**Centre for Internet of Ethical Things (CIET), IIIT-Bangalore**

**Workshop for Stakeholders in Ethical Assessment Framework for IoT Solutions in Smart Cities**

**20th June 2024 | 10:00 A.M – 12:30 P.M**

Meeting Agenda:

The purpose of the workshop was to inform the relevant stakeholders on the development of an ethical assessment framework for Internet of Things (IoT) solutions used in smart cities and to solicit their input in order to operationalise the framework. The assessment framework is an outcome of a year-long funded project by the Government of Karnataka, IIIT-B, and the World Economic Forum.

Attendees:

The attendees in the workshop had joined through both the online and offline modes.

IIIT-Bangalore and CIET

* Prof. Debabrata Das, Director, IIIT-B
* Prof. Amit Prakash, Principal Investigator, CIET, IIIT-B
* Prof. Vinay Reddy Venumuddala, Assistant Professor, IIT-Jodhpur (Online)
* Mr. Purushottam Kaushik, Head Centre for Fourth Industrial Revolution, World Economic Forum (Online)
* Mr. Kanan, Program Manager, CIET, IIIT-B
* Dr. Deepa Austin, Research Scholar, CIET, IIIT-B
* Swati Ganeshan, Research Associate, CIET, IIIT-B
* Shruchi Singh, Research Intern, CIET, IIIT-B
* Taru Jain, MS by Research Scholar at IIIT-B

Government Representatives

* Mr. Prabhakar, Deputy Chief Information Officer, Bruhat Bangalore Mahanagara Palike (BBMP)
* Dr. Manjunath Daler, Bengaluru Smart City Limited
* Mr. Srinivas M S, Smart Cities Mission, KUIDFC (Online)

Industry Representatives

* Mr. Bhaskar Verma, Regional Director, Karnataka and Tamil Nadu, NASSCOM
* Dr. Madalasa Venkataraman, Senior Director, Data Science, Oracle

Independent Consultants

* Mr. Vivek V, Independent Researcher and Consultant, Niti Aayog
* Ms. Arati Megharaj, Consultant on IoT Technologies (Online)
* Dr. Anjali Karol Mohan, Urban Consultant and Regional Planner (Online)

Meeting Summary

The workshop commenced with a welcome address by Prof. Das, Director, IIIT-B with an introduction about the inception of CIET, the vision and scope of the centre. This was followed by a formal introduction of all the people present during the workshop. Prof. Amit, Principal Investigator at CIET, then outlined the tripartite agreement that was laid down to contribute to a policy framework which explicitly engages with ethical aspects of IoT and AI technologies and nurtures a thriving innovation ecosystem in the state. He then pointed out that CIET’s focus will center around the domains of health, agriculture, education, manufacturing and smart cities.

The first strand of this project focused on building an ethical assessment framework for IoT interventions in the application domain of smart cities. Highlighting the findings and work done so far was one of the key objectives of this meeting. Prof. Vinay then went on to present CIET’s efforts thus far and spoke of taking the complex adaptive system approach to theoretically grounding the ethical assessment framework for smart city IoT intervention. The framework was also designed to provide a structure to look at IoT interventions in other application domains viz healthcare, manufacturing, education and agriculture with the technology as an entry point.

The four ethical pillars considered were justice and equity, fairness, trust and consent, and dignity of life and work. Role of existing IoT technologies in initiatives such as the setting up of the ICCC (Integrated command and control centre) was discussed along with the need to integrate structured dimensions into these systems. In this context, emphasis was laid on the complex adaptive nature of these systems that must be taken into consideration before employing IoT solutions to them in a manner that does not disrupt the naturally evolving complex systems. The use cases detailed within this domain were Solid Waste Management (SWM) system and Integrated Transport Management System (ITMS).

