Community Research Partnership: A Case Study of San Antonio Research Partnership Portal

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Abstract

Research collaboration between academic researchers from universities, organizations and government local city departments can be tremendously useful to all institutions, but these collaborations involve a wide range of skill sets, making them difficult to establish and manage. For many local government city departments, finding research professionals and collaborators to solve community problems remains a big challenge. The information of research opportunities is either posted on the individual city department website or researchers are approached through a personal relationship with city department officials. As a result, a researcher interested in working with the city department would have to either navigate various websites or try to build a personal contact with city department officials. In this paper, we will look at the relevance of community research partnerships as well as the barriers that prevent them. We will also demonstrate the development of, Research Partnership Portal, a collaborative platform for academic researchers, organizations, and government city departments in San Antonio. This portal will assist academic researchers and organizations in collaborating with government city departments and using current administrative data to produce effective answers to community concerns.

Keywords: Community Research Partnership, Open Source, R&D Partnership Portal, Smart City.

Introduction

Community-based research is a collaborative research partnership approach in which academic researchers, local government, community members, organizational representatives, and others are equally involved in all aspects of the research process, with all partners contributing expertise and sharing policy-making decisions [1, 2]. The goal of community research is to improve knowledge and understanding of a specific phenomenon, as well as to integrate that information into policy or social change actions that benefit community members. Although there have been many advancements in community research over the last several decades, one particular improvement that is required in the area is the need to change the way research is generated and used, rather than methodology or analytical tools. Unfortunately, most community research does not influence policy because it takes too long to conduct, is too expensive, does not apply to a specific context of interest, and is not presented to decision makers in a clear and direct manner. To overcome these challenges, both the producers and potential users of community research must work together [3, 4].

Local governments can give university researchers access to city data, allowing their research to have a broader influence beyond the traditional academic publication, a higher chance of receiving research funding, and a more systematic and deliberate approach to community outreach. The stakeholders in this sort of collaboration partnership can usually no longer afford to engage on ad hoc research initiatives and must instead develop long-term research partnerships based on a shared commitment to generate high-quality research that will be valuable for evidence-based policymaking [5]. However, these collaborations are not as common as they should be since more financial support is needed to initiate and assist these collaborations, more information is required to inform universities and city departments on how to create and maintain these partnerships, and universities must recognize the importance of this work and incentivize and encourage these efforts. The goal should be to foster research that makes a significant contribution to strategic planning, community capacity building, urban planning, placemaking, workforce planning, leadership development, ecological sustainability, and technology use to improve community involvement and service quality.

R&D League is a research and development program initiated by the Office of Innovation, City of San Antonio in a collaboration with University of Texas at San Antonio (UTSA), Southwest Research Institute (SwRI), and United Services Automobile Association (USAA) [6]. The mission of this league is to form cross-sector, multi-disciplinary partnerships to research innovative ideas, support evidence-based policymaking, and pursue the frontier of innovation for San Antonio residents. To facilitate the community research partnership, the R&D League planned to design and develop a centralized platform. The purpose of this initiative is to create an interactive open partnership portal that allows university academic researchers to get more involved in open collaboration initiatives with government city departments, other organizations, universities, and the community. Academic researchers and City officers working in open innovation and community issues are interviewed to learn about their duties, difficulties, and strategies to develop the portal successfully. The interviews yielded valuable information and suggestions that will aid in the creation and implementation of an open collaboration prototype. Academic researchers, city departments, the community, and corporations will be able to communicate and work more efficiently through the planned portal prototype, which will improve community participation, evidence-based policy decision making, and data-driven smart city projects.

The rest of the paper is organized as follows: Section II describes the importance of community research partnership. Section III explains why community-based research partnerships aren't more frequent. Section IV demonstrates the development of the Research Partnership Portal followed by the discussion in Section V. Finally, we conclude the paper in Section VI.

