National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Navigation and Control of Autonomous Underwater Vehicle in Unfamiliar Underwater Environment Using Artificial Intelligence Assisted Methodologies
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Supervisor	: Prof. Dayal Ramakrushna Parhi
Venue	: ME 001
Date and Time	: 29 Apr 2024 (4.30pm)

Abstract : An autonomous underwater vehicle is a particular class of unmanned underwater vehicles that can complete its task without the help of a human. For attaining this autonomy, the robot should have the ability to navigate through obstacle to find its goal. Different kinds of literature were studied to better understand the previously conducted research. From the literature reviews, it is evident that most of the research on navigation is conducted on mobile and humanoid robots, while the field of AUV navigation still needs to be explored. Different artificial intelligence (AI) and optimization techniques were also reviewed. Four optimization techniques, i.e., Tuna Swarm Optimization (TSO), Monarch Butterfly Optimization (MBO), Flower Pollination Algorithm (FPA), Prairie Dog Optimization Algorithm (PDO), are selected for their advantages like balance in exploration and exploitation, better computational speed, ability to solve complex and nonlinear problems over other traditional swarm based techniques. Among the above techniques, TSO is modified and implemented on an underwater robot to determine efficiency. Both simulations and experiments were conducted where less than 5% deviation was found, which was within the desired limit. These results were compared against the conventional TSO, where 118.7 cm less path length is noticed for AUV controlled by MTSO and is 2.2 sec faster.