

IIT-Indore designs smart bio-mimetic aquatic robot

Institute is also developing memory alloy integrated glass fiber reinforced composite flapper for missiles

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INDORE

A team of researchers at Indian Institute of Technology Indore has designed smart material based bio-mimetic aquatic robot that can probe underwater conditions and can be used for surveillance.

"Dr IA Palani with his research group at IIT-Indore has developed the robot," said Nirmala Menon, media in-charge of IIT-Indore.

IIT-Indore is focused on developing smart material based micro-devices and ro-

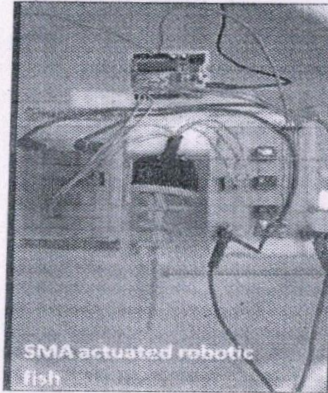
botic systems. Dr Palani with his research group at IIT-Indore is into the development of shape memory alloy (smart material) based intelligent devices.

The group has designed a bio-mimetic shape memory alloy actuated underwater robots.

This project aims at biomimicking the undulating motion of a fish, using carangiform mode of swimming and uses its tail fin for propulsion.

"The skeleton of the robot fish is designed using CAD and the final prototype is 3D printed. SMA springs were chosen as actuators and it acts as a dynamic rib between the skeletal structures. The skin and the caudal fin of the robot is manufactured at IIT-Indore using

photopolymer, which was cured by UV rays to get the desired shape as an elastomer," Menon said.



The posterior end of the fish is made with a thin skin of soft polymer. The buoyan-

cy of the robot is set so that, robot floats just below the surface of water. Fin is flexible to mimic the motion of a real fish. This robot has a potential application in probing the underwater condition and surveillance.

Project was completely funded under promotion of research for undergraduate student (PRIUS) scheme from IIT-Indore.

Research scholars from Mechatronics and Instrumentation lab at IIT-Indore have demonstrated for the first time, a novel copper-based flexible SMA bi-morph, with high flexibility and recovery ratio.

This bi-morph has potential application towards energy harvesting and MEMS based device.

A project has been initiat-

ed in collaboration with Volvo Eicher, MHRD and IIT-Indore for waste heat recovery from automobile engine using SMA bi-morph.

Post graduate students at IIT-Indore are involved in developing several other SMA actuated micro devices which include micro-valves for drug delivery and SMA actuated stewart platform for opto-mechatronics device.

Further the research group is into the development of shape memory alloy integrated glass fiber reinforced composite flapper for missiles. This flapper will be helpful to precisely control the orientation of missiles. This project is in collaboration with Defense Research Development Organisation (DRDO) and IIT-Indore.