Crowd-Sourced Searching for Missing Persons

Jonathan R. Ahnert

Abstract— There are many unsolved missing persons cases, additional volunteer efforts could be hugely beneficial. Getting more volunteers is difficult for existing organizations as some of their volunteering force is dedicated to managing other volunteers. These organizations also can't make use of small contributions from people who aren't willing or capable of spending large amounts of time or traveling substantial distances. I believe that a mobile application and website could allow for users to make small scale contributions to these cases that would result in a large cumulative civic value. I will examine numerous projects and where they have succeeded to better understand some of the existing solutions to gathering large scale involvement. The project will then be detailed based off conclusions from these examples. Research methods best fit for this project will be outlined followed by ethical issues surrounding the project. Finally, I will look at the limitations and advantages of the view I bring to this problem.

Index Terms—cognitive surplus, knowledge community, civic value, collective intelligence

I. INTRODUCTION

Attempts at enabling volunteers or the public to assist in solving missing persons cases have been based on the formation of institutions. This excludes potential volunteers thus reducing the manpower available to assist in the search, or collection of data. So, can a knowledge-based community be created around a central application to gather meaningful information on missing persons cases? Secondary questions regarding validity of information will also be discussed, both with regard to the user's sense that their entry's validity is of value and that the information generated and collected is viewed as valid by law officials and the public at large. The first of these concerns, the view of the user, will be required to create a sustained knowledge community that is able to form consistent values and motives[1]. The second will build on that knowledge community and is needed for civic value to be generated. The two are interdependent as the potential for civic value should inspire those intrinsically motivated by the goal of the application to contribute often enough to create a self-regulating community.

II. BACKGROUND

A. NamUs

One institution that has very similar goals as this project is NamUs (pronounced "name us"). NamUs is a website that allows law officers and the public to freely access databases including missing persons cases as well as unidentified remains. It also includes publicly available search options to allow for comparisons to be made between the two databases. One key element of NamUs is the ability for users to submit cases, which are then reviewed before being placed on the site. NamUs is the great source from which to draw case information, it is also a potential destination for content created within the app through this case submission process. NamUs will also be used to determine which cases qualify as missing persons cases[2].

B. Foldit

Foldit is a perfect example of a crowdsourcing project based around an application that has been quite successful. It's a program in which players can alter 3D protein structures and are scored based on how well their protein performs[3]. What is most interesting is how Foldit gathered its users. It began with members who had installed Rosetta@home, which was a program that used the processing power of your computer to help with the brute force efforts of the Rosetta program in solving protein folding problems. Users could see possible protein formations as screensavers and expressed the desire to change the proteins they were shown. From this desire Foldit was formed. Because those who had installed Rosetta@home had some knowledge of biology they were a prime source for the creation of a knowledge community based around the program of protein folding[4].

C. CART

An institutional knowledge based community has been attempted in the creation of CART (Child Abduction Response Teams) which are "representatives from law enforcement, legal agencies, probation and parole, communications, victim advocates, social service agencies, and emergency management personnel"[5]

who meet and respond to incidents of missing children. The purpose of this group is to formulate a plan and begin to execute that plan. In [1], Shirky would call this "Collective Action" and it is one of the hardest principles to design for within a collective intelligence community. It is so difficult because it requires decisive action, and when these decisions are spread between so many different agents, agreement and a sense of group identity become harder to establish and maintain at a level conducive to action. Because of this, the proposed app will take advantage of contributions from experts in different fields and allow for that knowledge to be shared, but will not focus on creating a group capable of collaborative action, for that is an area that seems to be covered by CART and similar institutions. Instead the App will focus on collecting location based information from users and allowing them to meaningfully share that information while they gain a greater awareness of missing persons in their area.

D. Wiki-Pedia

The methodologies apparent in the creation and development of Wikipedia will be looked to as a primary inspiration. Wikipedia was formed under the idea of creating an encyclopedia that was publicly available for both the purposes of viewing and editing. Critically, it was not started with the intention of becoming the massive information hub it is today; instead it began with a simple, focussed, and humble request. Larry Sanger asked the mailing list of *Nupedia,* the attempt to create an encyclopedia from a collaboration of experts, to "humor" him by spending a few minutes entering or editing an article or two[6]. Because the academics Sanger asked did not have to know everything upfront to create an article, as they could trust the community to expand or edit anything that was missing, *Wikipedia* began accumulating content at an alarming rate. In 6 months it had accumulated nearly 8,000 articles[6]. This was a stark and evident improvement over the prospects of *Nupedia* which moved at a snail's pace with many of the proposed entries indefinitely frozen in the extensive review process they had established. This illustrates both the potential of knowledge based communities over knowledge based institutions, as well as the importance of an effective "promise", being the first part of Shirky's "Promise, Tool, Bargain" structure behind the utilization of cognitive surplus[6].

