

Vol4All: A Volunteering Platform to Drive Innovation and Citizens Empowerment

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ABSTRACT

Cities nowadays have embraced the digital era and continuously strive to merge technological advancements with the benefit of their social capital and communities. A major quest is to place humans and their competences at the center of the efforts towards sustainable and smart cities. Citizen societies have widely accepted and practiced volunteering for years now and already a great number of volunteering actions and networks have flourished, in support and aid to several communities in need. Most popular volunteering networks have greatly capitalized on the rapid advance and spread of Internet and Web technologies, which are ideal for coordinating and monitoring of the volunteering tasks. The Vol4All platform advances this trend, by building on extended Internet technologies in its aim to support citizens' activism towards novel urban social innovation. Vol4All enables ideas exchange and crowdsourcing by facilitating citizens' involvement in the realization of community projects. Volunteering actors (initiators, participants, stakeholders) can easily interact via the Vol4All platform which enables volunteering opportunities dynamic sharing, evolution and monitoring. Such opportunities can be initiated by any authorized stakeholders, with a publicly open interface which allows citizens commitment assessment, best practices highlights, and a gamification style of interaction such that volunteering becomes a societal and growth asset.

CCS Concepts

• Software system structures → Distributed systems organizing principles → Organizing principles for web applications • Human computer interaction (HCI) → Interaction paradigms → Web-based interaction • World Wide Web → Web applications

Keywords

Volunteering; Web and mobile city applications; social innovation; city platform; participation; citizens' empowerment; collective awareness

1. INTRODUCTION

Most recent and ground-breaking scientific and technological innovations bear significant potential for evolving and redefining living and interactions within cities. Embedding cutting-edge

devices, networks and services into cities' centuries-old streets impacts citizens' daily lives in terms of their mobility, habits and behavioural patterns [7]. With each generation of technological advancements, cities are given new ways to make the most of their human capital via online platforms which may act as problem solvers and citizens' activation engines [5, 11].

Early examples of this endeavour are already prominent in the form of the so-called CAPS (Collective Awareness Platforms)¹, i.e. the ICT systems leveraging the network effect (or the "collective intelligence"), in actions related with the use of open data, the social media exploitation, the shared knowledge detection, etc. CAPS offer the ground for environmentally aware, grassroots processes and practices to share knowledge; to achieve changes in lifestyle, production and consumption patterns; and to set up more participatory democratic processes [11, 1].

In this context, many cities and communities worldwide, have acknowledged the importance of volunteering as the most direct act of driving the society forward [6, 2]. Volunteering applications and platforms can largely support digital social innovation by harnessing the power of citizen crowdsourcing, and the immediate interaction capability. Cities can thus enhance public awareness and utilize resources (declared by citizen volunteers) towards a more effective and responsive co-sharing and co-creation [10]. Major cities worldwide (like New York, London, Shanghai and Athens) have already taken advantage of such digital tools and have supported the design and development of platforms easily accessible by citizens via Web browser interfaces.

Vol4all platform is inspired by earlier efforts, but it further extends the principles required for supporting cities emerging big data production, their flexible organizing and also their publicly open nature [13]. These goals are driven by the need to make volunteering an accessible and enjoyable activity, driven by the desire for common good contribution and for advancing the communities wealth. Vol4all components and elements emerge from nowadays societal trends in volunteering applications and with a continuous extension and adaptive process involving:

- solid display, of volunteering opportunities in a compact calendar form or via advanced filtered search;
- a mobile application implementation such that volunteers and organizations can have access to the platform's features under a "volunteering on-the-go" spirit;
- a Web accessible administrative platform for authoritative supervision and coordination purposes.

