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CGNet: An Alternate Information Architecture for Chhattisgarh

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Abstract

In any information sharing society, the value of communication networks is immense. These networks, often perceived to be limited to the physical data transfer mechanisms that enable communication, can be extended to create stronger hybrid networks that facilitate more efficient and wide ranging communication.

CGNet is a group of individuals working in Chhattisgarh to enable community participation in the development of the state by empowering the community through information.

CGNet aims to define an alternate information architecture incorporating alternate network models and swarm intelligence concepts that can enable such a community to perform its tasks with efficiency and celerity.

Problem Definition

Choice of Chhattisgarh as the target region for the project

The state of Chhattisgarh in Central India was formed when sixteen districts of the former Madhya Pradesh were given separate state status. Chhattisgarh has a population of 20.8 million, over one third of which is tribal.

- Chhattisgarh has always had a strong rural tradition, with only 20% of the population being in urban centers.
- There has been a traditional concept of a gram sabha, which is a forum for members of the community to discuss issues and voice concerns relating to the community. The gram sabha usually meets at a Panchayat Ghar, which is like a resource center and forum for the entire community.
- Hindi and Chhattisgarhi being the predominant languages in the region, any medium of communication should therefore begin with those languages in order to be most effective.
- The literacy rate in Chhattisgarh is about 65%. Rural literacy is about 61% as opposed to 81% in the urban centers. Despite this, the number of literate people in rural areas is greater and their medium of education is Hindi.

These characteristics are shared by many communities across the developing world. Once the methods have been successfully implemented, they can be expanded outwards to benefit other communities and the central location of Chhattisgarh makes it an ideal region for a project of this nature.

Need for an alternate information architecture

In order to define the need for an alternate information architecture, the following need to be considered:

- Is the architecture allowing information to be gathered from all relevant areas of community interest with appropriate emphasis?
- Is the architecture conducive to efficient dissemination of information to all members of the community, in a manner that empowers them to use it to maximum benefit?
- Is the architecture suitably pervasive in terms of connectivity, or are certain members of the community marginalized in order to conform to standards?
- Does the architecture sustain itself, or does it require external inputs, either monetary or regulatory, for it to run?
- Is the architecture scalable in the event of an increase in the size of the community?

- Is the architecture robust and reliable enough to be considered a serious aid to development or is it a drain on community resources?

Analysis of Existing Architecture

We can now analyze the existing architecture based on the following metrics

Relevance of disseminated information to the community

The current media coverage of community issues is pitiable in Chhattisgarh. A recent survey revealed the following:

- Coverage of crime stories was very high
- Articles and editorials seldom delve into social issues
- Politicization of social issues dilutes and frequently misdirects their impact on the community.
- Environmental issues are rapidly escalating in the state, but there are few articles in the press related to the subject
- The disparity between private and public education is resulting in the creation of class differences
- Analysis of health services in the area is particularly poor
- Agriculture related news is rarely published

That which sells as opposed to that which has meaning dominates broadcasted information.

Methods of Information gathering

The major part of information gathering in Chhattisgarh is at this time done either by professional newsgathering agencies or private organizations, which may or may not share such information, based on commercial implications.

News and other information, which has specific relevance to the community is not collected efficiently.

In addition to this, there is very little scope for cross checking of the information collected.

Method of dissemination of information to the community

The State government in Chhattisgarh has a number of ambitious information technology projects in the pipeline. However, these projects are still in the experimental stage and have not yet reached their full potential.

The ChiPS society, which describes itself as the prime mover for IT and Biotechnology in the state is working with most of these projects.

Despite optimistic possibilities, these projects are yet to achieve their full potential.

They would also require increased community participation for their positive effects on the state to be maximized, which would require community access to relevant information.

Communication infrastructure

Despite efforts by the Chhattisgarh government and other organizations over the last few years, last mile connectivity still remains an issue in the state.

Large sections of the community are cut off from broadcast media due to lack of infrastructure.

The current Internet penetration is limited to the densely populated areas of the state. Rural and semi-urban areas are still lagging on the connectivity front.

Radio, which could prove to be an effective method of communication in these circumstances, is inaccessible to the general public, since private use of radio waves remains a legislative issue.

Information therefore filters down slowly at best to the community members in areas with limited connectivity.

The government of Chhattisgarh has a project in the pipeline to improve connectivity in the state, using a hybrid of leased lines, VSAT and WiMax technology to connect the rural areas.

However, this project is in the planning stage and still a long way from becoming usable in the state.

