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Need of Technology Changes in Hospital Domains for Improved Nursing Service using Ai (Artificial Intelligence) and IoT (Internet of Things)

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Abstract: ***Healthcare has come a long way with the technological upgrades that it has witnessed and embraced. Technological disrupters like automation, big data, cloud, AI, IOT, have contributed in making the healthcare domain more enhanced and efficient. In the healthcare when we focus more on hospital related services, we see that the changes have started to reflect. Considering Nursing as one of the major services, this study attempts to understand the long ranging impact of AI and IOT on nursing specifically. Nursing as a choice of work has always been looked down upon by the society. The overall work environments, pay structures have also not been conducive for the work force. Being a crucial component of the healthcare domain, the impact of AI and IOT would be more pronounced and visible on nursing in the coming years. The paper attempts to find the gaps and areas of improvement in nursing to make it more efficient.***
Research Methods and Approach:
The paper finds relevant attributes which impact the performance of the nurses. The attributes are derived using mixed method of research and triangulation. This is planned by conducting the systematic literature review followed first by qualitative research methodology based semi structured interviews of patients and their relatives and later by interviewing the doctors and nurses, hospital management.
A Systematic literature review of minimum 75 to 100 research papers from the following databases Pubmed, Ieee, ACM, Science Direct and Google Scholar was planned.
For the interviews it was decided to conduct a heterogeneous quota sampling for interviewing the patients, their relatives and doctors and nurses, hospital management.
Purpose of the Study:
Artificial intelligence and Internet-of-Things are the most path breaking techniques today69. The paper integrates these in the hospital domain focussing only "nursing" as service. It answers the crucial research questions like 'If AI and IOT is used as a methodology in "nursing Services" ,visualizing the impact of AI enabled Bots in nursing, pros and cons of introducing the AI technology intervention in Nursing and to conceptualize a model for the same.
Results/Findings & Interpretation:
The paper maps the AI algorithms and IOT to the basic nurse functions. These AI-IOT enabled bots are better in performance compared to nurses.
Implications: description of main outcomes of the study.
a) The paper helps to address the manpower shortage in rural regions which are deprived of hospital services. b) Can help better care of elderly patients c) Can provide a substantial support for the human nurses and d) Can help to improve the nursing on the whole.
Originality/Novelty: The literature review proved that the concept of the paper is very original. Nowhere had the AI algorithms mapped to any hospital service efficiently.

Keywords: AI, Nursing, Hospitals, Job-Burnout, Stress, Job Dissatisfaction.

I. INTRODUCTION:

Healthcare involves various health workers. Without the health workers the system is very much incomplete. The Nursing fraternity becomes the crucial aspect in this system. Nursing profession owns up for the unremitting care of the sick, the disabled, the injured, and the dying. Ideally, the fraternity is supposed to be owning for the uphill task of inspiring the individuals, families, and communities in taking care of their health in terms of their medical and community settings. Nurses are also dynamically engrossed in health care management, health care study, policy discussions, and patient advocacy.[11]When we consider health care, the nurses are the ones to face the heat in case of epidemics or even while treating the regular patients directly.

History of nurses in India:

The history of not only India, but globally reflects that the principles and practices of nursing have an ancient time line. Most of these earliest nursing practices are so scientific, clear, intelligent and detailed, that many of them might fit into any of the current, modern textbook. Prior to the 20th century, the nurses were usually young men, with women acting as midwives for assisting with childbirth, especially in India.

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The acceptance of nursing as a profession in India has gone through huge learning curve. It was thwarted mainly by the caste system, illiteracy and political unrest. Besides the low status of women in our societal mind-set added to problems.

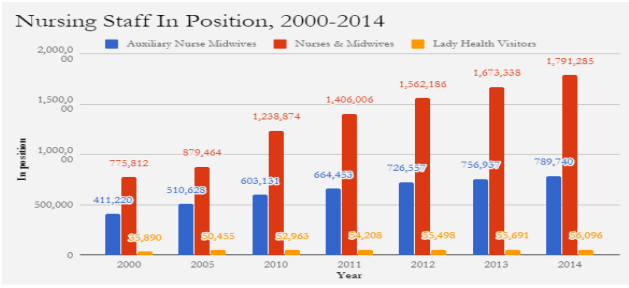
Current scenario:

For many years now, the global public health is facing a nursing shortage. It is true for not only the developing countries but also in the developed countries. Globally, the World Health Organization (WHO) forecasts an approximate shortage of almost 4.3 million persons in the healthcare domain, constituting the physicians, nurses, and other health workers. This is echoed to be the consequence of years of neglect and underinvestment in health worker working environment, their education, training, wages or pay structures and overall management.