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¹ Collective Awareness Platforms for Sustainability and Social Innovation (CAPS) <https://ec.europa.eu/digital-single-market/en/caps-projects>

Furthermore, Vol4all platform's volunteering tasks are designed in a user friendly and simple manner with the aim to offer a joyful activity which will attract and engage citizens [3, 14]. This is reached by the main following features:

- direct searching process: by clickable volunteering category and other features choices at the Vol4All home page;
- volunteer's and organizer's profiling: to allow users to view and monitor their progress and history in volunteering;
- implementation of a point system: for rewarding and motivating the citizens via an enjoyable gamification processes.

Under the above principles, Vol4all aims to empower citizens for becoming volunteers, broadcasters and motivators, towards an active and dynamic cities volunteering network, at which volunteers and organizations interact, co-create and co-solve their city's crucial emerging problems [6, 8].

2. BACKGROUND

Vol4All platform is inspired by earlier volunteering platform implementations, with a focus on the ones practiced in large scale cities. Earlier such platforms include functionalities which primarily utilize graphical user interfaces, and support similar core functionalities (e.g. search for volunteering opportunities, seek volunteers, registering as volunteers, etc.). In a similar manner, CAPS principles build on the collective awareness, i.e. the technology driven "smart services" [15] which promote social innovation aiming at solving societal issues and enhance quality of life on a city level. Major cities like London (Team London), New York (NYC Service), Athens (Synathina), San Francisco and USA (Volunteer Match), Shanghai (Hands on), Sydney (Go Volunteer) etc. follow this pattern, as summarized in Table 1, which highlights the basic characteristics of the most indicative such volunteering platforms which all respect CAPS principles.

Table 1. Volunteering platforms principles overview

	Crowd sourcing	Geo spotting	Gaming	Analytics
Team London	✓	✓	-	-
NYC Service	✓	✓	-	-
Hands On	✓	-	-	-
Volunteer Match	✓	✓	-	-
Go Volunteer	✓	✓	-	-
Synathina	✓	✓	-	-
Vol4All	✓	✓	✓	✓

Out of the most popular indicated volunteering platforms, the ones considered as the best influence for the development of Vol4All are in London, New York and Shanghai, addressing the needs for increased responsiveness and usability under attractive user interfaces. These platforms indeed promote and aid volunteering spirit, inline with CAPS principles, focusing on collective awareness and sustainable society. These platforms' most attractive features are highlighted next:

- **Team London(London)² and NYC Service(New York)³:** are quite similar both in visual and functional aspects, offering a range of features (crowdsourcing, dynamic volunteering

content indication, popular social media and online map tools). Their most prominent features are the visual support for volunteering events, and their graphical representations of volunteering actions which further facilitate citizens searching.

- **Hands On(Shanghai)⁴:** This platform offers a unique feature in the form of a calendar at which all registered volunteering events are organized over the different time periods. This helps potential volunteers search and seek events based on a timeline.

Such features characterize effective and attractive volunteering platforms capable of supporting emergent online social innovation on a shared virtual space.

3. RESEARCH METHODOLOGY

This section offers a detailed analysis of the proposed Vol4All platform. Initially, the core design principles are discussed in 3.1 and in 3.2 an outline of the platform's architecture is presented.

3.1 Vol4All Design Principles

The core Vol4All design goal is the development of an attractive platform, following the crucial CAPS principles of collective awareness and innovation. Vol4All advances earlier implementations by focusing on more advanced and citizen-centric functionalities at which social media and online visualization of geo-located volunteering spots converge via gamification practices and analytics. Gamification is defined as the application of game-design practices and game principles in non-game contexts in order to improve user engagement, productivity and enjoyment [16, 17]. The introduction of gaming related features in the volunteering process targets an enjoyable and attractive experience which will engage all volunteer action stakeholders. Additionally, targeted analytics will enable volunteering event location binding and volunteers' assessment and rewarding (Table 1). A set of novel features (gamification, analytics, best practices) enables interactivity and volunteering experience as a city's asset. Vol4All platform designing process covers the next important functionalities:

