Firas FREDJ

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Work Experience

Jan 2021 – Aug 2023

Research Assistant | *University of Manitoba, Canada*

- Extended a neural variational inference-framework to estimate the channel statics in RIS-assisted networks.
- Implemented neural variational inference-based framework to solve channel estimation problem in RIS-assisted networks.

Keywords: Wireless Communication, mmWave communication, Neural Networks, Bayesian Inference, Matlab, Python, Tensorflow/Keras.

Feb 2020 – Jun 2020

Graduation Research Internship | *University of Manitoba, Canada*

- Implemented parallel version of DDPG algorithm to solve the beamforming problem in a distributed manner for Cell-Free networks
- Implemented and evaluated a DRL-based solution to solve the beamforming problem for Cell-Free networks.

Keywords: Cell-Free networks, Beamforming, DRL, Python, Multiprocessing, Tensorflow/Keras.

Jun 2019 – Aug 2019

Embedded Systems Internship | *CodinTek, Tunisia*

- Designed and built IoT prototype system to solve heat detection in cattle using RSL10 system-on-chip, Raspberry and server that uses Things-Board solution.
- Decoded CAN bus communication protocol for drones. [Code].

Keywords: Embedded C, STM32, Bluetooth Low Energy Communication, Raspberry Pi, IoT communication protocols, MQTT, Python.

Projects

In-Application Programming (IAP)

- Implemented a STM32-based code enables the upgrade of STM32 chips program via Bluetooth interface. [Code]
  Keywords: Embedded C, Bluetooth, STM32, Flash Memory, IAP Driver.

Computer Skills

ML Frameworks	TensorFlow, Keras
Programming	Python, C/C++
Parallel Processing	MPI, OpenMP
GPU programming	CUDA, OpenCL

Education

2021 - 2023 **Master's Degree in ECE**
University of Manitoba
Wireless Communication, Optimization, Prallel Processing, ...
*GPA : **4.13***

2017 - 2020 **Polytech Engineering Degree**
Ecole Polytechnique de Tunisie
Computer Science, Applied mathematics, Signal Processing, ...

2015 - 2017 **Undergraduate Degree**
Institut Préparatoire aux Études d'Ingénieurs de Tunis (IPEIT)
Diploma in Mathematics and Physics
*Ranked: **64** out of **1437***

Publications

Distributed Beamforming Techniques for Cell-Free Wireless Networks Using Deep Reinforcement Learning - *IEEE TCCN 2022*

Firas Fredj, Yasser Al-Eryani, Setareh Maghsudi, Mohamed Akrout, Ekram Hossain. [Paper]

Channel Estimation in RIS-Enabled mmWave Wireless Systems: A Variational Inference Approach, - submitted to *IEEE TWC 2023*

Firas Fredj, Amal Feriani, Amine Mezghani, Ekram Hossain.

Variational Inference-Based Channel Estimation for Reconfigurable Intelligent Surface-Aided Wireless Systems, - *IEEE ICC 2023*

Firas Fredj, Amal Feriani, Amine Mezghani, Ekram Hossain.

Editorial Energy Efficiency of Machine-Learning-Based Designs for Future Wireless Systems and Networks (Invited paper) - *IEEE TCGN 2021*

Ekram Hossain, Firas Fredj. [Paper]

Certificates

May 2019 Big Data Engineer v2 Mastery Award for Students - *IBM*
Jun 2019 Structuring Machine Learning Projects - *Coursera*

Extracurricular Activities

- Regional Competitive Programming Contest : Arabian Collegiate Programming Contest (ACPC 2019 Egypt)
- National Competitive Programming Contest : Tunisian Collegiate Programming Contest (TCPC 2019 Tunisia)
- Vice-President @ American Chamber (AmCham) TPS Junior Chapter