

Introduction to Artificial Intelligence

Assignment-1

Syed Muhammad Irtiza Zaidi-23973

Table of Contents

Pathfinding Algorithms Evaluation:	2
Try1:.....	2
Try2:.....	3
Try3:.....	4
Best Algorithm Selection	5
Modifying the Task:	5
1. BFS becomes the worst choice:	5
2. DFS becomes the worst choice:.....	5
3. UCS becomes the worst choice:	5

Pathfinding Algorithms Evaluation:

Try1:

Movie1 Name: Coco

Movie2 Name: Onward

Algorithm	Breadth-First Search	Depth-First Search	Uniform Cost Search
Trace of Path	'Coco', 'Toy Story 4', 'Onward'	'Coco', 'The Wild', "Mickey's Twice Upon a Christmas", '101 Dalmatians (Animated)', 'Cars 3', 'Toy Story 4', 'Raya and the Last Dragon', 'Cinderella', 'Beauty and the Beast: The Enchanted Christmas', 'Bambi', 'Fun & Fancy Free', 'Zootopia', 'Tangled', "Howl's Moving Castle", "Recess: School's Out", 'Bolt', 'Elemental', 'Strange World', 'Elio', 'Dinosaur', "Atlantis: Milo's Return", "Teacher's Pet", 'The Aristocats', 'The Three Caballeros', 'Saludos Amigos', 'Wreck-It Ralph', 'Snow White and the Seven Dwarfs', "Ron's Gone Wrong", 'Winnie the Pooh', 'Peter Pan', 'The Little Mermaid', 'Tinker Bell', 'Aladdin', 'Onward'	'Coco', 'Toy Story 4', 'Onward'
Total Number of Nodes	6	33	15
Number of Moves to Goal	35	33	69
Number of Dead-Ends	0	0	0
Total cost	-	-	52.0

Try2:

Movie1 Name: Frozen 2

Movie2 Name: Cars 3

Algorithm	Breadth-First Search	Depth-First Search	Uniform Cost Search
Trace of Path	'Frozen 2', 'Bambi II', 'Ron's Gone Wrong', 'Raya and the Last Dragon', 'Cars 3'	'Frozen 2', 'Mulan', 'Bolt', 'Bambi II', 'The Princess and the Frog', 'Spirited Away', 'Ponyo', 'Dumbo', 'Hercules', 'The Incredibles 2', 'A Bugs Life', 'The Three Caballeros', 'Tales from Earthsea', 'The Little Mermaid II: Return to the Sea', 'Pete's Dragon', 'The Bob's Burger Movie', 'Ron's Gone Wrong', 'Return to Never Land', 'Pinocchio', 'The Nightmare Before Christmas', 'Finding Nemo', 'Treasure Planet', 'The Aristocats', 'Mickey's Twice Upon a Christmas', 'The Great Mouse Detective', 'Toy Story 4', 'Home on the Range', 'Melody Time', 'Wreck-It Ralph', 'Piglet's Big Movie', 'Fantasia', 'Mulan II', 'Tinker Bell', 'The Lion King 2: Simbas Pride', 'Monsters, Inc', 'My Friends Tigger and Pooh: Super Sleuth Christmas', 'Mickey's Once Upon a Christmas', 'Frozen', 'The Adventures of Ichabod and Mr. Toad', 'Elio', 'Cars 2', 'Little Mermaid: Ariel's Beginning', 'Howl's Moving Castle', 'Victory Through Air Power', 'Planes: Fire & Rescue', 'Inside Out 2', 'Fun & Fancy Free', 'Lilo & Stitch 2: Stich Has a Glitch', 'Tangled', 'Up', 'Phineas & Ferb the Movie: Across the 2nd Dimension', 'Spies in Disguise', 'The Wind Rises', 'Tinker Bell and the Pirate Fairy', 'Make Mine Music', 'The Rescuers', 'The Brave Little Toaster', 'Aladdin', 'The Black Cauldron', 'Alice in Wonderland', 'Tinker Bell and the Lost Treasure', 'Lilo & Stitch', 'Wreck-It Ralph 2: Ralph Breaks the Internet', 'Inside Out', 'Pooh's Heffalump Movie', 'The Lion King 1 1/2', 'The Rescuers Down Under', 'Tangled: Before Ever After', 'The Wild', 'Tigger & Pooh and a Musical Too', 'DuckTales: The Movie - Treasure of the Lost Lamp', 'Atlantis: Milo's Return', 'Pooh's Heffalump Halloween Movie', 'So Dear to My Heart', 'The Reluctant Dragon', 'Monsters University', 'The Lion King', 'The Fox and the Hound', 'Beauty and the Beast', 'Elemental', 'Saludos Amigos', 'Peter Pan', 'Cars', 'Raya and the Last Dragon', 'Chicken Little', 'Tarzan', 'The Emperor's New Groove', 'Tinker Bell and the Great Fairy Rescue', 'Brother Bear', 'Mickey, Donald, Goofy: The Three Musketeers', 'The Fox and the Hound 2', 'Toy Story 2', 'Winnie the Pooh: Springtime with Roo', 'Mars Needs Moms', 'Snow White and the Seven Dwarfs', 'Winnie the Pooh: A Very Merry Pooh Year', 'Wall-E', 'Kronk's New Groove', 'The Little Mermaid', 'Cars 3'	'Frozen 2', 'Mulan', 'The Princess and the Frog', 'The Nightmare Before Christmas', 'The Black Cauldron', 'Melody Time', 'Beauty and the Beast: The Enchanted Christmas', 'Frozen', 'Cars 3'
Total Number of Nodes	168	99	77
Number of Moves to Goal	611	99	153
Number of Dead-Ends	0	0	0
Total cost	-	-	142.0