II. The Community Research Partnership

A community research partnership is a collaboration between several participants, each of whom has their own set of goals. We will discuss the importance of community research collaborations for all participants in this section. On one hand, city departments have the benefit of collaborating with academic researchers and organizations. First, many local departments around the country are short on funds while dealing with numbers of community concerns. Due to lower budgets and inadequate staff, research funding is frequently put to the bottom of the priority list, leaving

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many city departments without enough research support. City departments' research teams—if they even exist—have a hard time filling research staff positions due to a lack of funding. This makes producing large-scale research studies extremely challenging that may be used for decision-making for city departments.

Second, city departments collect a lot of information about the community, their programs, and their employees. There is no shortage of data, but there is often a lack of time and resources to conduct in-depth assessments on topics like community growth and persistence, changes in achievement gaps over time for programs, and the short and long-term consequences of programs and interventions. However, they are aware that they require answers to these critical concerns. There is also a lack of time and resources to create, manage, and update an information system that effectively consolidates data from several sources and is set up adequately for extracting data and analysis of the findings.

Finally, city departments require access to research that has been created independently. The public is skeptical of city departments when they publish studies, such as program or project reviews. Positive outcomes or claims of progress are sometimes disregarded or misconstrued. Given the public nature of their job, city agencies must reassure the public that the research they use for decision-making is rigorous and reliable, and independently produced research can be more persuasive. More access to independently produced research, such as that produced by research institutions, is needed for city departments to make more informed decisions.

On the other hand, universities and organizations also need to partner with city departments. First, research institutions and organizations typically have access to a wide range of resources, cutting-edge research methods, and a pool of researchers with relevant experience, but university researchers and organizations require data. Given the sensitive nature of the data and the possibility of identifying individual community members, city departments' data is particularly tough to obtain. As a result, national data sets are frequently utilized by university researchers and organizations. These datasets, while incredibly informative, have several significant flaws. National data sets, for example, cannot be utilized to guide local decisions about specific communities that may have different outcomes depending on the region or context. Figure1 shows the research collaboration model.
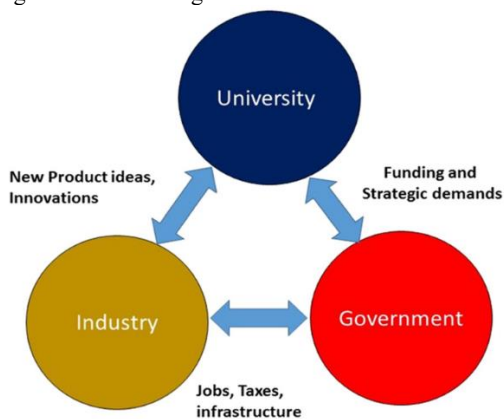

Figure 1: Research Collaboration Model.

Second, despite the fact that research universities and organizations produce high-quality research, its influence on community decision-making is usually minor. Officers in city departments try their hardest to stay up to date on research, but it's absurd to expect them to study the most recent research articles and books when they have such demanding duties as administrators. Furthermore, research grant funding from key funding agencies such as the National Science Foundation (NSF), the Institutes of Educational Sciences (IES), and the United States Department of Energy (DoE), as well as other sources, is becoming increasingly competitive. Solid research partnerships between city departments and universities provide an inventive element that increases researchers' chances of obtaining research funding, and funders have the advantage of knowing that they are not just supporting research person but also assisting to enhance the conditions of community members in ways that are more direct and immediate than what is possible with a traditional research grant.

Lastly, more community outreach is required by academic institutions. Universities are known for forming Liberal Elite communities of elites that insulate themselves from the urgent demands of the greater population, generally from very privileged backgrounds. Many institutions make earnest efforts to engage with the surrounding community, but these are sometimes irregular, volunteer-based initiatives with a power imbalance. Universities must develop stronger links with the community through systematic and established partnerships, with long-term pledges not only to invest their most valuable product in the community but also to listen to the needs of community partners. This form of community outreach has a lot of potential for both the university and its partners to profit from.

III. Why Community Research Partnerships Are Not More Common

There are challenges in every stage of community research partnership [7]. There are at least three major reasons why official city departments–university collaborations aren't more widespread. First, additional money for such endeavors is required. Although participation in these partnerships may boost the likelihood of receiving research funds, more financing is required to establish these partnerships in the first place, as previously stated. Infrastructure costs are explicitly excluded from many financing sources. However, bringing together academics from various institutions, establishing compatible research organizations, and conducting rigorous research projects will require a significant number of resources. If the research is to be self-contained, the city department should not be the source of funding. As a result, there is a critical need for funding to help these partnerships get off the ground.

