

Research Methodology

Selecting a research problem

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Questions

1. What kind of problems form suitable for research?
2. How do you decide which problem to investigate/explore?
3. How do you narrow down on a specific research problem?

Research problem selection

- There is no algorithm!
- The idea is simple: what is it that truly excites you and you wish to explore more about?
- What do you want to understand or learn about?
- Perhaps, you have been reading developments in some field and have identified limitations in the current literature and wish to tackle those in your work.
- Or, because of your experience, you have come to identify an unexplored problem and want to tackle it from scratch.
- Or you look around the real world and see something is missing and you work to address it through your work. You ask yourself, how may I solve it using my expertise in technology?
- There can be really any source which piques your interest in some domain and then you start exploring it step by step.

Example

- You are working in the domain of IoT.
- Smart Homes for Elderly care could be one potential area.
- Why?
- You notice increasing number of single old/fragile people and want to ease their lives in some manner.
- What could be that “some” ??
- A problem is not technical, a problem is a problem, you seek to identify how technology could solve it!!!
- And this opens room for creativity and innovation.
- LOOK AROUND, THE WORLD IS REPLETE WITH PROBLEMS WAITING FOR YOU TO SOLVE!

General to particular

- clearly defined researchable problem - is a process.
- Your research problem needs to be tight!
- Choosing to study AI/ML/IoT does not provide a researchable problem.
- Read research papers in the domain and see how problems have been identified in those works.
- Reading is never enough! It what happens later which is the most important.
- CRITICAL THINKING. BRAINSTORMING!
- Formulating a concrete research problem and writing a proposal are the most time taking steps in research.

- Think of the who, what, when, where and why questions:
- **WHY** did you choose the topic? What interests you about it? Do you have an opinion about the issues involved?
- **WHO** are the information providers on this topic? Who might publish information about it? Who is affected by the topic? Do you know of organizations or institutions affiliated with the topic?
- **WHAT** are the major questions for this topic? Is there a debate about the topic? Are there a range of issues and viewpoints to consider?
- **WHERE** is your topic important: at the local, national or international level? Are there specific places affected by the topic?
- **WHEN** is/was your topic important? Is it a current event or an historical issue? Do you want to compare your topic by time periods?

Research Tip

- Pick a topic that interests you. You are going to live with this topic for weeks while you research, read, and write your assignment. Choose something that will hold your interest and that you might even be excited about. Your attitude towards your topic will come across in your writing or presentation!

Source

- Try to find your own research problems for thesis work and not wait for your professors to find for you.
- Easy will not make you learn anything.

Mandatory Readings

- Ratan, S. K., Anand, T., & Ratan, J. (2019). Formulation of Research Question - Stepwise Approach. *Journal of Indian Association of Pediatric Surgeons*, 24(1), 15-20. [Link](#).
- Identification and formulation of research problem. - S.L.Sharma.
- *Boudah, D.J. (2011). Identifying a Research Problem and Question, and Searching Relevant Literature.* [Link](#)