ISSRE Cares: How the Software Reliability Engineering Community Can Give Back to Society

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Abstract—The reliability engineering community should consider undertaking activities that benefit society as an integral part of their major conferences such as ISSRE. The requirements engineering community adopted a philanthropic activity combining to assist an organization in the locale of the IEEE Requirements Engineering (RE) conference, called RE Cares. At the conference, a live requirements elicitation is performed. Then, developed artifacts are used by the open source community to continue development of the application. The reliability engineering community could adopt a similar model and serve the locale of their ISSRE conference via ISSRE Cares. Rather than requirements and prototyping, ISSRE Cares would perform reliability engineering of an important application that helps serve the public interest, by, for example, applying testing techniques and expertise.

Keywords—outreach, broader impact, technology transfer, testing techniques, open source

I. INTRODUCTION

Academics and practitioners can make an impact. These experts may apply their techniques to real world projects or for industry partners and obtain good results that might be transferred to industry. Their research might inspire ideas in others and lead to additional research and hopefully transferred technology. But is that enough?

These experts are uniquely positioned to make an impact throughout the world, one city at a time. These worldrenowned professionals in their field spend at least one week per year in the locale of their focus area conference, such as ISSRE for software reliability engineering. This should be viewed as an opportunity to make a difference in that city, so that when ISSRE "leaves town" a legacy remains: a local organization serving society that continues to benefit from the conference having been held there.

The requirements engineering (RE) community is in their second year of such an undertaking, called RE Cares. Can the software reliability engineering community apply our unique skills and experiences and techniques for the betterment of society? This paper argues that yes, we can make a difference by using ISSRE as an opportunity to assist a local organization that is positively impacting society.

II. BACKGROUND AND POSITION

Background and the paper's position are presented.

A. Background

A seed idea regarding broader outreach to the locale of an RE conference was planted in 2012 as part of a Dagstuhl workshop [1]. The idea lay dormant for five years. In 2017, University of Kentucky Association for Computing-Women

(ACM-W) developed an app to assist social workers of the nonprofit Breaking Ground.

In 2018, a small group of academics and industry practitioners developed the idea of RE Cares, a co-located event of the IEEE RE Conference [2]. RE Cares identifies a socially impactful stakeholder with a software need in the RE Conference locale. RE Conference attendees work with the local stakeholders to develop a requirements specification and related artifacts. These participants design the software and then undertake a one-day hackathon to prototype features. The requirements that were not implemented then or during a post-conference period are "let out" to the open source community for future development.

Over the course of the RE Conference, participants took part in two full day events (one held with the workshops and one hackathon held in parallel with the main conference) as well as one other track in parallel with conference tracks. Participants were able to pick and choose the RE Cares activities of interest, the website was kept up to date with the latest versions of artifacts so that all could quickly come up to speed.

The result of RE Cares 2018 was a prototype tool called Crier, available heroku it is on here: https://crier.herokuapp.com. The resources developed during RE Cares are available here. https://wsrecares.wixsite.com/recares/resources. The project is hosted on github for open source developers to contribute: https://github.com/RECares/crier

In addition to assisting the stakeholders, RE Cares 2018 resulted in materials used in requirements engineering courses, in at least one PhD thesis, and in at least one RE 2019 research paper. RE Cares 2019 is currently underway. The stakeholder is the Jeju Center for Creative Economy & Innovation (J-CCEI) in South Korea. They seek to assist tourists/residents, particularly the disabled, to determine the routes and transportation to optimally travel to one or many tourist or other locations on the island. The latest website is here: https://wsrecares.wixsite.com/recares2019.

B. Position

The software reliability engineering community can help give back to society by developing a means of doing so as part of the regular ISSRE conference offering.

III. ISSRE CARES

This section discusses ISSRE Cares and how it might be organized. To ease a first offering, we suggest that the idea for ISSRE Cares could follow the RE Cares format.

