

RATBOTS USING EMBEDDED SYSTEM

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Abstract "Robot" as an "apparently human automation, intelligent but impersonal machine..." A ratbot or roborat is a rat controlled through implants in its brain. Guided rats controlled through implants in their brains could one day be used to search for landmines or buried victims of earthquakes, scientists say. An extraordinary experiment has seen researchers steering five rodents - so-called ratbots - through an obstacle course by remote control. Writing in the journal *Nature*, the scientists say the ratbots could reach places inaccessible to humans or machines. "One can think of the guided rat as a very good robot platform capable of traversing terrain that modern robots are unable to do," Dr Talwar said. The rodents in the first experiment wore a small electronics backpack that linked to electrodes in their brains. They received radio commands from a laptop that would stimulate sensations in their whiskers and reward/pleasure receptors to manipulate them into following pre-programmed routes. Some researchers propose using them to search for landmines or buried victims of earthquakes, as they can much more efficiently scout such areas than human rescuers or existing robots. The rats also quickly learnt to associate the stimulation of their brains' reward centres with simply walking forwards, even if this involved climbing or descending ladders or steps, or moving into the centre of a brightly lit room - something that most rats would avoid.

I. INTRODUCTION

Rat - common name for any large member of a family of rodents, with dull - colored, coarse fur; long tails; large ears; and a pointed snout. Rats have extremely powerful teeth, with which they often gnaw through wooden planks to get to stores of food, and they have even been known to bite holes in lead pipes. They are usually nocturnal and live in human habitations, in forests, in deserts, and on seagoing ships. They are extremely prolific, breeding 1 to 13 times a year and producing 1 to 22 young in a litter. Most species of rats are herbivorous, but some are omnivorous. Rats have an average lifespan of eight months to one year in the wild and two to three years in captivity.

Animals have often been used by humans in combat and in search and rescue, but not under direct computer-to-brain electronic control.

The advent of surgically altered roborats marks the crossing new boundary in the mechanization, and potential militarization, of nature.

- ❖ This ratbot technology isn't nanotechnology yet, and it is not new, as the principle of "MIND CONTROL" through implantable devices is the same

INTO THE TOPIC

- ❖ Two electrodes lead to the parts of the rats' brains, which normally detect an obstacle against their whiskers. A third plunges into an area of the brain identified as far back as the 1950s as providing the rat with a feeling of pleasure when stimulated this area of stimulation is called Medial Forebrain Bundle (MFB)
- ❖ Once trained they would move instantaneously and accurately as directed, for up to an hour at a time. The rats could be steered up ladders, along narrow ledges and down ramps, up trees, and into collapsed piles of concrete rubble.



STEP WISE PROCEDURE OF HOW RATBOTS ARE BUILT.....

↻ Step-1

After anesthesia being given, the mouth of the rat is first cut in order to go through the incision towards Brain.

↻ Step-2

Now the incision continues towards to the head position to reach the brain

↻ Step-3

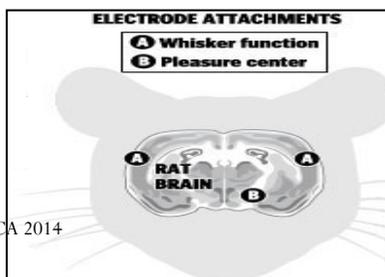
The Three electrodes used for stimulation are placed as shown beside

↻ Step-4

A Back Pack with batteries, an antenna, a receiver and a camera is placed to rat as shown beside

↻ Step-5

Finally the rat is molded into Ratbot and the only thing left with it is, it should be trained



HOW RATBOTS LOOK LIKE...

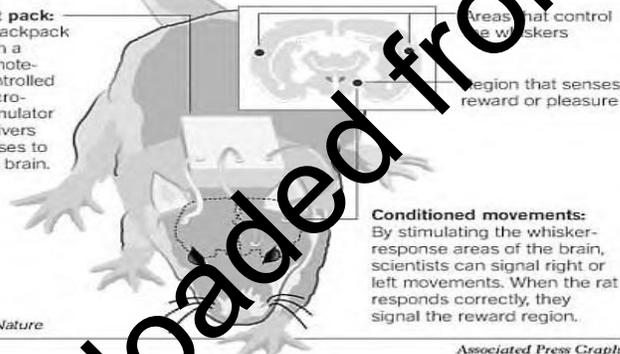
The remote control rats look like school children, wearing small backpacks that house microprocessor-based remote-controlled stimulators. Wires connect the backpack to tiny electrodes that have been placed into areas of the rat's brain that are responsible for reward and areas that process signals from their whiskers. Manipulating these two areas of the brain controls the rats.



II. WORKING (OR) OPERATION OF RATBOT

Remote-controlled rats could be an important new aid for search and rescue teams.

