

A Visionary Conversation: Insights on the Frontiers of AI in Communication

展望未來的對談： AI 在通訊領域的前沿見解

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Professor Wong Kam Fai, a pioneering figure in AI in Hong Kong, has been at the forefront of the development of AI chatbots in the field of communication. He believes that AI in this domain can monitor signals, identify patterns, and provide valuable insights.

The Evolution of AI

Before the advent of generative AI, there was predictive AI, which operated through classification techniques. For instance, categorizing someone as female if they were wearing a dress. This supervised learning approach required extensive labeling of data by experts, a time-consuming and labor-intensive process. So unsupervised learning began to develop, where the machine no longer looks for patterns, but is given a set of data with similar characteristics, and the machine groups them together and the expert labels the whole group. Now, with generative AI, it is largely just filling in the blanks. For example, in communications, when a signal is found, AI can predict what the signal is about.

Copyright Challenges

Wong discusses the potential application of generative AI to creative work, such as generating text in the style of a particular author. However, this raises important copyright questions. He draws the analogy of someone humming a song and another person publishing it – does the original person have copyright ownership? In the age of generative AI, does copyright apply to generative AI itself? He believes that generative AI will change the definition of intellectual property.

Getting started

Wong started working on AI during his PhD, and at that time, the three most important things about the technology were: one, what to do with the data; two, the algorithms; and three, the computational power. He worked mainly on the algorithms, but the problem was that there wasn't a lot of data at the time, and even when he had it, the computers weren't powerful enough to do the calculations.

It was only around the start of Nvidia and the development of GPUs that computing power started to become possible. So, in his time, they were not paying much attention to data, but they were developing rule-based systems instead. He gives the example of learning a language, where the set of rules about grammar and spelling is what rule-based systems take into account. However, in real life, people who are fluent in that language don't usually speak that way, so the only way to learn is through receptive listening and practice, which is what machine learning does.

AI in the future

Wong talks about the destiny of AI for the public. He starts with the example of the split of Open AI, how Open AI started as a company that did not receive any revenue from providing ChatGPT, but as the company developed, they did not have enough funds to continue research and development. So they set up a subsidiary of Open AI to ask for funding. However, Sam Altman was kicked out because he became too commercialised and always had to serve investors and sponsors promptly, such as Microsoft who wanted to buy GPT so he could bundle it with Bing and create a smart engine, so whenever there was new development he wanted to push it out quickly to gain market recognition. The others disagreed because they wanted to build something that was safe and tested before pushing it out. So, Wong believes that in the future, discussions of AI will involve a lot more disputes of the same kind about safety and security. The second problem is the affordability of AI. To build a trustworthy and effective system, a huge amount of data is needed, and to get that

黃錦輝教授是香港 AI (人工智能) 領域的先鋒人物，一直走在開發通訊領域 AI 聊天機器人發展的前列。他認為，這領域的 AI 可以監測信號、識別模式，並提供有價值的見解。

AI 的演進

在生成式 AI 出現之前，有一種透過分類技術運作的預測式 AI。例如：將穿裙子的人歸類為女性。這種監督學習方法需要專家對資料進行大量標籤，是一個耗時耗力的過程。因此無監督學習方法開始發展起來，在這種方法中，機器不再尋找模式，而是給出一組具有類似特徵的資料，然後機器將其組合起來，再由專家對整組資料進行標籤。現在，有了生成式 AI，很大程度上就是填空。舉例來說，在通訊領域，當發現一個訊號時，AI 就可以預測這個訊號是關於什麼的。

版權挑戰

黃教授討論了生成式 AI 在創作工作中的潛在應用，例如以特定作者的風格生成文字。然而，這也引起了重要的版權問題。他打了個比方：某人哼唱了一首歌，而另一個人將之出版，那麼原作者是否擁有版權的所有權？在生成式 AI 時代，版權是否適用於生成式 AI 本身？他認為生成式 AI 能將改變知識產權的定義。