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A. Champions

The first step is to find a champion who will spearhead the undertaking for the software reliability engineering community. The experience of the RE community was that after a small steering committee was formed, it was very easy to get others to help with the organizing. We had roughly seven steering committee members (with three main workers) and an additional six organizers. We also had two senior advisors who only assisted us with contacts and by answering questions. Once we were at the conference in 2018, we found it extremely easy to get others to join as all were very curious. Once they came in for even a few minutes and saw that we were all working hands on with stakeholders and applying our ideas and research, they wanted to take part too.

B. Stakeholders

If the RE Cares model is followed for ISSRE Cares, a long lead item is to identify a stakeholder in the locale of the conference. We began this one year prior to each conference. This should not be difficult, however. A quick Google search for 'social good Berlin non profit' yielded a number of nonprofits working there as shown in Fig. 1. Any of these organizations could potentially have served as stakeholders, had ISSRE Cares been run this year.

C. Organization

ISSRE Cares could build on existing workshops or sub committees in the conference organization hierarchy. Participation may be encouraged by identifying Principal Investigators (PIs) with grants from the National Science Foundation (NSF) or other agencies who require broader impact. These PIs could use ISSRE Cares to apply their research while also embracing the funding agency mandates.

1) Data Science for Social Good Berlin

2) Psychosocial Counselling Centre for Cancer Patients and Their Families e.V.

3) mob e.V. Making homeless people mobile (mob)

4) Charitree

The Charitree platform showcases projects in Berlin which provide innovative, sustainable solutions to help integrate refugees in our society.

Fig. 1. Possible stakeholders for ISSRE Cares in Berlin.

D. Logistics

Prior to the conference, the stakeholder must be identified along with their need, which should fall within the scope of ISSRE. e.g., an application that needs bug review? An application that needs debugging? An application that needs testing? An application that needs performance analysis? The identified application should be evaluated for suitability for the timeframe of the work, the skills of the participants (many are students), and any other logistical concerns such as intellectual property, copyright, programming language and platform. The stakeholder's need is advertised on the event website to recruit participants. Mailing lists, Twitter, and other social media are also used to attract participants.

The activities for ISSRE Cares must be planned, such as working with the stakeholders in a one-day event to understand their need and the application itself. For example, if the stakeholder's need is to find bugs with software testing, the activities could include understanding how the stakeholders use the application (elicit the operational profile), reviewing the specific bugs that need to be addressed (if any), experimenting with the application to make sure the participants can test the application. This could be followed by a track during ISSRE where the stakeholders again introduce themselves and their needs and new participants join ISSRE Cares. That afternoon a breakout session could be held to allow researchers to discuss possible techniques to be applied (though some of this should be planned ahead of time). Depending on the stakeholder's need, some activities may require substantial effort to conduct and thus need to be planned ahead of time. In this case, the participants are expected to communicate with the stakeholders remotely to obtain information to facilitate on-site activities. Part of this advance planning will be to elucidate information that can be used to build the reliability model.

An all-day 'testathon' could then be held (if the stakeholder's need is testing an application) in parallel with ISSRE tracks, where at least some students and one organizer are there all day (and others can come and go). The participants may work with the stakeholders to perform actual testing activities. The participants can be separated in groups to complete the activities. For example, if the stakeholder is concerned with creating test cases for detecting security bugs in an Android app, there can be two groups with one group working on random testing and the other using automated security testing tools (e.g., Dynodroid [3]). Each group will be assigned an expert to lead the activity.

At the closing ceremony of ISSRE, a report could be provided on the outcome. Finally, follow on testing could occur after ISSRE and artifacts could be made available on the website as well as collecting feedback on the experience of the stakeholders and organizers and participants to allow improvement for the next offering.

E. Funding

ISSRE Cares will need a funding model, but it need not be complex or expensive. RE Cares runs on the volunteer time of organizers and participants and their payment for a one day workshop. It runs on RE steering committee support in allowing the stakeholders to attend at no cost. The only other expenses have been optional items such as t-shirts, donated by various industry partner organizations.

IV. WHAT IS NEXT?

ISSRE organizers have an opportunity to give back to society by using their skills and energy and techniques to assist an organization in the locale of the conference who is helping society. The next step is to decide to do it and identify a champion. The RE Cares community is happy to assist.

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