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PROBLEM STATEMENT

AI - BASED NUMBER GUESSING GAME

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Introduction:

The AI-Based Guessing Number Game is a traditional problem in which a system tries to guess an obscured number from a given range optimally. A human guesses randomly, while AI uses a systematic method to try and reduce the number of attempts needed to locate the correct number.

The game is played as follows:

A secret number is set within a given range (for example, 1 to 100).

The AI provides a guess.

The system gives feedback on whether the guess is too high, too low, or correct.

The AI bases its next guess on the feedback, repeating the process until the correct number is identified.

AI Techniques Used for Guessing

AI may employ various techniques to guess the number effectively:

Binary Search Algorithm: AI begins with the middle number in the range. In case of an incorrect guess, it rules out half of the numbers and makes another guess. This strategy decreases the number of attempts by a considerable extent.

Randomized Search: AI selects numbers at random but uses feedback to sharpen guesses.

Machine Learning Approach (Advanced): AI is capable of learning patterns from previous guesses and dynamically optimizing its strategy.

We applied a straightforward and intelligent method named the Binary Search Method. Rather than guessing blindly, the AI adopts a logical method to determine the right number in the minimum amount of time.

Step-by-Step Process

Select a Range: The game provides a number range (for example, 1 to 100).

Initial Guess: The AI selects the middle value of the range.

Example: If the range is between 1 to 100, the AI guesses 50 initially.

Check if it's Correct

If it is the correct guess, then the game is over. ?

If the guess is too high, then the AI is aware that the number has to be smaller. It discards the upper half and guesses again.

If the guess is too low, then the AI is aware that the number has to be larger. It discards the lower half and guesses again.

Keep Guessing Until Correct: The AI continues to repeat this procedure, halving the range every time, until it gets the correct number.

Why This Method is Clever?

Saves Time: Rather than guessing randomly, the AI gets the number in very few guesses.

Works for Any Range: Regardless of whether the number lies between 1-100 or 1-1,000,000, this technique works well.

Always Correct: The AI will always arrive at the right number with this approach.

Tools Used:

Python as the programming language

Google Colab or Jupyter Notebook for coding and executing the code

Random Library to create a secret number

CODE

```
# AI-Based Number Guessing Game

# This program uses an efficient binary search strategy to guess a number chosen by the user.


import random


def number_guessing_game():
    print("Welcome to the AI-Based Number Guessing Game!")
    print("Think of a number between 1 and 100, and I'll try to guess it.")

    low, high = 1, 100  # Defining the range of possible numbers
    attempts = 0  # Count the number of attempts

    while low <= high:
        guess = (low + high) // 2  # AI makes a guess using binary search
        attempts += 1

        print(f"Is your number {guess}? (Respond with: 'h' for too high, 'l' for too low, 'c' for correct)")
        user_input = input().lower()

        if user_input == 'c':
            print(f"Hooray! I guessed your number {guess} in {attempts} attempts!")
```

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            break
        elif user_input == 'h':
            high = guess - 1  # Adjust the search range (eliminate upper half)
        elif user_input == 'l':
            low = guess + 1  # Adjust the search range (eliminate lower half)
        else:
            print("Invalid input! Please enter 'h', 'l', or 'c'.")

    print("Game Over! Thanks for playing!")

# Run the game
number_guessing_game()
```

```
Welcome to the AI-Based Number Guessing Game!
Think of a number between 1 and 100, and I'll try to guess it.
Is your number 50? (Respond with: 'h' for too high, 'l' for too low, 'c' for correct)
5
Invalid input! Please enter 'h', 'l', or 'c'.
Is your number 50? (Respond with: 'h' for too high, 'l' for too low, 'c' for correct)
l
Is your number 75? (Respond with: 'h' for too high, 'l' for too low, 'c' for correct)
h
Is your number 62? (Respond with: 'h' for too high, 'l' for too low, 'c' for correct)
h
Is your number 56? (Respond with: 'h' for too high, 'l' for too low, 'c' for correct)
l
Is your number 59? (Respond with: 'h' for too high, 'l' for too low, 'c' for correct)
c
Hooray! I guessed your number 59 in 6 attempts!
Game Over! Thanks for playing!
```

CREDITS:

ChatGPT

GitHub

Microsoft word