



Department of Electrical and Computer Engineering  
University of Peloponnese

Summer School 2022,  
Intelligent Cities: Technologies and Services of Smart Information  
Systems

6-7-8 June University of Peloponnese (Koukouli), 9-10-11 June Conference Centre of University of Patras  
(Physical and Digital Edition)



In cooperation with

	Subject	Speaker	Description
<b>Monday 6 June- University of Peloponnese (Koukouli)</b>			
14:30-16:00	Intelligent Cities: Technologies and Services of Smart Information Systems	Nikos Voros: Professor, Head of the Department Company Representatives: <ul style="list-style-type: none"><li>• CISCO</li><li>• HUAWAI</li><li>• Deloitte</li><li>• Google</li><li>• Microsoft</li></ul>	Welcome and presentations of the market and industry in the thematic areas of the summer school.
<b>Coffee Break</b>			
16:30-18:00	Digital Infrastructures for Intelligent Cities	Tania Politi, Assistant Professor University of Peloponnese	During the lecture the basic IoT principles will be analyzed together with the corresponding wireless and wired communication technologies with emphasis on their integration over a digital infrastructure that is suitable for Smart City services. We will discuss the design, development and implementation of such a digital infrastructure through best practices and various Smart City examples. We will emphasize on the three pillars of Smart City digital infrastructure (hardware,

			software, data): open access, scalability and ability to integrate innovative technologies and security that are required to ensure governance procedures with participation of all stakeholders that will maximize impact.
<b>Coffee Break</b>			
18:30-20:00	Introduction to Next Generation Networks	Anastasios Drossopoulos, Professor University of Peloponnese	During this presentation the basic principles of Next Generation Networks will be presented. Definitions of Next Generation Networks, connection with other networks, General Architectures, mobility and nomadism. Special reference will be done to an open source solution; GnuRadio.
<b>Tuesday 7 June- University of Peloponnese (Koukoul)</b>			
14:30-16:00	Modeling of CMOS primitive circuits and MOSFET devices operation for sub-50nm technologies	Lambros Bisdounis, Professor University of the Peloponnese	<p>Estimation of CMOS circuits behaviour, in terms of analysis and computation of their dynamic characteristics (such as propagation delay, transition time, energy dissipation) is today a standard part of digital circuit design. Since, these characteristics are critical design parameters in CMOS digital circuits, much effort has to be devoted for the extraction of accurate, analytical expressions for primitive circuits. Using transistor level simulators with continuous modeling of the devices, like SPICE, can be very expensive in terms of storage and computation time. Hence, much of research has addressed the development of analytical timing and energy dissipation models, without the necessity of expensive numerical iterations.</p> <p>This talk starts with a reference to the evolution of CMOS ICs design and fabrication and emphasizes to the methodology for the derivation of closed accurate expressions for the afore parameters. The operational conditions of primitive CMOS structures are determined and the differential equations describing their operation are solved analytically by using appropriate approximations in order to simplify the modeling procedure without significant influence in the accuracy. As a case study the CMOS inverter is used. Following a detailed analysis of the inverter operation, accurate expressions for its output response are derived for the different operation regions, and based on this analysis, analytical expressions for the calculation of the timing and energy parameters are produced. The derived</p>