Try3:

Movie1 Name: Planes

Movie2 Name: Brave

Algorithm	Breadth-First Search	Depth-First Search	Uniform Cost Search
Trace of Path	'Planes', 'Monsters, Inc.', 'Strange Magic', 'Brave'	'Planes', 'DuckTales: The Movie - Treasure of the Lost Lamp', 'The Rescuers', 'Toy Story', 'Monsters, Inc', 'The Bob's Burger Movie', 'Spies in Disguise', 'Raya and the Last Dragon', 'Tangled: Before Ever After', 'Finding Nemo', 'Pete's Dragon', 'Gnomeo & Juliet', 'Pinocchio', 'Return to Never Land', 'Pooh's Heffalump Halloween Movie', 'The Lion King 1 1/2', 'The Proud Family Movie', 'A Goofy Movie', 'Bambi II', 'Elio', 'The Emperor's New Groove', 'Bolt', 'Teacher's Pet', 'The Wild', 'Frankenweenie', 'A Bugs Life', 'Mickey's Magical Christmas: Snowed in at the House of Mouse', 'Brother Bear 2', 'The Many Adventures of Winnie the Pooh', 'Lilo & Stitch', 'The Black Cauldron', 'Howl's Moving Castle', 'Strange Magic', 'Encanto', 'My Friends Tigger and Pooh: Super Sleuth Christmas', 'Inside Out 2', 'Melody Time', 'Wall-E', 'The Tigger Movie', 'Meet the Robinsons', 'G-Force', 'Phineas & Ferb the Movie: Across the 2nd Dimension', 'The Nightmare Before Christmas', 'The Lion King', 'Home on the Range', 'The Aristocats', 'Tinkerbell and the Legend of the Neverbeast', 'Inside Out', 'Bambi', 'Tinker Bell and the Pirate Fairy', 'The Incredibles', 'Zootopia', 'Cinderella II: Dreams Come True', 'Fantasia', 'Fantasia 2000', 'The Wind Rises', 'The Sword in the Stone', 'The Lion King 2: Simbas Pride', 'Toy Story 4', 'Alice in Wonderland', 'Mulan', 'Aladdin', 'Beauty and the Beast: The Enchanted Christmas', 'Brave'3'	'Planes', 'The Rescuers', 'The Lion King 1 1/2', 'Toy Story 3', 'Brave'
Total Number of Nodes	108	63	31
Number of Moves to Goal	463	63	113
Number of Dead-Ends	0	0	0
Total cost	-	-	58.0

Best Algorithm Selection

The best algorithm for selecting films based on similarities between two specified films is Uniform Cost Search (UCS). UCS examines pathways according on their cost, making it ideal for determining the best path in weighted graphs with lowest cost. In this instance, weights can indicate the degree of similarity between movies, allowing you to prioritise recommendations that are more similar to both movie1 and movie2.

While shortest path may be provided by BFS, but this does not guarantee that it will be the lowest-cost or optimal path. In other words, large weights may be included in the path, which could indicate differences between the movies.

Modifying the Task:

1. BFS becomes the worst choice:
 - In a fully connected graph where all vertices have edges with weights indicating similarity, BFS may find direct paths between all movies, regardless of actual similarity or high costs. In such cases, BFS becomes less effective .
2. DFS becomes the worst choice:
 - DFS is worst for finding the shortest path in a weighted graph due to its tendency for deep exploration, potentially overlooking shorter paths with lower weights. Furthermore, its deep traversals can lead to inefficient searches, deviating far from the starting point before considering alternative paths.
3. UCS becomes the worst choice:
 - In an unweighted graph with movies having similar neighbors, BFS is ideal for finding the shortest path and identifying similar movies between two films. UCS becomes less suitable due to its cost emphasis, making BFS the preferred choice for exploring similarity relationships without considering the degree of similarity.