LOHIC FOTIO TIOTSOP

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EDUCATION AND EXPERIENCE

- Born on 05/05/1990
- Received the M.S. in Mathematical Engineering from the Politecnico di Torino (Italy) in 2017
- Currently a Ph.D. student in Computer and Control Engineering at the Politecnico di Torino since Nov 2018
- Primary research interests: advanced statistical and optimization methods, and machine learning algorithms applied to several multimedia problems (coding, transmission, and perceived visual quality assessment).

MASTER THESIS TOPIC AND DESCRIPTION

- **Title:** The multi-path Traveling Salesman Problem: from the stochastic model to deterministic ones using the asymptotic extreme value theory
- Abstract: A novel approach to cope with uncertainty when solving stochastic models of the Multi-path Traveling Salesman Problem when the involved random parameters are not identically distributed and independent was proposed. Computational results revealed both the effectiveness and efficiency of the proposal.

PH.D. TOPIC

- Modeling individual media quality perception through neural networks
- Improving and optimizing multimedia coding, compression, and transmission techniques in different scenarios (e.g., precision agriculture images/videos) using statistical and machine learning methods.
- Effective use of machine learning algorithms coupled with stochastic optimization models and methods for optimally training models for visual quality assessment using limited size annotated datasets.
- Developing a framework to cope with uncertainty in stochastic optimization problems when the probability distribution of uncertain parameters is unknown

CURRENT RESEARCH ACTIVITIES

Modeling single observers media quality perception through neural networks

The research focuses on exploiting neural networks to learn how single observers perceive and judge the presence of artifacts in image/video. This is fundamental for the development of compression algorithm that would ensure good visual quality for the compressed content. After gathering some data from an actual observer regarding the way he/she perceives and judges media visual quality, a neural network is trained relying on this data to mimic that observer, yielding a virtual observer that can later be used on demand. Neural networks are trained to mimic observers with different background, culture and expectation. This leads to an automatic evaluation of visual quality that takes into account the final users' characteristics. This activity has yielded 3 scientific papers, one presented at the Human Vision and Electronic Imaging conference and two journal papers submitted for publication in IEEE and ACM transactions.

Optimizing multimedia coding and transmission systems

The research activity leverages combinatorial optimization models and methods to enhance multimedia systems performance. In particular, in the contest of this research, a couple of integer linear models and a branch and bound algorithm for modeling and efficiently solving routing and scheduling problems while considering the difficulties related to the transmission of multimedia data in rural areas have been proposed and published in the journal Computers and Operations Research.

Finding an optimal subset of multimedia contents to be used in subjective experiments for media quality assessment

Subjective experiments consist of gathering end-users' opinions about the visual quality of multimedia content. These opinions are then used as ground truth data to train and validate the accuracy of algorithms for visual quality prediction. It is not yet known how to optimally select the subset of sequences to be used for subjective experiments. The current research activity considers combinatorial optimization models, such as variants of the knapsack problem, to address the issue.

Effectively using Deep Learning models on limited size data-sets

Deep learning models have demonstrated to be quite useful if trained on large-scale labeled data sets. Unfortunately, subjective experiments are time-consuming and expensive, and thus finding such data sets for quality assessment purposes is quite tricky. The research activity aims at designing advanced regularisation techniques that would enable the effective use of deep learning models on limited size data-sets.

Deterministic approximation frameworks for efficiently solving stochastic optimization problems

The research focuses on exploiting extreme values theory, i.e., a well-established research field in probability and statistics, in the context of combinatorial optimization to cope effectively with uncertainty without drastically increasing the computational complexity of optimization models. Preliminary results on such an approach were initially presented at the Odysseus 2018 Conference. Further insights yielded two papers published respectively in Transportation Science and Computational Management Science. Considerable efforts are currently being spent to prove that the proposed approach is a framework that can be deployed on a large class of stochastic optimization problems. The first results in this direction have been presented at the 2021 AIROYoung workshop.

TECHNICAL STRENGTHS

Modeling, progamming and Analysis	Matlab, Python and C
Software & Tools	SQL (databases management)
	Microsoft packet (Word, Excel, OneNote,)

PUBLICATIONS

JOURNALS:

L Fotio Tiotsop; A Servetti; E Masala. (2020). An integer linear programming model for efficient scheduling of UGV tasks in precision agriculture under human supervision. In: COMPUTERS & OPERATIONS RESEARCH, 114, 104826.