初探門道

黃教授在攻讀博士學位期間開始研究 AI，當時對於這項技術最重要的三件事是：1) 如何處理數據；2) 演算法；3) 運算能力。他主要研究演算法，但問題是當時沒有太多數據，即使有數據，電腦的運算能力也不夠強大。

大約在輝達 (Nvidia) 和 圖形處理單元 (GPU) 開發之初，運算能力才開始成為可能。因此，在他那個時代，他們並不注重數據，反而是在開發基於規則的系統。他舉了一個學習語言的例子，基於規則的系統所考慮的是一套關於語法和拼寫的規則。然而，在現實生活中，精通該語言的人通常不會這樣說，所以學習的唯一方法就是通過接受性聆聽和練習，這就是機器學習所要做的。

未來的 AI

黃教授談到 AI 對大眾的命運。他先以 Open AI 的分拆為例，說明 Open AI 一開始是一家不靠提供 ChatGPT 獲得任何收入的公司，但隨著公司的發展，他們沒有足夠的資金繼續研發。於是他們成立了 Open AI 的子公司來請求資金。然而，Sam Altman 被踢出局了，因為他變得太過商業化，總是要及時為投資人和贊助商服務，例如微軟就想買下 GPT，讓他可以和 必應 (Bing) 綑綁在一起，創造一個智慧引擎，所以每當有新的研發成果，他就想趕快推出來，以獲得市場的認同。其他人則不同意，因為他們希望先建立一些安全且經過測試的東西，然後才推向市場。因此，黃教授認為未來討論 AI 時，會牽涉到更多關於安全保障的同類爭議。第二個問題是 AI 的經濟負擔能力。要建立一個可信賴且有效的系統，需要大量的數據，而要取得這麼多的數據，

amount of data, a lot of money is needed. Therefore, AI will be less open to the public and the general population will be left behind, increasing inequality and the digital poverty gap. Wong believes it is the government's responsibility to step in and decrease this gap, but in a democratic society, many of the government voices are the rich themselves, so this gap will be hard to repair.

Future opportunities for AI in communications

Wong believes that more work will be done by machines, for example, chatbots can do repetitive tasks such as communicating with customers, answering many mundane and common questions, leaving the bigger problems for humans to answer, reducing the manpower and time needed. However, this raises the question of whether AI will replace humans, but Wong does not believe that AI will replace humans. He cites the example of the Industrial Revolution, where work was mostly manual, but when steam engines became popular, although some jobs were replaced, people knew how to adapt and create other jobs. Then, with the second industrial revolution, when the invention of electricity displaced other jobs, more jobs were created to adapt, just as in the third industrial revolution, so now, as we face the fourth industrial revolution with the invention of AI, Wong believes that new jobs will be created in place of those displaced, so AI won't replace humans. However, the following changes will be made. The first and second industrial revolutions built machines that automated processes, which is based more on intellectual development, so the change was from labour to brain as work switches to design. The third and fourth revolutions, however, have ChatGPT and Sora to help with design. The work then becomes a switch between brain and heart. For example, the work created by generative AI is only done through prompting, which is created by humans. Prompting requires creativity and imagination, and in order to have that kind of imagination, people will eventually train themselves to be more cultural, to talk to people more and to understand the world. He believes that the degree of automation is inversely proportional to risk, so if the application itself is very human, then the risk is very low. For example, in the Israeli-Palestinian conflict, an AI-automated drone bombed four trucks of supplies and aid sent by the World Kitchen Organisation. These operations are very high-risk, so he believes that if these processes are to be automated, they must be authorised by a human in charge before they are carried out.

