Is Green Computing a Social Software Engineering Domain?

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Abstract

Reusing of information technological product is called Green Computing. Recycling plays an important role in Green Computing. In generally, Green Computing is the deployment, optimization, virtualization and energy management and more over resource allocation. This includes software, hardware, applications, utilities, drivers and so on and can be treated as model or approach foe eco-friendly information technology utilization. Cloud Technology and Green Computing are related with Cloud Computing. To prepare easy and effective Information Systems virtualization is the main fundamentals of Cloud Computing. Use of minimum computers and machine are recommended which provide centralized service. The aim of Green Computing may be fulfill by appropriate Cloud Computing utilization directly and indirectly. Apart from dealing with developing programmes or systems it also helps in developing a big spectrum of related components, which centralize software. Software Engineering is a common names in today's information age. A list of instruction or data loaded into the computer to do certain activities in the computer is recognized as software. Software is a list of instruction or programme to carry out function in the computer and here software engineering play an important role for the social and cultural development and for designing and development of systems. Machine and this trend is increasing rapidly. This paper is illustrated several aspects of Software Engineering including its basic as well as fundamentals and some concern deals with Software Engineering in generally as well as in the perspective of social and community product development. Paper is expressed how Green Computing is an important socially touched domain and more clearly a social software engineering field.

Keywords: Green computing, ICT, energy informatics, social sciences, social engineering, social technologies, energy consumption, interdisciplinary social science

Green Computing (GC) and similar technologies refers to Green user, Green disposal, modeling, Green Product development and so on. This is the modeling and designing of electronic gadgets and their implementation. GC always prefers in use of efficient and effective electronic gadget which have lesser or no impact on the environment, directly[05],[08]. Green Information Technology concept emerged during 1980's and today Green Computing treated healthy domain and discipline. Energy consumption, material cycling, power management are some key features and requirement in GC and Technology practice. GC is deals with wide range of products apart from computing and computers[01], [04].

The function and integration of Software Engineering and development principles for the society or community is known as Social Software Engineering. It is the means to produce design, development in addition to management and implementation of software, application, system and even hardware components for community user directly and indirectly. It is very tough to develop software as per client need in the first initiative because Software Engineering basically consists with so many problem and challenges. Social Software Engineering plays an important role in terms of community and social development; It depends upon some challenges on scale, quality and productivity, consistency and repeatability and changes. The system and application development is directly and indirectly, for the communities are the main operational area for some organization in recent days [03], [06].

Green Computing

Green Computing is one of the main study and practice field and also a significant schedule for designing as well as development of computing devices and computing system; as it is based upon the theory of power management principle. Eco friendly computing platform as well as architecture creation is the main responsibility of Green Computing which reduces less harmful chemical CO_2 and other injurious and harmful gas with such as CFC. It minimizing use of lead and also concerned the area for Green Computing. As computer manufactured with several kind of chemical and therefore IT manufacturers are working on designing of faster computers and systems with minimum energy and minimum harmful chemical output [02], [07].

Green Computing and Green Information Technology is similar with each other. But it is bigger and broader and take care about the design and development of database system and machine, web system, machine multimedia system as well as machine, communication having less power and smallest amount of harmfulness towards environment. Implementation of whole computing, hardware, software, networking system and multimedia system in the organizations and institutions for power management as well as releasing less destructive and harmful chemical and gas are main concerning /involvement area for Green IT. Green Information Technology also helps to build sustainable Environment towards better organizational practice and obviously in a roundabout way the societal need [06], [11].