Second, information on how to construct these partnerships is required. Typically, researchers and administrators are not trained to operate in partnerships. Researchers frequently interact with researchers from similar institutions, but they seldom collaborate with researchers from other universities and organizations. Furthermore, there are significant organizational disparities between universities and city departments, which personnel of these distinct organizations are typically unaware of. The Research Partnership Portal is an effort to bridge these gaps between researchers and policymakers.

Finally, there are few or no incentives for university academics to take steps to ensure that their work is used. Instead, they are mostly rewarded for publishing their work with the most prestigious publishers or in the most cited academic journals, neither of which are frequently read by decision-makers. Basic research is crucial and should be continued. Academic journal publication is equally vital and should be continued, especially because the blind review process encourages authors to enhance and polish their work in ways they might not otherwise. Research

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universities, on the other hand, should acknowledge and encourage attempts to apply research in contexts that could benefit from it, such as community and government agencies. Academics should not aim solely for publication in academic journals; instead, they should take additional steps to guarantee that their research genuinely educates decision-makers.

IV. The Community Research Partnership Portal

The open community research partnership portal is an open-source initiative that supports collaboration between academic researchers and government city departments. In this section, we will describe the development process of the portal. The development process consisted of four key phases: The Project Initiation Phase, Analysis and Design Phase, Prototype Phase, and Feedback Phase.

The partnership portal is a pilot project from R&D League initiative of Office of Innovation, City of San Antonio. The project was initiated during the first quarter of 2021. During the project initiation phase, multiple departments from City of San Antonio were interviewed to identify their need. Also, current partnership platforms were checked to identify the best practices, workflow, and functionalities for the portal. Further, Adobe XD, a powerful user experience design tool is used to design the wireframe of the portal [8]. Academic researchers from UTSA and official from multiple City of San Antonio departments were interviewed to analyze the requirement of a research collaboration portal. Furthermore, an alpha prototype of the portal was developed with basic functionalities based on the analysis. Finally, at the time of feedback phase, previously interviewed academic researchers from UTSA and officials from City of San Antonio were asked for feedback for the alpha prototype of the portal. The recommendations were incorporated into the portal prototype. Then open research opportunities from City of San Antonio were collected and structured to publish in the developed portal. At present, researchers can view all opportunities and check the details to express interest to the point of contact. Also, they can know about us and check FAQ in the about page, as well as contact us through contact form if they have any question in mind.

Tools:

Here is the list of tools used to develop the open community research partnership portal.

1. MySQL

MySQL is a free and open-source Relational Database Management System (RDBMS) under the terms of the GNU public license [9]. It is also available under a variety of proprietary licenses.

2. Airtable

Airtable is a hybrid of spreadsheet-database that has features of a relational database but applied to a spreadsheet [10]. Both free and premium plans are available for Airtable.

3. HTML and CSS

Hyper Text Markup Language (HTML) is the most basic structure of web content to be displayed in a web browser. Cascading Style Sheet (CSS) is style sheet language that is used to describe how HTML elements should be displayed.

4. Python Flask

Flask is a python web framework that is used to develop web applications easily. It is a micro framework and designed to keep the core of the application simple.

Database Structure:

The database has two tables, named Project and Message. The project table stores all information related to a project. The columns name and type of project table are shown in figure 2.

Column	Type
index	int
id	varchar(100)
status	varchar(20)
agency	varchar(100)
opportunity_dose	date
title	longtext
start_date	date
end_date	date
policy_area	longtext
collaboration_type	longtext
summary	longtext
deliverables	longtext
purpose	longtext
expertise	longtext
requirements	longtext
keydates	longtext
data	longtext
prior_research	longtext
funding	longtext
contact_name	varchar(45)
contact_title	varchar(45)
contact_email	varchar(45)
contact_image	varchar(100)
agency_image	varchar(100)

Figure 2: Database structure for 'Project' table.

