

Alliance on Digital Management of Pandemic Disasters



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ALLIANCE ON DIGITAL MANAGEMENT OF PANDEMIC DISASTERS

Alliance on Digital Management of Pandemic Disasters (ADMPD) consists of <u>parties aiming to</u> <u>minimize the negative effects of pandemic disasters using advanced digital technologies.</u> The alliance uses the term "pandemic" to indicate the disasters which negatively influence a large number of people. As such <u>the alliance does not restrict itself to infectious diseases only but also</u> <u>considers disasters such as large-scale earthquakes and war conditions.</u>

ADMPD is a working group supported by the TOBB Economy and Technology University; The alliance members exchange ideas and knowledge among each other and participate in selected activities of digital pandemic disaster management.

Currently, there are a considerable number of activities in the world which aim at preventing and managing pandemic disasters, and it is likely that this trend will grow in the future. <u>The alliance distinguishes itself from most of these activities in the following 3 aspects</u>: Firstly, the alliance focuses on digital management techniques in the broadest sense. Instead, most work in disaster management today mainly considers organizational, management and governmental procedures. Naturally, the alliance is interested in the digital infrastructures that can be utilized by such procedures. Secondly, the alliance does not target a specific application domain. In contrast, most commercial product development activities in disaster management today address a particular set of problems, such as statistical analysis of pandemic data, simulation of various scenarios, proximity tracking of persons, etc. Logically, the alliance investigates the common ground of such applications in disaster management of today and the future. Thirdly, most activities in disaster management are organized and managed by a company, institute or NGO. Although the alliance is supported by the TOBB Economy and Technology University, it is an independent working group.

Although approaches based on digital technology constitute to the core of its activities, the alliance strongly believes that fighting pandemic disasters demands holistic methods not only in technical domains but also in psychological, sociological and political fields. As such, we consider <u>human-centered digital approaches essential in seeking technical solutions for pandemic disasters.</u>

The alliance emphasizes that due to emerging connected socio-political structures in our planet, the current pandemic disaster must not be considered as a rare event but instead <u>a highly probable</u> calamity which will repeat itself in different forms and dimensions possibly in increasing frequency.

To cope with the complexity of pandemic disasters, novel holistic digital approaches are required. The alliance states that ad-hoc combination and usage of currently available digital technologies and systems do not provide effective and efficient means to fight pandemic disasters. Neither provide a along-term answer the systems which are hastily put together to urgently find solutions to some dedicated pandemic problems as observed today. What is required are <u>the human-centered digital solutions that address the specific pandemic characteristics of such disasters as a whole while assuring sustainability in a firm ethical framework.</u>

Efficiency requires adoption of <u>advanced digital technologies and automation.</u>

Sustainability requires reconsidering multiple quality factors such as <u>scalability</u>, <u>adaptability</u>, <u>evolvability</u>, <u>timeliness</u>, <u>robustness</u>, <u>safety</u>, <u>security</u> <u>within</u> <u>pandemic</u> <u>scenarios</u> <u>along</u> <u>the</u> <u>trajectory</u> <u>of</u> <u>digital</u> <u>realization</u>.

To address the emerging problems of pandemic disasters, the alliance uniquely <u>brings different</u> expertise together with a strong research emphasis in industrial context.

Activities

The strategic objective of the alliance can be briefly summarized as to establish a large enterprise architectural framework for digitally managing pandemic disasters. To this aim, the alliance carries out the following activities:

- Support national and international pandemic-related digital standardization activities;
- Define systems of systems digital infrastructure (digital ecosystem) which integrates products possibly developed by different parties and cultivates the results of research outputs.
- Define professional certification criteria based on offered training plans and accredit evaluation bodies in pandemic technology domain and smart cities for various roles (e.g. decision makers, managers, technologists and entrepreneurs)
- Provide growth of the digital ecosystem through events, media and academic relations;
- Starting from the human-centered pandemic scenarios, formulate the areas where the current digital systems and technologies fail in short;
- Elaborate on the digital solution domains, and define the areas of technological research in harmony with psychological, sociological, political and spatial considerations. Accordingly, initiate, support and collaborate within the (newly) initiated research activities;
- Publish and disseminate the generated knowledge as manifesto, standards, and ecosystem infrastructures in the relevant public media;

Motivation

The world was caught unprepared for the Covid-19 pandemic disaster. The impact of this disaster is expected to be enormous from technical, economical, social and political perspectives. It is one of the most overwhelming global crisis since the second world war. Although we do not want to speculate about the future, we assume that such disasters will happen in the future either by natural causes or



deliberately for malicious purposes. No matter what the cause of a pandemic disaster is, it is clear that the probability of such an event cannot be ignored by any realistic strategic plan. <u>Claiming</u> <u>that there will be a substantial investment to prevent and manage future pandemic disasters by</u> <u>all major countries and organizations is not a utopic scenario anymore.</u>

