ABSTRACT
India, world's largest democracy, has witnessed enormous development in information technology over past few years. It has become a necessity to share personal information for every service, from getting a mobile phone connection to registering for online banking. India being a collectivist society (one of the developing countries part of BRIC nations) has different expectations of privacy than other developed nations. The concept of privacy in India has not been investigated in detail, and we also lack empirical data with respect to privacy perceptions among Indian citizens. Recent developments in the Indian scenario e.g. privacy bill, UID project signify a need for privacy awareness and understanding in Indian masses. It is also important for policymakers to comprehend sentiments and opinion of masses for structuring effective laws and policies for the citizens of India. Our study focuses on understanding privacy perceptions and expectations of Indian citizens and was conducting in two phases. In the first phase, we conducted interviews among 20 participants and 4 focus group discussions with 31 participants, to collect qualitative data about the privacy perceptions. In the second phase, we developed a survey questionnaire to collect quantitative data. We collected responses (10,427) from various cities in India. We hope the understanding developed through the responses collected during the study, helps decision makers and technology developers in producing customizable solutions and laws for Indian users. Also, it will help us in identifying conflicting nature of users in their expectations and practices on privacy matters.

1. INTRODUCTION
Technology in its various forms e.g. online social networks, mobile phones, and credit cards has expanded and firmly rooted in each individual’s life. Indian users, not being untouched from it, are captivated to use technology. Kumaraguru et. al. in their work demonstrated that Indian users lacked awareness of privacy issues and were not concerned about privacy in 2004 [1]. In recent years, concerns have been raised about privacy leakage through social networks [2], users in ignorance end up giving personally identifiable information on social networks, various third party application and other members on the network. Wang et. al. in their work [3], showed Indian users to be least concerned about information they share on OSN sites, amongst Indians, Chinese, and Americans. Ion et. al. in their study [4], demonstrated perceptions of Indian and Swiss users on cloud storage. Indian participants were more tolerant to government surveillance as compared to Swiss. The study also showed more trust on cloud storage among Indian users. Therefore, cloud storage was extensively being used as a backup system among Indian customers and some of the important documents e.g. passport copies were also stored on the cloud. In recent past, there has been a significant increase in privacy invasion incidents in India; leakage of Industrialist Ratan Tata’s phone tapes containing private conversation with lobbyist Niira Radia, was one such incident. The existing laws in India cater few aspects of information available to financial bodies e.g. banks and cyber data under IT Act 2000. Law enforcement agencies in India have retorted to various techniques of IP address tracking in order to bring criminals to books, but this has also raised significant privacy threats for innocent users [5]. Similarly, projects like NATGRID and UID may be treated as oppressive tools for individual’s privacy. Therefore, it is of extreme importance for policy makers to understand sentiments of Indian customers, and make laws and policies respectful of mass opinion in India. This would also provide necessary security against privacy breaches. Our work is an endeavor to create one such information base, which could demarcate and characterize privacy awareness and tolerance of Indian citizens today. Our main contributions are as follows:
• To the best of our knowledge, this is one of the largest studies on privacy perceptions in India.
• We have developed an empirical understanding of privacy perceptions and awareness with sample of 10,427 participants across India; and have developed a benchmark for privacy perceptions through this study.

2. METHODOLOGY
To explore users’ privacy practices and expectations, we conducted 20 semi-structured, in depth interview studies with residents of Delhi. These were followed by focused group discussions to brainstorm on various aspects of privacy. Next, we conducted survey with 10,427 respondents, to collect quantitative data. This understanding can help in framing appropriate privacy laws and policies, and developing usable privacy solutions. We discuss each of the techniques in detail:

2.1 Interviews
To explore user privacy behavior, we conducted Interviews. We recruited participants through word-of-mouth from Delhi (in India) region. We completed 20 individual interviews lasting for about 120 minutes each. We had 9 females and 11 males in the interview. The participants were spread across various walks of life (e.g. age group, education, and occupation). Interview sessions involved one participant at a time and were run by one moderator. Interviews were mostly conducted in English. Sessions were audio recorded for future analysis. We started the discussion by asking the participants about what in general privacy means to them. This was followed by questions on mobile phone privacy, where we asked them about unsolicited calls, spam, and location based tracking. We also asked participants about their privacy concerns on online social networks.

