

Antonella Comuniello

Current Position

Ph.D. Student at Department of Engineering of the University of Perugia.

Biographical information

Antonella Comuniello, born in Sapri, Italy, December 4, 1987.

Education

Degree in Electronic Engineering, at the University of Perugia (110/110).

Occupation

Nov 2017---- **present:** Ph.D. Student at University of Perugia, Department of Engineering;

May 2017---- **Oct 2017:** Software Engineer at Hi-Tech Solutions s.r.l., Foligno, Italy. The main task undertaken in this duty was firmware development, using C programming language;

Nov 2016---- **May 2017,** Stage, Park It s.r.l., Perugia, Italy. The main tasks undertaken in this duty were research and development, market assessment, projects planning and development.

Research activities

The PhD research activity is focused on short-range localization advanced techniques. Short-range localization is an interesting topic for various innovative services often related to the Internet of Things paradigms that include for instance Domotics, Ambient Assisted Living, Line Traceability, biometric identification, telemanipulation and advanced robotics. In this context, the main objective of this activity is to advance the state of the art in position and attitude estimation, obtaining a measurement accuracy compatible with real time 3D positioning of body parts, using wireless mobile node and transducers. In particular, this activity is mainly focused on use of ultrasound and magnetic signals. Ultrasound transmission enables accurate measurements using low-cost/low-power hardware, and is competitive in Line of Sight and short-range scenarios. On the other hand, magnetic fields are a well-known solution for short range positioning systems, since they consent accurate range and position measurements, unaffected by multipath and effective in non-Line of Sight scenarios. Application of sensor fusion between ultrasound and magnetic positioning systems is an envisioned target of this research activity.

Publications

Conferences And Journals

Poster presentation: "Short range positioning using ultrasound techniques", 2018 IV Edizione del Convegno Nazionale Sensori (CNS), February 21-23, 2018, Catania;

Poster Presentation: "Six DOF scalable finger tracking system", XXXV Congresso Nazionale di Misure Elettriche ed Elettroniche (GMEE), September 17-19, 2018;

Poster Presentation: "Simultaneous RSS measurements using multiple inductively coupled coils", IEEE M&N 2019, Catania, Italy, 8-10, 2019;

Poster Presentation: Presentazione delle attività di ricerca, XXXVI Congresso Nazionale di Misure Elettriche ed Elettroniche (GMEE), September 12-14, 2019;

Oral Presentation: "Effect of transducer directivity on ultrasound 2D positioning system accuracy", IEEE ISSE 2018, October 1-3, 2018;

Oral Presentation: "Ultrasound Time of Flight based positioning using the Bluetooth Low Energy Protocol", IEEE M&N 2019, Catania, Italy, 8-10, 2019;

Oral Presentation: "Simultaneous amplitude measurement of multiple Chirp Spread Spectrum signals", IEEE I2MTC 2020, May 25-29, 2020, Dubrovnik, Croatia;

Oral Presentation: "A Low-cost TDoA-based ultrasonic positioning system", IEEE I2MTC 2020, May 25-29, 2020, Dubrovnik, Croatia;

Invited Presentation: "CARATTERIZZAZIONE SIMULTANEA DI SEGNALI CHIRP LINEARI", XXXVII Congresso Nazionale di Misure Elettriche ed Eletttroniche (GMEE), ON-LINE, 10-12 SETTEMBRE 2020;

Attendance at the PhD School "2018 Instrumentation & Measurement PhD School Italo Gorini", Geneva, September, 10-14, 2018;

A. De Angelis, A. Moschitta and A. Comuniello, "TDoA based positioning using ultrasound signals and wireless nodes", Proceedings 2017 IEEE International Instrumentation and Measurement Technology Conference (I2MTC), Turin, 2017, pp.1-6.doi: 10.1109/I2MTC.2017.7969873;

A. Comuniello, A. De Angelis, A. Moschitta, 2018, "Short range positioning using ultrasound techniques", Proceedings CNS 2018, <http://hdl.handle.net/11391/1427202>;

G. Cerro, L. Ferrigno, M. Laracca, F. Milano, P. Carbone, A. Comuniello, A. De Angelis, A. Moschitta, "Probe Localization by Magnetic Measurements in Eddy-Current Nondestructive Testing Environment," Proceedings 2018 5th IEEE International Workshop on Metrology for AeroSpace (MetroAeroSpace), Rome, 2018, pp. 45-49. doi: 10.1109/MetroAeroSpace.2018.8453551;

A. Comuniello, A. De Angelis, G. De Angelis, A. Moschitta, 2018, "Tecniche di localizzazione 2D mediante trasmissione di segnali ultrasonori", Proceedings XXXV Congresso Nazionale di Misure Elettriche ed Eletttroniche (GMEE), September 17-19, 2018;

A. De Angelis, G. De Angelis, F. Santoni, M. Dionigi, M.L. Fravolini, A. Comuniello, A. Moschitta, P. Carbone et al, "SIX DOF SCALABLE FINGER TRACKING SYSTEM", Proceedings XXXV Congresso Nazionale di Misure Elettriche ed Eletttroniche (GMEE), September 17-19, 2018;