The message table stores all information send through contact us form. The columns of the message table are shown in figure 3.

Column	Type
id	varchar(100)
name	varchar(45)
email	varchar(45)
subject	varchar(45)
message	longtext

Figure 3: Database structure for 'Message' table

Design:

The partnership portal is designed in such a way that two separate python application can access the same database at the same time. One is the Portal web UI, and the other is the Admin web UI. Figure 4 shows the design of the portal.

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Figure 4: Design of the research partnership portal.

research opportunities that are in progress now. The about page has details about this initiative and some frequently asked question. User can contact us using the form in contact us page. Figure 5 shows the home page of the portal web UI with open opportunities.

Admin Web UI:
The admin web UI will have the access to alter the database. So, the admin web UI will require authentication login credentials. The admin Web UI is designed in a way that, one need not to know the usage of any specific database system. It will work with all database management system. It will have same interface while the backend python application manages all the database queries. Figure 6 shows the homepage of the Admin web UI. Admin web UI has options to insert new research opportunity, edit current research opportunities, as well as to check the message received through contact us form.
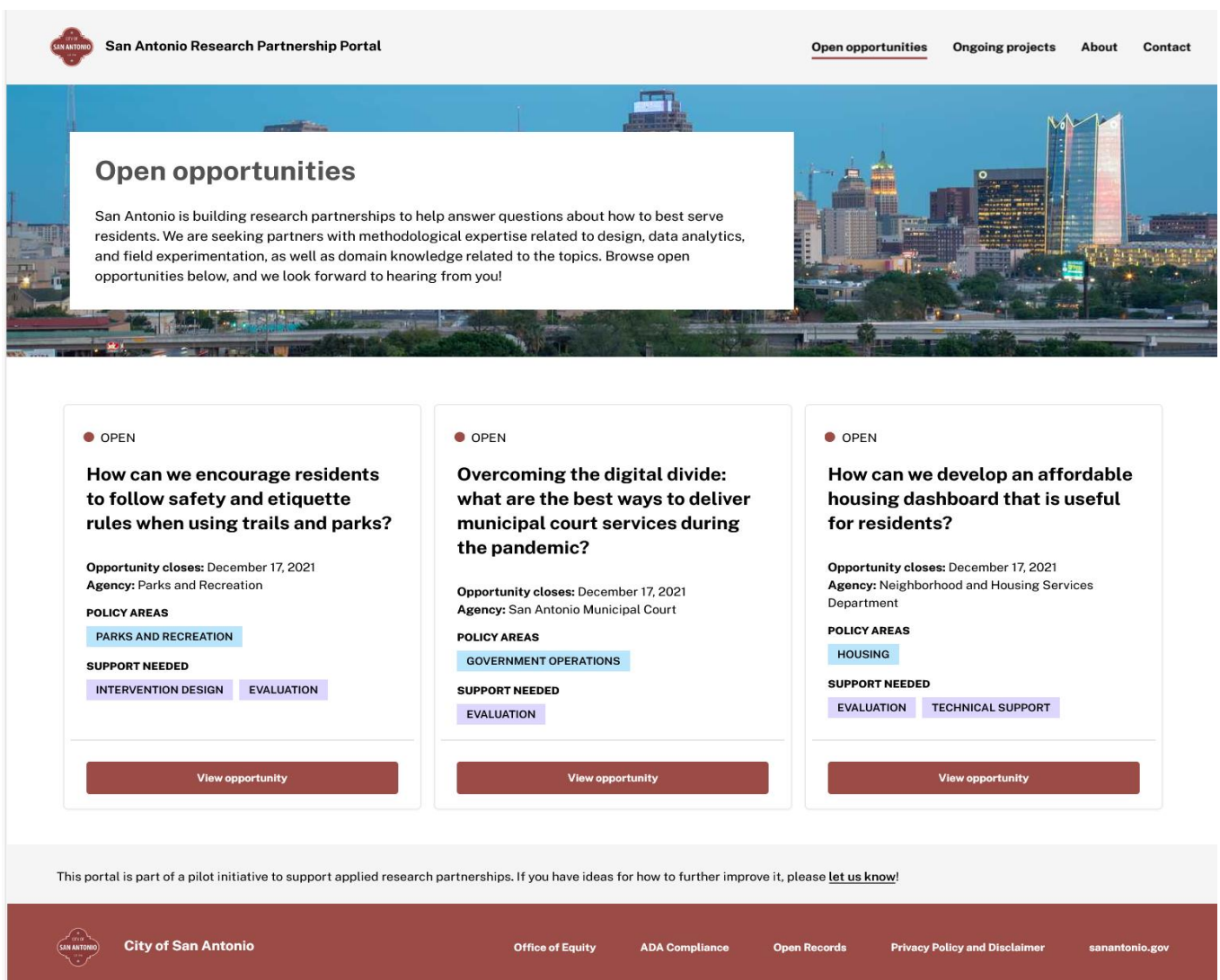
Portal Web UI:
The portal web UI has four web pages. The home page shows all open research opportunities. Ongoing projects page shows the