There is marked and visible shortage in skilled, competent and experienced nurses. The past decade has witnessed a pretty higher percent of aging population as also the growth and usage of robots in hospitals, viz. nursing, especially in developed countries like Japan.[39]

India:

In the Indian public health systems, the government has a set standard of one nurse for a single primary health centres and seven nurses for a single per community health centre. If we consider these standards, then rural India is deficient of nearly13,000 or more nurses. This is as per the reports of Rural Health Statistics 2016. And as per the reports of the Indian Nursing Council (INC) and World Health Organization (WHO) the IndiaSpend analysis states that India is short of 1.94 million nurses. As per the national data, Uttar Pradesh, Odisha and Uttarakhand had the maximum vacant posts for nurses in the last few years. The current scenario is very bleak in terms of the admissions in the nursing colleges in India. The nursing college admissions have dived down in the entire country. Many of the nursing colleges are in the process of shutting down. There is also another burning issue, of migration of Nurses from India to other countries. The developed countries have discovered in India a new source of skilled, competent, well trained and most importantly English-speaking nurses to overcome their nursing shortages.19 As per recent studies, a very strong societal and political commitment is required for improving the nursing situation in India. Reducing this migration and mobility of nursing personnel outside the country is an onus of the state as well as central government. The nursing fraternity chooses migration as a realistic option arising from the circumstances existing in the country. Adequate incentives, financial, professional, social and economic reasons are the cited for this mobility. In the recent years there were large scale migrations to countries like Australia, Canada,, United Arab Emirates (UAE) and the Europeancontinent.



Source: Indian Nursing Council; Figures for personnel registered with the INC

Figures of number of nurses in India:

As of 2014, there were 1.79 million registered nurses/midwives and 786,796 auxiliary nurse midwives in India, according to INC data.

II. LITERATURE REVIEW:

Task Category		Reference
Patient care	(1) to carry-out strenuous physical tasks. These include the mobility of patients, i.e. lifting them from chair to bed, vice-versa	1) Ilias (2014). 2) Ahn, (2015, August) 3) Fuji, (2011, November) 4) Sato (2003) 5) Mamun (2014) 6) Vukobratovi, (2006) 7) Hu (2011, May) 8) Cremer, (2016, May). 9) Metzler (2016).
	(2) check the patient vital statistics, inform the nurses , set an alarm when there is a need for a human intervention	
	(3) in medical labs -to take samples and the study, analyze, and store them.	

Administrative Tasks	(1) Schedule appointments (2) control of health management systems including electronic health records (3) Treatment decisions like bandaging , plastering etc. under guidance of physicians (4) writing chart notes, prescriptions and ordering tests (5)support in sanitizing patient-rooms and operating-rooms (6) support to transmit bed linens, meals	1) Ahn (2015, August). 2) Fuji (2011, November). 3) Mamun, (2014) 4) Vukobratovi,. (2006). 5) Cremer,. (2016, May)
Communication	(1) Help to battle lonesomeness and inactivity especially in the elderly. Support in taking care of aging family members. (2)Talking with patients, Playing musical instruments and entertain the dependent patients who are not able to move	1) Lee (2018) 2) Metzler (2016)
Assistance to Doctors	(1)Assistance in surgery (2) for interpreting X-rays, skin rashes and biopsy slides	1) "Vukobratovi (2006).
Nurses Factors		1) "Khamisa (2015). 2) "Yaghoubi (2013)

The objective of this literature review was to find about Nurses, their tasks and what affects their performance. Literature Reviews was carried on the following databases: Pubmed, Ieee, ACM, Science Direct and Google Scholar.***The search Strings were: Nurse Performance, Performance measurement of Nurses.***

