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Intelligent Automation in Health Insurance

Automation has been initiated in some of the core functions of the health care industry, but they are not yet fully automated to drive the next level of automation called cognitive or intelligent automation. But, with the acceleration of the new age technologies like AI & ML, Blockchain, RPA, IoT, etc., the entire process of health care delivery, right from member enrolment to health care services, including paramedical and ancillary services of the health care ecosystem will become a fully automated in the next 10 years. This article highlights the applications of intelligent automation, the importance of clinical data coding, the development of integrated payment systems, auto-verification of hospital credentials, fraud detection, and control, etc. The intelligent automated system with appropriate data coding of diseases, procedures, and allied health care services, would enable insurers risk-based underwriting, design customized policies based on the individual risk profile, automated claim adjudication, and payment integrity. It also discusses the important features of HIPAA regulations of US Health Care and how these guidelines can be incorporated into the Indian health care data standards. More importantly, cognitive intelligence in health insurance would enable the policymakers to design better health care programs, support evidence-based research, better disease control, and cost management, which would ultimately ensure a better quality of health to the customers and the society at large.

Keywords: Health Insurance, Automation, Artificial Intelligence, Medical Coding

The covid-19 pandemic has necessitated the urgent option of digital adoption across all industries, including the insurance sector and the consequent digitization has accelerated particularly the healthcare sector. The health care sector including the medicare facilities had to switch over to remote and networked conditions almost overnight, expand their digital capabilities to support the increased volume of business across the entire

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healthcare networks; collaborate with hospitals, diagnostic centers, pathological laboratories, medical equipment firms, etc., to ensure timely settlement of claims of customers. The new-age technologies like AI, IoT, blockchain, computer vision, etc., triggered the digital disruption in the health care services as never before and it is changing the way the health insurance business is conducted today.

The automation process in healthcare involves automating the core areas of sales, quote to card, enrolment, consumer engagement, claims' processing, referrals and authorization, payment integrity, and case management - in the final analysis, the effort to deliver a superior customer experience. Intelligent automation is a fully automated end-to-end process across an entire business, and the IT processes through a dedicated set of solutions and services around the automation continuum including Robotic Process Automation (RPA), Intelligent Process Automation (IPA), and Artificial Intelligence (AI).

The potential business benefits of intelligent automation are much broader than the cost savings that might be implied by the term 'automation', as it uses a large volume of data from all the key stakeholders in the healthcare delivery chain - i.e., customers/ policyholders, insurers, hospitals, diagnostic centers, pathological labs, and other health-accessary services. These required data are collected from various sources, verified, and fully integrated, and hence, the quality of health data that these intelligent machines generate are ready for use leading to faster actions and quicker decision making by all the key stakeholders. Thus, the insurers are enabled to issue the policies instantly, personalize the coverage and benefits according to the risk profile of the customers.

Consequently, hospitals would be able to admit the policyholders instantly without any hassle, free admission process, and access instant pre-authorization approvals to provide quality care. Thus, the entire process of hospital services, right from nursing care to physician diagnostics, would be standardized and driven by intelligent analysis of the customer, based on the pre-existing data on health conditions. As a result, the hospitalization period of the customers would be reduced considerably. And for insurers, healthcare costs, including the claims' cost would come down drastically. Additionally, automation would enable effective fraud detection and control, thus minimizing the claims leakages.

Depending upon the health requirements of the patients, technology would help in deciding the exact man-hours required for treatment. An intelligent health analysis would indicate the specific medical skills of the physician and the paramedical professionals required to treat the particular patient, thus improving the efficiency and effectiveness of the customized quality care provided to the patients. As a result,

digitization would lower the healthcare cost and provide greater scalability to all the stakeholders, i.e., hospitals, customers, insurers, and the entire healthcare supply chain, including vendors.

The adoption and use of new-age technologies like AI, ML and IoT generate a lot of intelligent data, helping in better understanding of the risk profile of the customers as well as their healthcare needs at a micro-level. Thus, technology is applied to enable insurers to develop customized products and services in accordance with the risk profiles of the customers. Accordingly, insurers would be able to introduce disease-specific insurance policies, like Cancer Insurance, Diabetic and Cardiac Care insurance, Mental Health, Psychosomatic illness covers, and long-term care insurance.