Figure 5: Open Community Research Partnership Portal (Portal web UI).

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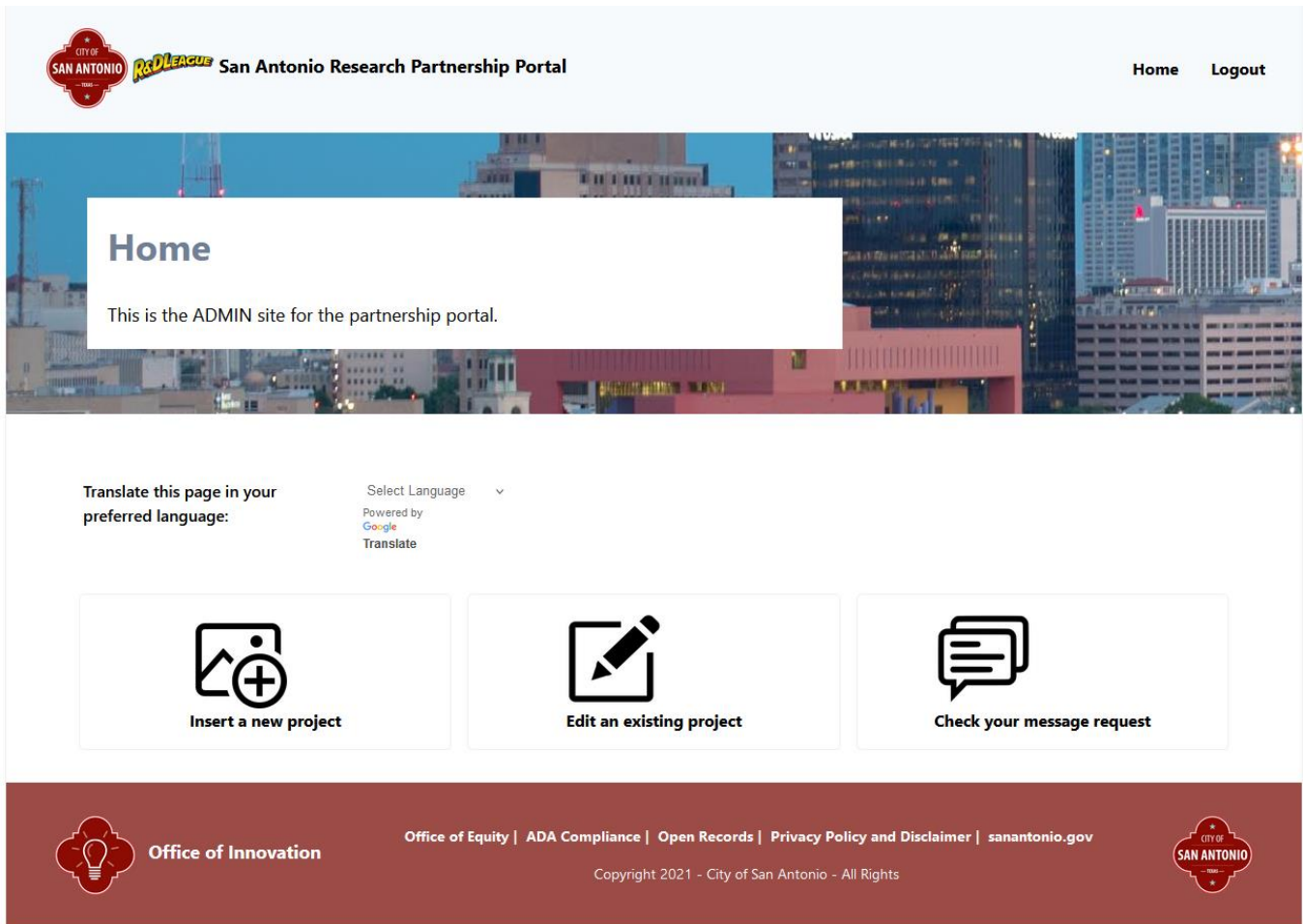Mobile Devices and Multimedia: Enabling Technologies, Algorithms, and Applications 2022

