

## Future Trends Report

### Based on Analysis of the Team's Chosen Community / Organisation in Mid-Term and Final Evaluation

Community / Organisation Studied: \_\_\_\_\_ Healthcare Industry \_\_\_\_\_

#### STEP 1. Identify Challenges

Read the Future Scene carefully and generate ideas for challenges, concerns, and possible related problems. Choose the 5 most important challenges and write them in the space provided. Include applicable research with appropriate in-text citations.

##### Challenge #1:

Based on surveys and studies done, most people feel that the loss of human touch is the most important problem. Unlike humans, AI is unable to connect emotionally with patients. These patients will lack the emotional support that they need. Even if they have the best treatment, patients will need emotional support to be able to persevere. Furthermore, AI will use only its knowledge to treat patients. Under critical circumstances or making out-of-the-book decisions, it will not be able to perform as well as a human doctor.

##### Research:

Article title: The future of artificial intelligence in healthcare - Medical Technology | Issue 4 | November 2017

Website title: Medical-technology.nridigital.com

##### URL:

[https://medical-technology.nridigital.com/medical\\_technology\\_nov17/the\\_future\\_of\\_artificial\\_intelligence\\_in\\_healthcare](https://medical-technology.nridigital.com/medical_technology_nov17/the_future_of_artificial_intelligence_in_healthcare)

**Challenge #2:**

Based on our survey, the majority of people also felt that a leak of their confidential information was also a major issue. When health data gets leaked, others may find out that another person has a type of disease, and will ostracise or cast them out and they will not be able to lead normal lives. If there is a major leak of confidential information, hackers or bad people will try to access personal details.

Research:

Article title: Artificial intelligence may put private data at risk | Cornell Chronicle

Website title: Cornell Chronicle

URL:

<https://news.cornell.edu/stories/2018/08/artificial-intelligence-may-put-private-data-risk>

Author Matthew Hughes

Article title: Personal info of 31 million people leaked by popular virtual keyboard Ai.type

Website title: The Next Web

URL:

<https://thenextweb.com/security/2017/12/05/personal-info-31-million-people-leaked-popular-virtual-keyboard-ai-type/>

**Challenge #3:**

Another problem is AI malfunctioning and it not being accurate, thus leading to problems. Malfunctioning, caused by programming faults, can bring the patients to danger, due to the wrong steps in treatment.

**Research:**

Article title: Robot surgeons kill 144 patients, hurt 1,391, malfunction 8,061 times

Website title: Theregister.co.uk

URL:

[https://www.theregister.co.uk/2015/07/21/robot\\_surgery\\_kills\\_americans/](https://www.theregister.co.uk/2015/07/21/robot_surgery_kills_americans/)

**Challenge #4:**

Some also feel that the loss of jobs would be a prominent issue. Healthcare workers would be taken over by AI. This means that healthcare workers will have no other job to go to as they have only studied medicine. They will not have a stable income and may not be able to live well anymore.

Research:

Article title: AI Expert Says Automation Could Replace 40% of Jobs in 15 Years

Website title: Fortune

URL: <https://fortune.com/2019/01/10/automation-replace-jobs/>

Article title: Automation 'could replace 1.5 million jobs'

Website title: BBC News

URL: <https://www.bbc.com/news/business-47691078>

**Challenge #5:**

Lastly, people feel that AI requiring large amounts of patient data to function efficiently is an issue. AI would need to collect a lot of information to be able to carry out procedures properly. This means that if there were not to be enough data, treatments might not be carried out correctly, thus leading to severe outcomes.

**Research:**

Article title: Data Is The Foundation For Artificial Intelligence And Machine Learning

Website title: Forbes.com

URL:

<https://www.forbes.com/sites/willemsundbladeurope/2018/10/18/data-is-the-foundation-for-artificial-intelligence-and-machine-learning/#7c406b0d51b4>

Article title: Data in, insights out: why AI needs robust data to be effective

Website title: Medium

URL:

<https://medium.com/swlh/data-in-insights-out-why-ai-needs-robust-data-to-be-effective-2168b5c1730b>

Author Nick Ismail

Article title: The success of artificial intelligence depends on data

Website title: Information Age

URL:

<https://www.information-age.com/success-artificial-intelligence-data-123471607/>

## STEP 2. Craft the Underlying Problem

Using the challenges listed in Step 1, identify a problem of major importance to the chosen community/organization in the future. Write your Underlying Problem making sure your question clearly explains the action that will be taken and the desired results/goal of that action.

Incorporating Challenge(s) # \_\_1,2,3\_\_\_\_\_

Given that there would be a loss of human touch, a leak of confidential information, and AI malfunctioning, how might we increase the reliability of the AI, such that people are able to adapt and accept it?

**STEP 3. Produce Solution Ideas**

Generate solution ideas to the Underlying Problem in Step 2. Choose the 5 most effective solutions and write the elaborated ideas in the space provided. Include applicable research with appropriate in-text citations.