Tesfaye T got the following findings.67 The Apparent levels of knowledge & skill and feedbacks on the performance appraisal were independent elements of the nurse's performance. Efforts should be made by the hospitals to keep the nurses' up-to date through provision of in-service training on identified knowledge and skill gaps. In addition, the hospitals should augment the facility of providing regular feedbacks on their performance appraisal. Yaghoubi M,from their experimental study found the following: The most important factors in improving performance of nurses were :The ability and help variables. Whereas the validity and evaluation were less important. Conclusion:76 Today, the effectiveness in performance of the staff is one of the important problems in health care organizations everywhere. In fact, performance improvement is the most important step for the improvement of the organization.

Khosla R., Chu M. discussed following Work pressure, strain has been related with ceaseless problem, discouragement, and resistant issue with nurses.32 Stress recognition is exceedingly abstract. Evaluation of work related pressure requires customized physiological checking and opportune accumulation of individual portrayal of origin of stress.

The following attributed were derived from the literature review in reference to the performance of the nurses. work-related stress & burnout, Job satisfaction, organizational commitment, supportive co-workers, supportive supervision & feedback, training on clinical tools, appreciation, job-expectations, work-environment, motivation, incentives, level of education, experience, nurses' morale, knowledge, skills, promotion, remuneration and competency level.

McNeil, B. J. stated that the main reason of nursing was to deliver care, relief and safety to the sick and injured.41 As the society changed and developed, the technological upheavals started to affect the nursing. The nurses had an extra task of looking after even the machines in addition to, or instead of, the main stakeholder patient. Nursing as a whole was affected by the technological upgrades. But unfortunately the nursing education and agency orientation programs have not prepared the nurses to work efficiently with the complex and urbane equipment.

The Paper identified the breaches in research concentrating on burnout, work-related stress, job-satisfaction and general health of nurses within developing countries like South Africa. A cross sectional study carried out on sample size of 1200 and multiple regression analysis was used to find the relationship among variables.31 The result found states that Burnout was the main culprit found with the highest amount of variance in the mental health of nurses. Due to this the impact was felt on performance, productivity and patient-care quality. Issues, such as security risks in the workplace etc. impact the job satisfaction and health of nurses.

The objective of this literature review was to find about Nursing and AI. The Literature Review was carried on the following databases: Pubmed, Ieee, ACM, Science Direct and Google Scholar. ***The search Strings were: Nursing and AI, AI in nursing, Nurses as robots***

Locsin identified the autonomous robots(AR) as the ultimate expression of automation in nursing. with future potentials of functions comparable to human persons.38 He had his reservations about Robots replacing the nurses in their tasks.

Papadopoulos conducted a literature review on the opinions of the nurses, health care and also social care workers on the use of assistive humanoid in healthcare.47 The Health care workers conveyed mixed opinions in response to the use of robots. They reflected an assortment of jobs that the humanoid robots could achieve; they attempted to resolve patient safety keeping the privacy of patients upmost.

AI plays an important role in enabling human like behaviour in machines and improving the human machine interaction using deep learning. By using AI enabled machines or bots the patient engagement could be more effective and more customized care can be provided by hospitals to patients reducing the waiting time.

Use of neural network will add more accuracy to the responses. Use of mental commit robots to provide psychological and social effects in humans through physical interaction results in reducing the mood swing of elder people as it reduces the dependency feeling of them. The stress of elderly people is also reduced and the stress of the nurses also decreased as elderly people required less supervision when bots are used to interact with them which in turn improve the nurse's performance.

With the help of robots the dreams for the future for clinical simulation will lead to more sophisticated manikins and even more realistic features and functionality.

In japan, there is a shortage of number of caregivers and care facilities.

To overcome this situation robots can be used for communication in caring for robots by using AI and big data in case of day care providing centres.

The concept of robotics has been around, but currently it is evolving with new updations. It is basically grounded on conversion of industrial robots to something, all can accept, teach and apply.

In long lasting medical conditions medical adherences plays a crucial role. Engaging patients in self tracking their medication is a big challenge. By using AI the burden of reminders for medication throughout the all stages can be reduced and their wellness can be promoted and maintained more effectively.