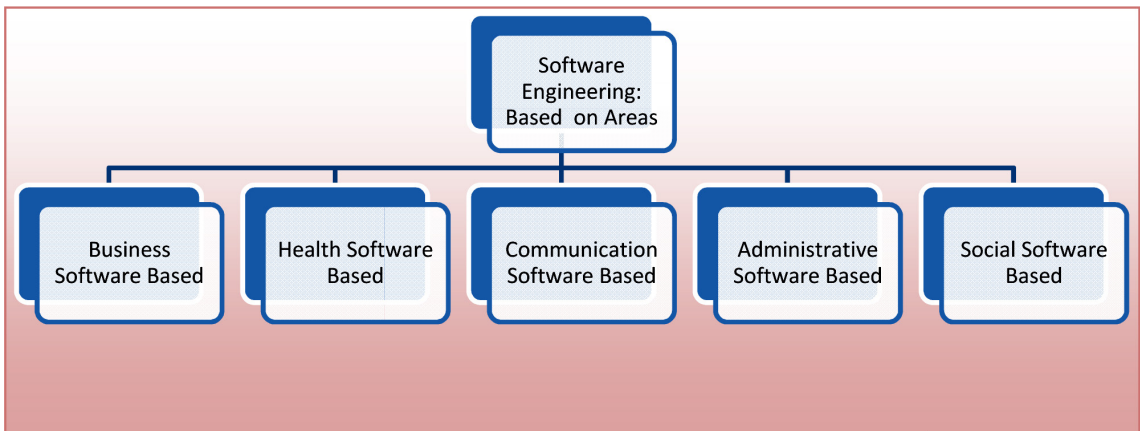## Software Engineering, Social Software Engineering and Green Computing

Green Computing, Green IT and Green Information Science etc are co-related and thus noteworthy towards design as well as growth of Green and Eco friendly Information Infrastructure building. Green Technology is the up-and-coming field of research and thus universities and research centers, globally using some strategic planning towards optimal energy management. Here importantly creation of information in

addition to computing unit which releases less harmful chemical and CO_2, with ultimately reflects global temperature and reason for the global warming, creates floods, drought and also increases sea level and etc.

Computing section and information system unit of an organization normally needs Green Computing, Green Information Technology. And here Green Information Science may deemed as broad area and applicable for whole IT machine and hardware up to date and less energy consumption. Therefore, Green Computing and interrelated professionals normally engaged in healthy IT Infrastructure building depending upon need, so that IT equipments becomes more power consuming [9].

The main objective of Green Computing is to design as well as development of hardware, software and display systems which principally alarmed with the less energy consumed computer and build with less harmful chemical. Green IT is enthusiastic to wider technology and device and includes groundwork of database, networking, communication technology, web technology etc based on eco-friendly modeling, principle as well as algorithm. Hence preparations as well as building of communication system including router, switches, server principle etc are emphasized on less power consumption and moreover it should be less harmful chemical based [10].

Software development not only focuses on budding programmes, but also developing of a wide spectrum of related software components. According to IEEE 'software is a collection of computer programmes, procedure, rules and associated documents and data'. In large and complex systems several problems are occurred. With healthy software engineering principles proper Information infrastructure can be built upon. This structure is managed by the embedded and sophisticated software development process or system where software design, development and maintenance etc are possible is software engineering[13],[14]. It depends upon on the characteristics as well as may be classified and depicted in Fig. 1.

Fig. 1: Software Engineering based on domain

Software Engineering (SE) principle may be classified depending upon application and development of software and programmes. In Software Engineering domain social software engineering are concern —

◆ Software process in addition to models.

◆ Software configuration management is a kind of process.

◆ SE is deals with the Software requirement analysis, functional specification etc.

- ◆ Metric and Quality of products, services are the core concern of SE.
- ◆ Software architecture and design are important matters that need to take care.
- ◆ Coding, testing and default analysis and including prevention etc are important task.

