Project Title:	**Democratising neighbourhood mapping through design and creatively collaboration with local communities in India**	
Project Number	**ID00989**	
Monash Main Supervisor (Name, Email Id, Phone)	Ilya Fridman <Ilya.Fridman@monash.edu>	*Full name, Email*
Monash Co-supervisor(s) (Name, Email Id, Phone)	Xavier Ho <xavier.ho@monash.edu>	
Monash Head of Dept/Centre (Name,Email)	Gene Bawden <Gene.Bawden@monash.edu>	*Full name, email*
Monash Department:	Department of Design	
Monash ADGR (Name,Email)	Selby Coxon <Selby.Coxon@monash.edu>	*Full name, email*
IITB Main Supervisor (Name, Email Id, Phone)	Venkatesh Rajamanickam <venkatra@iitb.ac.in>	*Full name, Email*
IITB Co-supervisor(s) (Name, Email Id, Phone)	Arnab Jana <arnab.jana@iitb.ac.in>	*Full name, Email*
IITB Head of Dept (Name, Email, Phone)	Phani Tetali <phanit@iitb.ac.in>	*Full name, email*
IITB Department:	IDC School of Design	

Research Clusters: Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? *(Please nominate JUST __one.__ For more information, see www.iitbmonash.org)*		**Highlight which of the Academy's Theme(s) this project will address?** *(Feel free to nominate more than one. For more information, see www.iitbmonash.org)*	
1	*Material Science/Engineering (including Nano, Metallurgy)*	*1*	*Artificial Intelligence and Advanced Computational Modelling*
2	*Energy, Green Chem, Chemistry, Catalysis, Reaction Eng*	2	*Circular Economy*
3	*Math, CFD, Modelling, Manufacturing*	3	*Clean Energy*
4	*CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control*	4	*Health Sciences*
5	*Earth Sciences and Civil Engineering (Geo, Water, Climate)*	5	*Smart Materials*
6	*Bio, Stem Cells, Bio Chem, Pharma, Food*	6	*Sustainable Societies*
7	*Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng*		
8	*HSS, Design, Management*		

The research problem

People have been drawing maps to document, guide, and navigate the lands since the early days of orientation. We locate ourselves in maps, which rapidly became essential in how we travel and commune. However, the act of mapping also found itself turning into a geopolitical and technical issue. It requires keen awareness of socio-cultural boundaries, and appropriate training in geospatial information systems (GIS). This presents a problem when local residents in urban and suburban areas are not equipped to participate and contribute when engaging with digital maps.

In India, this problem is heightened with many other factors such as lack of resources, access to technology, and insufficient training. Residents in India have a good understanding of how to read and use maps, but they do not have a voice in what is included in the map that they use daily to communicate critical issues. Maps bring the dialogue to the streets, the rivers, and the state-boundaries.

This research project stems its practice from collaborative mapping workshops (Kerzner et al. 2019) and the works of citizen mapping (The Office for Creative Research 2017). The tangible nature of drawing does not require any prior knowledge in using computer systems, which can open doors for residents who are not tech-savvy. There are also opportunities to translate geospatial mapping technologies from Australia to India.

A successful candidate will have access to the following technologies through partnership with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia, such as the Open Data Cube initiative (https://www.opendatacube.org/), and TerriaJS (https://terria.io/). Community mapping can also potentially contribute to disaster planning, revealing valuable insights for town planners and emergency response to close the socio-economical gap, linking with organisations in India such as C-USE, CSRE (https://www.csre.iitb.ac.in/), and NDRF (http://ndrf.gov.in/). Creative use of technology will also be explored with the industry partner CSIRO's Data61 to further close the technical literacy gap.

Design Precedents
The following images provide examples of potential pathways that this project can take.

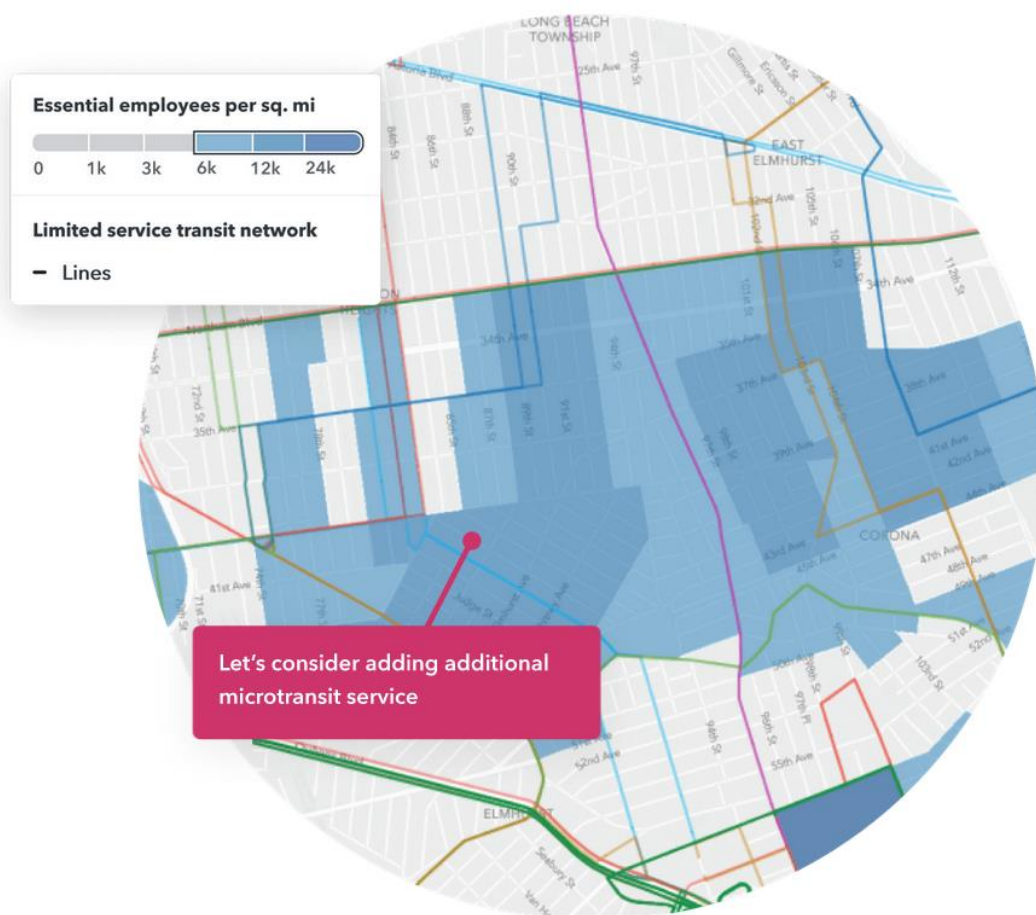Figure 1: Collaborative neighbourhood mapping for the St. Louis Map Room (c.f. http://stlmaproom.org/)