Waves of technology such as big data, IOT, machine learning ,cloud and AI are restructuring the personal and professional lives in a huge way. This new era will be changing the current classes and requirements of jobs that are present in today's era .Many established government structures and procedures will become outdated and irrelevant in the new era. There is a now a resounding requirement to lay the groundwork and to rethink to best serve in terms of their operations, for the governments.

In this technological era, the healthcare management system needs to be accurate as well as it needs to be portable so that everybody will able to access their personalized healthcare management system.

Paper states the answer for accepting Use of humanoid robots to provide company to the nurses while taking care of older people had been challenged by some people as they feel this is false relationship between human and machine.43 Some may relate it with religion, psychology and presuppositions. Therefore, the negative response may change to perhaps after seeing the usage of AI models for interactive classical and quantum computation.

The paper provides a summary of a growth in the area of robotics. Issues related to human-robot interface including ethical, cultural, societal concerns were found.63 The Nursing education required to deliver nursing services were analysed and collaborated with the engineers who developed personal care robots so the optimum results can be achieved from the robots while fulfilling the needs of elders and people with disability.

The paper talks about a summary of the views and perceptions of nurses and other health and social care workers about the use of robots, humanoids and animal-like robots.47 The result contains mixed opinions as regards the use of robots. They deliberated some specific sets of tasks could be perform by robot but also raised the concern about the issue of patient safety and privacy. They concluded by stating that robots will have a huge role to play in nursing, health and social care.

The paper presents the functionality and design of robots in nursing.15 A netnographic study was done with the help of social media postings over a period of 3 years. The study consisted of image analysis. The study revealed various design of robots with a common objective of patient care.

Their paper talks about the latest trends in technology. Focussing on the computer which has become integral in the medical treatment.48 It discusses automation in terms of remote treatment and diagnosis like in tele-medicine or mobile-medicine.

The paper talks about the significance of telesurgery.13 This requires robotic aide. Besides that the definition of health-care persons and their roles also need to be revisited .The paper talks about efficient and quality of nursing services.66 The identification of the factors which impact the performance and productivity of the nurses is crucial.

Practical Implementations of Robots as Nurses: The Literature Review was carried on the following databases: Pubmed, Ieee, ACM, Science Direct and Google Scholar. ***The search Strings were: Nursing and AI, Robots as nurses, Nurses as robots***

Zeng, D in their paper, described a basic probability study and design for the tele-medicine and tele-operated healthcare service system using the Internet services. Few simulation studies have established the efficiency of such systems.

Cremer in their paper focuses on application requirements for ARNA(Adaptive Robotic Nursing Assistant),9 It can perform tasks like patient care by supporting patient walking i.e. helping mobility of patients and movement. Patient sitting. i.e. observing the patients, on the request of patients, fetching things etc. The robots need to comprehend the objective and perform the objectives. These robots are enabled with sensors and other electronics.

Hu, J. in their paper proposed a mobile robotic nurse assistant (RoNA), system that provides physical support to the nurses in a hospital ward.22 Hence tasks like pushing the medical cart, lifting heavy equipment like cylinder, supporting the movements of patients from beds to chairs etc. will reduce the burden and stress of the nurse fraternity.

Vukobratović, M discusses about Robot Doctor, Robot Nurses, Robot Tutors, Robot Guards. In-short there could be a robotic-intervention in the responsibilities and tasks of all stakeholders in a hospital.73 Hence robots can be doing a variety of tasks like treating, operating patients, supporting patients, teaching the students, fighting in wars. Etc

Ilias B.in their research discuss mainly regarding solving the tasks of nurses like push the heavy cart, lifting oxygen cylinders, etc. A simulation was carried out with robots who could perform these tasks by avoiding obstacles and carrying a load of almost 20 kg.25

Lee, J. Y in their study determined the need for care robots and prioritizing robotic-care in integrated nurse services. The Korean government announced an"integrated nursing care service" for the same.36

In their paper reported and tested an intelligent system for remote patient service module. The module used one of the most robust algorithms.40 The outcomes of this system can lead to crucial changes in robotics. The study found that remotely measurable body vitals are : body temperature (BTemp), heart rate (HR), electrocardiogram (ECG), respiration rate (RR), body acceleration (BA) using sensors.