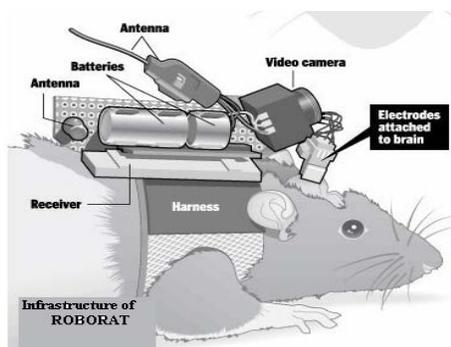
Rat pack:
A backpack with a remote-controlled micro-stimulator delivers pulses to the brain.

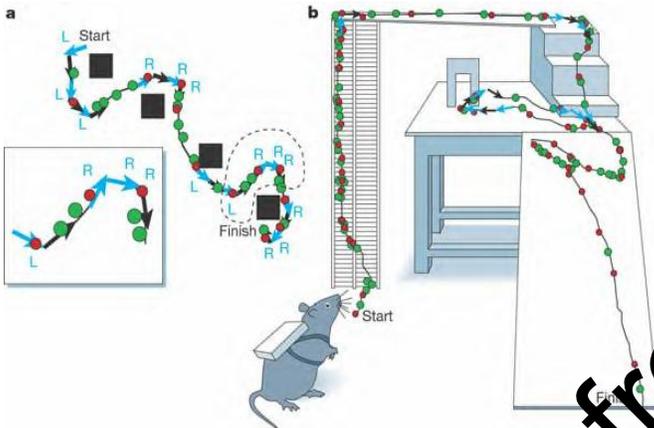
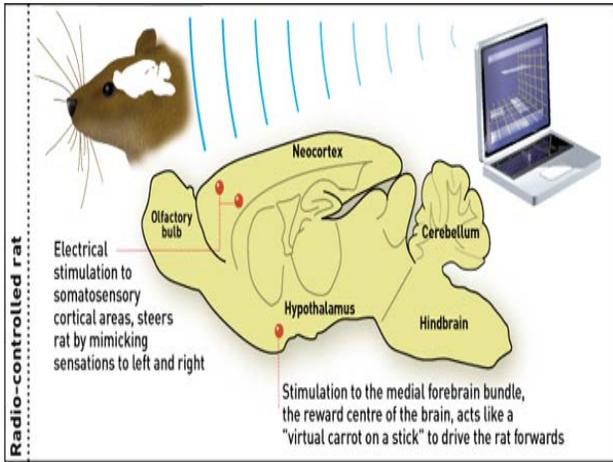


Conditioned movements:
By stimulating the whisker-response areas of the brain, scientists can signal right or left movements. When the rat responds correctly, they signal the reward region.

Source: Nature

Associated Press Graphic





SCIENTISTS CONTROL RAT'S MOVEMENTS

1. The scientist sends signals to rat's brain.

2. The rat is instructed which way to move by the technology contained in its brain.

SCIENTISTS OPINIONS (ABOUT RATBOT)

- It could save a lot of lives. It's not all bad for the rats because they feel pleasure when they go the right way
- Rats are small and can fit into places where we can't. If it helps save lives then we should implement it.

APPLICATIONS

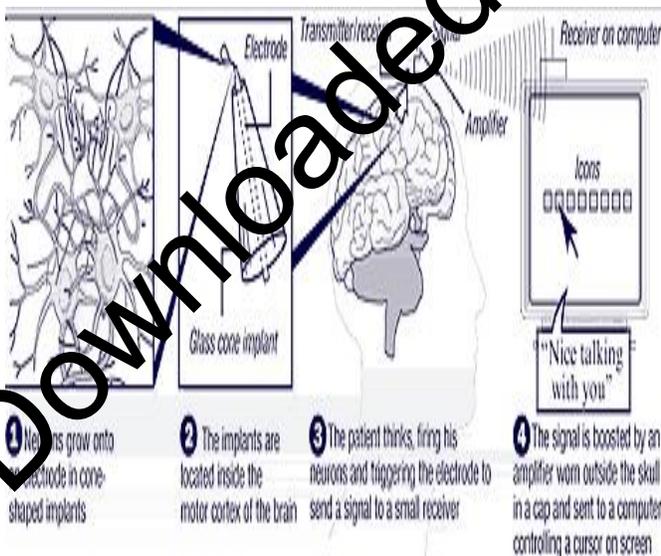
- ❖ Giant Rats Trained To Sniff Out Land Mines
- ❖ Roborat Could Help Find Earthquake Victims



EVOLUTION OF THE IDEA

The work on guided rats was an offshoot of earlier research which showed that animals wired up to a processor could command a robotic arm by thought alone, a development which could potentially empower paralyzed humans.

FUTURE DEVELOPMENTS



CONCLUSION

New inventions in science always have ethics as a shadow.

So what ever may be the ethics, the rat loves to become a RATBOT and helps to save human life.

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