A. Bernieri, G. Betta, G. Cerro, L. Ferrigno, M. Laracca, F. Milano, P. Carbone, A. Comuniello, A. De Angelis, A. Moschitta, "Short range magnetic localization for Non-destructive testing applications", Proceedings XXXV Congresso Nazionale di Misure Elettriche ed Eletttroniche (GMEE), September 17-19, 2018;

A. Comuniello, G. De Angelis, A. De Angelis, A. Moschitta, "Effect of transducer directivity on ultrasound 2D positioning system accuracy", Proceedings IEEE ISSE 2018, October 1-3, 2018;

A. Comuniello, A. De Angelis, A. Moschitta, "Ultrasound TDoA positioning using the Best Linear Unbiased Estimator", I2MTC Proceedings, 2019 IEEE International Instrumentation and Measurement Technology Conference (I2MTC), May 20-23, 2019, Auckland, New Zealand;

A. Comuniello, G. De Angelis, A. De Angelis, A. Moschitta, "Ultrasound Time of Flight based positioning using the Bluetooth Low Energy Protocol", Proceedings IEEE M&N 2019, Catania, Italy, 8-10, 2019;

G. De Angelis, A. Comuniello, A. De Angelis, A. Moschitta, P. Carbone, "Simultaneous RSS measurements using multiple inductively coupled coils", Proceedings IEEE M&N 2019, Catania, Italy, 8-10, 2019;

A. Comuniello, A. De Angelis and A. Moschitta, "A low-cost TDoA-based ultrasonic positioning system," 2020 IEEE International Instrumentation and Measurement Technology Conference (I2MTC), Dubrovnik, Croatia, 2020, pp. 1-6, doi: 10.1109/I2MTC43012.2020.9129061.

A. Moschitta, A. Comuniello, F. Santoni, A. De Angelis, P. Carbone and M. L. Fravolini, "Simultaneous amplitude measurement of multiple Chirp Spread Spectrum signals," 2020 IEEE International Instrumentation and Measurement Technology Conference (I2MTC), Dubrovnik, Croatia, 2020, pp. 1-6, doi: 10.1109/I2MTC43012.2020.9129567.

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Antonio Moschitta, Antonella Comuniello, Francesco Santoni, Alessio De Angelis, Paolo Carbone, "CARATTERIZZAZIONE SIMULTANEA DI SEGNALI CHIRP LINEARI", Proceedings XXXVII Congresso Nazionale di Misure Elettriche ed Eletttroniche (GMEE), ON-LINE, 10-12 SETTEMBRE 2020;

omuniello A., De Angelis A., Moschitta A. (2019) Short Range Positioning Using Ultrasound Techniques. In: Andò B. et al. (eds) Sensors. CNS 2018. Lecture Notes in Electrical Engineering, vol 539. Springer, Cham, doi: https://doi.org/10.1007/978-3-030-04324-7_48;

G. Cerro, L. Ferrigno, M. Laracca, F. Milano, P. Carbone, A. Comuniello, A. De Angelis, A. Moschitta, "An accurate localization system for Nondestructive testing based on magnetic measurements in quasi-planar domain," Measurement: Journal of the International Measurement Confederation, vol. 139, pp. 467-474, doi: 10.1016/j.measurement.2019.03.022;

A. Comuniello, A. Moschitta and A. De Angelis, "Ultrasound TDoA Positioning Using the Best Linear Unbiased Estimator and Efficient Anchor Placement," in *IEEE Transactions on Instrumentation and Measurement*, vol. 69, no. 5, pp. 2477-2486, May 2020, doi: 10.1109/TIM.2019.2958011;

Moschitta, A., Comuniello, A., Santoni, F., De Angelis, A., Carbone, P., Fravolini, M.L. Statistically efficient simultaneous amplitude measurement of multiple linear chirp signals, (2021) IEEE Transactions on Instrumentation and Measurement, DOI: 10.1109/TIM.2021.305166.

Teaching

Oct 2018----- Feb 2019, Educational activities as teaching assistant at Department of Engineering at the University of Perugia within the following courses:

- Calculus I (50 hours)
- Probability Theory (50 hours)

Oct 2019----- May 2020, Educational activities as teaching assistant at Department of Engineering at the University of Perugia within the following course:

- Probability Theory (100 hours)

Oct 2020----- Feb 2021, Educational activities as teaching assistant at Department of Engineering at the University of Perugia within the following course:

- Probability Theory (100 hours)

Competencies and Interests

Language proficiency

- proficient in written and spoken English;
- proficient in written and spoken French.

Technical Skills: Windows OS, MAC OS, Microsoft Office, Photoshop, Solidworks, Ultimaker Cura (additive manufacturing and design software). Programming languages: C, Matlab, Java. Measurement Instrumentations: Oscilloscopes, Multimeters, Waveform Generators. Development Software: Code Composer Studio, PSoC Creator, Keil μ Vision. Integrated Development Environments: LAB VIEW, Electric, Spice, Matlab, AWR, ADS.