

### MAGAZINE

ISSUE NO: 132 May 15, 2023

Byte Quest

Department of

CSE







# COMPUTATIONAL LINGUISTICS

#### **Department Vision**

To be a center for academic excellence in the field of Computer Science and Engineering education to enable graduates to be ethical and competent professionals.

#### **FACULTY COORDINATORS**

KOMAL KAUR
ASSISTANT PROFESSOR
DR. BHARGAVI PEDDIREDDY
ASSOCIATE PROFESSOR

#### **Department Mission**

To enable students to develop logic and problem solving approach that will help build their careers in the innovative field of computing and provide creative solutions for the benefit of society.

#### STUDENT COORDINATORS

TALLURI CHANDRA KIRAN (3/4) CSE C AMOGHA KANDURI (3/4) CSE C



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## CRYPTO COMPUTING

Cryptography is the science of encrypting and decrypting data. Based on complex mathematics, provides cryptography several important information security services such authentication, confidentiality, integrity, and non-repudiation. <u>Cryptographic protocols</u> and applications make cryptography user-friendly and enable users to secure their data without having to carry out the complex mathematics themselves.



Based on the type of keys used, cryptography is classified as either symmetric or asymmetric key cryptography. Both symmetric and asymmetric key cryptography provide data confidentiality. Asymmet-ric key encryption is sometimes called <u>public key</u> encryption. Digital signatures, one of the byproducts of <u>public key cryptography</u>, enable the verification of authenticity, integrity, and non-repudiation.

While cryptography enables security, there are attempts to circumvent and subvert its use. Since most of the cryptographic algorithms are public knowledge, security of the data is reliant on the security of the cryptographic key. This makes it very important to safeguard the cryptographic keys.

#### **BIO-INSPIRED COMPUTING**

Bio-inspired computing, short for biologically inspired computing, is a field of study which seeks to solve computer science problems using models of biology. It relates to connectionism, social behavior, and emergence. Within computer science, bio-inspired computing relates to artificial intelligence and machine learning. Bio-inspired computing is a major subset of natural computation.



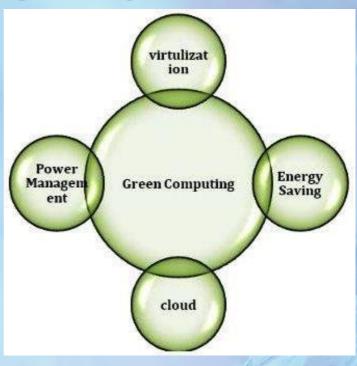
neural networks are a prevalent example of biological systems inspiring the creation of computer algorithms.[3] They first mathematically described that a system of simplistic neurons was able to produce simple <u>logical operations</u> such as <u>logical conjunction</u>, <u>disjunction</u> and <u>negation</u>. They further showed that a system of neural networks can be used to carry out any calculation that requires finite memory. Around 1970 the research around neural networks slowed down and many consider a 1969 <u>book</u> by Marvin Minsky and Seymour Papert as the main cause.



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## GREEN COMPUTING

Green computing, or sustainable computing, is the practice of maximizing energy efficiency minimizing environmental impact in the computer chips, systems and software are designed and used. In their working lives, green computers deliver the must work for the least energy, typically measured performance per watt.



Green computing is a significant tool to combat climate change, the existential threat of our time.

Global temperatures have risen about 1.2°C over the last century. As a result, ice caps are melting, causing sea levels to rise about 20 centimeters and increasing the number and severity of extreme weather events.

The rising use of electricity is one of the causes of global warming. Data centers represent a small fraction of total electricity use, about 1% or 200 terawatt-hours per year, but they're a growing factor that demands attention.

Powerful, energy-efficient computers are part of the solution. They're advancing science and our quality of life, including the ways we understand and respond to climate change. Engineers know green computing is a holistic discipline.

"Energy efficiency is a full-stack issue, from the software down to the chips," said Sachin Idgunji, co-chair of the power working group for the industry's <u>MLPerf</u> Al benchmark and a distinguished engineer working on performance analysis at NVIDIA.Idgunji's work is a job description for a growing cadre of engineers building products from smartphones to supercomputers.



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#### COMPUTATIONAL LINGUISTICS

Computational linguistics is the scientific and engineering discipline concerned with understanding written and spoken language from a computational perspective, and building artifacts that usefully languages.



The theoretical goals of computational linguistics include the formulation of grammatical and semantic frameworks for characterizing languages in ways enabling computationally tractable implementations of syntactic and semantic analysis; the discovery of processing techniques and learning principles that exploit both the structural and distributional (statistical) properties of language; and the development of cognitively and neuroscientifically plausible computational models of how language processing and learning might occur in the brain. The practical goals of the field are broad and varied. Some of the most prominent are: efficient text retrieval on some desired topic; effective machine translation (MT); question answering (QA), ranging from simple factual questions to ones requiring inference and descriptive or discursive answers (perhaps with justifications);

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