Insight into the Thought

Social Software Engineering is a branch of Software Engineering which is mainly dedicated to social and community aspects of software development as well as programming (According to Wikipedia[14]). It is very much hard to describe Social Software Engineering it is actually a design and development of application as well as system and computing mostly for the societal purpose. Though, it may also for the community or by the community or society or NGO) for dealing big and wider society.
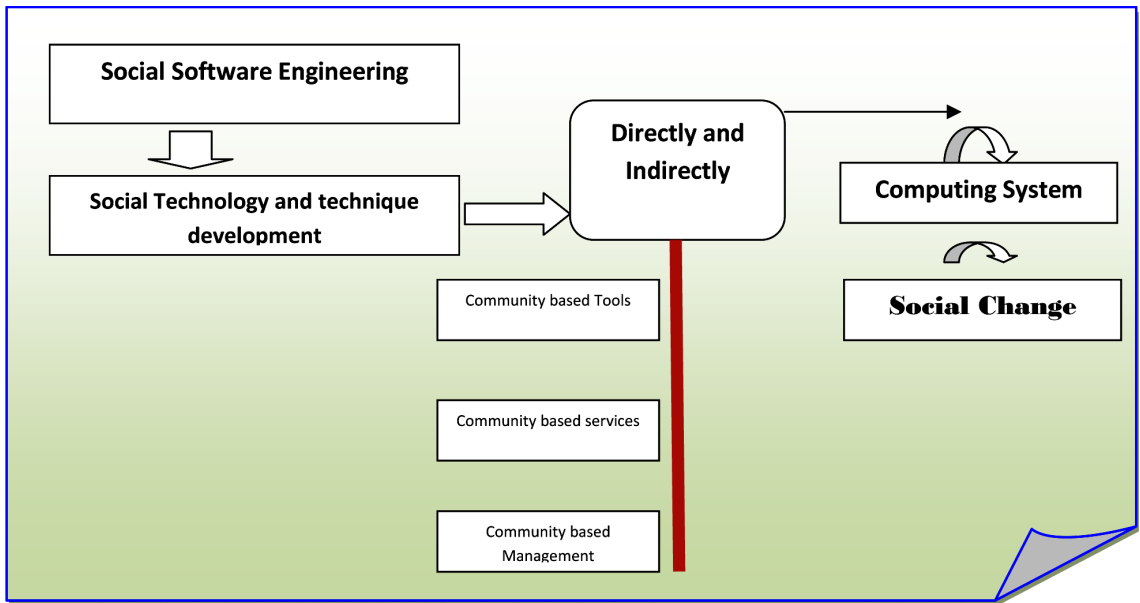

Fig. 2: Depicted ultimate aim of Social Software Engineering for social changes

In the 1st International workshop on Social Software Engineering and Application *[SoSEA]* held in 2008 proposed the following characteristics and features of SSE—

Centered in Community Affairs

This kind of approach is specifically for dealing software, application, programmes and complete systems are when produced, consumed for and by community than that of individual.

Centered in Collaborative/ Collective Nature

This SSE mainly deals with the collective efforts and here many people engaged for healthy as well as complicated and sophisticated software development. Hence it is the exploiting and collaborative, collective capacity of human beings.

5.3 Centered in Companionship Matters

Aspects and matters of the relationship which is helpful for the explicit the various associations among people.
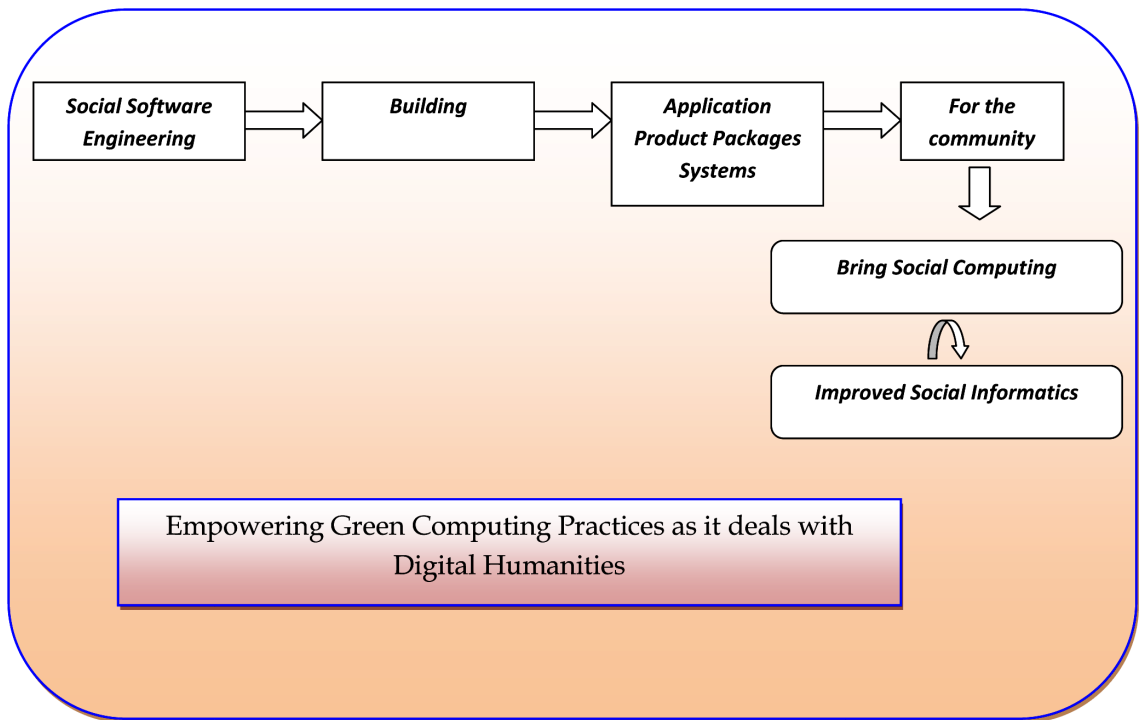
Fig. 3: Depicted role of Social Software Engineering for Social Computing practices