AI in academia

The first category of the usage of AI is most commonly used in science, for example to generate hypotheses and possible solutions when designing and experimenting. However, people started to talk about how if AI were to do jobs for people, the AI needs to be accurate, so the development of the science of AI began, where humans made sure the AI was effective and trustworthy to use. The second category of the usage of AI is in social sciences. Wong believes that AI can no longer be considered an inanimate object, but a virtual body, so the study of AI in social sciences is the study of the behaviour of bodies and the behaviour of relationships between bodies. He believes that AI encourages people to do research because we no longer have to find a lot of data to complete a project, but AI can just generate it for us, so people can spend more time on the creative aspects. But again, there are issues like copyright, and some universities may ban the use of ChatGPT because they feel that we are relying too much on our machines to be able to think.

Wong's pioneering work in AI and communication has shed light on the evolution and potential of this field. From predictive AI to unsupervised learning and generative AI, Wong has witnessed the advancements in data, algorithms, and computational power, and raises thought-

就需要巨額的資金。因此，AI 對大眾的開放程度將降低，一般民眾將被忽視，增加不平等與數字貧窮的差距。黃教授認為政府有責任介入並減少這種差距，但在民主社會中，許多政府的發聲者本身就是富人，因此這種差距將難以彌補。

AI 在通訊領域的未來機遇

黃教授認為更多的工作將會由機器來完成，例如：聊天機器人可以做重複性的工作如與客戶溝通，回答許多常規的問題，將更大的問題留給人類來回答，減少所需的人力與時間。不過，這也帶出了 AI 是否會取代人類的問題，然而黃教授並不認為 AI 會取代人類。他舉出工業革命的例子，當時的工作多半是體力勞動，但當蒸汽機普及後，雖然有些工作被取代，但人們知道如何適應並創造其他工作。然後，隨著第二次工業革命，當電力發明取代其他工作時，就會創造更多工作來適應，就像第三次工業革命一樣，所以現在，當我們面臨第四次工業革命，人工智能發明時，黃教授認為會創造新的工作來取代那些被取代的工作，因此 AI 不會取代人類。但是，會有以下改變。第一次和第二次工業革命建造了自動化流程的機器，這更多是基於智力的發展，所以當工作轉換到設計時，改變是從體力勞動到大腦。第三和第四次革命則有 ChatGPT 和 Sora 協助設計。如此一來，工作就變成大腦與心之間的轉換。舉例來說，生成式 AI 所創造的工作只有透過提示才能完成，而提示則是由人類所創造。提示需要創造力與想像力，為了擁有這種想像力，人類最終會訓練自己更有文化、更會與人交談、更了解這個世界。他認為自動化程度與風險成反比，如果應用程式本身非常人性化，那麼風險就會非常低。舉例來說，在以巴衝突中，一架 AI 自動化無人機炸毀了由世界中央廚房（World Kitchen Organisation）派出的四輛補給品與援助卡車。這些作業的風險非常高，因此他認為如果要將這些程序自動化，就必須先由主管人員授權，才能執行。

AI 在學術界的應用

第一類應用 AI 最常應用於科學領域，例如：在設計與實驗時產生假設與可能的解決方案。然而，人們開始討論如果要讓 AI 替人做工作，AI 就需要準確，因此 AI 科學的發展也開始了，人類要確保 AI 使用起來有效且值得信賴。第二類是社會科學。黃教授認為 AI 不能再被視為一個無生命的物體，而是一個虛擬的身體，所以社會科學中對 AI 的研究就是研究身體的行為和身體之間關係的行為。他認為 AI 鼓勵人們做研究，因為我們不再需要找大量數據來完成項目，AI 可以直接幫我們生成，所以人們可以花更多時間在創意方面。但同樣也存在版權等問題，有些大學可能會禁止使用 ChatGPT，因為他們覺得我們太依賴機器的思考能力。

黃教授在 AI 與通訊領域的開創性工作，為這個領域的演進與潛力帶來啟示。從預測性 AI 到無監督學習和生成式 AI，黃教授見證了數據、演算法和計算能力的進步，並提出了生成式 AI 時代

provoking questions about copyright in the age of generative AI and highlights the future challenges of safety, affordability, and inequality. 

的版權問題，發人深省，並強調了未來安全、可承擔性和不平等的挑戰。 

