**AI that detects cancer in blood and pinpoints its location before symptoms appear 'could be ready in one year'**

* **Scientists from the University of California developed the new software**
* **It works by looking for specific molecular patterns in cancer DNA**
* **The algorithm was able to correctly detect cancer in 80 per cent of cases**

By [Tim Collins For Mailonline](http://www.dailymail.co.uk/home/search.html?s=&authornamef=Tim+Collins+For+Mailonline)

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* [e-mail](mailto:?subject=Read%20this:%20AI%20that%20detects%20cancer%20in%20blood%20and%20pinpoints%20its%20location%20before%20symptoms%20appear%20%27could%20be%20ready%20in%20one%20year%27&body=AI%20that%20detects%20cancer%20in%20blood%20and%20pinpoints%20its%20location%20before%20symptoms%20appear%20%27could%20be%20ready%20in%20one%20year%27%0A%0AThe%20program%2C%20dubbed%20CancerLocator%2C%20works%20by%20looking%20for%20specific%20molecular%20patterns%20in%20cancer%20DNA.%20It%20was%20created%20by%20a%20team%20from%20the%20University%20of%20California%20at%20Los%20Angeles.%0A%0Ahttp%3A%2F%2Fwww.dailymail.co.uk%2Fsciencetech%2Farticle-4343264%2FNew-computer-program-detect-early-traces-cancer.html%3Fito%3Demail_share_article-top%0A%0A%0AMost%20Read%20Articles%3A%0A%0AIs%20Italy%27s%20SUPERVOLCANO%20about%20to%20blow%3F%20Experts%20warn%20that%20Campi%20Flegrei%20is%20at%20a%20%27critical%20stage%27%20in%20the%20build%20up%20to%20a%20devastating%20eruption%0Ahttp%3A%2F%2Fwww.dailymail.co.uk%2Fsciencetech%2Farticle-4500412%2FIs-Italy-s-SUPERVOLCANO-blow.html%3Fito%3Demail_share_article-top_most-read-articles%0A%0ASay%20goodbye%20to%20the%20MP3%3A%20Format%20is%20officially%20%27killed%20off%27%20after%20founders%20terminate%20its%20licensing%20programme%0Ahttp%3A%2F%2Fwww.dailymail.co.uk%2Fsciencetech%2Farticle-4507098%2FMP3-format-killed-founders-terminate-licensing.html%3Fito%3Demail_share_article-top_most-read-articles%0A%0AWhy%20nobody%20will%20own%20a%20car%20in%202030%3A%20Self-driving%2C%20electric%20ride-shares%20will%20spell%20the%20end%20for%20traditional%20automobiles%0Ahttp%3A%2F%2Fwww.dailymail.co.uk%2Fsciencetech%2Farticle-4506568%2FBy-2030-won-t-car-death-spiral-oblivion.html%3Fito%3Demail_share_article-top_most-read-articles%0A%0A)

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A machine that can detect[**cancer**](http://www.dailymail.co.uk/news/cancer/index.html)from a blood sample could be ready in a year.

Scientists in [**California**](http://www.dailymail.co.uk/news/california/index.html) have developed a computer program that can detect tumour DNA as well as specify where in the body it is coming from.

The program, dubbed CancerLocator, works by looking for specific molecular patterns in cancer DNA.

Researchers have developed a computer program that can simultaneously detect cancer and identify where it is in the body purely from a blood sample

**THE RESULTS**

Blood samples from 29 liver cancer patients, 12 lung cancer patients and five breast cancer patients were tested.

Out of the 29 liver cancer patients, 25 had early stage cancers - which the program was able to detect in 80 per cent of cases.

It was also able to identify the five out of 12 lung cancer patients tested who also had the disease.

The new program had an error rate - the chance of a false positive - of 0.265, a more than 50 per cent improvement on the nearest best computer model.

Created by a team from the University of California at Los Angeles, it then compares these patterns against a database of genetic modifications known to be caused by different cancer types.

DNA from tumour cells is known to end up in the bloodstream in the earliest stages of cancer and so offers a unique target for early detection.

Professor Jasmine Zhou, co-lead author of the study, said: 'Non-invasive diagnosis of cancer is important, as it allows the early diagnosis of cancer, and the earlier the cancer is caught, the higher chance a patient has of beating the disease.

'We have developed a computer-driven test that can detect cancer, and also identify the type of cancer, from a single blood sample.

'The technology is in its infancy and requires further validation, but the potential benefits to patients are huge.'

The new computer program was tested alongside two other popular machine learning algorithms - called Random Forest (RF) and Support Vector Machine (SVM).

The three were tested with blood samples from 29 liver cancer patients, 12 lung cancer patients and five breast cancer patients.

The work was carried out by scientists from the University of California. This graph shows the low error rate of the new software compared to two other popular machine-learning algorithms

 The non-invasive test could prove to be an early detection method for cancers of organs with good blood circulation - like the liver and lungs (middle two bars). But it does not perform as well with dense tissue like the breasts (left bar)

Tests were run ten times on each sample to validate the results.

The team compared the error rates of each method - the chance that the tests will produce a false positive - and found that RF and SVM had rates of 0.646 and 0.604 respectively.

The new program obtained a lower error rate of 0.265, a more than 50 per cent improvement on older models.

Out of the 29 liver cancer patients, 25 had early stage cancers - which the program was able to detect in 80 per cent of cases.

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It was also able to identify the five out of 12 lung cancer patients tested who also had the disease, though the level of tumour DNA present in the blood is much lower during the early stages of these cancers.

Professor Zhou added: 'Owing to the limited number of blood samples, the results of this study are evaluated only on three cancer types (breast, liver and lung).

'In general, the higher the fraction of tumour DNAs in blood, the more accurate the program was at producing a diagnostic result.

'I hope it [a diagnostic test] will be available within a year. It depends on training data, testing and machine learning,' she told [**The Independent**](http://www.independent.co.uk/life-style/health-and-families/health-news/cancer-blood-test-university-of-california-jasmine-zhou-dna-tumour-samples-computer-program-a7646956.html).

'With enlarged training and testing data we are confident to achieve much higher performance.'

The team [**published**](http://genomebiology.biomedcentral.com/articles/10.1186/s13059-017-1191-5) their findings in the journal Genome Biology.

Read more: <http://www.dailymail.co.uk/sciencetech/article-4343264/New-computer-program-detect-early-traces-cancer.html#ixzz4h9kdxKDm>   
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