Research Methods

Dr. M. Ishtiaq

Course Details

- Contact hours: 3 per week
- Credits: 3 for MS students
- Contact hours: 45 hours (3 per week)
- Pre-requisites: none
- Co-requisites: none
- Level: The course is designed as 3 contact hours course for graduate students and also designed as the pre-requisite for the MS Thesis.

Course Instructor

- Dr. M. Ishtiaq
  - PhD (CS), MS(CS), BS(IT)
- Area of Research
  - Digital image security and forensics and applied AI
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Google Classroom Code

- Open the link:
  - https://classroom.google.com/
- Use code to join a class:
  - ncki25c

Course Modules

- Module 1: Formulating a research question
  - Outcome: Understanding of how to construct and evaluate a research questions
- Module 2: Literature Review
  - Outcome: Understand of what constitutes a good literature review and why research project needs one.
- Module 3: Planning and Managing research
  - Outcome: Awareness of the skills required to enhance one's research
- Module 4: Producing a research proposal
  - Outcome: A plan of action to complete the research

Course Modules

- Editing softwares
  - LaTex
  - WinEdt

- Download and install these software for later use. You can use other editors of your choice, but I will use these for classroom demonstrations.

What is research

- It is about adding a very small but original contribution to the body of knowledge.
  - It may start with a question and possibly ends with a question
  - It must be systematic as it could possibly be
  - Try to find out something beyond the data itself.
  - Sometimes there’s a need to rethought an answer in the context of trends that change or contemporary events or processes.

What is research cont.

- A systematic inquiry that helps to make sense of the world. That tends to make sensible the debates and interpretations that we have of issues of contemporary significance.

Suggestions by the domain experts

- It must be a balance between what's achievable and the contribution it is going to make
- It must have a finite end at some point. (realize this at the beginning)

- Want to be good at research? Try to be a good:
  - Reader -> Thinker -> Writer

What is a research question

- It must have 3 attributes:
  - It has to
    1. address something of significance, some issue, problem, puzzle question that relates to the interests of a broad community of scholars that arises in the real world or arises in the context of the sort of theories and frameworks that we are always endeavoring to develop in order to understand the real world.
    2. be researchable. Something that you can answer by doing research. So, that would let out metaphysical questions or questions that are so broadly formulated, one wouldn't know where to look or what sort of information to gather that would enable us to give a systematically researched answer to it.
    3. address a question that hasn't been definitively answered. (That's what differentiate research from an essay), or something that can strengthen existing answers.

Research Question discussion

- How to embed and hide electronic patient record in its medical image?
  - Is it possible to use Wavelet packets transform in the embedding of electronic patient record in the respective medical images.
  - Is it possible to use Wavelet packets in the prediction error expansion-based information hiding in the context of EMR data in medical images.
  - Can UML be used for threat modelling?
  - Why do we protect/secure our computer/network system from dark web and how it could be possible?