E Fadda; L Fotio Tiotsop; D Manerba; R Tadei. (2020). The Stochastic Multipath Traveling Salesman Problem with Dependent Random Travel Costs. In: TRANSPORTATION SCIENCE, 54(5), 1372-1387.

M Roohnavazfari; D Manerba; L Fotio Tiotsop; S H R Pasandideh; R Tadei. (2021). Stochastic single machine scheduling problem as a multi-stage dynamic random decision process. In: COMPU-TATIONAL MANAGEMENT SCIENCE, https://doi.org/10.1007/s10287-020-00386-1.

L Fotio Tiotsop; T Mizdos; M Uhrina; M Barkowsky; P Pocta; E Masala (2020). "Modeling and Estimating the Subjects' Diversity of Opinions in Media Quality Assessment: A Neural Network Based Approach". In: MULTIMEDIA TOOLS AND APPLICATIONS.

L Fotio Tiotsop; T Mizdos; M Barkowsky; P Pocta; A Servetti; E Masala (2021). Mimicking individual media quality perception with neural network based artificial observers. In: ACM TRANSACTIONS ON MULTIMEDIA COMPUTING, COMMUNICATIONS, AND APPLICATIONS (forthcoming).

SUBMITTED TO JOURNALS:

L Fotio Tiotsop; T Mizdos; M Barkowsky; P Pocta; A Servetti; E Masala (2021). "Deep Neural Networks based Artificial Observers for No Reference Image Quality Assessment". In IEEE TRANS-ACTIONS ON IMAGE PROCESSING (submitted).

L Fotio Tiotsop; F Agboma; G Van Wallendael; A Aldahdooh; S Bosse; L Janowski; M Barkowsky; E Masala. "On the Link between Subjective Score Prediction and Disagreement of Video Quality Metrics". In: IEEE ACCESS (submitted).

BOOK CHAPTERS

E Fadda; L Fotio Tiotsop; D Manerba; R Tadei (2021) Optimization Problems under Uncertainty in Smart Cities. In: HANDBOOK OF SMART CITIES / S.N. Cham, Springer. ISBN: 978-3-030-15145-4.

CONFERENCES:

E. Fadda, L. Fotio Tiotsop, G. Perboli, R. Tadei (2018), The Multi-Path Traveling Salesman Problem with Dependent Random Cost Oscillations Odysseus Conference, Cagliari, Italy, June 2018, pp. 368-371.

L. Fotio Tiotsop, E. Masala, A. Aldahdooh, G. Van Wallendael, M. Barkowsky (2019), Computing Quality-of-Experience Ranges for Video Quality Estimation QoMEX conference, Berlin, Germany, June 2019.

L. Fotio Tiotsop, A. Servetti, E. Masala (2019), Optimally Scheduling Complex Logistics Operations Involving Acquisition, Elaboration and Action Tasks in Proceeding of IEEE 5th International Forum on Research and Technologies for Society and Industry (RTSI 2019).

L. Fotio Tiotsop, A. Servetti, E. Masala (2020). "Full Reference Video Quality Measures Improvement using Neural Networks". In Proceedings of IEEE ICASSP 2020.

L. Fotio Tiotsop, A. Servetti, E. Masala (2020). "Investigating Prediction Accuracy of Full Reference Objective Video Quality Measures through the ITS4S Dataset". In Proceedings of HVEI 2020.

L Fotio Tiotsop; T Mizdos; M Uhrina; P Pocta; M Barkowsky, E Masala (2020). "Predicting Single Observer's Votes from Objective Measures using Neural Networks". In Proceedings of HVEI 2020.

EXTRA-CURRICULAR

- Worked for a company named Axist as a consultant on a global optimization problem for device calibration.
- Worked for a start-up company named Global Solution as a data scientist.
- Study on the social impacts of Artificial Intelligence.
- Study on the social influence of social networks.

PERSONAL SKILLS

- Highly motivated and eager to learn new things.
- Strong motivational and leadership skills.
- Ability to work individually as well as in a group.
- Speak and write three languages: English (Good), Italian (Excellent), French (Native).