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An engineer's fiery passion for robots

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Rex Sham was so inspired by the robot cat Doraemon that he created his own - one that detects wildfires to stop them from spreading

Doraemon, the robotic cartoon cat from Japan, was the early inspiration for a young Rex Sham Pui-sum and the reason he got into robotics. On the day he discovered that Doraemon did not exist in real life, the then schoolboy set about creating his own.

Sham, 29, studied engineering at Chinese University before starting his own company, then called Hong Kong Robotics. His first foray into business involved creating custom designed circuit boards for factory automation and education.

But an investor who saw potential in him and his inventions enabled him to move forward in his field. Sham then created a fire detection robot that can be used in country parks to detect even very small fires.



The Computer Vision Wildfire Detection System uses a robot equipped with thermal imaging sensors and advanced artificial intelligence vision technology. It can detect and locate wood- or vegetation-based fires - as small as two metres by one metre in size - within a 5km radius, covering up to nearly 80 sq km of forest and living area.

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The robot then sends real-time images and the location of the fire to control centres for manual or computer analysis, allowing local fire services to stop the fire from spreading.

Sham's company, now known as Insight Robotics, has sold 60 such robots to the mainland for use in its country parks.

"This month and the next, we will be setting up a pilot site with the Agriculture, Fisheries and Conservation Department in Tai Mo Shan," Sham says. If the department approves Sham's robot fire detection system, it will put forward a budget plan to the Legislative Council in 2016, he said.

Sham graduated this year from the Hong Kong Science and Technology Park's three-year Inco-Tech programme, an incubation programme for young scientists that teaches them business skills and provides them with office space. By the end of June, the non-profit body's programme had seen 319 graduates, 242 of whom are still in business.

Since 2010, Sham's company has developed a close working partnership with the Guangdong Academy of Forestry to protect the mainland's forests and ecosystem.

In his work to save the forests, Sham also gets to release his inner pyromaniac, testing his robotics system with firefighters in southern China by setting fires on hillsides for them to be detected by the system and then extinguished.

In December 2011, Sham and his colleagues joined a major forest fire drill in Guangdong province that involved more than 600 firefighters, 200 senior forestry officials and three helicopters.

On top of the wildfire detection system that is used in a fixed location, Sham has also developed a small unmanned helicopter with the robot attached, allowing it to be transported into high-temperature fires and smoke to collect data.

"Forest fires cause 30 per cent of our carbon emissions," Sham says. "Most of these are set by humans. Only 8 per cent of forest fires are started by lightning and other natural causes."

Some fires are started to burn fields ahead of the planting season while others are meant to clear woodland. The Ching Ming festival can be a problem, says Sham, because people often leave joss sticks and offerings burning by graves in the hills after paying respects to their dead loved ones.

Sham's robot can even detect if fires were started by an arsonist, he says, because such fires often follow a pattern in which the arsonist puts a distance between each fire to prevent himself from being caught in them.

Sham has also tested his robot with the Canadian government in Alberta and is looking to test it in New Zealand and especially Australia, which is affected by destructive bush fires every year.

In April, Insight Robotics won the Hong Kong Information and Communications Technology Best Innovation Grand Award. It has been put forward for the innovation for good category of the Spirit of Hong Kong Awards.

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