

ANTARES: Theory And Practice Of IoT

(IISA 2018 Workshop Proposal)

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Abstract—The Internet of Things (IoT) is a collective term referring to a number of recent technological advances including ad hoc networks, sensor array processing, data science and humanistic analytics, and cross layer energy conservation protocols combined in order to transform both the industry and the daily life by introducing a wide array of interconnected smart devices. Each such device contributes specialized functionality, usually concerning aspects of human activity, which adds considerable boost not only to traditional economic activities such as manufacturing and logistics, but also to daily issues such as healthcare, education and lifelong training, and digital entertainment. This multitude of devices poses a series of unique challenges to stakeholders, designers, and engineers such as power consumption and dissipation, analytics design, reliability, flexibility, security, and non-obtrusiveness to name a few.

The proposed workshop fits perfectly to the stated objectives of IISA as IoT is emerging to a primary industry transformative power and as such its industrial applications are numerous. Moreover, these applications rely on a strong theoretical background composed of communications protocol design, topology analysis, firmware development, signal processing, data fusion, sensor calibration, and social media interface to name as few. Thus, the theory and practice of IoT are large enough to justify an individual workshop which will serve as a meeting point of the IoT community.

Index Terms—IoT; Industry 4.0; telemetry; communications protocol; network topologies; industrial applications; sensors; humanistic data; data fusion; privacy; non-obtrusiveness; personal data protection; reliability; social media

I. INTRODUCTION

Internet of Things (IoT) is the general trend of upgrading at least with reprogrammable firmware, remote control capabilities, a wide array of various sensors, and wireless connectivity devices which previously were considered to be either pointless or impossible to do so. The major driver behind this trend is the ever growing need for collecting a broad spectrum of data and for efficiently mining them for their latent value. Prime examples are household appliances such as coffee machines and bed sensors which collect data regarding how well one might sleep and how much coffee consumes after four or eight hours of sleep. Although these data might sound meaningless to collect and process, they may in fact be of tremendous value to insurance companies and medical researchers alike.

Another significant branch of IoT is the famous Industry 4.0, a relatively recently proposed set of documents put forth by the German government describing the specifications for heavily upgrading several critical sectors of the German industrial production, including chemical engineering, automobile assembly, and mass scale manufacturing, using a number of information and communication technologies. The expected results of this radical transformation is a strong increase in economic growth along with various benefits for the workforce and the society in general.

The primary contribution of the workshop is threefold:

Objective 1: Consolidate the theory and practice of IoT.

Objective 2: Provide a meeting point for forging professional bonds between practitioners.

Objective 3: Increase the visibility of the field by serving as a central point of high quality work.

Please note that this is the first time ANTARES is ever proposed. Its close connection to the objectives of IISA is justified on the grounds that IoT is expected to be a major industry driver with vast and significant applications.

The remainder of this proposal is structured as follows. Section II briefly reviews scientific literature relevant to IoT and related software. Section III describes the peer review process, names the workshop chairs and the program committee members who have already agreed to participate, and lists indicative application areas.

II. SCIENTIFIC LITERATURE

Industry 4.0 is a term originally coined by *Bundesregierung*, namely the German federal government, to indicate the enormous transformative potential of rendering traditional equipment ranging from heavy industrial tools to ordinary home appliances with at the very least connectivity and an upgradable firmware. There are a number of recent surveys exploring its various effects on industry [1], each highlighting different aspects of the coming IoT revolution such as technologies [2], Internet considerations [3], and industry standards [4].

Concerning the social aspect of IoT, the so-called SIoT, a number of papers are available, most notably [5] and [6]. Both works emphasize on the integration to social media of multimodal information, including location and local language preferences, collected from smart devices. Also, the Internet of

People (IoP), an offshoot of the Fermat project, emphasizes on the almost immediate global reachability of any person from any other person under strict privacy rules.

Security software for IoT is also beginning to rise, at least in the form of specifications. Given that IoT devices will be also located in homes or they will have access to sensitive personal or business data, securing them is imperative. However, the limited computational power and energy resources call for short keys for most existing cryptographic schemes, which translates to the need for sophisticated data encryption.

III. EXPECTED ATTENDANCE

ANTARES aims to bridge various communities ranging from firmware and embedded system developers, data scientists, and cryptologists to telemetry specialists, material scientists, and social media experts. A meeting between these practitioners is expected to be mutually beneficial. Due to the specialized nature of the proposed workshop, highly skilled and experienced individuals are anticipated to join.

Given the rising popularity of IoT as well as the number of communities involved, an significant attendance is to be expected. This can be corroborated by the number of relevant research papers as indexed by DBLP until February 2018. As it can be seen in table I, there is clearly a rising interest in the field as indicated by both the increasing number of submissions and venues. However, the latter increases disproportionately with the former and, consequently, collecting the set of research papers is a painstaking procedure. Instead, the proposed workshop aspires to serve as a reference point for a major part of the so far accumulated knowledge in this rapidly evolving field.

TABLE I
RESULTS OF DBLP QUERIES.

Year	Papers	Venues	Average
2013	2034	245	8.30
2014	3189	521	6.12
2015	5116	791	6.46
2016	5234	817	6.40
2017	5911	832	7.10

Given the data of table I, it is estimated that there will be at least 10 submissions. The time of the year as well as the ideal location of Zakynthos are positive factors in attracting interested scholars and practitioners. Therefore, the proposed workshop is financially viable and can boost the main conference. Moreover, due to the high profile of the field, it will enhance the publicity of the main event.

Program committee members who have already concurred to apply are listed below alphabetically. Note they come both from industry and academia.

- Georgios Drakopoulos, Ionian University (contact person)
- Andreas Kanavos, University of Patras and Hellenic Open University (contact person)
- Michael Marountas, AM Photo Labs
- Phivos-Apostolos Mylonas, Ionian University
- Spyros Sioutas, University of Patras

- Foteini Stathopoulou, University of Luxembourg
- Konstantinos Theodoropoulos, Dialog semiconductors
- Yorghos Voutos, Ionian University

The review process will be single blind, as normally done in easychair. Also, the important dates of ANTARES will be those of IISA. The list of topics will include but will not be limited to:

- IoT industrial applications
- Smart cities and smart infrastructures
- Public policies for IoT
- Web of Things (WoT)
- Internet of People (IoP)
- Current and evolving IoT standards
- IoT topologies
- Security and privacy
- Non-obtrusiveness
- IoT networking complexity
- Social networking for IoT
- Device material and technology
- Deep and distributed learning for IoT

IV. CONCLUSIONS AND PROSPECTS

IoT is an emerging multidisciplinary field which aspires to revolutionize a large number of industrial and economic life as well as ordinary social life with the promise of improved, self-managed, and self-sustained equipment, buildings, factories, and infrastructure. As such, it encompasses a large number of diverse engineering, scientific, and social fields.

Given the worldwide popularity of the field, it is expected that the proposed workshop will be financially viable. Additionally, it will add to the topical diversity of IISA 2018 and will provide a reference point for engineers and scholars.

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