Figure 6: Open Community Research Partnership Portal (Admin web UI).

V. Discussion

Despite having numbers of benefits, open community research partnership portal also has challenges to overcome. In this section we will discuss the benefits and challenges of our developed open community research partnership portal.

Open Source:

Existing and prospective users of open-source software are given licenses that allow them to use, inspect, edit, and distribute modified and unmodified software to others. Many of the innovations we take for granted today would not have developed or would be protected by patent law if it weren't for it. Innovation through collaboration is encouraged by open-source licensing. Governments around the world are rapidly adopting open standards to gain substantial benefits such as interoperability, flexibility, and avoiding vendor lock-in as Open-Source Software adoption continues to grow [11]. Open-Source Software projects that are community-based are typically self-organized and dynamic, with contributions from a wide range of volunteers. The survival, long-term success, and continuity of such community-based open-source software largely depends on providing support to the volunteers and lowering barriers related to the contribution process [12]. The difficulties raised by the nature of such software must be addressed before the users meet the tools in real world situation [13].

Multi-Database Support:

It is a complicated decision for developers to choose correct database management system from over 300 options. Each one of them has its own strengths and weaknesses. Relational Database Management System (RBDMS) stores structured data that are designed for the open community research partnership portal. Currently it supports MySQL and Airtable database system. Other RDBMSs can easily be configured and supported by the portal.

Mutable Configuration:

The developed open community research partnership portal can be configured easily. At present, the portal is configured for Office of Innovation, City of San Antonio. All branding details like logo, URL, portal name, text, images, background can be changed accordingly in the configuration file. The mutable configuration will help local government to adopt the system without worrying about changing any code.

Security Challenges:

The Open Web Application Security Project (OWASP) is an online community that publishes articles, approaches, documents, applications, and technologies in the subject of web application security that are all publicly available [14]. Although the renowned OWASP model provides many best practices for Web applications, it is still insufficient for quantitative evaluation and comparison of

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the security levels of various web applications [15]. The security of developed web portal should be evaluated using a variety of testing techniques [16, 17]. Advanced malware [18, 19] impact on web applications can a good scope of future research.

Multilingual Support:

A web portal that allows users to choose from a variety of languages has a significant competitive advantage. The web portal is more likely to be used by users who can read content in their native language. In fact, if the material was presented in their original language, they felt more trust and confidence [20]. Google Translator has been used in a wide range of fields to automate the translation to different languages [21, 22]. Google Translate API is used in the developed open community research partnership portal to provide multilingual support.

VI. Conclusion and Future Works

Community research partnership is a collaborative approach from government agencies, academic researchers, and research organizations to solve the community challenges. Policy decisions taken based on research evidence have huge impact on the community [23]. However, there are challenges to initiate this type of collaboration. The Partnership Portal is an open-source initiative from the Office of Innovation, City of San Antonio to facilitate the community research partnership. We have developed the primary version of the portal along with many exciting features planned for the future version. Currently, the portal only supports the government agency to publish research opportunities. In future, the academic researchers and research organizations will also be able to publish collaboration proposal. An artificial intelligence system will be developed for matchmaking. A chatbot system could minimize the complexity of information query on the portal [24].

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