III. PROMISE

An effective promise should turn potential users into participants by convincing them their involvement is worth the investment of their time and that their contribution will be of value to the collective [6]. However this assurance is not predicated on the promise encapsulating the full potential of the application. This is evident in [1]'s analysis of the operating system Linux, "Linux got to be world-changingly good not by promising to be great...but by getting incrementally better". Linux was initially conceived as a "hobby" project, so it was easy for the creator to express the idea in a way in which the value of someone's contribution was comprehendible, as he did not know how large the scope of Linux would end up being. Striking a balance between creating a promise that imparts the importance of the project without eclipsing the value of a single user's contribution will be crucial to this venture.

My promise will be "I want to make it easier for targeted information to be collected about missing persons cases, and I want your help in making that easier for me and others". This is designed to make the problem seem approachable for an individual, most of whom won't have any current knowledge of missing persons cases. It does not specifically ask for them to contribute information, but to interact with information to narrow it down which will add group value. The promise will get people in the door, but if they are to become members of a community they will have to find the tools made available to them powerful and rewarding enough with regards to the promise.

IV. TOOL AND BARGAIN

This project will culminate in the creation of an app and accompanying website that allow users the ability to access missing persons cases and to make contributions easily for the dual purpose of bettering the information of the community as well as the awareness of the individual. Viewers will access nearby cases and be presented with a map of the subject's last known location as well as some basic information: name, photo, age when lost, projected age, height, weight, eye color, and notes collected on the case; this information will be drawn from NamUs. A heat map will be layered on top of the local area, showing where other users have thought the subject might be, comments on why other users think the subject is or isn't in certain areas will also be accessible through nodes on the map.

When users enter locations in the real world that are areas of interest on a heat map, they will receive a notification which will bring them to the case and show them their position on the map as well as what other users have noted when deciding to include that area in the heat map. The user can then simply add their own comment, adjust the heat map, or remove a comment they feel isn't helpful.

This is meant to create the cases as continually editable documents and the maps as visual wiki pages. Allowing users to remove one another's comments

seems counter-intuitive to collecting and valuing submissions but it is necessary to allow for a self-editing community. Wikipedia uses this methodology to discourage vandalism[6], while maintaining version control of past entries to make sure that vandalism in which valuable content is deleted is always undoable. This project will handle this issue through the website and similar methods.

The Website will have all the cases available on the site, and your ability to access them will not be dependent on your location (as is the case in the app), however you won't be able to edit the maps directly. You will have access to message boards for each case which will include comments that have been made by app-users including those that have been removed by other users. Through the website, active site-users can restore comments made by app-users to the map. You can also comment in the message board for other website users to see. This division is intentionally unintuitive. If a vandal were to add a comment that was of no value, another user could easily remove it. The vandal would find this discouraging and it would be unlikely that they would want to invest the time to log-in to the site to restore their useless comment. However if a vandal removes a valuable comment, site users who are dedicated to pursuing these cases (more active users) will be able to restore the comment once again discouraging the vandal. Alternatively, a vandal who primarily used the site could not edit a large series of maps directly as that is only possible through the use of the app by people in that area. This distinguishes the roles of "creator" and "editor" while still allowing for fluidity and flexibility between them for each user.

Users can still access and edit famous cases and user submitted cases from anywhere, the missing persons cases will be the only ones restricted by location. This geographic restriction on app-based additions to cases does exclude a large user base from a large portion of the cases and also seems to run contrary to the idea of collective intelligence [7]. Even if users are more likely to contribute to local cases, there are still contributions that may exist from users in other areas. While contradictory, having this restriction adds so many valuable elements to the project. There is already the discouragement of vandalism mentioned above, but this restriction also encourages user input and creates a stronger connection between the case and the actual location that is being searched. If users are notified when they are near a case, they feel in some ways like they have already "found" the case, and they have been given an opportunity to contribute in a way not all users can (by directly and dramatically influencing the map). This change will not only be evaluated by those on the website, but it will also determine where other users get

notifications in the future. Making sure this exploration and observation of the area is a rewarding part of the experience will be a key area of testing. Because the user will not always be able to edit these "found" cases (once they leave the area), there will be a heightened weight to their contribution. This will hopefully result in more deliberate and valuable contributions and a greater level of involvement from those surrounding the areas where missing persons cases exist. Users who contribute could then be encouraged to visit the website to see their changes and how people are reacting to them or to see what other cases are nearby.

