



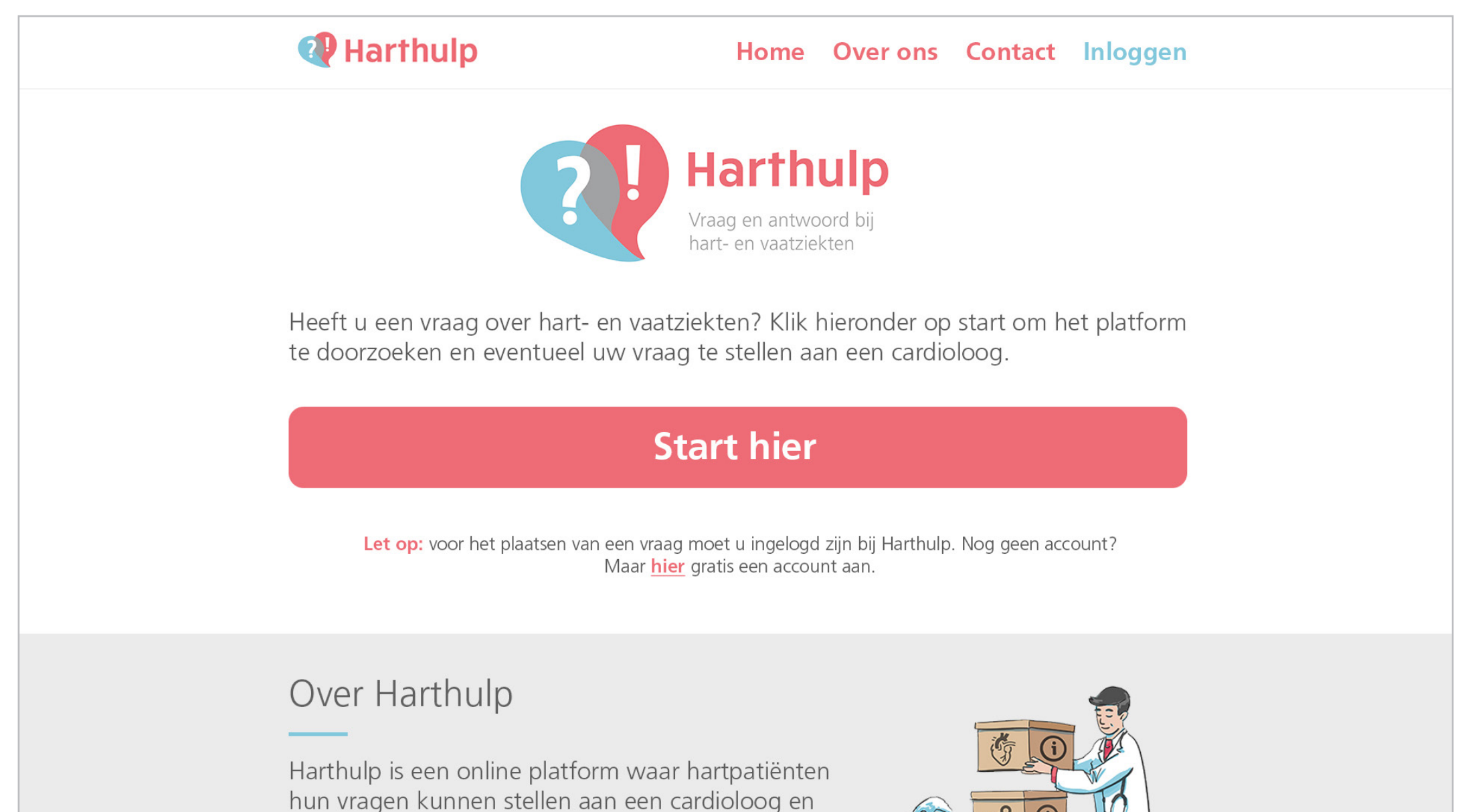
a smart question-and-answer platform for cardiac patients

Harthulp combines deep learning and design to help cardiac patients to quickly find relevant information on health-based social networks.