Effectiveness of architecture as an aid to development

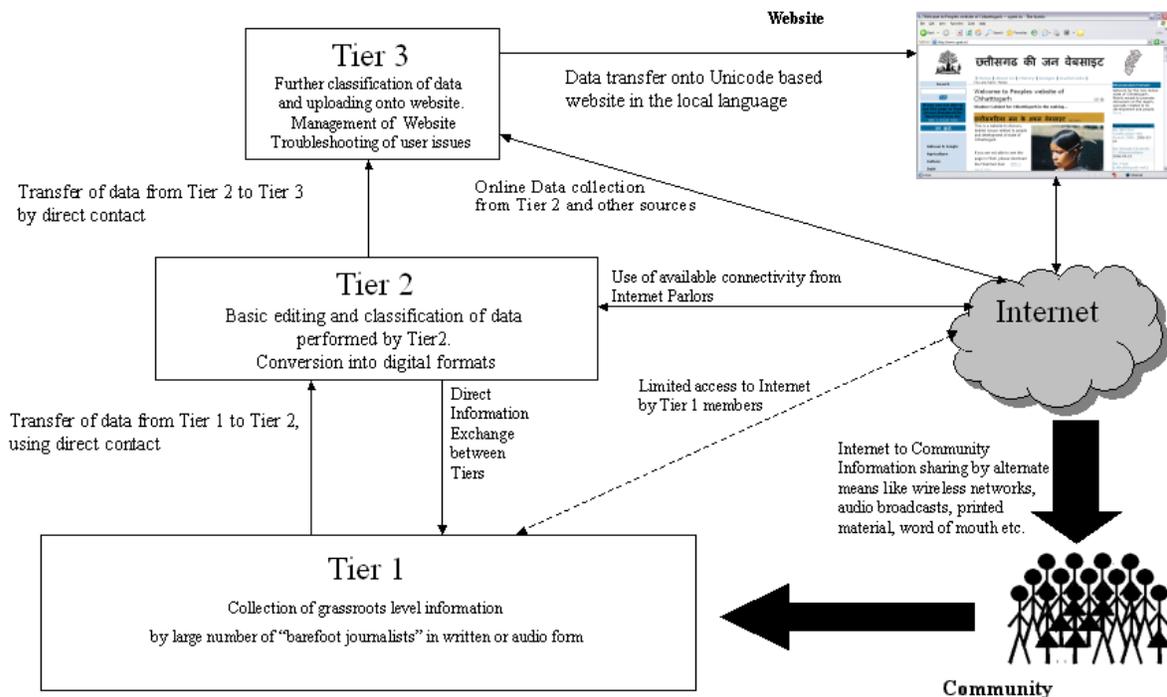
Since most of the information that the community can access is not relevant to development issues, the effectiveness and conduciveness of the existing architecture to community participation in development is yet to begin.

CGNet proposes to address these concerns of relevance and sustainability of an information architecture, with a view to kickoff participation and with robust framework which will empower the community with information and encourage participation in development

Solution Description

CGNet proposes to create an information architecture, which would complement the existing communication system and provide a means for the community to determine which information they would find relevant, using the following concepts

Layering



The structure of the architecture is intended to be pyramidal in three tiers.

Tier 1, Information Gathering

Grassroots level information gathering, by “barefoot journalists”, who would be given very fundamental training in information collection methods.

The data at this stage could be in audio or, if possible, written form.

This tier would also be involved in making efficient use of the oral tradition of the region to disseminate information.

Tier 2, Compilation and basic editing

This tier would compile information gathered by “barefoot journalists” into digital form and perform basic editing.

It would involve:

- Conversion of audio material into text for dissemination on the Internet,
- Basic editing on text matter to ensure relevance and consistency
- Categorization of information

The members at this tier would also be involved spreading awareness about the usage of the architecture to obtain information and possibly in the dissemination of audio-visual content in areas where literacy and connectivity is low.

Tier 3, Planning, Management and Dissemination through the website

- Collection of compiled data from Tier 2
- Classification of the data into different sections and dissemination through the CGNet website
- Website management and troubleshooting of user issues.

Self Organization and Collective Intelligence

Self-organization ensures self-empowerment for community based architectures. After an initial kickoff, the architecture should self organize by virtue of its design.

The concepts of swarm intelligence can be used in this context.

Conventional particle swarm optimization relies on exchanging information through social interaction among individuals.

Here each iteration results in the calculation of a fitness value for each individual, by virtue of a given position and velocity. Based on the local, global and recorded personal best fitness values of the particle and its neighbors, the velocity and position of the particle can change.

In the case of the proposed information architecture, this method finds application in the areas of work distribution and inter-tier movement of members.

For each tier, criteria would be defined for determining the fitness values of the members. Based on periodic peer reviews, members could observe the best values in their surroundings and modify their goals and methods to aim for these best values. This would allow the members to self organize themselves to ensure maximize efficiency.

To formulate the goals of the individual community members, the ant colony module of foraging for food could be used.

Ants typically forage for food using very simple rules for the individual ants to follow, such as following the trail left by another ant to the food source. This allows maximum efficiency of the entire colony, despite simple goals for the individual

In place of food, the foraging members in this case would be collecting and disseminating information.

