

Rahul Computers

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Workshop for SE and TE

Contents:

- 1) Project (16-18 hours)
- 2) Puzzle Game/Mini Project (4-6 hours)

Fee: Rs 500 per student

Language: Python

Project options for SE

1) Balloon Flight

In this game, a hot air balloon appears on the screen. You need to use the mouse button to make the balloon rise or fall. The challenge is to keep the balloon in the air without hitting any birds, houses or trees. For every obstacle you avoid, you'll score one point. But as soon as you hit one, the game is over. If you fly the balloon for a challenged time you win.

2) First name based Gender Detection

In this NLP/ML project, the system is trained with a corpus of names of males and females. A bag of words is formed using a Vectorizer. BernoulliNB (Naive Bayes) classifier suitable for binary / boolean features is trained on the discrete data (bag of words) and readied for first name based gender detection.

3) Steganography+

In this image processing project, a document/image/any kind of file is embedded in a vessel image using LSB overwriting technique. The process ensures no visually detectable changes in the vessel image. The image (with secret file) may be transferred using emails/whatsapp chats. The recipient applies an extraction process on the image to extract the embedded document/file. As an additional (+) feature the document/file is encrypted/decrypted using a password (symmetric key).

4) Security using Armstrong Numbers and Colours

This is a cascaded cryptography system is an implementation of an IEEE paper. Multiple updates like colour based mapping tables and mathematical formulae's for increasing the efficiency from $O(n^2)$ to $O(n)$ are applied to the ideas presented in the paper.

Puzzle Game/Mini Project options for SE

1) Slideshow generation with sub titles, transition and video export

This Open CV, PIL and NumPy based system parses a directory to fetch images, form a slide show with sub titles, transition effects and video export.

2) Maze Solver

This project uses AI (AStar algorithm and Heuristic search) to help the turtle reach the egg, avoiding the hurdles.

Projects options for TE

1) Dance Challenge

In this game, the dancer performs a sequence of moves. You need to remember this sequence and make him repeat it using the four arrow keys on the keyboard. Each correct move will earn a point. You win if you complete the dance with less than 4 incorrect moves.

2) Geographical Analysis (of a country) for solutions to queries.

This system is provided with the information about the locations of various states in India (corpus). It uses Logic Programming (AI) to analyse geography and build a solver that can answer various questions based on the facts and rules.

Example queries: List of states adjacent to Maharashtra and Telangana. List of states that border to a coastal state.

3) Live Object Movement Tracking.

This project uses open cv to select objects in live or recorded videos. The movement of the objects (ball, aeroplane, bird, etc) is tracked using the CAMShift algorithm.

Puzzle Game/Mini Project options for TE

1) Region Colouring Problem

This project uses simple AI search, CSP algorithms and backtracking to colour a map with 4 colours so that no adjacent region has the same colour.

2) 8 puzzle Solver

This project uses AI (AStar algorithm and Heuristic search) to build a 8 puzzle solver (Auto order 8 numbers that are randomly arranged in a 3*3 matrix with 1 empty space).