Historical facts show us that in extreme circumstances, authorities, knowledge providers, NGO's and commercial organizations generally have to deal with possibly two conflicting requirements: (a) To find urgent but not necessarily optimal solutions to the problems being experienced as early as possible. (b) To carry out research activities by carefully studying the nature of the disaster for discovering, validating and implementing more sustainable, economical, efficient and effective solutions. Although the first approach can be appealing within a disaster context, it may soon turn out to be not the best investment in the long term. We believe that both options must be considered simultaneously. The alliance, nevertheless, focuses in the second option.

Due to all-encompassing impact of calamities on societies at all levels of organizations, managing pandemic disasters demands broader solution perspectives than only medical treatment and incident management. What is required is a holistic approach where multiple technologies are integrated and utilized to implement pandemic disaster management workflows possibly in a large spatial context.

Computer, software and artificial intelligence technologies are the prime integrator, enabler and harvester of many systems that we use today. Almost all products contain software or are made by manufacturing processes that contain software. The capabilities which are offered by software intensive systems also influence our psychological and social life. <u>Digital technologies cannot be ignored in fighting against disasters;</u> <u>contrary, they are at the heart of this struggle.</u>

Although much progress has been made in almost all disciplines of computer science and applications during the last decades, fighting against pandemic disasters has not been studied in detail. The state-of-the-art of digital technologies available today are a large set of fragmented systems which have to be (re)considered in pandemic context. By starting from pandemic disaster scenarios, the mission of the alliance is to exploit what kinds of digital technologies are available today and to fill the gaps where it is needed.

Similarities Between Pandemic Disaster Digital Management Systems and Smart City Systems

Although there is a controversy about the precise definition of what a smart city is, in general, smart city systems are structured in three layers: sensors and sensor networks where data are collected, systems where collected data are stored and processed, and applications where data are used for some dedicated purposes such as for visualization, traffic management, incident management, resource management, information retrieval and guidance, etc.

A set of smart-city applications, such as tracking, recognition, incident management, resource management and logistics management may play an important role in fighting pandemic disasters as well. This is not surprising since pandemic disasters especially have dramatic affect on cities. Similarly, smart-city system infrastructures, sensor networks and sensors are also suitable for systems against pandemic disasters. It is evident that smart city systems and pandemic disaster digital management systems share a large set of characteristics.

However, one also needs to define new, dedicated and integrated business cases and scenarios for digitally managing pandemic disasters instead of speculating how smart-city application can be adopted and extended. <u>Nevertheless, the currently experienced disaster should give the opportunity to interpret what is needed today and as such form a basis to predict what may be needed in the future.</u>

There are also some notable differences between these two systems. Firstly, fighting against pandemic disasters is not limited to city boundaries only. <u>Depending on the need, scalable systems</u> must be adopted to handle the problems in increasingly larger geographical contexts from cities, regions, countries, continents to the world.

Fighting against pandemic disasters demands specific measures. Such disasters have severe negative impact on a large set of businesses. Financial management systems such as cash-flow management, credit management, capital-market management have to deal with special financial constraints and objectives. In normal conditions, tracking persons or group of people, classifying and isolating them are restricted to the people who violate legal code. In pandemic disaster context, however, such actions are carried out also for persons who are not involved in illegal actions. In pandemic disasters, security forces may be required to enforce certain measurements.

In most disastrous situations, sufficient and timely supply of medical services, necessary equipment and material are crucial. E-diagnosis and treatment may be also required. In pandemic disaster context, education activities may be disrupted. Obviously, more examples can be added to this list. It is clear that in fighting pandemic disasters, different kinds of applications may become highly prioritized. Moreover, Imperative measures which are necessary in pandemic disaster context may demand new laws and ethical rules.

Modern societies have become increasingly more dependent on digital systems. This is especially true in pandemic disaster context. This requires that digital infrastructures which are adopted in pandemic context must be highly dependable; they must be correct, resilient to failures, safe, secure and timely. Systems that are used in fighting pandemic disasters, are therefore, strategically critical. <u>Dedicated digital system infrastructures must be designed to provide the quality needs of critical infrastructures.</u>

It becomes evident that preparing for the future pandemic disasters will have impact on almost every aspect of our governmental and social processes and our personal life. The society has to gradually adapt to this new way of life. New digital systems must be introduced to implement this change. <u>This demands designing flexible and scalable digital systems that cope with this</u> <u>evolutionary process in an economical way.</u>



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