**Solution 1**

We will inject nanoparticles with receptors a day before surgery. A surgeon will run a program that we design, which allows him/her to select the part of the body the nanoparticles will stick to. During the surgery, those particles will emit high-frequency radio signals that can be detected by receptors attached to surgical equipment. The equipment will be attached to the AI, and the entire surgery will be fully automated. There will be a surgeon present at the operation site in case of any emergencies. This will reduce the chance of malfunctioning happening, and will increase the trustworthiness of AI.

Research:

Article title: What is Nanotechnology

Website title: Understandingnano.com

URL: <https://www.understandingnano.com/>

## **Solution 2**

People are worried that malfunction and leak of data might happen with AI. Thus, we would want to educate the public on the actions that we are taking in order to prevent the occurrence of those problems. We would want to hold talks or exhibitions around the country to show the actions we have been taking. We hope these would increase the trustworthiness of AI.

Research:

Article title: The future of medical education | SMJ

Website title: Smj.org.sg

URL: <http://www.smj.org.sg/article/future-medical-education>

### **Solution 3**

We would introduce humanoid doctors. These are AI which will be checked regularly and we would work on improving it. Checking it regularly will prevent AI from malfunctioning during treatment and prevent any security threats. Improving on it means that AI is able to be equipped with more human like features. This means that AI will start to become more like a human but with less errors. We hope this will increase the reliability of AI and that patients can trust it as much as they trust doctors.

Research:

Author Tanya N. Beran

Article title: Reducing children's pain and distress towards flu vaccinations: A novel and effective application of humanoid robotics

URL: <https://www.sciencedirect.com/science/article/pii/S0264410X13004027>

#### **Solution 4**

We will have doctors on site to watch over the AI. These means that when AI is doing their job and operating on patients, doctors will be on standby to solve any issue that might come up. We hope that by doing this, doctors will have less of a work to do but ensure that the patient is all right.

Research:

Article title: Healthcare - Open Source Leader in AI and ML

Website title: Open Source Leader in AI and ML

URL:

[https://www.h2o.ai/healthcare/?gclid=CjwKCAjwyqTqBRAYEiwA8K\\_4O\\_C8dxvFhe0nczvSFaej9Gnvi\\_XIY6\\_jU44oE6M4Ml5gEFnDMw0OPRoCrBsOAvD\\_BwE](https://www.h2o.ai/healthcare/?gclid=CjwKCAjwyqTqBRAYEiwA8K_4O_C8dxvFhe0nczvSFaej9Gnvi_XIY6_jU44oE6M4Ml5gEFnDMw0OPRoCrBsOAvD_BwE)

**Solution 5**

We propose having multiple AI. For example, if a robot were to give a patient a diagnosis, we would have more than one robot giving it. This will better ensure accuracy as even if one robot fails, there are others to confirm the real diagnosis. By doing this, we hope we can better increase the trustworthiness of AI and that people are not worried of it malfunctioning.

Research:

Article title: Will Artificial Intelligence Improve Health Care for Everyone?

Website title: Smithsonian

URL:

<https://www.smithsonianmag.com/innovation/will-artificial-intelligence-improve-health-care-for-everyone-180972758>

**STEP 4a. Select Criteria**

Generate criteria to determine which solution idea does the best job of solving your Underlying Problem and/or addressing the Future Scene situation. Select the 5 most important criteria for measuring solution ideas and write them in the spaces provided.

**Criterion #1:**

WS is the most efficient?

**Criterion #2:**

WS is the most ethical?

**Criterion #3:**

WS is the most effective in increasing the trustworthiness of AI?

**Criterion #4:**

WS will give patients the help they need best?

**Criterion #5:**

WS best reduces the glitches of AI?

### STEP 4b. Apply Criteria

List the solution ideas from Step 3 on the grid. Use each criterion to rank the solutions on a scale from 1 (poorest) to 5 (best). The weighting for one important criterion may be doubled if necessary.

| Step 3 Sol'n # | Solution Idea    | Criteria |   |   |   |   | Total |
|----------------|------------------|----------|---|---|---|---|-------|
|                |                  | 1        | 2 | 3 | 4 | 5 |       |
| #1             | Nanoparticles    | 1        | 3 | 2 | 3 | 2 | 11    |
| #2             | Educate Public   | 4        | 1 | 5 | 1 | 1 | 12    |
| #3             | Humanoid Doctors | 3        | 5 | 4 | 5 | 5 | 22    |
| #4             | Doctors on site  | 5        | 4 | 3 | 4 | 3 | 19    |
| #5             | Multiple AI      | 2        | 2 | 1 | 2 | 4 | 11    |

## **STEP 5. Develop an Action Plan and Evaluate its Feasibility**

Develop your top-scoring solution idea into an Action Plan. Thoroughly explain how the Underlying Problem is solved, how the plan will be implemented, and how the community/organization will be affected. Explain how this Action Plan is feasible with secondary research consulted, preferably also with primary research (feedback from chosen community/organization)

After identifying 5 problems, we decided that our Underlying Problem would state: "Given that there would be a loss of human touch, a leak of confidential information, and AI malfunctioning, how might we increase the reliability of the AI, such that people are able to adapt and accept it?"

