"AI cannot replace doctors in making the final decision on patient's course of medication treatment": Dr Cathy Fang

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Artificial Intelligence (AI) is increasingly shaping the future of healthcare. From assisting doctors in diagnosing diseases faster and more accurately to improving patient care, AI has the potential to make a life-saving impact. According to recent research undertaken by Frost & Sullivan, AI in the healthcare market is predicted to hit US$6.16 billion by 2022. It is also set to save the healthcare industry US$150 billion by 2025, thanks to its ability to minimise complexity, reduce risk, improve accuracy and increase profitability. In conversation with BioSpectrum Asia, Dr Cathy Fang, Vice-President, Yitu Healthcare, Hangzhou, China shares her views on the role of AI in early lung cancer diagnosis and its evolving future. Excerpts from the interview:

1. **What is the importance of artificial intelligence in healthcare? What role does it play in early lung cancer diagnosis?**

Healthcare needs are on the rise as a result of rapidly-ageing populations in the region and the growing prevalence of chronic diseases. AI, when coupled with data, analytics and machine learning, can help meet these complex healthcare demands by assisting doctors to diagnose and treat diseases at an earlier stage, and optimising clinical operations and resources.

Using lung cancer as an example, the disease presents a challenge to China's healthcare sector as approximately 830,000 people are diagnosed with lung cancer every year, accounting for 25 percent of all cancer deaths in the country. With the number of radiologists that are available in China, every radiologist would need to analyse at least 20,000 CT images a day to provide a diagnosis for every patient. This presents a risk of missed diagnosis or misdiagnosis due to fatigue or human error.

In the case of lung cancer, our AI system helps radiologists do an initial review of CT scans but the radiologist still reads the scans himself and has to determine if he agrees with the diagnosis generated by the AI system.

Ultimately, our AI system is designed as an assistive tool for doctors - doctors still make the final decision concerning patients' course of treatment or medication.

2. **How far has artificial intelligence advanced over recent years and what impact has it had on healthcare so far?**

The use of AI in healthcare is still in its early stages. However, AI can be a useful assistive tool for clinicians and has the potential to augment the ways healthcare professionals provide patient care.

- In early disease detection and diagnosis, AI can help detect diseases, such as cancer, more accurately and faster and in their early stages, when it is usually easier to treat.

- In clinical decision making, big health data combined with predictive analytics help support clinical decision-making and actions. The use of AI can also prioritise tasks automatically so healthcare professionals can focus on cases which require their urgent attention.

- In patient-doctor interactions, AI is helping automate many of the routine tasks that doctors handle on a daily basis. This enables them to be more efficient administratively and frees up their time for better patient interaction or to undertake more research.

As AI adoption in healthcare becomes more prevalent, healthcare organisations should look into how they can better align their workflows and organisational structures to take better advantage of new AI capabilities.

3. **How is AI going to help healthcare professionals advance quality of patient care?**

AI can be a useful assistive tool for healthcare professionals, helping them work more efficiently and effectively. In the demanding healthcare sector, doctors and healthcare professionals are often faced with tremendous amounts of pressure at work. This is also exacerbated by the shortage of healthcare professionals, which puts further strain on healthcare professionals. Singapore for instance has a lower proportion of healthcare professionals per capita compared to healthcare systems in a number of other developed countries, with the Ministry of Health predicting that Singapore will need an additional 30,000 healthcare workers by 2020. The United States has 2.6 doctors per 1,000 citizens. Singapore only has 2.2, which is at the lower range for developed nations.

The fatigue and stress healthcare professionals face may result in misdiagnoses which will impact the quality of patient care. AI can help streamline some of the more routine work doctors do, such as reviewing CT images and writing detailed reports. With AI as an assistive tool, doctors can focus more on better patient engagement, or even research work. Patient engagement is an important component of healthcare, and often the level of engagement determines the quality of care they receive.

The consistency of AI also makes it an invaluable tool in helping raise the quality of care for patients. Using medical imaging as an example, AI can analyse diagnostic imaging scans such as CT scans for long periods of time without fatigue or distractions. This results in consistently accurate diagnoses over an extended period of time, which the average human doctor may find challenging to achieve.

It bears repeating that although AI can assist doctors with such diagnostic tasks, it cannot replace the years of training and experience they have gained from treating patients.

Medicine is both an art as well as a science. Doctors make judgements on a patient's condition from intuition and conscious

reasoning supported by their training and experience. Their knowledge and experience are necessary to validate any diagnosis generated by the AI.

4. **How is adoption of AI healthcare solutions impacting patient care in China? Do you have any examples to exemplify these tangible results?**

Lung cancer is one of the leading causes of cancer deaths in China and approximately 830,000 people are being diagnosed with lung cancer every year. With the number of radiologists that are available in China, every radiologist would need to analyse at least 20,000 CT images a day to provide a diagnosis for every patient. The manual nature of this process may result in missed diagnoses or misdiagnoses as a result of human error.

With Yitu Healthcare's *care.ai Intelligent Diagnosis System for Chest CT*, which is in use in more than 100 leading 3A hospitals in China, this helps medical professionals complete the detection of lung nodules within seconds, of which the sensitivity of lesion detection is greater than 95 percent. The system also automatically generates a structured report that has a 92 percent acceptance rate by clinicians. The AI- powered diagnostic system is already making a positive impact for patient care in China by greatly improving the interpretation efficiency of chest CT scans and helping relieve the work pressure radiologists face, cutting down on the number cases where healthcare professionals miss diagnoses or misdiagnose. Since 2016, the system has been deployed in leading 3A hospitals across China, including the Zhejiang Provincial People's Hospital, Second Affiliated Hospital of Zhejiang University and Fudan University Shanghai Cancer Centre.

Another example is Yitu Healthcare's *care.ai Intelligent Diagnosis System for Child Growth and Development* which uses advanced AI medical imaging technology to calculate a child's bone age within seconds. Bone age evaluation is frequently used as an indicator of a child's skeletal and biological maturity. It helps doctors diagnose a child's growth and development more accurately and enables them to make timely treatment decisions to optimise a child's growth. With our system, diagnosis time is cut from 30 minutes to less than 5 seconds, increasing diagnostic efficiency by 360 times. The system delivers results with a very high accuracy rate, with doctors' adoption rate of the bone age results exceeding 99 percent.

5. **How is the use of AI in healthcare going to evolve in the coming years/ future?**

While AI's role in healthcare is still at a nascent stage, we have witnessed how the technology has been developing and getting increasingly better at performing tasks more efficiently and at a lower cost. From our perspective, AI is set to transform disease detection and diagnosis, empowering medical practitioners to help patients achieve better clinical outcomes.

The use of AI algorithms to detect cancerous nodules have applications beyond lung cancer. At Yitu Healthcare, our AI system for breast cancer detection is currently undergoing clinical trials in China.

As AI technologies advance, AI may be able to play the proactive role of identifying patients at risk of developing a disease and providing healthcare workers with that insight to help work with patients to manage these risks.

There have also been some concerns about AI replacing doctors and healthcare workers in the near future. However, AI cannot replace doctors in making the final decision on a patient's course of treatment of medication. The adoption of AI in the healthcare sector is meant to complement healthcare professionals, increasing their productivity and efficiency, and freeing up their time so that they can focus their efforts on patient care. Doctors will still have the final say in deciding on the course of treatment for their patients, using the years of training and experience they have gained during the course of their work.