			<p>models accounts for the influences of input voltage transition time, device sizes, parasitic capacitances, output load, as well as small</p> <p>The inverter model can be extended to multi CMOS gates by using reduction techniques of series and parallel -connected transisto</p> <p>Since, the accuracy of the used MOS device I model determines to a large extent the accuracy of CMOS structures' timing and energy models, the talk will emphasize on the adoption of an accurate and compact device model that takes into account the influences of predominant effects in modern sub-50nm device technologies.</p>
<b>Coffee Break</b>			
16:30-18:00	Secure chips: Hardware Trojan example	Paris Kitsos, Associate Professor University of the Peloponnese	<p>The basic scope of this lecture is the presentation of the basic non-destructive methods for detecting Hardware Trojans (HTs) in Integrated Circuits (Chips). These methods are divided into run time methods, logic-time methods and side channel analysis methods. After presenting the main features of these methods in the practical part of the lecture, a Ring Oscillator based method for HT detection will be presented.</p>
<b>Coffee Break</b>			
<b>19:00-20:00</b>	Future Cities: An integrated and holistic strategy	Georgios Kapogiannis Visiting Professor in Ningbo Institute for Supply Chain Innovation   MIT SCALE Network (China)	<p>The presenter will demonstrate why and how a city has to be designed over a digital platform using a port as case in Ningbo,China. Beside this, a clear overview of the digital architecture will be provided based on the same case study.</p>
<b>Wednesday 8 June- University of Peloponnese (Koukouli)</b>			
14:30-16:00	Industry 4.0 / Smart Factory & Cyber Factory / industrial IoT	Loukas Hadellis, Professor University of Peloponnese	<p>Since 2016 the modern Industry passes to the full digitization based on the Industry 4.0 standard and convergence / agreement of the Plattform Industrie 4.0 of the European / German industry and the Industrial Internet Consortium (IIC, OMG) of the American / Global Industry. The design-implementation of new architectures, development of strategies &amp; advanced Industrial Manufacturing Execution Systems (MES), the integration of the Internet of Things (IoT) and the adoption of specialized Cyber Physical Production Systems (CPPS) in the vertical and horizontal structure of the industrial enterprise, along with the end-to-end gradually developed interoperability, creates the Smart Factory and transforms it into the future Cyber-Factory</p>

			<p>or Factory of the Future (FoF) where all physical processes are represented by virtual-digital processes, faithful &amp; fully functional copies of the physical world (Digital Twin) through the successful and complete integration of the industrial field production systems (Operational Technology) with the information systems &amp; networks (Information &amp; Communication Technology) and the Internet.</p> <p>The Factory of the Future extends to &amp; interoperates with the Cloud, is protected by cybersecurity systems, interacts in real time with intelligent Enterprise Resource Planning (i-ERP) &amp; creates a collaborative Seamless &amp; Data-Centric super-network along the Value Chain of the Industrial Enterprise, monitoring &amp; controlling the complete life cycle of the product from the idea-creation-production-storage phases to the sale-use-maintenance-withdrawal-recycling phases, with main goals the assurance of the product quality, the savings &amp; rational use of Energy &amp; Resources, the optimized &amp; lowered production costs, the shortest downtimes, the acceleration of industrial production, the through-engineering as well as the creation of dynamic self-organized and optimized in real-time interfaces of People, Things &amp; Systems of great added value.</p>
<p><b>Coffee Break</b></p>			
<p>16:30-18:00</p>	<p>Cloud computing services for the development of machine learning applications</p>	<p>Panagiotis Zervas, Assistant Professor University of Peloponnese</p>	<p>Machine learning is an application of artificial intelligence (AI) that provides systems with the ability to automatically learn and improve from experience without being explicitly programmed. The idea of machine learning was first introduced in the 1950s, which is considered being the decade of the pioneers of artificial intelligence. The concept of shared and centralized computing resources (technologies that are considered as the first steps of cloud computing services) was introduced for the first time in the same era. Nowadays enormous progress has been made in the research fields of machine learning and cloud computing technologies. In fact, the combination of these fields seems to give efficient scenarios for the development and use of smart applications.</p> <p>The aim of this lecture is to introduce the audience with</p>

