Socially Relevant Computing Community

Contents

Introduction

Our project Socially Relevant Computing Community aims at making Computer Science as a subject more appealing to students by highlighting its various social aspects. We look to create an introductory course curriculum to be taught at the high school junior, sophomore and undergraduate level along with a Website that caters to the needs of both the students and the industry.

The course will emphasize on "How computer science can be used to solve social problems". The students will learn new technologies through some useful projects which will be inclined towards solving social problems. They will also develop some new projects on the same line.

The students will also be able to use the website as a discussion forum, a place to look for new Ideas and as an interaction medium to people from the Industry. The website is a platform for the socially relevant computing which includes the participants spanning from the university students, entrepreneurs to the people across the community who are facing these problems

The curriculum will also involve frequent visits to community centers, Hospitals and care facilities. These visits will be designed in a way that the students get familiar with the environment and completely understand some of the problems that these places face. They can then come up with ideas and solutions to these problems.

We hope that this will lead to more exploration in the social importance of Computer Science and more and more students feel attracted towards studying Computer Science.

History/Current Solutions/Deficiencies of Current Solutions

Computer Science in general is considered to be very abstract and having no social relevance. Studies have shown that less and less number of students has been taking computer science as a career option.

As per the recent statistics of US government the total number of students opting for computer science for their undergraduate is very less as shown below:
(Source - http://www.nsf.gov/statistics/seind12/c2/c2s2.htm#s3)

Total in S&E field	34%
Engineering	10%
Computer Science	**1.5%**
Biological Sciences	11.6%

This can probably be attributed to the reason that students are unaware of the applications of computer science in socially relevant fields. Students have been attracted towards other fields such as medicine etc, because of their social relevance. On the other hand Computer Science is thought of as a field which is purely technical and the one where the monetary returns are good. In such a situation, it is but natural for the students to not feel motivated towards taking computer science as a major.

Socially Relevant Computing was started by Michael Buckley, SUNY Buffalo, John Nordlinger, Microsoft Research and Devika Subramanian, Rice University in 2008. Efforts were put in to highlight the social impacts of computer science through various projects and activities undertaken.

The Software Engineering course at the University at Buffalo, taught with by Buckley involves students getting into groups to develop solutions to real world problems. Some of the outcomes of this were projects like the DISCO system which helps therapists and teachers to teach choice

making relationships and Firefighter Monitoring System which monitors the location and health of a firefighter during real time situations.

Similar efforts were also carried out at the Rice University under Devika Subramanian, where a "Hurricane risk assessment and evacuation" course was taught and the response of students to which was overwhelming.

Though the efforts being made are appreciable, some concrete steps need to be taken to really attract the students towards Computer Science. One way, to start with, can be introduction of a new full-fledged course which presents Computer Science as a platform to solve problems of social relevance. It will include teaching students the basics of computer science through projects that have dramatic impact on people's lives. The students can also recognize problems and come up with solutions to them. This course will be a next step towards Socially Relevant Computing and that is why we strive to build it.

Objectives and Goals

The following are the main goals and objectives of Socially Relevant Computing.

- The first and foremost is to incorporate social connect in computer science and present it as a cutting-edge technological discipline that empowers students and non-profit organizations to solve problems of that are important to society at large.
- SRC emphasizes the use of computation for solving problems of personal and societal interest to students.
- It offers conceptual and technological tools for solving meaningful, real-world problems.
- The main motive of this project is to help students identify the problems that are socially relevant and they are most passionate about and design and implement a solution using computation.

The next question is how relevant, Social relevant computing, is to our day-to-day life. Here are few examples of the projects implemented which answer the aforementioned question

- At University at Buffalo, students of CS442 came with the idea of UB talker. Their main goal is to give people with voice disability a virtual voice using a commercial grade technology that is affordable.
- Incident Responder Monitoring System: Students at UB in collaboration with NYSTAR, RIT, SPECTRACOM, and SYRACUSE UNIVERSITY are developing a monitoring system that monitors the vital signs of fire fighters and relays back the information to local command center.