V. CURRENT INSTITUTIONS

Police force reactions to this project could dramatically affect its success. Because the project is not sanctioned by any official body, it will have to be framed correctly in order for the benefits it has over institutions working with missing persons cases to be highlighted without seeming intrusive. While official reactions are hard to predict, there is definitely a desire for increased community involvement. The International Association of Chiefs of Police (IACP) has said "the potential benefits of utilizing volunteers in missing person cases cannot be overstated"; coupled with the numerous programs focused on getting the word out about missing persons cases, this shows an acknowledgement on behalf of law officials to be able to get the most value from cooperation with the public as possible[5]. The most prevalent of these programs is the America's Missing: Broadcast Emergency Response Alert (AMBER Alert). This program's goal is to notify the entire community to assist in searching for urgent child-abduction cases. The AMBER Alert does this through the voluntary participation from broadcasters, transportation agencies, and the wireless industry. There is also the "Silver Alert" program which is primarily used to find those suffering from Alzheimer's and other illnesses that result in displaced persons[5].

While these organizations have found some success, they invariably compromise on volunteer time and effort for the purpose of maintaining the organizational structure. This can clearly be seen in the guidelines for utilizing volunteers, "their (the volunteers') skills must be harnessed to benefit the agency" and "even if the activity a volunteer is trained to do does not translate into assisting in a missing person investigation, he or she can help maintain agency operational continuity"[5]. These concessions are necessary to maintain the structure of the organization, they often don't have the resources to manage all volunteers and so some must be used to help organize the others. [6] states that when an institution is formed, it's first priority shifts from whatever the reason for which it was originally founded,

to self-preservation. This is clear in the examined excerpts as the purpose of using the volunteers is two-fold: to "benefit the agency" and secondarily to help find missing persons. It is here that space exists for a community generated effort to be more efficient, which would have relatively negligible managerial overhead.

Another optimization made possible through the use of an app as a means of public involvement is the ability to take full advantage of the Power Law Distribution that [6] has found in cases of aggregating social volunteered works. If contributors were ranked in order of the quantity of their contributions, a Power Law Distribution is when a contributor in the nth position has provided 1/nth the amount of work as the most active member. This leads companies to use only the top contributors as employees because they do not have the infrastructure to support all the users especially when each member is adding only a small amount of value. This is also the case when it comes to government organizations using volunteers. They are directed to: write volunteer position descriptions, recruit volunteers, screen recruited volunteers, train volunteers, supervise and evaluate volunteers in the field, and conduct program evaluation [5]. This effectively creates a class of professional volunteers out of those most dedicated to helping. While this works well and allows for a malleable and controlled group of volunteers, it excludes any contribution that someone less invested or with less time or access to transportation might provide. This project will allow such involvement and will focus on encouraging and organizing these contributions in addition to those of much more active members making full use of the spread across the Power Law Distribution.

VI. RESEARCH METHODOLOGY

Research practices that will be conducted prior to the creation of the first version of this project will include interviews with potential participants, law officials (especially those who have worked missing persons cases), and organizational faculty members of missing persons organizations such as NamUs, AMBER Alert, and CART. These interviews will be conducted as dyads whenever possible, and 1 on 1 in all other cases. Dyads are more conducive to prompting discussion, especially when the two interviewees opinions differ on the subjects discussed. These discussions will allow for a more in depth knowledge of the environment around these discussions within the field of police work; I have no prior experience in this field so understanding the context of the opinions presented will be just as important as getting those opinions. Prior to starting the

project, and investigation into available records on past missing persons cases, both solved and unsolved will take place. This will hopefully lead to a better understanding of the effectiveness of some of the tools already being used and where they fall short.

