

ARTIFICIAL INTELLIGENCE IN HEALTH CARE

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Abstract— We know how much health is important in our day to day life. Especially when we are surrounded with machine zone environment. Daily new technologies are invented to deal with various health issues which are more significant than old ones but cost issues remain the same. In this paper we deal with some artificial intelligence tools and techniques to improve the health care system. As we define why there is a need of AI, how the AI is used to transforming healthcare throughout the new health ecosystem. How AI and robots detect diseases, application of AI along with its investment on various factors.

Keywords— Artificial Intelligence, health ecosystem, LUMO LIFT

I. INTRODUCTION

Health matters. It matters to each of us as individuals and to society as a whole. It lies at the heart of our economic, political, social and environmental prosperity and is one of the largest industries in the world.

Modern health systems can treat and cure more diseases than ever before. New technology is bringing innovation to old treatments. Yet significant quality, access and cost issues remain and our health systems are becoming increasingly unsustainable. The emergence and increasing use of artificial intelligence (AI) and robotics within and throughout this New Health ecosystem. We chose 'What doctor' as our title for the report because during our research – and the response to that research – it has become increasingly clear that policy makers, payers, providers, educators and the public need to consider:

- What is the role of the AI/ robot doctor?
- What is the role of the human doctor?

- The answers to these two questions fundamentally impact clinicians and caregivers throughout healthcare. The answers will ultimately decide how we implement the use of AI and robots in developing our healthcare systems across the globe

II. WHY WE NEED AI IN HEALTH CARE

1. value challenge - there is escalating demand from long-term, chronic disease, rising costs, often with an ageing population and limited resources (money, workforce specialists, etc).
2. Explosion in the amount of health data- In 2013, it was estimated that the volume of health-related data had reached over four zetta bytes – that's four trillion gigabytes (10²¹) – and there are those who project this exponential growth rate to reach ten times that by 2020.
3. Information technology- Past decades have focused on the innovation provided by medical products delivering historic and evidence-based care. The present decade is one of medical platforms focused on real-time, outcome-based care. The next decade is moving towards medical solutions – using AI, robotics, and virtual and augmented reality – to deliver intelligent solutions for both evidence- and outcome-based health, and focusing on collaborative, preventative care.

4. The willingness of the general public: As reported in survey Care Anywhere, the explosion of technology and increasing ubiquity of the Internet of Things is bringing about breakthroughs that are erasing healthcare boundaries and enabling care anywhere & everywhere.



Fig 1.1 Transforming Healthcare through AI

1. KEEPING WELL: The use of AI and the Internet of Medical Things (IoMT) in consumer health applications is already helping people to manage their own healthcare. Example-: SMART BELT-WELT

- Developed by Samsung in 2016.
- It contains an array of sensors packed into the back of its buckle and a micro USB port for charging on its side.
- Uses blue-tooth technology to synchronize app and belt.

2. EARLYDETECTION:Example-Lifesense Arrhythmia

- Developed by CardioDiagnostics company and launched in 2014
- The device itself is about the weight and size of a mobile phone
- The algorithm automatically detects arrhythmias, or rhythmic abnormalities
- Algorithms to automatically record, detect and transmit wirelessly a wide range of cardiac events, allowing physicians to monitor patients continuously, in real-time.

III. AI IS TRANSFORMING HEALTHCARE

AI is getting increasingly sophisticated at doing what humans do but more efficiently, more quickly and at a lower cost. The potential for both AI and robotics in healthcare is vast. Just like in our everyday lives, AI and robotics are increasingly a part of our healthcare ecosystem.

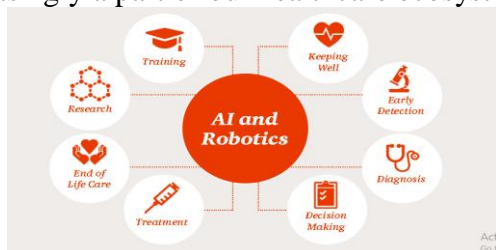


Fig 2.1 No longer science fiction, AI and robotics are transforming healthcare

3. **DIAGNOSIS:** Google's DeepMind Health is working in partnership with clinicians, researchers and patients to solve real-world healthcare problems. The technology combines machine learning and systems neuroscience to build powerful general-purpose learning algorithms into neural networks that mimic the human brain.

4. **DECISION MAKING: EXAMPLE- PWC'S Bodylogical**
This enables true-life simulations to predict the likely progression of chronic diseases.

Simulations help pharmaceutical companies, providers, payers, employers, researchers and consumers better understand how daily life choices and therapeutics impact individual patients or population health outcomes and associated costs.

5. **TREATMENT: EXAMPLE- IBM WATSON ONCOLOGY**

The amount of information available to inform cancer care decisions is growing exponentially.

Watson for Oncology helps physicians quickly identify key information in a patient's medical record, surface relevant evidence and explore treatment options.

6. **END OF LIFECARE:** Robots have the potential to revolutionise end of life care, helping people to remain independent for longer, reducing the need for hospitalisation, caregivers and care homes by performing routine tasks. **EXAMPLE – ZORA ROBOTS .**

7. **TRAINING:** AI allows those in training to go through naturalistic simulations in a way that simple computer-driven algorithms cannot. The advent use of natural speech in technology and the ability of an AI computer to draw instantly on a large database of scenarios means AI can respond to questions, decisions or advice from a trainee and can challenge more effectively than a human can.

IV. AI INVESTMENT HIGHLIGHTS

- **Insights & risk analytics:** Health insights and risk analytics has been the hottest category for investment since 2015.