Currently, a large amount of medical data on the personal health of the customers is being used in an unscripted form, and, some companies use cloud data sources, which are highly susceptible to data breaches. Currently, the health sector is one of the prime targets for hacking. With the introduction of new customer data protection law or regulation similar to GDPR, any customer data particularly highly sensitive data, like individual's health, the amount of compensation, regulatory breach penalty, would be the potential for a breach, which could be as high as 4% of the global turnover of the company. Consequently, the personal data protection officer or director can be held liable for civil and or criminal liability. Automation using encrypted data would protect the companies from a data breach as well as a huge regulatory penalty or third-party liability.

Intelligent automation necessitates the automation not only of the critical process of healthcare delivery, but the total healthcare ecosystem needs to be integrated including the entire supply/ delivery chain of all the outsourced medical services or accessory vendors. Technology like RPA or blockchain enables all the stakeholders, not only in standardizing the healthcare treatment process but also the entire process of outsourced entities/agents in the healthcare ecosystem. This would not only reduce the operational cost to each of the entities in the system but also improve the efficiency and speed of the healthcare delivery significantly.

Automation also enables the service providers to improve their legal and regulatory compliance as the system automates the compliance requirements and regulatory activities among all the entities associated with the blockchain system. This would also reduce the submission of fraudulent claims or insurance proposals, save huge leakages by way of fraudulent claims at every point of the healthcare delivery system.

Automation in Member Enrolment

The current enrolment process is time-consuming and error-prone since all the enrolment requests with all the required information need to be validated and verified manually before data entry. The challenges faced in the process are:

a) Missing precise information about the applicant's name, address, income, and other demographic and basic health information.

b) High turn-around time between submission and approval of an application.

c) Lack of a robust tracking mechanism for monitoring.

Intelligent automation brings together multiple input channels, such as email, shared folders, web portals managed by bots for enrolment request data intake. Data can then be extracted from these sources and be validated as per the predefined organization's rules. Automation in member enrolment saves cost, increases process efficiency, and can reduce administrative process time by 75% and Average Handling Time by 35-45%.

Similarly, Coverage and benefits verification, eligibility conditions of the customers can also be verified instantly when the insured approaches the hospital or TPA at the time of admission. The intelligent automation software can also verify the credentials of the service provider through multiple platforms including social media and also accreditation agencies. The automation can also ensure that the latest provider data is used in this process, leading to minimized credentialing cycle time and enhanced provider onboarding experience.

Enabling Automated Underwriting

This is an important cross-cutting function. Innovation and automation can drive efficient premium pricing. This function requires demography, health data (preventive checks, IoT, etc.), claims data, financial, and other alternate datasets of the member to identify the risk before arriving at a premium. Systems should be tightly integrated to generate an intelligent report combining the customer's health data, clinical/hospital data, insurance/policy data, claims information, etc. This allows the system to build a complete member profile and also generate an accurate risk score. Automated pipelines have to be built which constantly consume data from various sources and link them in order to create a 360-degree view of the member data. AI and ML-based algorithms built on this ever-increasing and accurate data would certainly help in pricing efficiently and accurately.

Medical Coding Standardization: Clinical Claim Review for Utilization Management Claims Processing.

It also enables data coding of every clinical procedure, diagnosis, and medical practice thus standardizing the entire clinical procedures/diagnoses based on the standard clinical guidelines and procedural/diagnostic codes. This can help in (i) effective monitoring of the treatment protocols, (ii) clinical review, (iii) prior authorization, (iv) case management, (v) utilization management (vi) cost containment, (vii) research purpose, and (viii) automated claims processing. Multiple validations of the standardized solutions, using the current health claims data and historical clinical data across the automation continuum, can help a third-party provider/experts expedite the clinical claims processing and medical review based on the actual utilization. This would also help in standardizing the cost of healthcare for all types of medical treatments based on place of service, quality of provider, provider setting, geography (urban, rural, etc.), which would also reduce the insurance claims cost.

