(様式 5)

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学位（博士）論文要旨

(Doctoral thesis abstract)

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論 文 題 目 (Title)	A Solution Path for Search and Rescue and Rehabilitation through Robotics

論文要旨 (2000 字程度)
(Abstract(400 words))
※欧文・和文どちらでもよい。但し、和文の場合は英訳を付すこと。
(in English or in Japanese)

Imagine if is there is a natural calamity like an earthquake or a tsunami and there is a need for search and rescue with people stuck under the debris. We need a solution for this problem to save the lives of people. If we can improve the process of search so that rescue help will come even faster and if the time for search can be reduced, then more lives will be saved. Some researchers have worked with neural stimulation of the cyborg insects, and some have worked to equip them with sensors like camera and microphone. One work equipped a beetle insect with a small blue tooth camera, some have worked on equipping with omnidirectional microphones, others have worked on simulation of distributed bio bot nodes but no one has worked on the combined ability of navigation with camera and neural control. I in the process of developing an end to end solution have developed a cyborg insect which can be navigated by camera feedback with remote neural stimulation. Coming to snake robot some of the founding members have worked on slender designs, amphibious mechanisms and some have studied differential gait locomotion, some have studied salamander like snake robots, some have equipped with snake robot with a camera, but no one has worked with sound source localization on reconfigurable snake robots to listen to help cries. I have developed a sound source localization-based snake robot which can listen to sound sources like help cries of survivors by using minimum number of mics with shape reconfiguration. Now given that the search process is execute with cyborg cockroach and sound reactive snake robot the wounded survivors are treated with surgeries by surgeons and doctors who are trained with robotic surgical tools. For this purpose, we developed an anthropomorphic search elastic actuator based surgical trainer arm and a human computer interface which is not possible with robotic surgical joystick like Phantom from 3D systems. After this process if there are patients who have lost a limb like an arm or a leg due to amputation or because of the natural calamity then we have developed an EMG controlled robotic leg that allows lower leg amputees to ride a bike and control it with neural signals. Thus, in this process we have shown with the development of robotic systems as to how we can provide an end to end solution chain for search and rescue and rehabilitation.

(英訳) ※和文要旨の場合(400 words)