PhD in Information Technology and Electrical Engineering
Università degli Studi di Napoli Federico II

PhD Student: Francesco de Pandi

Cycle: XXXVI

Training and Research Activities Report

Year: First

Tutor: prof. Leopoldo Angrisani

Co-Tutor: prof. Egidio De Benedetto

Date: October 21, 2020

1. Information:

- ➢ **PhD student: Francesco de Pandi**
- ➢ **DR number: DR995135**
- ➢ **Date of birth: 02/12/2021**
- ➢ **Master Science degree: Electronic Engineering   University: UNINA**
- ➢ **Doctoral Cycle: XXXVI**
- ➢ **Scholarship type: UNINA**
- ➢ **Tutor: prof. Leopoldo Angrisani**
- ➢ **Co-tutor: prof. Egidio De Benedetto**

2. Study and training activities:

Activity	Type[1]	Hours	Credits	Dates	Organizer	Certificate[2]
Digital Forensics' methods, practices and tools	**Course**		**3**	**03-05-06-09-10/11/2020**	**DIETI**	**Y**
GDPR basics for computer scientists	**Seminar**	**1,30**	**0,3**	**10/12/2020**		**Y**
Patent Searching Best Practices with IEEE Xplore	**Seminar**	**1**	**0,2**	**27/11/2020**	**IEEE**	**Y**
How to Get Published with IEEE	**Seminar**			**02/12/2020**	**IEEE**	**Y**
3D-CFD-Virtual Engine development in Motorsport- when Efficiency drives the Power	**Seminar**	**2**	**0,5**	**11/12/2020**	**DII**	**Y**
3D-CFD-Virtual Engine development drives the development of High-Efficiency and Ultra-Low-Emission ICE	**Seminar**	**2**	**0,5**	**18/12/2020**	**DII**	**Y**
AR/VR Technologies for commercial aviation operational benefit	**Seminar**	**2**	**0,5**	**20/11/2020**	**UNINA**	**Y**
Corso di modellazione delle scelte discrete	**Course**		**3**	**11-15-18-22/12/2020**	**DII**	**Y**
The Apulian Aerospace System: challenges and	**Seminar**	**1,30**	**0,3**	**26/01/2021**	**UNINA**	**Y**

strategies						
NLP ed AI nel mondo enterprise	Seminar	1,30	0,3	21/01/2021	UNINA	Y
Going electric in the air and in space: challenges and potential of fully electric propulsion for airplanes, spacecraft, and extraterrestrial rovers	Seminar	1	0,2	09/02/2021	UNINA	Y
Scientific Programming and Visualization with Python	Course		3	08-09-10/03/2021	DIETI	Y
Statistical data analysis for science and engineering research	Course		4	17-19-24-25/02/03-04/03/2021	DIETI	Y
Visual interaction and communication in data science	Seminar	1	0,2		DIETI	Y
Big Data and Computational Linguistic	Seminar	1	0,2		DIETI	Y
Mars Exploration: Robotic systems for the discovery of the red planet	Seminar	2	0,4	12/03/2021	UNINA	Y
Battery Management Systems	Seminar	2	0,4	30/03/2021	UNINA	Y
Robo Ludens: A game design taxonomy for human-robot interaction	Seminar	1	0,2	05/03/2021	DIETI	Y
Sensors and Smart Metering	Course		9	29-06-2021	UNINA	Y
The Ethics of Quantification	Seminar	2	0,4	26-05-2021	DIETI	Y
Sadas Engine, an innovative DBMS for the DATA WAREHOUSE, great performance in the VLDB environment	Seminar	2	0,4	23-06-2021	DIETI	Y
L'esposizione umana ai campi elettromagnetici	Seminar	4	0,8	16/07/2021	DIETI	Y

generata dal sistema 5G						
Qiskit: state of the art and tools for Quantum Computers from IBM	Seminar	2	0,4	15/10/2021	DIETI	N
Study on Far Field Wireless Power Transmission	Research					N
Study on Skylight polarization pattern	Research					N
Study on Augmented Reality Approach to Remote Controlling Measurement Instruments	Research					N
Study on Cyber Physical Systems (CPS)	Research					N

1) Courses, Seminar, Doctoral School, Research, Tutorship
2) Choose: Y or N

2.1. Study and training activities - credits earned

	Courses	Seminars	Research	Tutorship	Total
Bimonth 1	3	2,3	3	0	8,3
Bimonth 2	3	0,8	3	0	6,8
Bimonth 3	7	1,4	2	0	11,4
Bimonth 4	9	0,8	3	0	12,8
Bimonth 5	0	0,8	3	0	3,8
Bimonth 6	0	0,4	3	0	3,4
Total	22	6,5	17	0	49,5
Expected	30 - 70	10 - 30	80 - 140	0 – 4.8	