Sato, K,created a patient condition checking algorithm.61 The algo also checks for identification and facial expression. Hence it can pass remarks on the patient-condition.

Researched on the assistance of humanoid robots in hospitals.17 The aim of their research was to elucidate the response of nurses and support staff to the humanoids. The major research questions being 1) the type of tasks which can be done by humanoids. and 2) what is the pre-requisite for the humanoids to perform clinical functions.

Ahn, H. S presented a robotic-system for healthcare facilities.2 The major tasks were –administrative, nurse-aiding and a medical server.

Semi-structured interview for Healthcare- Nurses their tasks related stress and its impact on stakeholders i.e. End users of the nursing services, problems, gaps, possible solutions.

III. THE QUALITATIVE RESEARCH METHODOLOGY BASED SEMI STRUCTURED INTERVIEW

The purpose of conducting the semi-structured interview was to get a preliminary understanding of views examined persons who are interviewed are stakeholders i.e. patients their relatives, doctors and nurses for the healthcare systems from nursing services perspective. Individual's face-to-face in-depth interview, which delves upon their individual experiences expectations to overcome the existing issues, opinions and perspectives on a given set of issues and problems.

Selecting interviewees

Particular group's opinions, views are shared and perceived with the help of In-Depth Interviews. The respondents should represent similarity as well as the interviews conducted based on some of the research questions. We have used purpose sampling method for selection of interviewees. We conducted in-depth interviews of three groups of stakeholders which are impacted directly by the nursing services i.e. patients and their relatives, doctors and nurses.

The data were analyzed further by carrying out some interviews This was followed with some preliminary analyses, and then more respondents were selected to fill in emerging questions. We selected purposive sample of 20 Doctors having varied specialization like Paediatrics General Physicians, Gynaecologist. 10 Registered Nurses were interviewed. And 15 patients and 15 relatives of Patients were interviewed. interviewee for this healthcare facilities related from nursing aspect to examine, the current issues in this area and nursing support needs in terms of robots or automated tasks etc. and gap finding perspective.

The Results of the Semi structured Interview data when analyzed specifically depicts current issues in healthcare sector related to nursing stress and its impacts on stakeholders as well as nurses, as indicated by interviewee and give us direction for the significant need of automation, robots facility to support nursing functions to be created in future.

Result of Semi structured Interview Data and Analysis:

Table 1.0 Semi-structured interviews of Doctors:

Questionnaire for Doctor:

Question_ No.	**Interview Questions based on Issues in Healthcare related to Nurses, their tasks and Stress and impacts on stakeholder-Doctor**	**Data Result, Analysis of Respondents Responses**
1	Do you find need of increase in nurses? Is there a manpower shortage?	Majority Respondents said Certainly increase in nurse, Yes, night shifts,
2	Do you think the critical tasks as well as frequently required tasks can be efficiently and consistently done by machine over human in healthcare?	88 % Agreed
3	Do you think the nurses have a lot of work pressure, stress, anxiety due to workload, accuracy of work expected, work shift timings, mental and physical concentration needed at work?	Y-88 % Agreed
4	Can the stress on nurses impact quality of tasks and tangibly the impact patient's wellbeing and service?	72 % Agreed
5	Do you feel that the number of Nurses working is sufficient?	No, Not as per WHO ratio or as per requisite ratio required
6	How would you rate the Attrition Rate of Nurses on a scale?	88 % Agreed
7	Are the Nurses skilled? Rate on a Scale.	64% Agreed. Skill on scale of 4 out of 5
8	Are you comfortable with robots working as Nurses?	49% Agreed
9	What tasks of a nurse can a Robot perform?	Lifting the trolleys etc, monitoring patients by recording temperature ,other vital stats, giving med, injections , helping in documentation, Operation Theatres

10	In your opinion will the Patients be comfortable with robots in the hospital environment?	68 % Agreed
11	Can we envision an environment in hospitals with many robots as nurses in the future?	56 % Agreed
12	Do you feel Robots working as nurses can help the health care policy in rural India?	56 % Agreed-, can help to over manpower scarcity in rural and help rural health programs.
	Do you feel that Stress levels, work-home pressures affect the performance of the Nurses?	61 % Agreed

The doctors suggested that the Nurse attrition is huge. So if Nurse Tasks are automated, it would always be a huge benefit. They felt that general public, nurses and other health workforce need to be extensively trained about robots and automation.