The CGNet website would be the community storehouse of information, to which all members would be contributing and from which they could draw relevant information.

Emergent collective intelligence is an expected development, despite individual members following simple goals.

Self Sustenance

Since the level of training required for the first tier of the architecture is minimal, once the basic structure has been erected, the community can draw in more members.

For the upper tiers, vertical movement from other tiers can add members.

Once the subset of the community involved in the architecture is suitably large, advertising could be one method of obtaining revenue. An obvious risk of advertising is that once commercialization sets in, the relevance to the community might be threatened. However, since the community itself is collecting the information here, the monitoring and assurance of relevance would be the onus of the community.

Also, information exchange would automatically broaden the horizons of all the participating community members, enabling better implementation of new ideas for self-sufficiency.

Robustness and Self Healing

Since the number of people involved in the information collection and dissemination process is sufficiently large, the alternate architecture would ensure that if any of the constituting members were unable to perform their task appropriately, the other members would be able to distribute the load in order to ensure flow of information.

Communication infrastructure

The communication infrastructure required by the alternate architecture would have to take into account the human element in addition to the existing technology.

Also, since connectivity remains at a premium in the region, the technical aspect would have to be re-examined and augmented where needed.

As a preliminary hypothesis, the use of wireless technology to connect previously unconnected regions could be considered. With a number of homebrew innovations emerging in wireless technology, this could be made more cost efficient than the commercial solutions currently available.

With the growing Information Technology industry in India, a lot of computer products, which become obsolete every year are discarded. These could be obtained and used in a cost effective manner.

Research Areas

Formulation of Processes

The best processes for initial training would need to be worked out. This would require some pilot experiments with the community to understand the mindset of the members.

Swarm Based Optimization Application

The metrics of swarm based optimization as applicable to the Information Architecture need to be formalized. Also, exact procedures for members to follow under the ant colony module for data collection would need to be laid out.

This would require some statistical analysis and sample testing in the region.

Technical Aids To Connectivity Enhancement

The following areas need to be explored as possible methods of improving connectivity

- Wireless networks in rural and semi-urban areas, with the range and terrain issues considered
- Mobile technology for network access

This would require experimentation in the region with live equipment for a conclusive judgment

Entrepreneurship opportunities

The possibilities of monetary gain through e-commerce for community members could be considered. In addition to existing industry, new ideas for entrepreneurship could be explored.

Partners

CGNet

<http://www.cgnet.in>

CGNet is a group of people who are working in Chhattisgarh to promote community participation in development. The means that CGNet aims to employ to this end are community empowerment through information.

Conventional media is frequently unsuited for use as a tool of community information exchange, due to commercial concerns. To overcome this, CGNet decided to use the Internet as a medium for communication. The CGNet website, hosted by One World South Asia, is one of the first ever community sites in Hindi. It provides a cheap and freely accessible method of sharing information among the members of the community. CGNet initially planned the website as an e-PanchayatGhar, for members of the community to discuss community issues, voice their concerns and plan for the development of the community as a whole. The website's content is classified under a number of sections such as Agriculture, Media, Forestry, Minerals, Education etc. Each of these sections is semi-independently managed.

With the success of the website and the positive response from the community, CGNet perceives a need to expand the structure and scope of their work.

CGNet aims to establish a shadow cabinet in Chhattisgarh with the purpose of people empowerment and building community participation in development of the state. Such a community would require a means of efficient communication, in order to ensure that relevant information is shared across the community.

Potential Partners

Team Dhanush

<http://groups.yahoo.com/group/teamdhanush>

Team Dhanush is a brainstorming group dedicated to the policy of "think, defend, refine and apply". It was started in August 2005 with a group of professionals from diverse fields, encompassing engineering, software technology, journalism, law and business.

Team Dhanush has grown.

Ideas are placed before the group and analyzed from a multitude of different perspectives, with a view to develop effective and sustainable processes that draw from the wide range of the members' experience. The group is based in Bangalore and meets once a month to network and discuss ideas, while offline activities with subsets of members are carried out as and when needed.

For the purpose of CGNet's Information Architecture, Team Dhanush could provide valuable intellectual input in the planning stage and technical as well as operational inputs during the execution stages.

ChiPS

<http://chips.nic.in>

ChiPS is the prime mover for Information Technology and Biotechnology in Chhattisgarh. They have a number of running projects and more are in the pipeline for use of Information Technology for development. Their assistance could be extremely valuable on infrastructural and technical issues

Chhattisgarh Government

<http://chhattisgarh.gov.in>

The Chhattisgarh government's stand on Information Technology issues, as laid out in their IT policy is progressive and conducive to development.

Their assistance on infrastructural and bureaucratic issues would be very valuable