Centered in Human/ Social Activities

In this approach common people or society; directly or indirectly are associated. In this approach, software and application is specially intended intentionally to support social or human activities and important for addressing common problem.

Centered in Social Inclusion

Important feature of Social Software Engineering is software should enable social inclusion enforcing links and trust in communities (according to SoSEA, 2008) and few aspects includes the Design as well as Development of Social Software Engineering deals with many challenges in terms of scale [13],[14]. Scale is an important factor for the large scale system. Some different set of methods are required in Large Scale System compared to small system. Some contemporary issues in this field is including (but not limited to):

- ◆ It is tough to work with thousands of line and importantly Large scale requires needs sophisticated methods, procedures as well as tools.

- Highly architected method is also important in this segment.

- The scales are also changing depending upon project size.

- Methods of small scale are not able for large scale, in many cases.

- In this case and approaches needs both engineering and management skills.

Methods and Way Vis-à-Vis Eco Social Software Engineering Practice

Green Computing is deals with many methods and models and that includes (but not limited to the)—

- Energy Consumption.

- Virtualization Promotion.

- Material Recycling.

- Ergonomics.

- Power Management.

- Using Hazard free Material.

- Deployment Optimization.

Now let's talk about some methods and way about GC briefly in the following points [12],[15]—

Deployment Optimization: This method mainly treats with better energy efficient algorithm development and design. Here reduction and minimizes of hardware, software, technological cost etc. are also important. Computing machinery designing as well as development of energy consumed intelligent algorithm etc are also very much important here.

Power Management: The main tool of this method is Centralized Operating Systems; it is responsible for the saving power for implementation Liquid Crystal Display, Low Powered Centralized Graphic Card.

Material Recycling: Recycle as well as reuse of computing products such as computers, printers, networking devices etc are responsible with this approach. Here Routers, switches etc. needs material recycling by using several methods.

Tele Conferencing: Virtual meeting is possible with tele-conferencing. Thus from end to end some central devices conference and seminar etc knowledge event etc is possible with this.

Virtualization: Creating centralizing computing services to so many users is termed as Virtualization. Here, centralized machine basically serve many points/ organizations and computing unit/s. Hence it helps in reduction of separate and each computing centre in the organization and institutions.

Thus it is important to note that Green Computing is promoting Social Computing domain in many context. Social Software Engineering is the practice of software engineering in social and community context *and* here producing and creating new software and tools with environmental practices no doubt supporting green practices.

Conclusion

Green computing has definitely come a long way. Overall the effects of green computing with its

benefits, practicality, and uses are all positives. All which are great for not only the individual, but also all around the globe. By going "green" in technology we help promote an eco-friendly and cleaner environment, along with our own benefits by reducing costs, conserving energy, cutting down on waste and greenhouse gases. With so many new innovations coming along in regards of preserving the environment, it is safe to say that green computing is a great development. Social Software Engineering is promoting software and similar application for and by the society. Green Computing is for humanity and solid human development in many contexts and thus there are lots of potentialities to do work on the areas of social software engineering matters in Green Computing facets.

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