- maintain dynamic interaction among separate platform's users types i.e. volunteers, organizers of volunteering events and authoritative administrators, along with registering their demographic profiling information and their social media bridging;
- offer open versus private features and services via user-friendly, direct and accessible graphic interfaces (supporting registration, monitoring and searching of volunteering events), according to privileges and rights hierarchies, having the administrators' role being mostly important for the registration and approval of the volunteering activities;
- aggregate various types of data processed and managed, under a sophisticated database management system which supports emerging volunteering and city data flows (new and evolving volunteering tasks) and static data (volunteering categories);
- inclusion of gamification practices in the design process of the platform significantly improves its appealing potential. A city oriented point system is proposed for

² <http://volunteerteam.london.gov.uk/#s>

³ <http://www.nycservice.org/>

⁴ <http://handsonshanghai.org/>

rewarding participation and collaboration users of intensive and frequent behaviors. This is monitored by having completion of a volunteering task being awarded with points added up to the individual volunteer overall score. This will enable a city’s authority to award the “Top-k” volunteers with particular city offers (such as coupons, parking permits, etc.) and it will moreover engage volunteers who will have a visible record characterizing their experience and skills;

- analytics visualization in a leaderboard format to highlight best practices with the city’s most active volunteers, but also most popular volunteering tasks. Vol4all analytics toolbox is designed to encourage and mobilize citizens to practice synergies in a collaborative manner monitored under steady and periodic contributions.

3.2 Vol4All Platform Outline

Vol4All platform has its front-end and back-end sides covering Web and mobile applications (for user interacting) as well as remote database and data management implementation. The core platform’s components support main tasks such as: user (volunteer) authentication, registration of new users, retrieving volunteering data, administrative monitoring as well as a simple notification system. Depending on the process and functionality requested, the appropriate component is activated for processing through continuous communication with the remote database for the storage, edit, or retrieval of data (as depicted in Figure 1).

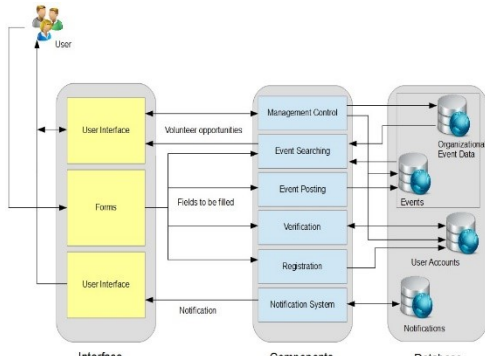


Figure 1. Component architecture of the Vol4All volunteering platform.

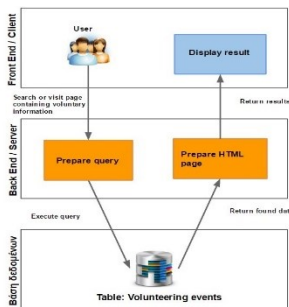


Figure 2. Data retrieval and presentation.

Among the different tasks, the most typical data flow from the platform to the database and vice versa is summarized in Figure 2. Volunteering data refers to all information relating to volunteering events (event information and its features, geo-location, apply forms, etc.). Retrieval of volunteering data takes place in several

cases and typically, retrieval and presentation of data is employed once the user indirectly triggers an event transformed into a dedicated query addressed to the server side. Upon executing the queries, data from the database server side are packaged into a user friendly page which is delivered to the user.

Of course, the aforementioned volunteering data need to be initially inserted by the corresponding organizing entities. Through filling a simple and easy to use front-end form, registered organizations collectively manage and send information, regarding future volunteering activities, to be validated on the server-side and consequently inserted into the database, pending administrator approval. This process can be seen in Figure 3 below.

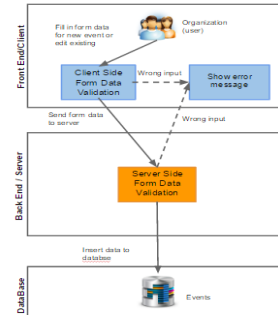


Figure 3. Data insertion.