Functional Requirements

General Requirements:

- Implement a web based educational portal to reinvigorate students of age ranging from 13 to 18 towards Computer Science, Engineering and Math italicizing Computer Science and Socially relevant problems.
- Incite students in a new area they never possibly recognized earlier, Socially Relevant Computing.
- Provide engaging, interesting, attractive and easy to understand education content and projects.
- An interface for the community who are facing the problem to come and discuss the problem and the possible solutions.
- A link between different universities of similar interest and objective.
- Provide computer science as a cutting-edge technological discipline that empowers students to solve problems of personal interest (socially relevant with a "little s"), as well as problems that are important to society at large (socially relevant with a "capital s") [1].
- Induce companies and organizations to solve the problems by sponsoring the projects which in turn adds to their Corporate Social Responsibility (CSR).

Projects:

- Website offers two kinds of projects practice and real.
- Practice projects are mini projects which will help the students to get a good grip on the technical skills. Real projects are the one posted by people.
- Practice projects should involve projects on robotics, designing small GUI, designing small games. These projects shall focus on many basic aspects of object oriented programming.

- The website will include few materials and small quizzes on those materials which will help students to measure themselves.
- Interactive online educational games to help team building.
- Tutorials and videos to solve student academic queries.

Website:

1. <u>Pages/Forums</u>:
   Separate webpages for anonymous, registered users and students.
   There will be two forums, 1 for student, 1 general. On general forum both students and people can comment but students' forum is accessible to only mentors and students.
   Sponsors can register and comment on both student and common page.
   There should be a small developer blog which will help to discuss issues related to website.
   Website will have a backend Admin screen for maintaining the website.

2. <u>Google custom search:</u>
   A custom Google search facility to help search the content on the main website as well as the related blogs.

3. <u>Gmail/Google docs/Google maps integration:</u>
   Traditional Google kit integration which will integrate all the social networking features to the website. Each registered user will have his own account with features such as Gmail, Google docs. Google maps on the website helps to locate the project related locations on the go.

4. <u>Google calendar:</u>
   A separate Google calendars screen which can be used to schedule meetings with the sponsors and the organizations who are offering the projects.

5. Android/iOS Integration:
The webpages are required to properly fit on mobile devices, working on iOS and android platforms. All the features of the website will have equivalent applications to the mobile environment.

6. Live chat
The website will have different chat interfaces like GTalk, Facebook, Whatsapp for quick communication between students. A common live chat facility will be available between students, mentors and organizations to quickly contact for minute discussions. A video chat facility for the project teams to discuss on the problems.

7. Blog/mini site design center:
This feature lets students, companies and organizations of a specific project have a separate discussion board in the form of a sub-domain blog. Even after the completion of the projects the blogs can be used for maintenance of the project in future.

8. Share:
The users can share a post of the website through Facebook, twitter sharing feature. The users can also share the link by sending through mail to the specific friends.

9. Auto-Response:
An auto response mail sender feature when user gets a comment or like on the post or project. Default auto mail response feature on registration.

10. Font enhancing facility
User can maximize/minimize the fonts on the web pages by a simple interface. This feature is useful for the visually impaired people so that they can maximize the font size on the website.

11. <u>Multiple lingual:</u>

The website will be displayed in at least 3 different languages. With a single button click on the main page the language of the complete website will be changed.

12. <u>Donate:</u>

A page for the users who would want to donate to the projects. This page will have co-ordination with PayPal for transactions.

13. <u>Miscellaneous:</u>

Security image integration to avoid spam on registration page. Reduce possibility of cyber bullying in the application. A RSS/feed feature for the users to track the website activities. Tags feature so that relevant posts can have similar tags and users can search those posts on the basis of these tags.

