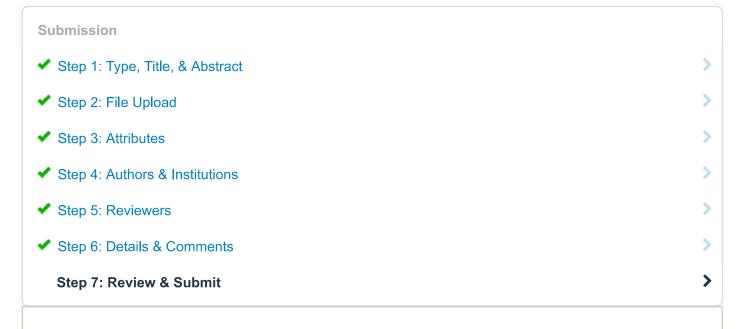


IEEE Transactions on Cognitive Communications and Networking

Home

A Author

Review



You're almost done! Please view your proof below.

Step 7: Review & Submit

Review the information below for correctness and make changes as needed. After reviewing the manuscript proofs at the foot of this page, you MUST CLICK 'SUBMIT' to complete your submission.

- * = Required Fields
- * Verify Step Information

FIELD

RESPONSE

RESPONSE

FIELD

Manuscript Type	Transactions Paper Submissions	
Title	Learning-based Spectrum Sensing in Cognitive Radio Networks via Approximate POMDPs	
Abstract	In this paper, a novel spectrum sensing and access strategy is proposed, wherein a cognitive radio learns a time-frequency correlation model defining the occupancy behavior of incumbents via the Baum-Welch algorithm, and concurrently devises an optimal spectrum sensing and access strategy that exploits this learned correlation model, under spectrum sensing constraints. The optimal strategy is optimized via an approximate point-based value iteration method, to facilitate control of the trade-off between secondary network throughput and incumbent interference, along with fragmentation and Hamming distance state filters to alleviate its computational complexity. Numerical results demonstrate improvements over state-of-the-art algorithms: 60% over correlation-based clustering, 25% over Neyman-Pearson Detection, 6% over Viterbi, and 7% over adaptive deep Q-network. The proposed solution is extended to a distributed multi-agent setting with neighbor discovery and channel access rank allocation, which improves throughput by 43% over cooperative Temporal Difference SARSA, 84% over cooperative greedy distributed learning, and 3x over non-cooperative learning via g-statistics and ACKs. This multi-agent scheme is implemented on the DARPA Spectrum Collaboration Challenge (SC2) platform, demonstrating superior performance over competitors in a real-world TDWR-UNII WLAN scenario emulation, and its implementation feasibility is demonstrated on an ad-hoc distributed wireless platform of ESP32 radios, exhibiting 96% success probability.	
	Less text	



FIELD	RESPONSE
File 1	Learning_based_Spectrum_Sensing_in_CRNs_via_Approx_POMDPs_DC.pdf
File 2	Learning_based_Spectrum_Sensing_in_CRNs_via_Approx_POMDPs_SC.pdf



☑ Edit

FIELD	RESPONSE	
Keyword	 Hidden Markov models Cognitive radio ad hoc networks Consensus-based cooperative spectrum sensing Markov processes 	
✓ Step 4: Autho	rs & Institutions	
FIELD	RESPONSE	
Author 1	Keshavamurthy, Bharath	
	bkeshava@purdue.edu	
	(ii) 0000-0002-5931-7622 ✓	
	Purdue University College of Engineering, Electrical and Computer	
	Engineering,	
	West Lafayette, IN, 47907-2045, USA	
Author 2	Michelusi, Nicolo	
	nicolo.michelusi@asu.edu	
	Arizona State University Ira A Fulton Schools of Engineering, Electrical,	
	Computer and Energy Engineering,	
	Tempe, AZ, USA	
	Purdue University College of Engineering, Electrical and Computer	
	Engineering,	
	West Lafayette, IN, USA	
✓ Step 5: Reviev	vers & Edit	
FIELD	RESPONSE	
✓ Step 6: Detail:	s & Comments	
FIELD	RESPONSE	
	KESPUNSE	

FIELD	RESPONSE
Cover Letter	
Funding	National Science Foundation
	CNS-1642982

Manuscript Information

- * Number of Figures: 8
 - * Number of Color Figures:
- * Number of Tables: 0
- * Has this manuscript been submitted previously?

Yes

✓ No

If yes, what is the manuscript ID of the previous submission?

Confirm the following:

- * Confirm that the manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere.
- * Confirm that the submission adheres to the conditions specified in "Information for Authors" published in ✓ every issue of the Transactions, including those related to material previously copyrighted, published, or accepted for publication.
 - * Please read the following three **Policy Statements** completely, then check the box acknowledging you have read all three. The first policy statement deals with multiple submissions or publications of the same
- ✓ work; the second deals with plagiarism; and the third deals with electronic posting of papers on author websites. Authors are responsible for understanding and complying with these policies. Failure to comply with these policies may lead to penalties on future publication in IEEE venues.

Human and Animal Research Disclosure

* Did this research involve either human subjects or animals? You can review the IEEE policy on human and animal research here.

Not applicable: This submission does not include human or animal research.

* If yes, was approval obtained from a relevant review board (or local/regional equivalent)?

Not applicable: This submission does not include human or animal research.

If this research involves either human subjects or animals, all approval details must be disclosed in the box below, as well as included in the manuscript.

If approvals have not been obtained, the reasoning or details of exemption must also be detailed below and included in the manuscript.

* View Proof

You must view both the HTML and PDF proof before you can submit

✓ View HTML Proof	✓ View PDF Proof				
Previous Step					
Submit >					

[©] Clarivate Analytics | © ScholarOne, Inc., 2021. All Rights Reserved. ScholarOne Manuscripts and ScholarOne are registered trademarks of ScholarOne, Inc. ScholarOne Manuscripts Patents #7,257,767 and #7,263,655.