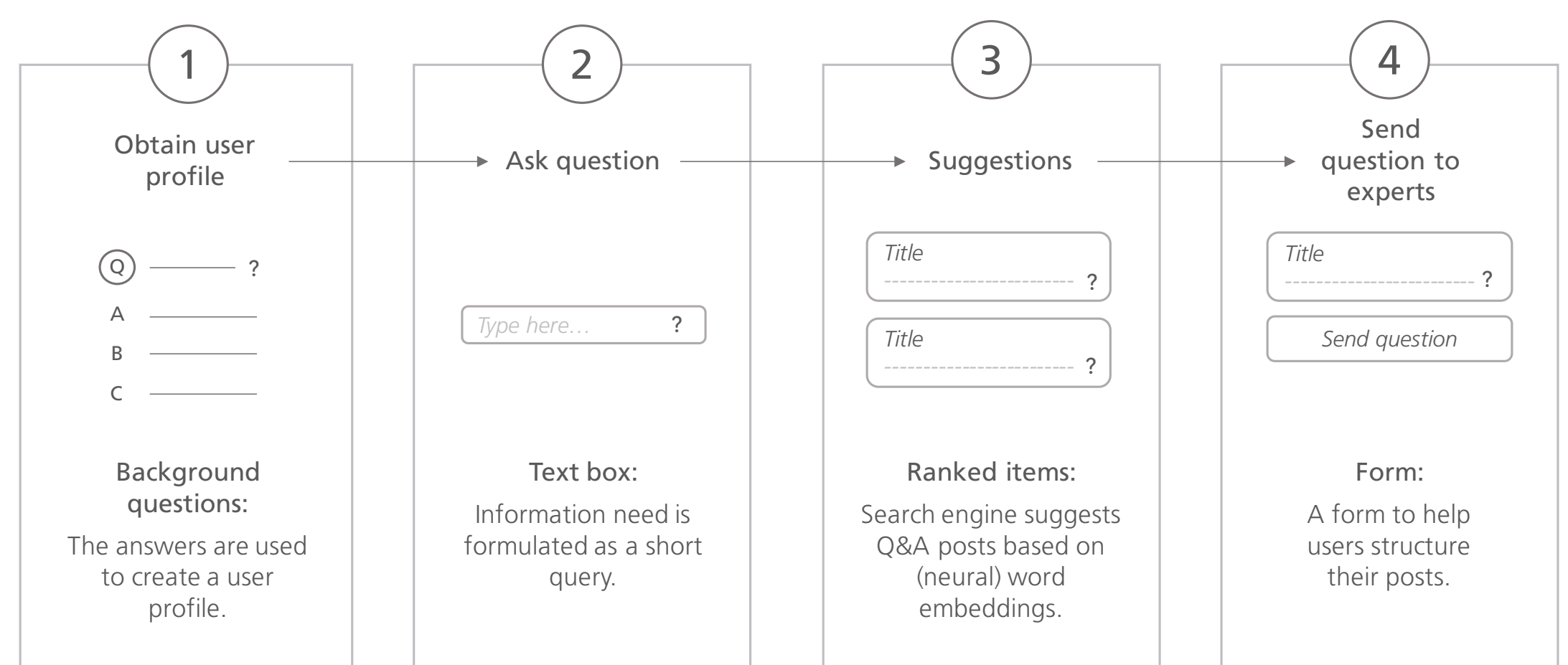
In common Dutch cardiac care, patients only have few follow-up meetings with their cardiologists after they have been treated at the hospital. Sometimes, they have to wait several months for their next visit. Therefore, patients often turn to online platforms where they can ask questions to other patients or healthcare professionals, namely health-based social networks. These platforms are managed by a small group of volunteers, cardiologists, who seek to inform patients in order to make efficient use of the limited time at the hospital. However, it is expected that the number of cardiac patients on these networks will increase due to overall growth of the number of Dutch cardiac patients and the recent trend of searching health information on the internet. Hence, it remains the question whether health-based social platforms can scale up with this development.

To investigate the sustainability of health-based social networks, user posts from the Dutch social platform Hart Volgers and American social platform DailyStrength were analysed. The results show that the number of patients on these platforms grows rapidly, and they reveal that users prefer to contact cardiologists instead of fellow patients. These findings suggest that there is an urgent need for new solutions that keep these platforms future-proof. To address this problem, Harthulp is proposed, a smart question-and-answer platform for cardiac patients to provide better and more efficient aftercare. Harthulp introduces a question wizard that enables patients to quickly find information on the platform, so that it is not always necessary to ask a question to a healthcare professional and to wait for a reply.