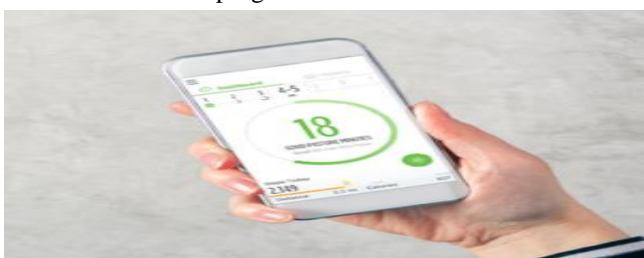
Companies in this category provide predictive insights about a patient's health using machine learning and natural language processing algorithms. The analytics are based on factors that include medical history and demography.

- **Imaging & diagnostics:** This category has become more saturated with companies in recent years compared to other areas of healthcare AI, with more than 80% of deals raised after January 2015.
- **Remote patient monitoring:** Deals to the category have picked up since 2015, though there are fewer companies here than in diagnostics or risk analytics. London-based Babylon Health, backed by investors including Kinnevik and Google-owned DeepMind Technologies, raised a US\$25m Series A round in 2016 to develop an AI-based chat platform.
- **Core AI companies bring their algorithms to healthcare:** Core AI start-up Ayasdi, which has developed a machine intelligence platform based on topological data analysis, is bringing its solutions to healthcare providers for applications including patient risk scoring and readmission reduction.
- **Drug discovery:** This category is gaining attention, and venture capitalists have backed six out of the nine start-ups on the map, who are using machine learning algorithms to reduce drug discovery times.
- **Oncology:** IBM Watson Group-backed Pathway Genomics has recently started a research study for its new blood test kit, CancerIntercept Detect. The company will collect blood samples from high-risk individuals who have never been diagnosed with the disease to determine if early detection is possible.
- **Emergency room & hospital management:** Start-ups here provide insights and real-time analytics, specifically in a hospital environment. Gauss Surgical, for instance, uses image recognition to monitor blood loss during surgery in real time using an iPad.

- **Virtual Assistants:** This category has a relatively low deal count, less than ten since 2012, but has the potential for increased investment activity. One of the start-ups, Babylon Health in the United Kingdom, was backed last year by investors including Kinnevik and Google DeepMind in a US\$25m Series A round.
- **Mental Health:** This is another category with relatively low deal count, as well as fewer companies. Seed-stage start-up Avalon uses AI to predict brain degeneration, and focuses on neuro-degenerative disease like Alzheimer's and Parkinson's.
- **Research:** This category includes China-based iCarbonX, which joined the unicorn club in Q2 2016. Another start-up, Desktop Genetics, helps scientist with genome editing and CRISPR research. It received funding last year from genetic research company Illumina.
- **Nutrition:** Ireland-based Nuritas uses artificial intelligence to mine data and identify compounds in food that are beneficial to health. Marc Benioff invested over US\$2m in the company in Q2 2016.

V. MAJOR APPLICATIONS OF AI IN HEALTHCARE

- AI For keeping well- LUMO LIFT



Lumo Lift is a posture monitoring device that alerts the person when their posture changes, thus providing the feedback necessary to ensure correct posture whether sitting or standing. Lumo Lift is a tiny posture coach and activity tracker that works with a free iOS and Android app to help you sit straighter, stand taller, and look



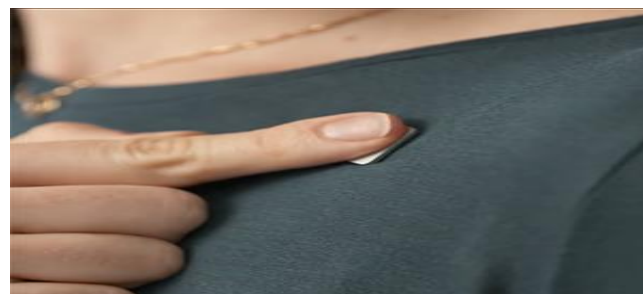
better. It is easy to operate as:

Fig 3.1 Download Lumo Lift app

Download App onto your supported device and follow the detailed instructions to set up your Lumo Lift.

Fig 3.2 Place Lumo Lift under your cloth

Remove the magnetic clasp from your Lumo Lift. Place your Lumo Lift under your shirt, right below your collarbone and use the magnetic clasp to secure it in place.



RECORD

Fig 3.3 Set target Posture

Get into your best posture and press your Lumo Lift once to set your target posture.

IMPROVE



Fig 3.4 Vibration occur on slouching

Receive a simple vibration when you slouch, reminding you to sit up straight.

VI. CONCLUSION

Artificial intelligence and robotic technologies have long been seen as promising areas for healthcare. The explosion of healthcare data

combined with the rise in demand from ageing populations around the world, rising costs, and a shortage of supply – both in the number of healthcare professionals needed to treat and care for an increasing number of sick people and the availability and access to a broader range of necessary services than ever before – has left a monumental gap that only technology can fill.

Over the past few years the rapid progress of technology has started to fulfil this promise and it's just the beginning. As these technologies develop, faster and better diagnoses, and more effective treatments, will save more lives and cure more diseases, and we will have more opportunities enabled by this technology to live healthier lives. Whether we like it or not, AI and robotics are the future of healthcare.

Access to quality, affordable healthcare, and good health for everyone is the ultimate goal. The economic and social advantages to be gained from integrating AI and robotics seamlessly into our existing healthcare systems, and then create new models of healthcare based on these technologies, are enormous. Yet healthcare remains personal, and we mustn't lose sight of the human element. This will mean redefining the various roles of healthcare professionals, and ensuring that the necessary new skills are understood and taught in or medical schools.

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