3. Research activity:

The research activity focused on a new definition of measurement in the 4.0 industry scenario. The scenario we are dealing with today is the one that includes all the software and physical components of a system working together, what is called the Cyber-Physical System (CPS). The measurement and sensing elements in a CPS are seen as simple tools that are fundamental to generate raw data that the CPS can elaborate later. Nowadays, Measurement Systems do not play a pro-active role in running the network; they are not allowed to operate any reasoning and to participate in any decision-making process. So, the research activity focus on how to allow them to become self-aware, self-conscious, self-maintained, to make the measurement system a CPS among CPSs turning a Master-Slave configuration

into a peer-to-peer one. The method carried out was to configure a system which is a native Cyber-Physical Measurement System (CPMS). The proposed method is based on a well-established measurement technology, which is the adoption of microwave reflectometry for the distributed monitoring of infrastructures such as pipe networks, bridges, etc. In this case, there are different issues to localize a leak, such as the personnel that must be on site to carry out measurements. In this specific case, the introduction of IoT and suitable communication protocols represent the optimal step, permitting the continuous remote acquisition and processing of large amount of data.

Another important step could be the introduction of artificial intelligence, that could facilitate the automatic analysis of the measurement output, thus reducing and supporting human intervention.

The goal is to demonstrate that, through the suitable introduction of 4.0 technologies into measurement systems and applying the methodological approach typical of the Measurement Science, it is possible to exploit the intrinsic potential of measurement systems and make them evolve in CPMS.

4.   Research products:

Schiano Lo Moriello, R., Ruggiero, D., Angrisani, L., Caputo, E., de Pandi, F., & de Alteriis, G. (2021). A Multi Objective Evolutionary Algorithm for the Parameters Extraction of Organic Thin Film Transistors Models. Electronics, 10(8), 939. (Published)

E. Caputo, R. Schiano Lo Moriello, F. de Pandi, A. Liccardo, V. Gallicchio and M. Quarto, "Exploiting Augmented Reality and Internet of Things for Gamma Ray Experiments in Educational Field," 2021 IEEE International Instrumentation and Measurement Technology Conference (I2MTC), 2021, pp. 1-6, doi: 10.1109/I2MTC50364.2021.9459881. (Published)

Liccardo, A., Arpaia, P., Bonavolontà, F., Caputo, E., de Pandi, F., Gallicchio, V., & Schiano Lo Moriello, R., (2021). An Augmented Reality Approach to Remote Controlling Measurement Instruments for Educational Purposes during Pandemic Restrictions. IEEE Transactions on Instrumentation and Measurement (Published)

Conte, C., de Alteriis, G., de Pandi, F., Schiano Lo Moriello, R., Rufino, G., & Accardo, D. Integration of a Sun light Polarization Camera and Latest-Generation Inertial Sensors to Support High Integrity Navigation. In 2021 28th Saint Petersburg International Conference on Integrated Navigation Systems (ICINS). IEEE. (Published)

Conte, C., de Alteriis, G., de Pandi, F., Caputo, E., Schiano Lo Moriello, R., Rufino, G., & Accardo, D. Performance Analysis for Human Crowd Monitoring to Control COVID-19 disease by Drone Surveillance. In 2021 IEEE 8th International Workshop on Metrology for AeroSpace (MetroAeroSpace). IEEE. (Published)

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5. Conferences and seminars attended

IEEE International Instrumentation and Measurement Technology Conference (I2MTC) – presented the paper "Exploiting Augmented Reality and Internet of Things for Gamma Ray Experiments in Educational Field"

28th Saint Petersburg International Conference on Integrated Navigation Systems (ICINS). IEEE. - Integration of a Sun light Polarization Camera and Latest-Generation Inertial Sensors to Support High Integrity Navigation.

IEEE 8th International Workshop on Metrology for AeroSpace (MetroAeroSpace). IEEE. - Performance Analysis for Human Crowd Monitoring to Control COVID-19 disease by Drone Surveillance.

6. Activity abroad:

Describe the exact study and research periods, the hosting institution(s), and the activities carried out abroad, and the framework of the scientific co-operation with the hosting institution

At the end, provide the number of months spent abroad in the current year

7. Tutorship

List the tutorship activities (including nr of hours) for undergraduate or graduate (ONLY activities authorized by the ITEE Board and by the related BSc or Msc Program Committee)