This will also create ample job opportunities for medical coders and health-tech professionals. The US healthcare system is one of the largest employers of health scientists, life science graduates, and post-graduates in India. Medical coding will not only add value to the healthcare ecosystem giving higher ROI (Return on Investment) but also create vast job opportunities for Indians.

https://www.financialexpress.com/lifestyle/health/medical-coding-certification-course-in-india-under-ayushman-bharat-irdai-nha-proposal-details/1710850/

CoverSelf - An InsurTech company has taken the initiative to standardize the healthcare data at par with any developed countries to reap the benefits of rich and comprehensive healthcare data. It is working with large insurance companies in India and the US. Such data standardization provides transparency for the Insurance companies and the ecosystem in India. It has also pioneered the creation of the pharmacy drugs codes (at the drug ingredients and the manufacturer's levels) for India to automate claims processing, report utilization, and bring transparency into the system.

Applications of Standardized Data

Standardized data: This can be used across the company by various teams for data-driven decision-making, senior management reporting, strategic initiatives, and IRDAI reporting.

Auto-adjudication for the claims team: With the quality of data generated, we can work towards efficient and scalable auto-adjudication. It will benefit the design mapped to code which can easily be converted into a rule engine for automation.

Payment Integrity for Risk/ILM/SIU teams: Rule-based (policy, clinical, utilization, and behavioural) and AI/ML models are now possible, as the data is structured and machine-readable.

Network benchmarking for network team: Standardized network pricing, benchmarking the cost, quality, etc.

New product innovation: Structured data for underwriting.

Clinical decision-support systems: Like the population health and disease management program which provides –

– Screening and wellness examination based on patient's health profile for preventive healthcare.

Better risk stratification for care management.

Predictive Analytics, AI/ML Models to detect diseases at the early stages to bend the cost curve and offer better patient health outcomes.

Research and quality measurements (quality of care and outcomes).

Interoperability: Seamless communication between various healthcare systems and code sets,

Payment Integrity

Healthcare payment integrity: The automated payment process ensures that the healthcare claim is paid accurately by the health insurance/payer, for eligible/covered members, as per the policy/contractual/clinical benchmarks, not in error or duplicate, and void of fraudulent, wasteful and abusive practices.

Healthcare insurers are seeking to uncover the signs of overcharging, false reporting, errors, wasteful and non-compliant practices, frauds and also evolve novel methods in claims handling and billing processes. Claims standardization will immensely help automated payment integrity solutions. Risk/ILM (Investigation Loss and Minimization) /SIU (Special Investigative Unit) teams can now focus on the cost-containment efforts and help mitigate risk proactively. This can be achieved by following the procedures described below, as many insurers have well-defined rules which will curtail the majority of falsified payments.

Rules-driven payment integrity has been thoroughly validated with the existing automation tools and it is working successfully in many developed countries. However, now with the availability of AI & ML algorithms, it could further be augmented with the availability of standardized and labeled data.

A. Personalized Product Pricing

With the increased adoption of IoT in insured wellness, insurers are enabled to incorporate a wide range of risk factors to accurately price products. The wearable can now transform the insurers from reactive to proactive mode. Sensor data from wearable technology directly connects insurers and policyholders, and the data indicating their mode of lifestyle can be used to determine the appropriate premiums in accordance with the risk profile of the customers.

Alternate data from healthcare claims utilization (IPD, OPD, Pharmacy) will help the patient to be profiled and risk-stratified giving a 360-degree view of the patient enabling personalized and patient-centric programs, like Care management for high-cost claimants, Population health programs, Disease Management, Medication adherence program, Wellness, and preventative care program, etc.

Insurers can reward policyholders with healthy behaviors by offering them low premiums and they should offer preventive care at no cost (Non-deductible, Co-insurance, etc.) to patients based on demography, present illness, family and personal health history, which encourage early detection of any severe disease ensuring the quality of life and better health outcomes to the patient in order to avoid high treatment costs when illnesses are detected late. Periodic/Planned preventive tests, when taken on a scheduled basis, the premiums could be reduced for the subsequent years.

B. Provider Network Optimization

Optimizing the use of the provider's network through appropriate collaboration between the insurers and the health care providers is essential for providing value-based healthcare, where both have incentives aligned around providing the right care to the right patient at the right time. Hence the insurers need to select the providers carefully.

