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DEPARTMENT: COMPUTER SCIENCE

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LEVEL: 400

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COURSE TITLE: AI AND EXPERT SYSTEMS

1. Explain the positive and negative impacts of ChatGPT to education.

Positive Impacts

    a. Enhances learning by providing explanations and tutoring in various subjects, making learning more interactive.
    b. Assists in research by helping students and educators summarize articles, generate ideas, and explore topics quickly.
    c. It adapts to the user's needs, making education more accessible and tailored.

Negative Impacts

    a. Over-reliance on ChatGPT may hinder students from developing independent problem-solving skills.
    b. Students may copy AI generated content without proper research which can lead to ethical issues and reduced academic integrity.
    c. ChatGPT does not always provide accurate or up-to-date information. It may generate biased or misleading answers if not fact-checked.

2. Explain the various Machine Translation methods.

Machine Translation (MT) is the automated translation of text from one language to another.

Rule-Based Machine translation (RBMT):

    a. Uses linguistic rules and dictionaries to translate text.
    b. Requires extensive grammar and vocabulary rules.
    c. Example: SYSTRAN.

Statistical Machine Translation (SMT):

    a. Translates based on statistical models trained on bilingual text
    b. Example: Google Translate (before neural networks).

Example-Based machine Translation (EBMT):

    a. Uses previously translated examples to generate new translations.
    b. Matches phrases from a database of existing translations.

Neural Machine Translation (NMT):

    a. Uses deep learning and artificial neural networks to provide more natural translations.
    b. Example: Modern Google Translate, DeepL.

Hybrid Machine Translation:

    a. Combines two or more translation methods for better accuracy.
    b. Example: using Rule-Based MT with Statistical MT

3. How many facts, rules, clauses and predicates are there in the following knowledge base? What are the heads of the rules, and what are the goals they contain?

loves(vincent,mia).

loves(marsellus,mia).

loves(pumpkin,honey_bunny).

loves(honey_bunny,pumpkin).

jealous(X,Y):- loves(X,Z), loves(Y,Z).

Facts are statements that declare relationships.

loves(vincent,mia).

loves(marsellus,mia).

loves(pumpkin,honey_bunny).

loves(honey_bunny,pumpkin).

Total facts = 4

Rules are statements that have a head and body (after :-). They are statements that define relationships based on conditions.

jealous(X,Y):- loves(X,Z), loves(Y,Z).

Total rules: 1

Clauses: Each fact and rule is a clause.

There are 4 facts and 1 rule.

Total clauses = 5

Predicates: defines the relationship between objects. It consists of a name and a number (arity).

Total predicates = 2

Head of the rule: a head is the part of a rule before (:-).

The head is jealous(X,Y)

Goal: is the part of a rule after (:-), meaning the conditions that must be satisfied.

The goals are:

loves(X, Z)

loves(Y, Z)