The Need for Cognitive Systems in Medical Care

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The idea of cognitive systems for medical care might conjure a frightening image of a silent, insensitive hospital full of unheeding robot nurses. But not every system is a robot — in fact, hardly any systems are robots. System-level thinking means thinking about patients, their friends, partners, parents and dependents, doctors and other health-care professionals, homes, hospitals, streets and — where available — intelligent technology. A system is a gestalt of interconnected parts. In a cognitive system, some of those parts are able to sense, evaluate, plan, and interact. But this does not necessarily imply robots replacing human nurses. Patients — that is, each of us — require human contact and attention for our mental and physical well being. This is something any health-care system needs to take into account.

Even if we were to banish robots entirely from patient care, contemporary hospitals and health care more generally could certainly benefit from cognitive systems approaches. Many of the most tedious tasks in a hospital such as cleaning do not require contact with patients, yet are essential to patient care. Adding cognitive capacities such as intelligent sensing of infection, scheduling of cleaning, tracking of equipment and so forth could increase the reliability of cleanliness while actively decreasing the amount of patient disruption. A human cleaner of wards might need to go in a particular sequence every day in order to ensure none are missed out, but with the help of AI either a human or a robotic system could safely resequence a particular room if entering it would inconvenience someone at a particular moment, without danger that the room would be forgotten off the day’s schedule.

But health is not just a matter for hospitals, and care giving is not done primarily by professionals. Our society is increasingly recognise the role of care givers that are parents, children, partners, friends and even just concerned neighbours. Again, as with any caring task, while some aspects of the task may be very personally rewarding, there are also immensely tedious parts of care giving. For example, people with dementia lose their short term memory and may try to “double” check whether they have locked their door.
hundreds of times in a single night. For a human care-giver monitoring and correction of this sort of behaviour for days and years on end might be maddening. Technology on the other hand is perfect for repetitive tasks. Sensors can be utilised to check whether doors are open or locked, and to notice when someone is getting out of bed. It’s technically feasible now for the home itself to offer assistance, either by reporting the state of the doors via voice or touch-screen interface, or to provide lighting or verbal prompts to help people remember and stick to their intended schedules and tasks.

None of the above is to say there is no role for personal robotics in health care. For example, one of the great inconveniences of a disability can be the perceived debt of social obligation that comes from having to accept help for even trivial tasks. For a paraplegic, having robotic assistance for lifting a glass can make the difference between whether a trip to a cafe is a pleasant diversion or a socially-distancing event. Robotics in this situation can be seen as an extension of an individual’s self, as it is the human owner that determines what the robot will do. But these robots still benefit by intelligence in determining how and when that thing should be done. The more the robot is able to sense, appreciate timing, adapt and act in a coordinated way, the more use it will be to the user, and the less control the user will be obliged to be able to exert in order to exploit the benefits of the robot.

A health care system should be considered to include the entire community around each of us — our selves, our neighbours, our governments, private companies, public hospitals, libraries and Internet services all have roles to play in helping us maintain our health and well-being. Artificial cognition can be introduced at many points, for example on-line agents that help us keep track of our medications and schedule of treatments regardless of our location; intelligent homes that help us maintain a warm, secure environment well-stocked with food and medicines; social networking sites that alert designated friends or family if we seem to have dropped out of contact for too long and might be facing injury or depression; robot companions that might help us engage in exercises to recover from a stroke or tutor us to help us overcome our autism. Cognitive systems may sound scary if we think of them as something taking power away from us, but no artificial system “naturally” seeks power. It is up to us and our society to decide how we incorporate artificial intelligence into our lives, including our health. Cognitive systems should be seen as extensions of our own minds and powers, there to help us achieve our goals and allow us to focus our attention on the things we consider most worthwhile.