Important Quality Parameters to Select Network Provider

a) Data-driven quality measurement: Medical codes also provide key information on quality metrics like re-admissions, post-operative complication, clinical non-compliance by the patient, no follow-ups, preventive test non-compliance, extended length of stay, hospital-acquired infections/conditions (HAC), viz., sepsis, Ventilator-Associated Pneumonia (VAP), etc.

b) Quality accreditation: Many healthcare-focused accreditation authorities/bodies, like the Joint Commission (JC), National Accreditation Board for Hospitals and Healthcare Providers (NABH) and American College of Radiology for Imaging Centers, provide such service.

c) Patient reviews and Surveys: Analyzing the online patient reviews, surveys, and testimonials (from provider websites and third-party aggregators), coupled with social listening (mentioning of providers by policyholders), can help the insurers in contract negotiations and decide to retain the providers. However one needs to be cautious since their opinions could be biased.

'Quality as the centerpiece', based on the qualified quality measurements, the industry can move toward a value-based model that will focus on the health outcomes of patients rather than on the fee for the service model.

d) Improved fraud detection and mitigation through payment integrity

Healthcare fraud is a moral hazard contributed by the users, patients, providers, and all those who are associated with the health care ecosystem. This prevalent menace is a threat contributing to huge financial losses to every stakeholder, and more importantly, it affects the trust built over the years between the entities and also the client-patient morale. The total loss contributed, by the fraudulent transactions, to the health care industry in the US has been estimated to be around $68 billion to $260 billion annually which accounts for 3 to 10% of all healthcare spending. Collectively, fraud, waste, and abuse (FWA) account for about 25% ($900B in 2018) of the total cost of health care in the US. The US has put in place strong regulations, standards, and technology, yet the fraud percentage is somewhere between 3 to 10%.

The Indian Penal Code does not as yet have an effective insurance fraud law/regulation even though frauds had contributed a leakage of Rs 45,000-crore to the insurance industry in 2019. In percentage terms, it had impacted most insurers in the range of 10%-15% across all lines of their business, while health insurance fraudulent claims could even touch 35% due to its complexities.

https://www.businesstoday.in/opinion/columns/story/insurance-frauds-control-act-an-urgent-need-in-india-fraudulent-claims-indian-penal-code-253947-2020-04-05

Being on the cautious side the insurance sector at present does not have a standardized and qualified data collection methodology to quantify this assumption accurately.

Payment integrity is a specialized function that focuses on over/fraudulent payments and FWA. Payers have to reduce their risk from FWA, hence each payer (Private, PSU, Government- funded) should have payment integrity programs/initiatives internally not only to detect but also to prevent such payments even before they are disbursed. Adopting the standardization and leveraging payment integrity technologies by the insurers/payers can bring the fraud percentage down to between 3 and 10.

https://www.acfe.com/article.aspx?id=4294974475

Fraud detection is most effective with standardized (Medical coding) data that is scientifically structured and comprehensive, which enables FWA prevention and detection possible. Some of the most prevalent approaches are rules-driven (Clinical, Policy, etc.) and with labeled data advanced micro-level analytics can be performed using statistical algorithms and AI/ML.

Improved wellness and personalized healthcare in the next 10-20 years

With rapid advancements in technology, like IoT, Sensors, AR/VR, computer vision, and availability of the better quality of data, doctors will have access to holistic and real-time data of the patient (past and present family history) including an integrated P Health Record (PHR) culled from different sources. This would enable the healthcare industry to move towards quality healthcare with the following improvements:

a) Wellness and preventive care

b) Early detection of diseases

c) Disease management

d) Medication adherence

e) Precision medicine

Further, this would improve the quality of life as well as the life expectancy of the people in the near future.

Regulatory and legal changes to improve healthcare in the Indian market

Strong regulations/laws are needed for interoperability, complete electronic transactions, administrative simplification, standardization and digitization, data privacy, and data security, Monitoring and enforcing compliance to the rules will help encourage the healthcare industry to simplify administration and reduce risk and at the same time lead to innovate, and create many new verticals within the healthcare ecosystem and generate a variety of job opportunities, and businesses, thus add value to society and most importantly the patient's holistic wellbeing.