			<p>the basic concepts of the research field of machine learning and to present cloud computing services that allow researchers, developers as well as “normal” users to experiment and develop smart applications.</p> <p>In the applied part of this lecture, Google Colaboratory and Drive cloud services will be employed, for demonstrating tasks, such as storing and processing data in the cloud (open data from online digital repositories, such as the Kaggle platform), training and evaluating machine learning algorithms. For the purpose to present the methodology and a case study of applying these techniques, acoustic event recognition in urban environment will be utilized.</p>
<b>Coffee Break</b>			
18:30-20:00	Invited Presentation: The Eco-Digital Transformation in the German Capital Region of Berlin-Brandenburg	Invited Speaker: Prof. Ulrich Berger Brandenburg University of Technology (Germany)	<p>The German capital region of Berlin-Brandenburg is undergoing a fundamental transformation, both in ecological and economic ways. The traditional coal regions in Brandenburg have to transform into sustainable energy providers and interconnect with the city of Berlin by utilizing smart transport and value chains. This approach is supported by a distinct research and innovation agenda, integrating science, economy, politics and civil society in a quadruple helix approach. The innovativeness and competitiveness of start-ups, SMEs and midcaps are supported by strategic R&amp;I platforms. We present selected use cases and technology solutions and discuss obtained results.</p>
<b>Thursday 9 June- Conference Center of University of Patras</b>			
15:00-16:30	Citizens in a networked environment	Vassilis Triantafillou, Professor University of Peloponnese	<p>The presentation will focus in technological aspects and other issues concerning the participation and involvement of active citizens in the area of intelligent cities.</p>
16:30-18:00	Smart City & IT infrastructure solutions	Nikitas Georgiadis, CISCO Sales Account Manager, Public Sector	<p>The need to accelerate the pace of urban development, to utilize the available resources in a “smart” and efficient way, contributing to improved governance and offering modern and innovative high-quality services to citizens and visitors</p>
<b>Coffee Break</b>			
18:30-20:00	Invited Presentation: Salesforce: Not just another CRM	Menelaos Radisis, Software Engineer Konstantinos Karavatakis, Consultant	<p>In a rapidly digitalizing world, learn why and how Salesforce is becoming the next big thing in Digital Customer Relations and how Deloitte invests in it and in Greek expertise.</p>

<b>Friday 10 June- Conference Center of University of Patras</b>			
16:30-18:00	Digital skills and STEM technologies	Michalis Paraskevas, Associate Professor Sotiris Christodoulou, Assistant Professor University of Peloponnese	The contents of the lecture include the following subjects: Computational thinking in didactics, Introduction to STEM theory and methodology, Educational robotics, Design of STEM teaching scenarios and their implementation on an Arduino platform. The Lecture will conclude with a short presentation by Arduino, the most popular platform for the development of educational activities and a demonstration of a real teaching scenario.
<b>Coffee Break</b>			
18:30-20:00	Application development using Cloud Computing services	Panagiotis Alefragis, Associate Professor London South Bank University (UK) & University of Peloponnese	The lecture will present the basic concepts and technologies behind cloud computing, we will see the most important cloud computing clouds and their services and we will come into contact with application development environments in them. Then there will be a presentation for the creation of an account and the development of a simple application in computing infrastructure (Google Cloud & AWS).
<b>Saturday 11 June- Conference Center of University of Patras</b>			
16:30-18:00	State of the art infrastructure and services facilitating the transition from the Internet of Things to intelligent cyberphysical systems	Nikolaos Voros, Professor Christos Antonopoulos, Assistant Professor University of the Peloponnese	The main goal of this lecture is to present the basic principles of the Internet of Things and how it can be used as an infrastructure for the design of intelligent cyberphysical systems. The lecture will introduce the concepts of wireless sensor networks, integrated sensor / actuator systems in combination with fog, edge and cloud computing and how they can be integrated to develop end-to-end communication / computing infrastructure to assist algorithms and machine learning artificial intelligence in modern cyberphysical systems of intelligent personalized decision making.
<b>Coffee Break</b>			
18:30-20:00	Processing of Large Scale Data	Vassilis Tampakas, Professor Ioannis Tzimas, Professor University of Peloponnese	The aim of the lecture is to present to students the basic principles of big data and the new technologies used to process them. The lecture will explain the characteristics of "big data" and the new business opportunities arising from their processing and will refer to the main principles of distributed systems and distributed database systems. It will also analyse the need to use new data organization models beyond the relational (e.g. NoSQL systems), will briefly present the

			<p>new distributed technologies for the processing of large-scale data (e.g. Hadoop and Spark ecosystems and will explain the integration of new technologies with cutting-edge sciences such as Business Intelligence, Data Mining and Machine Learning.</p>
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