Pedro Gomes | C.V.

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Summary

I am currently a PhD student at the University College of London, under the supervision of Dr. Laura Toni. My research interest lies in using dynamic graphs to model complex systems of relations or interactions. My current work is on graph neural networks for dynamic point cloud prediction.

Education

PhD at EEE Dept, in Graph Neural Networks for Dynamic Point Cloud Processing
University College of London (UCL), United Kingdom *2020–today*
Supervisor: Laura Toni

MSc. in Computer Science
University of Coimbra, Portugal; Politecnico di Torino, Italy *2017–2019*
Supervisors: Luis Cruz

BSc. in Electrical & Computer Engineering
University of Coimbra, Portugal *2014–2017*

Research

Experiences

Learning and Signal Processing Lab (LASP)
PhD student *2020–today*

- Design graph-based processing methods for dynamic point clouds.

Institute of Telecommunications (IT)
Research Scientist *2019–2020*

- FlexLif project (Funded by FCT): Development of efficient scalable light field image coding methods.

Grants

During my master's I received a research grant from the project *FlexLiF* from the Portuguese Institute of Telecommunications. This grant was focused on the development of efficient scalable light field image coding methods, with random access functionalities and compatible with existing or under development standard image and video encoders. My current grant is focused developed new tools for volumetric content (point cloud) with the specific twist of graph learning for new modalities of representations and processing.

Awards

- Merit Award given to the top (3%) best students of each course by the University of Coimbra
- Best Doctoral Symposium Paper Award at ACM MMSys'2021

Committees

- Reviewer for IEEE Transactions on Image Processing.
- Reviewer for ACM International Conference on Multimedia.
- Reviewer for IEEE International Conference on Image Processing.

Publications

Explainable Adaptative Combination of Hierarchical Features for Dynamic Point Cloud
P.Gomes, S.Rossi, L.Toni.
(Under Review) IEEE Journal 2022

Explaining Hierarchical Features in Dynamic Point Cloud Processing
P.Gomes, S.Rossi, L.Toni.
In Proceedings of the Picture Coding Symposium (PCS) 2022

Spatio-Temporal Graph-RNN for Point Cloud Prediction
P.Gomes, S.Rossi, L.Toni.

In IEEE International Conference on Image Processing (ICIP), 2021

Graph-based Network for Dynamic Point Cloud Prediction
P.Gomes, L.Toni.
In Proceedings of the 12th ACM Multimedia Systems Conference (MMSys '21).
Association for Computing Machinery, 2021.

Pseudo-sequence Light Field Image Scalable Encoding with Improved Random Access
P. Gomes, L.A.S, Cruz.
In 8-th European Workshop on Visual Information Processing, 2019

Skills

Knowledgeable in Graph and Machine learning:
- Graph signal processing
- Graph neural networks
- Scalability and hierarchical learning
- Building prediction/forecasting models
- Machine learning explainability

Knowledgeable in 3D Multimedia Processing
- Computer Vision
- Experience in 3D Formats: Point Clouds (LiDAR), 3D graphic objects, LightField, mmWaves
- Image/Video compression
- Multimedia manipulation/creation (Blender, OpenCV).

Background in Electronic and Electrical Eng.
- Strong background in mathematics
- Computer architectures
- Electronics and circuit design
- Embedded systems: FPGAs, VHDL, Assembly

Technical
- Programming: Python, C, C++, MATLAB, TensorFlow, PyTorch, OpenCV, Qt
- Video/Image Processing: HEVC, FFmpeg, Blender
- Databases: SQL, Oracle, MongoDB
- Others: Latex, GitHub/Git, scripting/building tools.

Social
- Languages: Portuguese (mother tongue), English (advanced, IELTS certification), and Spanish.
- Positive, make-it-happen, team-work, lead-by-example attitude
- Good/empathic communicator and able to collaborate with international teams.

Scientific Interests

During my studies, I developed a particular interest in signal processing. Later this interest evolved to the specific field of graph signal processing. I am interested in how graphs can be used to model so many aspects of our life.

Visa status

- Nationaly: Portuguese
- Currently on the UK settlement scheme