Table 2.0 Semi-structured interviews of Nurses: Questionnaire for Nurses:

QNo.	Interview Questions based on Issues in Healthcare related to Nurses, their tasks and Stress and impacts on stakeholders-Nurses	Data Result, Analysis of Respondents Responses
1	Do you feel the attrition in your profession is high?	84 % Agreed
2	If yes Why?	Remuneration, working conditions, social acceptance
3	Do you feel comfortable with the notion of Robots assisting you in your tasks every day?	67 % Agreed
4	Do you feel you can be substituted / replaced by a Robot someday?	26 % Agreed
5	Do you feel threatened by Robots?	24 % Agreed
6	Do you feel that the number of Nurses working is sufficient?	No, Due to Payment issues, working environment and social acceptance
7	Do you feel that Stress levels, work-home pressures affect the performance of the Nurses?	83 % Agreed

The nurses had a feeling of fear and uncertainty about robots and automation. They felt that better working conditions, payment models and reduced shift duration may decrease the rate of attrition.

Table 3.0 Semi-structured interviews of Patients and their relatives: Questionnaire for Patients and their Relatives:

Question_No.	Interview Questions based on Issues in Healthcare related to Nurses, their tasks and Stress and impacts on stakeholders-Patients and Relatives	Data Result, Analysis of Respondents Responses
1	Are you comfortable with a nurse being assisted by a Robot?	57 % Agreed
2	Are you comfortable with a robot performing Nurse duties?	33 % Agreed
3	Do you feel that Stress levels, work-home pressures affect the performance of the Nurses?	71 % Agreed
4	Can a Robot fill the Health worker gap, especially in rural India?	48 % Agreed
5	Do you think robots can help at hospitals?	63 % Agreed
6	What help can they provide?	Robots can perform tasks like maintaining documentation ; monitoring of patients in terms of recording observations etc. moving heavy objects;
7	Are you scared of robots?	77 % Agreed
8	Would you like to learn more about robots?	47% Respondents said Yes; 34 % said No; rest19% said maybe and not sure.

There is general fear amongst all i.e. patients, nurses. It is inferred that more awareness and training is necessary amongst all health workers, patients and their relatives about the robots. The patients felt that the nurse's performance does get affected by the stress, work-home pressure.

Issues of Nurses:

From the Literature Review and the Qualitative research conducted, it was observed that the number of nurses in hospitals is decreasing. The future will be definitely challenging and retain or increase the number of nurses in the hospital systems.

The Literature Review and the qualitative research also highlight the stress levels, the work-home pressure does take a toll on the nurses, and it impacts their performance. This may trigger some frictions and dissatisfaction amongst the patients, their relatives, seniors of the nurses and doctors as well.

Rationale of using Bots with nurses and may be instead of nurses: Today the AI, IOT technologies are most updated. Globally the AI integrated systems are being developed. Citing the reasons of shortage of Human workforce the scientific community has already started to collaborate with all involved. The concept is to automate necessary tasks.
Globally many use cases have been discussed. Many projects are being carried out as pilot studies.

Proposed Conceptual framework:

Mapping the Nurse tasks with an AI enabled BOT:

The authors categorised the tasks of nurses that can be handled by an AI-enabled Bot as :

a) Administrative Tasks: The tasks have been listed in the table below in Table 4.0.
These tasks can be tried, tested and implemented immediately. The Literature review reflects that globally these are under pilot studies, practically implemented and having successful results as well as feedback.

b) Patient Monitoring: These tasks are also listed in the table. The Literature Review suggests these are conceptually thought about. Work still in progress and not much implemented practically.