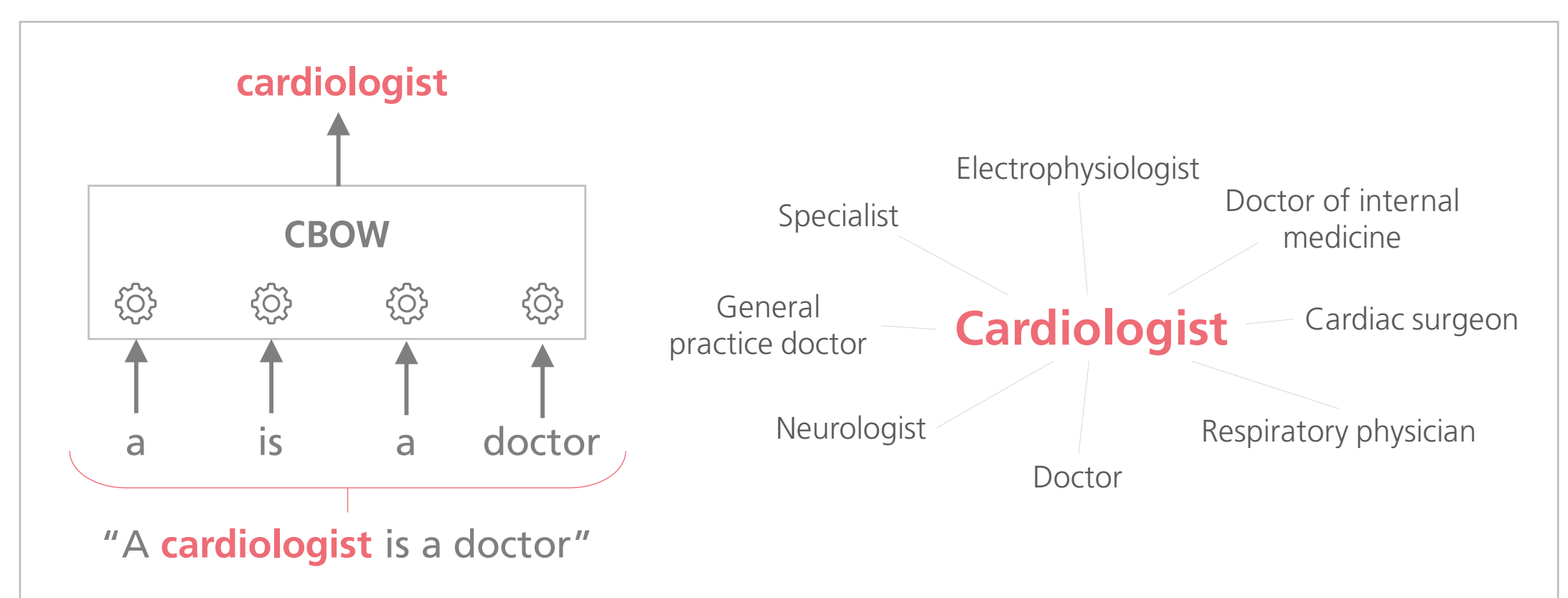
As a core component of the question wizard, a novel search engine has been developed which employs a deep learning model that captures the semantics of words on health-based social networks. In this way, patients can search with short questions and retrieve relevant posts while they may not contain the exact same words. It has been demonstrated that the proposed search engine significantly outperforms traditional search engines when retrieving relevant question-and-answer posts from Hart Volgers. A web interface has been designed to show how all components can be embedded in a single user-centered design. This design has been evaluated together with an experienced cardiologist.



Harthulp introduces a question wizard that guides cardiac patients when searching through the platform and posting a question to a team of healthcare professionals.



The question wizard: (1) ask background questions to collect information about the user, (2) search through the platform, (3) show relevant Q&A posts, (4) optionally, let users ask a question to a team of healthcare professionals.



The deep learning model powering the search engine of Harthulp learns the semantics of words by predicting words on the basis of their surrounding words. This model is called the Continuous Bag-of-Words (CBOW) of Mikolov, T., Chen, K., Corrado, G., & Dean, J. (2013), Efficient estimation of word representations in vector space.

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