Extensive monitoring of the remote database and all volunteering and account information, is carried out via an administrative page which serves as a portal for administrators to view and edit data through a number of dedicated queries to the database (depicted in Figure 4), prominent among which, is the approval or rejection of volunteering activities organized by registered organizing parties.

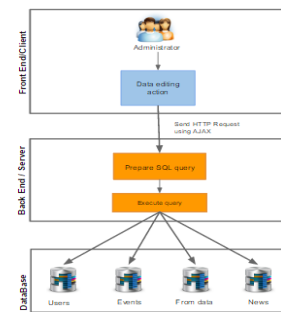


Figure 4. Administrative interaction with the remote database.

Access to the widest array of privileges is provided to established and registered members of the platform, either volunteers or organizations seeking citizen help. In this sense and in order to personalize the platform’s content, an authentication step is similarly utilizing the remote database by performing a query, which checks the validity of the user’s credential information. Upon successful identification, the volunteer or organization is presented with the full possibilities granted by the Vol4All platform.

4. Vol4All PLATFORM: WEB AND MOBILE SIDES

Vol4All Web application side facilitates users of the platform (volunteers, organizers and administrators) accessing and interacting. Users may act based on their privileges boundaries

and the tools offered allow easy access to the volunteering content and its metadata. Volunteering events are generated and registered under specific category, with additional features of city coordinates mapping, of timeline declaration, of competencies and skills required etc. The platform's authoritative administrators are responsible for coordinating volunteers and organizers, having the ability to communicate with involved stakeholders and verify the two sided validity.

To enhance the volunteering process and attract more citizens for an on-the-go urban participation, a mobile application was developed, interacting with the Web application. The aim is to offer the appropriate functionalities to citizens and stakeholders on the move, facilitating the platform's interoperability and visibility. Moreover, volunteers have access to their volunteering participation history record and the volunteering digital content in the palms of their hands.

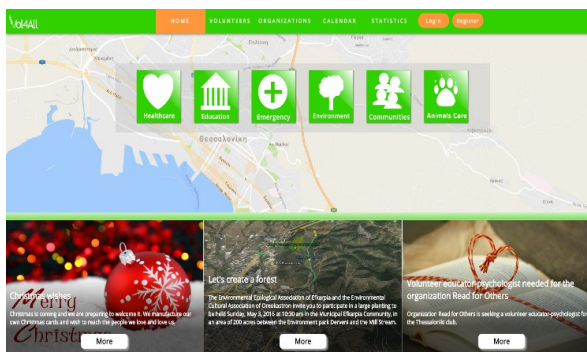


Figure 5. Homepage of the Vol4All volunteering platform.

Vol4All Web application interface is depicted in its homepage (Figure 5), accessible via any Web and mobile browser. In summary the most important actions to be followed by this homepage are as next:

Registering of a new volunteering opportunity/event by an organization: this feature is available to users connected through an organization-authorized account. The organizer must fill in the necessary information about the volunteering activity (such as title, short and detailed description, location, date and time, category, suggested volunteering skills etc). Submitting the form, a request is sent to the server for the storage of the information in the database, setting the status as 'Pending for Approval'. Then an administrator must review the data submitted and approve the activity, which can only be displayed in the search results once it has been approved as a verified public city authorized content.

Searching for a volunteering opportunity: to find a possible volunteering activity to participate, the potential volunteer may choose a specific category from the home page, or a more extensive filtered search by fill in a form with preferences declaration (such as category, location, age group, suggested skills and dates availability). Volunteering events, meeting the defined criteria, are displayed on the user's interface (Web or mobile) side.

Calendar outline presentation: which is indicated in Figure 6, to offer a timely direct access to the volunteering activities requiring participants organized by month and weeks. The calendar widget offers fluid navigation between months and additional information about the respective volunteering events should the user select any of them.

