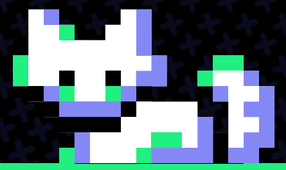
PLAYER 1

HIGHSCORE 2500

PLAYER 2

MACHINE PROBLEM 1

START MENU SIGN IN



ADD A SHORT DESCRIPTION

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RESEARCH AND COMPREHENSION

INTRODUCTION TO COMPUTER VISION

- COMPUTER VISION IS A FIELD OF ARTIFICIAL INTELLIGENCE (AI) THAT ENABLES MACHINES TO INTERPRET AND UNDERSTAND VISUAL INFORMATION FROM THE WORLD, SIMILAR TO HOW HUMANS PROCESS VISUAL DATA. IT INVOLVES ACQUIRING, PROCESSING, ANALYZING, AND UNDERSTANDING IMAGES AND VIDEOS TO PRODUCE USEFUL INFORMATION.

- ROLE OF IMAGE PROCESSING IN AI: IMAGE PROCESSING IS CRUCIAL IN AI AS IT INVOLVES TECHNIQUES TO ENHANCE, MANIPULATE, AND ANALYZE IMAGES TO IMPROVE THE QUALITY OF VISUAL DATA BEFORE IT IS INTERPRETED BY COMPUTER VISION ALGORITHMS. IT ACTS AS A PRECURSOR TO COMPUTER VISION, ENSURING THAT THE VISUAL DATA IS IN THE BEST POSSIBLE STATE FOR ANALYSIS.

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OVERVIEW AND IMAGE PROCESSING TECHNIQUES

- FILTERING: THIS TECHNIQUE INVOLVES MODIFYING OR ENHANCING AN IMAGE BY REMOVING NOISE OR HIGHLIGHTING CERTAIN FEATURES. FOR EXAMPLE, A GAUSSIAN FILTER CAN SMOOTH AN IMAGE, REDUCING THE IMPACT OF RANDOM NOISE.

- EDGE DETECTION: THIS TECHNIQUE IDENTIFIES THE BOUNDARIES WITHIN IMAGES WHERE THERE IS A SIGNIFICANT CHANGE IN INTENSITY. THE CANNY EDGE DETECTOR IS A POPULAR METHOD THAT HIGHLIGHTS THE EDGES BY DETECTING INTENSITY GRADIENTS IN THE IMAGE.

- SEGMENTATION: SEGMENTATION DIVIDES AN IMAGE INTO MEANINGFUL PARTS OR REGIONS, MAKING IT EASIER TO ANALYZE SPECIFIC AREAS. TECHNIQUES LIKE THRESHOLDING, CLUSTERING, AND REGION-BASED SEGMENTATION ARE COMMONLY USED TO ISOLATE OBJECTS OR REGIONS OF INTEREST WITHIN AN IMAGE.

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HANDS-ON EXPLORATION

- CASE STUDY SELECTION & OMPLEMENTATION CREATION

BACK TO AGENDA PAGE

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CASE STUDY SELECTION

- AI APPLICATION: AUTONOMOUS VEHICLES
- IMAGE PROCESSING TECHNIQUES USED: AUTONOMOUS VEHICLES RELY HEAVILY ON COMPUTER VISION FOR TASKS LIKE LANE DETECTION, OBJECT RECOGNITION, AND OBSTACLE AVOIDANCE. EDGE DETECTION CAN BE USED FOR LANE DETECTION, WHILE SEGMENTATION HELPS IN RECOGNIZING PEDESTRIANS AND OTHER VEHICLES ON THE ROAD.
- EFFECTIVENESS: THESE IMAGE PROCESSING TECHNIQUES ARE ESSENTIAL FOR THE SAFETY AND EFFICIENCY OF AUTONOMOUS VEHICLES, ALLOWING THEM TO NAVIGATE AND MAKE DECISIONS IN REAL-TIME.

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IMPLEMENTATION CREATION

- PROBLEM: LANE DETECTION FOR AUTONOMOUS VEHICLES
- MODEL CREATION:
- TECHNIQUE: USE AN EDGE DETECTION ALGORITHM (LIKE THE CANNY EDGE DETECTOR) TO IDENTIFY LANE BOUNDARIES ON A ROAD.
- HOW IT WORKS: THE ALGORITHM PROCESSES EACH FRAME CAPTURED BY THE VEHICLE'S CAMERA, DETECTS EDGES IN THE IMAGE, AND HIGHLIGHTS THE LANE BOUNDARIES. THIS INFORMATION IS THEN USED BY THE AI SYSTEM TO KEEP THE VEHICLE CENTERED IN ITS LANE.
- VISUAL AID: PROVIDING A BEFORE-AND-AFTER COMPARISON OF A ROAD IMAGE SHOWING HOW THE LANE BOUNDARIES ARE IDENTIFIED USING EDGE DETECTION.

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SUMMARIZATION

- SUMMARY: IMAGE PROCESSING TECHNIQUES LIKE FILTERING, EDGE DETECTION, AND SEGMENTATION ARE VITAL FOR ALLOWING AUTONOMOUS VEHICLES TO INTERPRET THEIR SURROUNDINGS.

- KEY LEARNINGS:

- AUTONOMOUS VEHICLES DEPEND ON ACCURATE IMAGE PROCESSING TO MAKE SPLIT-SECOND DECISIONS.

- ROBUST EDGE DETECTION AND SEGMENTATION IMPROVE THE VEHICLE'S ABILITY TO NAVIGATE COMPLEX ROAD ENVIRONMENTS.

- REFLECTION:

- THIS PROJECT HIGHLIGHTS THE IMPORTANCE OF APPLYING THESE TECHNIQUES TO ENABLE SAFER AND MORE EFFICIENT AI SYSTEMS.


MENU
THANK YOU!