# ANNOTATED BIBLIOGRAPHY FOR RESEARCH QUESTION

**Mason, J., Morrison, A. and Visintini, S., 2018. An Overview of Clinical Applications of Artificial Intelligence. *CADTH ISSUES IN EMERGING HEALTH TECHNOLOGIES*, [online] (174). Available at:**

# <h ttps://[www.cadth.ca/sites/default/files/pdf/eh0070](http://www.cadth.ca/sites/default/files/pdf/eh0070)

**\_overview\_clinical\_applications\_of\_AI.pdf> [Accessed 24 February 2020].**

*In this journal, authors talk about Artificial Intelligence, its emergence and how Artificial Intelligence is applied in the Health Sector. It explains in detail about the various application of AI in clinical specialties and how AI have the potential to resolve numerous clinical problems with accuracy. Also, this journal explains how AI is applied in Non−clinical but Health related applications such as research, drug discovery etc. Finally, the journal concludes by stating that AI going to create huge impact on future Health care systems & delivery.*

## Pollack, M., 2005. The Use of AI to Assist Elders with Cognitive Impairment. AI Magazine, [online] (26). Available at: <https:ƒƒ[www.aaai.orgƒojsƒindex.phpƒaimagazineƒarticleƒviewƒ1810ƒ1708](http://www.aaai.orgƒojsƒindex.phpƒaimagazineƒarticleƒviewƒ1810ƒ1708/)> [Accessed 25 February 2020].

*In this magazine, the authors particularly talk about how AI can help elderly people in different ways. Author categorizes the uses of AI for elderly into different categories such as Assurance systems, Compensation systems, Schedule Management & Assessment Systems. Each systems uses different AI techniques/devices and provides advanced care to the elderly. Finally, author concludes to support aging population AI technology & techniques should be implemented and it is going to play an integral part in the future.*

# ANNOTATED BIBLIOGRAPHY FOR PROPOSED PLAN

**Saolta University Health Care Group, 2018. Saolta University Health Care Group Operational Plan 2018. [online] Available at: <h** **ttps://**[**www.hse.ie/eng/services/publications/serviceplans/service-**](http://www.hse.ie/eng/services/publications/serviceplans/service-)

**plan-2018/operational-plans-2018/saolta-university-health-care-group-operational-**

**plan-2018.pdf> [Accessed 18 February 2020].**

*This report provided by Saolta University Health Care group lists their strategic developments for the year 2018−2023 and implementation of their new projects/ideas. Currently Saolta University Health Care Group have six hospitals under them and this report analyzes many factors such as census, finance, workforce to build a better Health care service for the people.*

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**GALWAY HEALTH CARE STUDY:**

# ISSUES

* + Senior Population (age > 65 years) in Ireland is expected to increase 23% by 2023. In Galway the elderly population (age > 65 years) has increased by 20% since 2011.
  + If this percentage continues to grow, then it will be difficult to provide health services to senior population. Currently there are 17 hospitals in Galway for 80,000 people and the total population is expected to increase to 1,00,000 by end of 2020.
  + There is not enough facilities and hospital to provide specific care to the senior population in Galway.

# PROBLEM STATEMENT

* + How to provide an Age specific Health care system for every person who is above 65 years in Galway?

# CHALLENGES

* + Government Policies with respect to current Healthcare System
  + Coordination between Hospitals, Senior Population, and new health care system
  + Proposed solution requires huge funding to implement in real time.

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# ARTIFICIAL INTELLIGENCE IN HEALTH (provided by Muthuselvi Manikavasakam)

**INTRODUCTION**

A Health Care Management system subdivided into below categories which are collectively implemented as Galway Senior Health Care Management System.

* + Personal assistance
  + Physical interfaces
  + Assurance Systems
  + Schedule Management
  + Al clinical applications

# TECHNOLOGY

The objective of Artificial lntelligence (Al) for Health care is to mimic human cognitive processes. Al techniques such as planning, knowledge acquisition and machine learning bring a radical shift to healthcare, driven by an increase in the healthcare data and technological advancements in analytical techniques and below are some of the main Al techniques which is used in the proposed new healthcare system for elderly.

# Machine Learning:

To predict or detect diseases, trends & insights based on available data

# Neural Networks:

An artificial neural network is a process of imitating the way the human brain learns using a computer model.