The figure below shows the high level overview of all the users and functionalities of the SRCC project in the form of Use Case Diagram:

uc Maintenance

SRCC

Projects

Curriculum

Student

Community

University

Companies

«flow»

«flow»
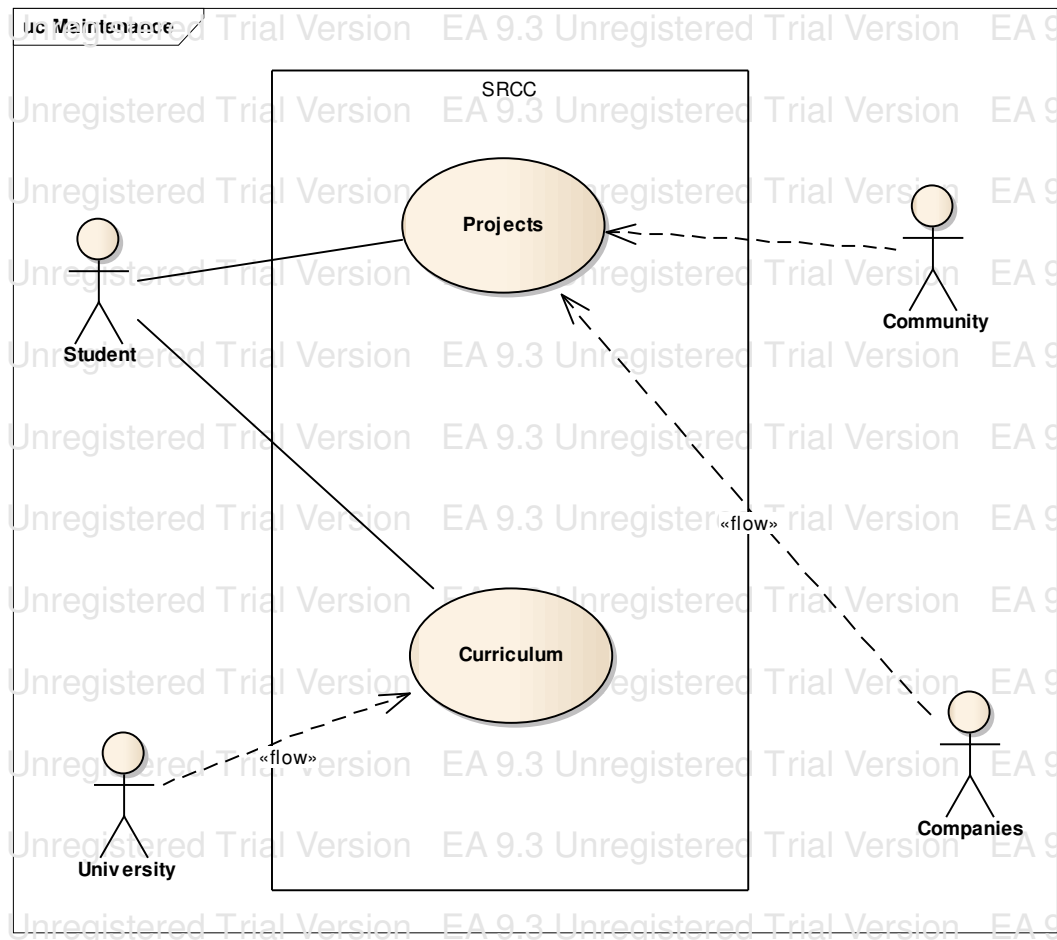
User Profiles

Students: Students will be the driving force of the community, they will help in keeping the community lively by continuously discussing solutions and sharing their ideas for the mentioned problems. The students from high school junior to sophomore year and undergraduate students are the main user of the website.

Mentors/ Professors: The mentors will be continuously monitoring the website to help the students in their desired area of interest. The mentors will engage themselves in developing interesting, attractive, and easy to understand course curriculum for the students. Mentors are also available to solve any student queries.

Partner Institutions/Organizations offering the curriculum: The universities all around the world with similar interest will come forward and help in developing the curriculum by sharing their ideas and experiences. The students from other colleges also can contribute to the projects.

Organizations willing to sponsor: This will include all the organizations who are willing to contribute to the cause of socially relevant computing. The organizations will search relevant projects and students on the website, monitor students profile and their budget with the project's so that they can decide whether to sponsor the project or not.

Normal People: These are the general people who are facing the problem, and will be benefited with the help of the efforts of the students working on the desired problem. This website will also help the teachers and parents of those children who are challenged.