2.2 Focused Group Discussions
We conducted 4 focused group discussions with 7 to 8 participants in each group to further explore users’ privacy attitudes. Participants were from various age groups, profession, and cultural background. Since perceptions might vary across genders, we sampled participants to maintain 50% ratio of each. In our interview, we observed that participants expressed concerns and specially emphasized on few areas e.g. mobile phone, social networks, etc. Hence, we explored in depth the different aspects of privacy as mentioned by the participants. This provided us an
opportunity to understand, how individuals thought of privacy. We maintained audio recordings of the discussions.

2.3 Survey:
To confirm our interview and focused group discussion findings, we designed and posted an online questionnaire on Survey Monkey. Questions in the survey were based on our understanding from interviews and focused group discussions. We collected responses from all over India, spanning various ethnic groups, states, age, and professions. We had 10,427 participants in the survey. Fig 1 shows distribution of participants in different states.

![Fig. 1 Percentage of participants from the survey (10,427) across the country](image)

3. RESULTS

3.1 Privacy to Indian citizens means Communication and Information Privacy. We found that “when asked about privacy” participants (51%) thought of information privacy e.g. information exchanged through Internet and 49% participants meant communication privacy. When asked about “what is personal information to you?” majority of the participants felt passwords to be the most protected personally identifiable information (PII) and then financial information, such as bank and credit card details. In comparison to this, religion, mobile phone numbers and health-related information were rated as less protected PII. In spite of India being a caste and religion sensitive country, these were rated low in the survey.

3.2 India is changing from collectivistic to an individualist culture. India has been time and again mentioned as a collectivist society. However, we found in the survey that participants did not share details like passwords (83.97%), passport number (55.73%), and personal income (51.55%) with anybody, showing strong signs of the change in the societal setup.

3.3 Less concerns for Privacy in public places. Participants, however, in the survey showed less concerns about privacy issues in the public places e.g. CCTV in public places etc. Around, 50% participants said that they would not change their actions if a camera would be observing them and seemed unconcerned about caste being mentioned publically. We asked participants about “How would you feel about your category (general / OBC / SC) being displayed on the notice board?”; to this 70.75% participants usually felt comfortable. About 80% of the participants felt comfortable about last name, first name, age, gender, boarding station, destination, seat number, PNR displayed on the platform and the compartment while travelling through trains. One of the reasons for such a behavior could be, perception of not being identified from large groups.

3.4 Mobile phones are the next destination for private information. Almost 54% participants stored personal information on mobile phones; this included information like Credit card numbers / ATM card number / ID numbers (26.20%), identity information like date of birth, PAN number, ID number, account number (30.51%).

3.5 Lack of trust in the services provided by mobile service providers. About 65% participants felt that mobile service providers keep records and can access the information exchanged through phones. Sixty eight percent showed concerns about phone conversation being tapped and 67.41% agreed that customer information could be shared with the government even without informing the customer. However, participants (63.21%) seemed confident about reasonable protection being provided to the collected information.

3.6 Unawareness about Privacy issues on OSNs. About 40% of the participants would never save / share personal information in / through emails. Privacy seems to be the primary reason for this behavior. Survey participants were more aware about privacy policies and tend to read these policies more than the earlier study in 2004. Minority of the participants had no “privacy concerns” with online social networks. Majority of the participants felt pictures to be the most privacy invasive data on the OSNs. About 5% of the survey participants tend to accept friend requests from strangers or people whom they don’t know, but just have common friends. This behavior seems to be same even with the third party applications.

3.7 Financial privacy is of prime concern for Indians. Participants were better aware of privacy issues related to financial data; thanks to various financial frauds and thefts that has created the awareness. Only, 15% of the survey respondents felt that the credit cards should display personal information like name, date of birth, and phone number. As high as 80% of the survey respondents were aware of identity theft issue through credit cards. This signifies extreme concern for financial privacy in contrast to other form (e.g. information or physical).

4. DISCUSSION
We hope exploring privacy attitudes will help us in generating solutions customizable for Indian users. A thorough analysis of privacy perceptions and awareness will also help in developing effective learning and training systems for Indian citizens. The study also aims at revealing current practices to solution developers. Since users are considered to be the weakest link, it is important to assess and know their habits and practices to develop effective solutions.

5. REFERENCES