Discussion

Key Takeaways:

* Adopting the complexity lens allows us to acknowledge the role of networks that don’t fall into the formal or informal categories but contribute to upholding the systems and enhancing their resilience.
* The framework provides a basis to define these specifications but seeks inputs to operationalise and evaluate IoT solutions in their design and implementation stages in an ethical manner
* The role that technology plays in the centralisation of data and decisions is an aspect that requires investigation.
* Before operationalisation of any technological solution the objectives for use of the solution must be defined. This may help in operationalisation at granular levels such as choice of tools and types of technologies needed to achieve the objectives
* The guidelines outlined by the ethical assessment framework should fit under the banner of the existing operational guidelines already existing for any department.
* The ethical assessment framework should be contextualised based on the use cases and implemented at the strategic levels according to the use case.
* By looking at the use-cases as examples, one can explain how ethics should be implemented at a strategic level. Industry organisations such as NASSCOM and guidelines by credible agencies like IEEE can help with the framing of the technological specifications of IoT in smart cities, keeping in view the ethical assessment framework.

Questions/Clarifications:

1.What is the underlying rationale for arriving at the four pillars (namely: Justice and Equity, Fairness, Trust, and Dignity of Life and Work)?

The presenters mentioned that a detailed review of ethics and governance literature suggests that most of the ethical concerns around IoT enabled technology and devices can be grouped under these four pillars. Moreover, it was pointed out that the abovementioned four pillars focus on how citizens are impacted by the use and design of IoT-enabled technology, which is essential, since the framework is centered around issues of governance.

2.Does this involve both how IoT devices are designed and built and the introduction of ethics into this process or does this capture how the devices need to be used ethically? Are we looking at how the device should behave or are we also looking at how it is to be or being implemented?

The discussants acknowledged that the ethical assessment framework should attempt to capture both the design, development and the implementation stages of such technologies.

3.You have highlighted that these technologies are pushed for efficiency and sustainability purposes. While it may be clear what you mean by efficiency, what do you mean by sustainability?

It was then pointed out that the rationale for such use and design of IoT devices was studied through tenders. Within such documents, mentions of zero-waste and zero-pollution were present. This is the existing outlook on sustainability that has been uncovered.

4.We are looking at how the state is structured. Are you also mapping the informal networks outside the hierarchical structures that exist? There are also systems that you cannot bucket into the formal or the informal, they are grey where the systems are focused on getting things done.

The presenters acknowledged that the formal and the informal networks is what they were unable to demarcate and examine as most of the times, these networks overlap to form grey areas. Hence, more inputs on the work practices of such networks are needed to fully understand the functioning of stakeholders involved in said networks.​​

5.Our cities are Complex Adaptive Systems (CAS), however, they are becoming increasingly inherently unjust. How are we going to address that?

Suggestions/Way Forward:

*Perspectives from the Government:*

* The framework must include the “technology perspective” i.e. the ethical framework should provide some general specifications that the IoT technologies used in smart cities should conform with (drawing from standards from recognised agencies, for instance).
* Guidelines for the use of IoT technologies at an operational level must be given along with the ethical framework as a policy document at the strategic and tactical level of urban governance.
1. Vocabulary around the framework must be restructured to reflect a shift from calling it a generalised or generalisable policy framework to a contextually adaptable policy framework. The discussants then acknowledged that this would allow for a deeper dive into some dimensions that might require a domain-specific revision to capture the nuances of the domain in focus.
2. A working definition of sustainability that the current framework will operate on must be established and well-defined.
3. A clear problem statement must be documented so that the rationale and steps taken to arrive at the objective behind the framework is clear and accessible to all.
4. A language of communication must be established to make the framework understandable and actionable for a wider audience beyond academia and subject matter experts.
5. Adequate and appropriate checks and balances must be devised to evaluate whether a data-driven or a data-forward approach is being adopted because it is the right/best approach or simply because it is possible and dictated by technology accessibility and availability.
6. The boundaries established for the bodies executing the city-level operations must be maintained. Such boundaries would be upheld according to what has been specified at the operational level and not dictated by what the newly introduced technology allows an official/department to do.
7. Avenues to incorporate ethics into tenders, RFP documents and technical specifications need to be detailed.

The meeting concluded with an expression of gratitude and soliciting in-depth feedback from the participants within two weeks' time through a form circulated from IIIT-B. Post this, the framework can be submitted to government representatives for further perusal.