

《英语阅读：类人机器人新突破》

If humanoid robots make you a bit queasy — would it help if they had fleshy faces that can smile at you?

The uncanny feat is the result of new technology using engineered living skin tissue and human-like ligaments to give robots a more natural smile, according to Tokyo University researchers who unveiled their work this week.



A new method of binding living skin tissue to a robotic skeleton will allow more humanlike expressions and better range of motion, according to researchers from the University of Tokyo.

Takeuchi et al. CC-BY-ND

“ In this study, we managed to replicate human appearance to some extent by creating a face with the same surface material and structure as humans, ” professor Shoji Takeuchi, the team leader, said in a news release. In the process, he added, “ we identified new challenges, such as the necessity for surface wrinkles and a thicker epidermis to achieve a more humanlike appearance. ”

The approach promises to make robots more lifelike — and in the future, the researchers say, similar techniques could also be used on humans, in the cosmetics and plastic surgery industries. Their findings were published in the journal *Cell Reports Physical Science*.

To overlay and connect the lab-produced skin on a robotic skeleton, a layer of collagen gel containing cultured human dermal fibroblasts (a type of connective tissue cell) binds to an innovative system of tiny V-shaped perforations in the surface, letting the skin move with the underlying structure without tearing or peeling. The work of muscles — creating a smile, and other motions — is done by actuators.

如果类人机器人让你感到有点恶心——如果它们拥有能对你微笑的血肉之躯，会不会好一些？

据本周公布研究成果的东京大学研究人员称，这项令人惊异的技术是新技术的成果，利用工程化活体皮肤组织和类似人类的韧带，赋予机器人更自然的微笑。

“在这项研究中，我们通过创造具有与人类相同表面材料和结构的面部，在一定程度上实现了复制人类外貌的目标，”团队负责人竹内庄司教授在新闻发布会上表示。在此过程中，他补充道：“我们发现了新的挑战，如为实现更类似人类的外观，需要表面皱纹和更厚的表皮。”

这种方法有望使机器人更加逼真——研究人员表示，在未来，类似的技术也可应用于人类，如化妆品行业和整形外科行业。他们的研究成果发表在《细胞报告物理科学》杂志上。

据东京大学的研究人员称，一种将活体皮肤组织连接到机器人骨架的新方法将允许机器人做出更多类似人类的表情和拥有更好的活动范围。

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为了将实验室培育的皮肤覆盖并连接到机器人骨架上，一层含有培养的人类真皮成纤维细胞(一种结缔组织细胞)的胶原蛋白凝胶会与表面上一套创新的小型V形穿孔系统结合，使皮肤能够随着底层结构移动而不会撕裂或脱落。肌肉的工作——包括微笑和其他动作——由驱动器完成。