Volunteering activity application process: At the dedicated volunteering event page, volunteers can find detailed information

with and incorporated geo-location options to display the city's geographical location of the event. In this section, users can officially apply as volunteers for the specific volunteering event organized. Then, the organization that has registered this activity can view the applicants' profiles and select those who seem mostly capable and suited for the volunteering tasks. For the volunteer selection process, earlier analytics on best practices and most experienced volunteers unfolds for the administrators who can proceed to their selections based on qualitative and excellence criteria. Finally, the volunteers selected receive a notification for their approval.

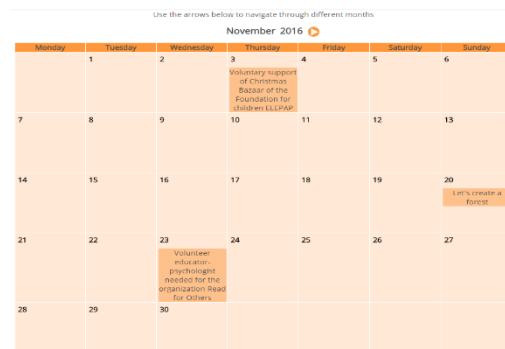


Figure 6. Calendar search functionality.

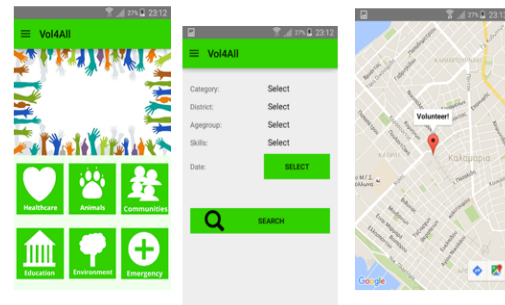


Figure 7. Vol4All mobile application screenshots.

The respective mobile-based application complements these functionalities, providing portable, simple and easy to use access to Vol4All from the comfort of a mobile device's screen. Mobile platform empowers volunteers with the necessary tools of searching, reviewing and applying to volunteering events regardless of their geographical location. Organizers in turn, hold a useful tool which enables them to monitor activity on their registered volunteering events with information about applicants and the ability to approve or reject them. Figure 7 summarizes some mobile application's screenshots (currently developed in Android operating system version).

At "Statistics" tab the analytics of earlier volunteering tasks are summarized and aggregated such that best practices are indicated and geo-located, revealing hidden city's volunteering "hubs" which exhibit strong volunteering practices and intensities. Social media support is evident at various of the platforms tasks since social media interaction, login, and analytics is also employed with the most popular Web 2.0 platforms (Twitter, Facebook, foursquare, etc. links) interlinking and interacting.

5. Vol4All IMPACT POTENTIAL AND ADOPTION FEASIBILITY

Vol4All improves a city's innovation capacity and its integration of new knowledge due to its effective social driven design, leveraging the power and the dynamics of collective awareness.

Targeting common synergies among cities society can drive "volunteering as an asset" with positive impact on city's economy and growth. The benefits are multi-dimensional for all stakeholders involved, as indicated in Table 2 which showcases the level of Vol4All expected impact to each city's stakeholder, per particular city segments. These segments targeted are mostly relevant to the proposed platform since cities services can be complemented by the volunteering activities, city apps can be linked with Vol4All apps, urban planning can be transformed based on Vol4All analytics, social inclusion and urban innovation hubs related to the volunteering best practices can be revealed and showcased. Specifically, impact relates to:

- Citizens/Communities/entrepreneurship enhancing due to sharing among platform users and communities, who interact over significant volunteering information and are motivated to behavioural change in response to several city's problems, favouring new crowdsourced knowledge under the best practises exposed and its analytics.
- Industry/SMEs competitiveness improvement, by promoting volunteering ideas capable of enhancing competitiveness with ideas which can improve the industrial "Social Profile". Cultivating such industrial Corporate Social Responsibility leads to companies significant direct and indirect benefits [4].
- Policy Makers governance improvement by providing a platform which enables volunteering ideas innovation and sharing, and therefore increases their capacity for designing and implementing policies towards beneficial volunteering exploitation.