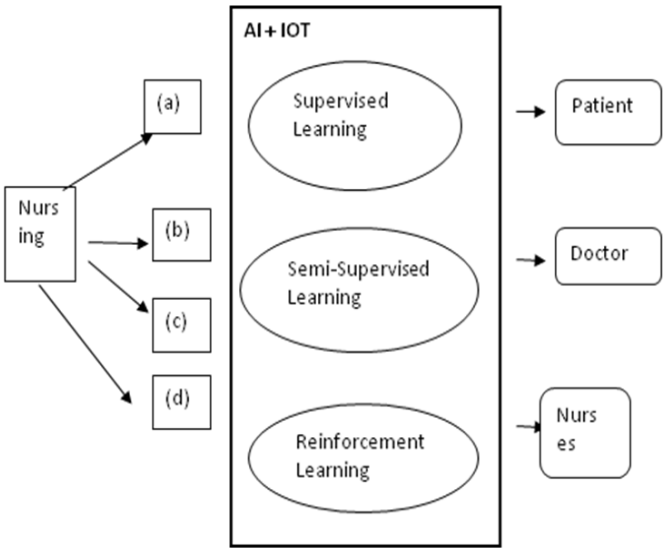
c) Patient Communication: These tasks are also listed in the table. The Literature Review suggests these are NOT conceptually given much importance as of today. This category has yet to be validly tested and tried. This could be seeing major suggestive innovations in the co
ming years, but currently not much implemented practically

d) Doctor Assistance: These tasks are also listed in the table. The Literature Review suggests these are conceptually well thought about. Already practical implied in many places globally for several varied branches or types of patient study. There could be major improvements in the near future.

Table 4.0 : Mapping Nursing Tasks to appropriate AI Algorithm

a)Administrative Tasks		
	AI Category	Algorithms
(1) Scheduling appointments	Supervised Learning and Later Reinforcement Learning	Regression, Classification, Control
(2) to control of health management systems including electronic health records	Supervised Learning & Reinforcement Learning	Regression, Classification, Control
(3) Treatment decisions like bandaging , plastering etc. with active guidance of physicians in their treatment decisions	learning	
(4) writing chart notes, medical-prescriptions and ordering tests	Supervised Learning	Regression, Classification
(5)used to sanitize the patient- rooms and operating-rooms	IOT & Supervised Learning	Regression, Classification, Sensors-Actuators
(6) transmit bed linens and meals to required destination	IOT & Supervised Learning	Regression, Classification, Sensors-Actuators
b)Patient Care		
(1) to carry-out arduous tasks like moving patients from lifts to stretchers, bed to wheel-chair vice-verse, movement of patients from point A to B.	IOT & Supervised Learning & Reinforcement Learning	Regression, Classification, Control, Sensors-Actuators
(2) monitor patient vital statistics and alert the nurses when there is a need for a human presence in the room	IOT & Supervised Learning & Reinforcement Learning	Regression, Classification, Control, Sensors-Actuators
(3) in med-labs to take samples and to study, analyse, and store them.	IOT & Supervised Learning	Regression, Classification, Sensors-Actuators
(c) Communication		
(1)to battle the lonesomeness and inactivity especially in elderly population. to take care of aging family members.	IOT & semi-supervised Learning	Classification, Clustering, Sensors-Actuators

(2)Talking with patients, Playing musical instruments and entertain the dependent patients who are not able to move	IOT & Semi-supervised Learning	Classification, Clustering, Sensors-Actuators
(d) Assistance to Doctors		
(1)Assistance in surgery	Supervised Learning	Regression, Classification
(2) for interpreting X-rays, skin rashes and biopsy slides	Supervised Learning	Regression, Classification



Diagrammatic Representation:

Figure 1.0 : AI in Nursing:

Nursing Tasks: (a): Administrative Tasks (b): Patient Care (c): Communication (d):Assistance to doctors

IV. CONCLUSION

The authors started with an objective of using AI in hospital allied service of "Nursing". It could only be prudent to have the robots to assist the existing human force of nurses. Since already the numbers of human nurses are less and decreasing. The Market is wide for nurses as robots. It is seen from the research that there is fear factor in the patient and nurses about Robots. This can be erased by training and educating the people and health workers, and all stakeholders. The concept is novel and can make a distinct impression in Rural health of India as well as urban parts.

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