Development Team: This includes an Administrator and a group of people. Administrator will be monitoring the website, and controls the login information. He is also responsible for contacting the sponsors and will control the team activities. The team will continuously update the website about the latest happenings and also responsible for the future developments.

Proposed Solution

The proposed solution is a full-scale website having all necessary components to successfully promote socially relevant computing. This Website should offer opportunities to demonstrate that computer science is a mainstream endeavor and that it offers conceptual and technological tools for solving meaningful, real-world problems. The proposed solution emphasizes the use of computation for solving problems of personal and societal interest to students. It provides online platform where communities seeking solutions to their problems meet students and Universities interested in solving them. It also provides a platform for obtaining funding to them through various companies. This website provides necessary support to students to help them complete the projects like assigning them mentors, scheduling meetings with the clients and providing various computer science courses and practice projects to enhance their technical skills .The website should present different interfaces to different people(communities, students, sponsors). For example, the communities should see interface that help them clearly express their problems. The sponsors should see the benefits and costs of the projects and how they makes a difference to the community.

Our project creates a lively environment by introducing discussion boards on the vital topics and develops insight over the problems, rather than just a website containing full of pages and links, o. It should have a convenient framework to upload and download documents, create a discussion and can be easily deployed in the university server .The sponsors can track the progress of their project and how their money is being spent. The communities can also see how their problem is being solved and give suggestions to improve them. It should also contain various resources for developing their interpersonal skills such as online educational games to build their team skills .Due to tremendous increase in usage of smart phones this website has also an equivalent android/iPhone app. The website will have a powerful user management identifying students, communities and sponsors and providing relevant features to them. . The project should be platform independent and

should run on all kinds of end systems to be accessible to large number of people. For this project to work, the website should attract large number of students, communities and companies to successfully promote socially relevant computing and therefore it should be integrated with facebook, twitter and other social networking sites.

In a nutshell, we propose positioning computer science to teenagers this way: you can make the world a better place ("Socially relevant"), have more fun and be cooler while doing it ("socially relevant"), and be technical marvels with the latest software and applications.

Constraints

- The cost of developing the user interface for this website is very less, almost zero. But the website is to be deployed on a web server, which requires some monetary input. As the project grows, we need more sophisticated webservers which have more storage space and faster access which may further increase the budget.

- This website is free for everyone, no student or organization using it is required to pay a membership fee etc. So the cost of maintaining it should be borne by the university or corporate companies.

- The primary goal of this project is to provide corporates, organizations and students a common platform to interact with each other. It is a non-profit initiative aimed to serve the society. Corporate Advertisements, though they help in earning some revenue to maintain the website, are not allowed at any cost.

- This website is easy to use, so no technical knowledge is required to use it. However, for developing the website and deploying it, a considerable level of technical expertise is required.

- It takes time for this project to embed deeply into the existing computer science which is full of theorems, data and coding.

- Developing the course curriculum, bringing together everyone on a common platform may be time taking.

Future Plans and Expandability

With the continued interest of students it will be easy to bring the sponsors for different projects. The more the funds the more well the projects will be. The excess funds can be used for the projects which have less or no funding. This in turn will motivate more students to take up the course. For sustaining the interest of students, they can present their work at different National and International level technical events.

As of now the project currently focuses on the students, universities and people who are only in the Eastern part of USA. This project can be extended at a global level by making it reachable to all the parts of the world. As it already has a web presence it should not take much time for it to reach different parts of the world. For this we need more and more students and organizations to take part. As the number of students and universities increase the awareness about the website increases which will bring in more projects, sponsors and hence global visibility.

As the project grows it can be introduced as an extra course in as many schools as possible. Once it flourishes in USA, mentors and student can go to different parts of the world and make one or two days workshops or hands on experience to the students and teachers of schools and in turn help them understand the importance of Computer Science in today's world through real world examples. Once the workshop is over the interest in all the students and institutions should sustain. For this, there should be a proper follow up with the institutions to know whether they need any kind of help.

Finally the mission is to make the world a better place to live with all the available technologies and innovation, which can be achieved easily by the students.

Reference:
[1] - http://www.cs.rice.edu/~devika/SIGCSEFinal.pdf