Vol4All is now under a prototype development of TRL4 to TRL5, accessible via the Web interface at: <http://oswinds.csd.auth.gr/vol4all> and as a proof of concept, in terms of its impact and future adoption, Vol4All has already been communicated and disseminated to the next two popular SMEs/startups (in Thessaloniki):

Table 2. Vol4All stakeholders impact

	City Services apps	Urban planning	Social inclusion	Urban innovation hubs
Citizens	*	*	**	
Organizations	***	*	***	**
Authorities; Policy Makers	**	**	**	***
Entrepreneurs	***	**	*	***
Industry and SMEs	***	*	*	***

- **Parallaxi** is a grassroots community with a more than 24 year creative presence in the editing landscape of the city, continuously organizing big volunteering events which alter the everyday city life. Such events involve immigrants support, large scale urban experiment for a city under a novel view entitled "Thessaloniki Differently"⁵. From the experiments of this urban activists' community, already 28 actions for design, architecture, environment, social inclusion etc. have brought more than 150.000 together.
- **Thessaloniki Walking Tours**⁶ team to discover the city of Thessaloniki, its people and their habits, its secrets and legends. This startup invites people to experience authentic aspects of the city through well-designed theme walks specifically aimed at providing the information and the means to spend a fascinating day in the life of this 2 thousand year old city. Connecting past and present, volunteering can be linked to Vol4All volunteering tasks to discover human stories behind city's important monuments, its art and its culture.

As it is evident from the above, citizen ground up groups have already addressed the need to proceed on more humanizing the city efforts, integrating city's needs with active people empowering actions. As is evident from the success of various volunteering platforms around the globe, citizen ground up groups have already addressed the need to proceed on more collaborative community efforts, integrating web technologies and modern standards in their everyday lives and perceptions. Some of the most indicative key measurable indicators are summarized in Table 3, mostly of what is planned and expected in a yearly basis upon acceptance of the platform in the local Thessaloniki's communities and stakeholders.

Table 3. Vol4All measurable indicators

Performance/success Indicator	Target Value
Number of users involved in pilots volunteering cases	2000 newcomers yearly (based on Parallaxi's audience)
Number of volunteering tasks and content uploaded by users	10 events per month; 10 photos/posts per user
Number of Companies activated at the Vol4All platform	100 yearly (based on local active companies outlook)
Volunteering quests resolved (estimated that 30% of Pilot users will solve on average one quest)	at least 60% of volunteering tasks being resolved in less than a set deadline
Number of new volunteering categories submitted at the Vol4All platform	10 new categories or sub-categories yearly in a volunteering topics hierarchy
Number of volunteering ideas approved by the authorities	At least 70% accepted to showcase the qualitative volunteering ideas sharing
Number of volunteering ideas adopted by the Industry and/or SMEs relevant stakeholders	estimated that 30% of the ideas will be adopted yearly

⁵ <http://www.parallaximag.gr/thessaloniki/thessaloniki-allios>

⁶ <http://thessalonikiwalkingtours.com/>

6. CONCLUSION

This paper contributes a new way to combine modern technologies with the volunteering ideals of a collective aware society by proposing the Vol4All volunteering platform. Powered by the Internet and the World Wide Web, Vol4All introduces a number of citizen-centric functionalities, such as dynamic content sharing, monitoring of activities and gamification-inspired practices, in an attempt to support and elevate volunteering actors' interaction. Aim is to provide an accessible and society-friendly portal to enable collaboration between stakeholders and citizens, and ultimately aid in the promotion of a collaborative and community-driven spirit. Vol4All improves cities innovation capacity by its novel volunteering practices which empower citizens and inspire entrepreneurs and innovators. Its dynamics of collective sharing and synergies among cities communities, build on the principle of "volunteering as an asset" for city's growth.

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