Figure 2: Map visualisation of essential employees overlaid with transit network services in New York (c.f. https://www.remix.com)

REFERENCES
1. Kerzner, Ethan, Sarah Goodwin, Jason Dykes, Sara Jones, and Miriah Meyer. 2019. "A Framework for Creative Visualization-Opportunities Workshops." *IEEE Transactions on Visualization and Computer Graphics* 25 (1): 748–58. https://doi.org/10.1109/TVCG.2018.2865241.
2. The Office for Creative Research. 2017. "St. Louis Map Room." https://ocr.nyc/public-space-interventions/2017/03/04/st-louis-maproom.

Project aims

This project aims to empower residents who are engaged with critical township issues by undertaking technology translation from Australia into the India context. It treats the act of mapping (both hand-drawn and technology-backed) as a conversation tool, a way to share knowledge between residents, governments, and organisations. It seeks to answer the research question, "How can we democratise neighbourhood mapping through design and creatively collaborate on critical issues with people who live there, strategise, support, and make change in their own towns?" Connecting people who are actively engaged with town development, disaster prevention and planning, and other critical issues, this project will create conversation with residents and policy makers and mobilise resources through the co-creation of local maps.

In order to address the research question, the following sub-questions will also be investigated:
● What type of local issues are under-documented, and are in dire need of engaging with local residents to solve?
● How can creative use of technology help to further close the technical literacy gap?
● What kind of perceptions do local residents have about their neighbourhood? What landmarks do they use?
● What social, technological, economical, and cultural barriers are present for community mapping?
● What can be learned from co-creating maps that would otherwise be difficult to find out?
● How can design approaches elevate maps from the personal computer to a shared conversation tool?

Expected outcomes

As a result of undertaking this research project:
- a set of geospatial technology translation opportunities will be identified, with lessons learned from a pilot study of the translation works
- the research will generate a design toolkit and a series of case studies of how design can be applied to community mapping with the benefits of geospatial technologies given barriers and context
- the candidate will work with local communities to co-create their own maps and have their voices heard, and be able to document previously uncharted neighbourhood knowledge to tackle specific problems. This can be done through design workshops or other approaches.
- the research projects will also result in a series of publications reporting on the findings of community mapping through a designerly lens

How will the project address the Goals of the above Themes?

A successful execution of the research project will demonstrate how design can further contribute to societal planning and our collective understanding of local neighbourhoods and communities through a series of workshops using mapping, both drawn and digitally-assisted, and the insights that can be generated and documented.

Potential RPCs from IITB and Monash

Provide names of the potential research progress committee members (RPCs) and describe why they are most suited for the proposed project

A/Prof. Shanti Sumartojo, Monash University
Dr. Desiree Hernandez Ibinarriaga, Monash University

Capabilities and Degrees Required

The candidate must have <u>one</u> of the following capabilities:
- practising design professionally at above the entry level, or have a distinctive academic record in collaborative design or related fields
- experience with engaging local communities through public workshops and willingness to explore new technologies
- have a solid programming foundation with keen interest to learn and practice design
- have a solid background in geospatial information systems (GIS)

Bonus capabilities:
- experience with disaster planning or urban planning processes
- familiarity with data visualisation design practices
- familiarity with open source mapping technologies
- data science skills, such as extracting, transforming, and aggregating data

Necessary Courses

Name three tentative courses relevant to the project that the student should complete during his/her coursework at IITB (the student will require to secure 8 point in these courses)

- DE 705 Interactive Data Visualization
- DE 803 Quantitative Design Research Methods
- DE 804 Qualitative Design Research Methods
- DE 801 Mini Project I
- DE 802 Mini Project II

Select up to **(4)** keywords from the Academy's approved keyword list **(available at http://www.iitbmonash.org/becoming-a-research-supervisor/)** relating to this project to make it easier for the students to apply.

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