Using a set of criteria, we ranked the summary of the solutions from the best way to the worst way to deal with the problem. We have decided to introduce Humanoid Doctors as our solution.

### Timeline

- 2020: Robots are in their experimental phase
- 2026: Introduce them to the healthcare industry, with doctors assisting them
- 2030: When everything is perfected, robots operate on their own

During experimental Phase, there humanoid doctors will be experimented with to see how it will work best. When introduced to healthcare industry, doctors will test it out with them to see if it works perfectly fine. When perfected, they will operate on its own in the hospital, but with regular checks and updates on them.

### How It Solves Underlying Problem

The Humanoid Doctors will have regular checks to ensure that they are working perfectly fine and will not malfunction during treatment etc. With this, they will be able to perform medical procedures as well as doctors can. With AI becoming more accurate, we are able to ensure that this accuracy never goes wrong, which will greatly reduce the chance of something critical happening.

More features, such as emotions, will also be added when possible. This means that AI will become more like humans, such that patients are able to treat it like a real doctor.

Ultimately, these AI can connect with patients as well as doctors can, but when it comes to treatment, they are able to do it more accurately. People can still have the sense of security and they would not worry about the problems anymore, knowing the actions that take place.

### Possible Assistors

**Health Foundations/Organisations:** These health foundations/organisations would want the best for patients and with this plan, the patients can get better services than before. This means that they would invest in Humanoid Robots, which are way more reliable than doctors now, given the precision the AI has and the connection it has with the patients.

**Patients:** Patients know the probability of doctors messing up is pretty high, due to human error. But knowing that the Humanoid Robots are very precise and accurate, they will not worry about malfunction anymore. They can also feel a sense of security knowing that data will never be leaked and they can feel assured that everything will be fine with emotional support.

### Possible Resistors

**Healthcare Workers:** These healthcare workers will not want to lose their job. However, we can ensure that they can still have work as improving on the AI to make its services better for patients.

Patients: They still might keep thinking that robots, are still robots. And they also may not be reassured that the AI will work perfectly fine. But with the introduction phase, where robots are assisted by doctors, this would allow them to be treated by AI while being reassured that doctors will be there to help if anything were to go wrong. Once they realise that AI works perfectly fine, they will start to accept AI and adapt to it.

### Obstacles

Loss of jobs: Healthcare workers might lose their jobs to AI but as said earlier, we can ensure they can still work by improving on AI to provide even better services to patients.

Miscalculation: When checking on AI, humans might check on it wrongly. We can solve this by allowing more than one person checking on it. This serves as a double confirmation purpose. When there are more brains as well, we can have more opinions on adding another feature, to see if it will be feasible. This means that every step we take will be safe.

## Bibliography

Cite the resources you consulted using the APA format.

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- PricewaterhouseCoopers. (n.d.). No longer science fiction, AI and robotics are transforming healthcare. Retrieved from <https://www.pwc.com/gx/en/industries/healthcare/publications/ai-robotics-new-health/transforming-healthcare.html>
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Website title: Cornell Chronicle  
URL: <https://news.cornell.edu/stories/2018/08/artificial-intelligence-may-put-private-data-risk>
- Author Matthew Hughes  
Article title: Personal info of 31 million people leaked by popular virtual keyboard Ai.type  
Website title: The Next Web  
URL: <https://thenextweb.com/security/2017/12/05/personal-info-31-million-people-leaked-popular-virtual-keyboard-ai-type/>
- Article title: Robot surgeons kill 144 patients, hurt 1,391, malfunction 8,061 times  
Website title: Theregister.co.uk  
URL: [https://www.theregister.co.uk/2015/07/21/robot\\_surgery\\_kills\\_americans/](https://www.theregister.co.uk/2015/07/21/robot_surgery_kills_americans/)
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Website title: Fortune  
URL: <https://fortune.com/2019/01/10/automation-replace-jobs/>
- Article title: Automation 'could replace 1.5 million jobs'  
Website title: BBC News  
URL: <https://www.bbc.com/news/business-47691078>
- Article title: Data Is The Foundation For Artificial Intelligence And Machine Learning

Website title: Forbes.com

URL:

<https://www.forbes.com/sites/willemsundbladeurope/2018/10/18/data-is-the-foundation-for-artificial-intelligence-and-machine-learning/#7c406b0d51b4>

Article title: Data in, insights out: why AI needs robust data to be effective

Website title: Medium

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URL: <http://www.smj.org.sg/article/future-medical-education>

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