# Deep Learning:

This technique analyzes complex data to predict the presence or absence of a disease accurately.

# Natural Language Processing:

It is a process of understanding and interpreting human language, which is used to analyze a patient’s response and EMR data.

# Personal Assistance:

ln this category, autonomous Al Robots are positioned in every Senior’s House and this Robot can play three different roles such as **Assistive, Companion & Service robots.** These robots are programmed to respond to a set of pre−written questions and phrases, and the entire conversation can be stored in the cloud. Then using Case−Based Reasoning (solve new problems by reusing or adapting solutions) improved responses or useful insights is derived. It should also incorporate natural language processor, visual tracking, facial recognition and other Al−based behaviors which can help on day−to−day activities. (Broekens, Heerink and Rosendal, 2009)

# Physical Devices/Interfaces for elderly users:

Many people above 65 years may suffer from physical disabilities related to hearing, learning, mobility, mental health, or cognition. Al technique helps to design products for every individual ensuring technology helps everyone.

**Visually impaired** − Driverless car which works with google map and Al was surrounding data collected by many sensors and cameras manipulated around the vehicle. Kapten Plus Personal Navigation System which speaks directions to the user.

**Mobility** − Electric wheelchairs built by capturing various signals (EMG, EOG & electroencephalographic) generated by muscles, eyes & brain and detect the type of command person is trying to think and use them as input command to the wheelchair. ln other words, wheelchair operated based on facial expressions.

**Patient Monitoring** − Using sensors and biosensors patient’s activity and current emotional state can be captured.

(Creed, 2016)

# Assurance Systems:

Assurance systems for the elderly may be necessary notifications to automated controlled networks. These include Lighting controls, Retrofit automatic door opening systems, Automatic curtains and blinds, Wireless socket control systems, Powered cupboards & Entry control systems.

(Hassan and Mumtaz, 2020)

# Schedule Management:

Schedule management systems remind people when to take their medicine when to eat meals when to take care of personal hygiene, and so on. It uses Al technologies and Reinforcement Learning to update and provide reminder according to user needs. It should be implemented as a PDA (personal digital assistant).

# AI clinical Applications:

**Radiology and Imaging**

The primary focus of Al in radiology is to assist imaging professionals in the reading and explanation of images. AI makes predictions when interpreting images at a competence level similar to that of a physician. Deep learning tools that automate the extraction and categorization of imaging characteristics with power and speed that assists in diagnosing stroke using CT and MRI neuroimaging.

# Oncology

Al is improving its participation in oncology, particularly in cancer−based cognitive computational systems. Cognitive computational mimics the functioning of the human brain by enforcing machine learning algorithms to realistically simulate thought processes using data mining, pattern recognition and natural language processing.

Machine learning is widely used to identify patterns in DNA combinations that can accurately predict a patient's chance of developing a disease and recognize root causes to facilitate the development of targeted therapies.

# Neurology

ln the field of stroke, the incorporation of Al algorithms that identify early signs of heart attack using motion sensor devices which can discriminate between normal resting and heart attack−related paralysis which is used for early stroke prediction.

# Diabetes Care

A screening tool using Al can be developed using Al, which will consider older people's family history, waist circumference & physical activity and predict Diabetes. Diabetes comes under active machine learning research complication concerning Diabetes from person to person can be identified at an early stage.

# Eye Care

Deep learning to distinguish stable eyes from eyes with age−related macular degeneration and foresee heart disease from retinal fundus images, and the use of neural networks to automate age−related rheumatoid arthritis, glaucoma screening and cataract diagnosis.

# CONCLUSION

lreland's Government Agency, Health Service Executive should create a new policy for Elderly care & fund this new Health Care System. This initially should be implemented for selective crowd and based on the feedback & results this can be built to cover entire Senior Population in Galway. Also, a dedicated team of Al & Analytical can be formed to implement this solution.

# REFERENCES

1. *Broekens, J., Heerink, M. and Rosendal, H., 2009. Assistive social robots in elderly care: a review. Gerontechnology, 8(2).*
2. *Creed, C., 2016. Assistive tools for disability arts: collaborative experiences in working with disabled artists and stakeholders. Journal of Assistive Technologies, 10(2), pp.121−129.*
3. *Hassan, M. and Mumtaz, N., 2020. AI in Assisting the Elderly and People with Disabilities. IJRE, 03(08).*