

# CSC 3118: Computer Science Project 1: Choosing a Topic and Project Areas

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# How to choose a Project Topic

- Guiding principles in choosing a good project topic
  - Deep Research
  - Explore different ideas
  - Innovation
  - Topic of interest
  - Put idea into practice
  - Take advice from an expert

# Question to ask yourself while choosing a project topic

- Can I do it?
- How can I do it?
- Is the topic unique?
- From where I can take the help?

# Projects and Research Topics in Computer Science

- Each passing day, new and innovative developments are coming out in this era of mechanization.
- Technology is the forerunner of this new change.
- Cell phones, laptops and many other electronic gadgets have become an integral part of our life and Computer Science is the seed.
- In academia, there is a need to get rid of obsolete ideas/projects and focus on new innovative topics.
- Projects like school management system, library management system etc. are now out of date.
- Students should shift their focus to latest technologies which are highly in demand these days and future depend upon these.

# List of latest topics in Computer Science

- List of some of the latest topics in Computer Science that you can choose and work for your project work and research.
  - Data Warehousing
  - Internet of Things(IoT)
  - Big Data/Data science
  - Semantic Web
  - Machine Learning
  - Artificial Intelligence
  - Data Mining
  - Image Processing
  - Bioinformatics

# Data Warehousing

- Data Warehousing is the process of analyzing data for business purposes.
- A Data warehouse store integrated data from multiple sources at a single place which can later be retrieved for making reports.
- Data Warehouse provides Online Analytical Processing(OLAP) tools for the systematic and effective study of data in a multidimensional view.
- Data Warehouse finds its application in the following areas:
  - Financial Sector
  - Banking Sector
  - Retail Services
  - Consumer goods
  - Manufacturing
- **NOTE:** Knowledge of database and data modeling is a requirement.

# Internet of Things(IoT)

- Internet of Things(IoT) is a concept of interconnection of various devices, a vehicle to the internet.
- IOT make use of actuators and sensors for transferring data to and from the devices.
- The example for this is is the traffic lights which changes its colors depending upon the traffic.
- Following are the application areas of Internet of Things(IoT):
  - Home Automation
  - Healthcare
  - Agriculture
  - Transportation
  - Manufacturing
  - Environment

# Big Data/Data science

- Data is a term to denote the large volume of data which is complex to handle. The data may be structured or unstructured
- Big data can be examined for the intuition that can give way to better decisions and schematic business moves
- The definition of big data is termed in terms of volume, velocity, variety, value and veracity). Application areas:
  - Government
  - Healthcare
  - Education
  - Finance
  - Manufacturing
  - Media
  - Sports



- Semantic Web is also referred to as Web 3.0 and is the next big thing in the field of communication.
- It is standardized by World Wide Web Consortium(W3C) to promote common data formats and exchange protocols over the web.
- In the semantic web, the information is well defined to enable better cooperation between the computers and the people.
- But proof can also be done by a computer smart enough to find the right proof.
- It can be a good topic for your project.

# Machine Learning

- It is also a relatively new concept in the field of computer science.
- It is a technique of guiding computers to act in a certain way without programming.
- It makes use of certain complex algorithms to receive an input and predict an output for the same.
  - Supervised learning
  - Unsupervised learning
  - Reinforcement learning
- Machine learning employs more statistical methods.
- The computer then finds the solution.

- Data Mining is the process of identifying and establishing a relationship between large datasets for finding a solution to a problem through analysis of data.
- Data mining tools and techniques give enterprises and organizations the ability to predict futuristic trends.
- Data Mining finds its application in various areas of research, statistics, genetics, and marketing
- The following techniques can be used for data
  - Decision Trees
  - Genetic Algorithm
  - Induction method
  - Artificial Neural Network
  - Association
  - Clustering

- Artificial Intelligence deals with the study and creation of intelligent systems that can think and act like human beings.
- In Artificial Intelligence, intelligent agents are studied that can perceive their environments and take actions according to their surrounding environments.
  - Expert Systems
  - Artificial Neural Networks
  - Robotics
  - Natural Language Processing

# Image Processing

- Digital Image Processing is the process of performing operations on digital images using computer-based algorithms to alter its features for enhancement or for other effects.
- Through Image Processing, essential information can be extracted from digital images.
- Techniques involved in image processing include
  - Image transformation
  - Classification
  - pattern recognition
  - Filtering
  - Image restoration

# Purpose and Applications of Image processing

- Purpose
  - Visualization
  - Image Restoration
  - Image Retrieval
  - Pattern Measurement
  - Image Recognition
- Applications
- Purpose
  - CT scan in medical field
  - Color Processing
  - Transmission and encoding
  - Pattern Recognition
  - Robot Vision
  - Video Processing

- Bioinformatics is a field that uses various computational methods and software tools to analyze the biological data.
- The field is a combination of computer science, biology, statistics, and mathematics.
- It uses image and signal processing techniques to extract useful information from a large amount of data
- Main applications of bioinformatics
  - Observing mutations in the field of genetics
  - Text mining and organization of biological data
  - Study the various aspects of genes like protein expression and regulation.
  - Genetic data comparison for understanding of molecular biology
  - Simulation and modeling of DNA, RNA e.t.c.