In order to test the effectiveness of this project, it will have explicit goals that can be thoroughly tested. Those goals are: to increase awareness of those who use the application regularly, to collect data that furthers engagement and assists the efforts of law officials, and the formation of a self regulating community capable of collaborative production. Awareness will be tested both for short term memory and long term memory. Test users will be asked what they got from the experience after interacting with the app and if they could remember any information from the cases they observed. Long term memory will be tested on those subjects who remembered case details in the short term test, they will be asked if they remember any of those same details and also tested to see if they can pick out missing persons photos from a line up. The long term test will also be conducted on users tasked with using the app for an extended period of time, for instance over the course of two weeks. Analytics will be collected by the program to track how long consistent users spend within the app, how frequently they use it or receive notifications from it, and where within the app they are spending their time. Successful data collection will be assessed based on how frequently maps are edited and whether cases submitted by users within the app can be passed through NamUs's review process and officially added to the database. Additional qualifications for success in this regard will likely be added through discussions with police officials. Interviews with participants who have used the app for a prolonged period of time to see if they felt their contribution was valued and if they felt a sense of community or connection to other users of the app. Test subjects will be mobile app users who travel on a daily interest and express a desire to find missing persons.

VII. ETHICAL ISSUES

A wealth of ethical issues surround any project based on such a sensitive subject, especially one that is not bound by governmental restrictions as it is a public generated product. The concerns as to the classification of a "missing person" will be handled by NamUs as they will provide the cases to be used in the app. The issue of which cases are shown to the users and in which order will be solved by having it be location based, users will see cases in order of shortest to furthest distance from them. The issue of what to do with the information is still very much an area for further development and is out of scope for this initial pitch. It will likely be determined by police departments and NamUs' reactions

to the project. While it is currently out of scope, it is also an issue that overshadows the entire project, in that the quality of the solution to this issue will determine whether or not the project progresses beyond the initial phases of research.

VIII.   MY PERSPECTIVE

As a digital media major, game designer, and artist, the largest advantage my perspective will come with is a focus on engagement and an understanding of not only the most effective means of motivating and encouraging recipients of my work, but also the benefits and detriments to each aspect of that engagement. This will allow me to develop a stimulating and cohesive experience for the community surrounding this project. However I have little experience in civil service, law enforcement, or missing persons cases. This lack of knowledge can be accounted for through research and relying on information gathered from members who are experts in those fields. I also have yet to design large-scale group projects focused around any sort of community engagement so looking at successful cases will be an integral part of preliminary research.

IX.   CONCLUSION

Potential for making meaningful contributions in efforts to solve missing persons cases exists within the structure of a collective intelligence and this project. Working from, and with, current programs will allow for a credible base in which a community can be developed. The engagement and minimal effort required to enter the community should allow for those only willing to give a few minutes the ability to make a meaningful contribution. This will culminate in a large body of data being collected that would otherwise be ignored. If this data is able to be adequately applied to cases for missing persons, the impact could be hugely beneficial. While this project is not yet ready for implementation, it is based on the current situation surrounding community efforts in missing persons cases and in the ability for collaborative effort to be organized through digital media tools and theories.

REFERENCES

[1]   C. Shirky, *Cognitive Surplus: creativity and generosity in a connected age*, New York, Penguin Press, 2010, pp.1-134.

[2]   A. Spector "About NamUs," National Missing and Unidentified Persons System, Washington, DC, US, 2011. [Online]. Available: http://www.namus.gov/about.htm

[3]   S. Cooper, "The Science Behind Foldit," UW Baker Lab, Seattle,Washington,US,2011.[Online].Available: fold.it/portal/info/about

[4]   J. Keeley, "Protein-folding game taps power of worldwide audience to solve difficult puzzles," Howard Hughes Medical Institute,ChevyChase,MD,US,2010.[Online].Available: http://www.eurekalert.org/pub_releases/2010-08/hhmi-pgt080310.php

[5]   C. Allen *et a,* "Missing Persons: Volunteers Supporting Law Enforcement," Volunteers in Public Service, Alexandria, VA, US,2008.[Online].Available: www.theiacp.org/Portals/0/documents/pdfs/missing-persons.pdf

[6]   C. Shirky, *Here Comes Everybody*, New York, Penguin Press, 2009, pp.1-150.

[7]   P. Levy, "The Four Spaces," in *Colective Intelligence Mankinds Emerging World in Cyberspace*, Cambridge, Perseus Books, 1997, ch.7, pp.131-141.