEO satellite constellation for Internet of Things." IEEE access 5 (2017): 18391-18401

3. Narayana, Sujay, R. Venkatesha Prasad, Vijay S. Rao, Luca Mottola, and Tamma Venkata Prabhakar. "A Hummingbird in Space: An energy-efficient GPS receiver for small satellites." GetMobile: Mobile Computing and Communications 25, no. 1 (2021): 24-29.

4. Dressler, Falko. "Technical perspective: Physical layer resilience through deep learning in software radios." Communications of the ACM 65, no. 9 (2022): 82-82

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