There have been several initiatives by the Government. of India like National Health Stack (NHS), National Digital Health Blueprint (NDHB), NDHM, etc. However, well-regulated monitoring by the policyholders would help the healthcare industry to ensure standardized quality care for all the stakeholders.

Given below are the details of HIPAA, which is implemented in the US healthcare industry, and it is mandatory.

The US - HIPAA: Health Insurance Portability and Accountability Act

The HIPAA law is enacted to ensure that healthcare entities protect sensitive patient health information (PHI) and patient privacy. Since its enactment by the US Congress in 1996, new rules have been added to the HIPAA in order to enhance the current levels of protection. It is vitally important for organizations to keep themselves up to date with these changes and understand what HIPAA means to keep abreast of one's business domain and practices.

The Salient features of HIPAA Rules

The HIPAA regulation consists of several rules and guidelines covering the privacy of individual health information, security, and protection of electronic data, administrative simplifications and enforcement, etc. Some of the important features of these rules are summarized below for a better understanding of HIPAA regulation.

1. HIPAA Privacy Rule protects the Personal Health Information (PHI) and the medical records of the individuals. It places limits and conditions on the various uses and disclosures that can and cannot be made without patient authorization. This rule also gives every patient the right to inspect and obtain a copy of their records and request corrections/updation to their file.

2. HIPAA Security Rule defines and regulates the standards, methods, and procedures related to the protection of electronic PHI on storage, accessibility, and transmission.

3. Administrative Simplification: To reduce paperwork and streamline business processes across the healthcare system, the Health Insurance Portability and Accountability Act (HIPAA) of 1996 and subsequent legislation has set national standards for electronic transactions and uniform data coding.

   A. Electronic transactions: Under the HIPAA, certain standard transactions for the electronic exchange of healthcare data include:(a) Payment and remittance advice, (b) Claims status, (c) Eligibility, (d) Coordination of benefits, (e) Claims and encounter information, (f) Enrollment and de-enrollment, (g) Referrals and authorizations and (h) Premium payment.

   B. There is certain uniform codes used in the HIPAA transactions: The following code sets of healthcare are to be submitted electronically while processing the claims. (a) International Classification of Diseases (ICD), (b) Current Procedural Terminology (CPT), (c) HCFA Common Procedure Coding System (HCPCS), (d) Code on Dental Procedures and Nomenclature (CDT) and (e) National Drug Codes (NDC).

Adopting a uniform set of medical codes is intended to simplify the process of submitting claims electronically and reduce administrative burdens on healthcare providers and insurers. The correct use of these codes ensures the safety, accuracy, security of medical records and the PHI.

4. Enforcement Rule governs mainly data privacy and security. Any violations of data privacy and security penalize the persons who are associated with it. The enforcement rule addresses five main areas concerning covered entities (hospital, Insurance, clearinghouse) and business associates (Any vendor who supports the covered entities in certain functions), in respect of data security and privacy, breach reporting, accounting disclosure requirements, the establishment of new criminal and civil penalties and enforcement methods for HIPAA non-compliance.

The introduction of Regulations like HIPAA in India would help achieve Standardization, Privacy, and Security as the policymakers are giving priority to data privacy, security, and consumer experience. A formalized regulatory push from the Government of India could expand the ecosystem, open new verticals and create jobs while addressing standardization, privacy, and security compliance. No doubt, technology will play a vital role in enabling this. Hence, InsurTech space in India will get a lot of traction for startups and investors, which in turn would allow innovations in this space. In a similar line, India has already set up National Health Authority (NHA) which is currently administering the national health insurance scheme PMJAY - Ayushman Bharat, providing health protection to nearly 50 crore individuals, especially, the economically weaker section of the population. NHA has also created an Electronic Health Data Repository under the National Digital Health Mission, which is an aggregate data portal where electronic health data records of the individuals shall be maintained. Such a data repository platform would certainly enable insurers and health service providers to analyze the mortality and morbidity trends at a micro level, which would help in designing customized coverages based on the risk profiles of the individuals. Further, NHA has also developed Health data standards covering health record IT standards, ISO Health Informatics, standard definitions of Medical Terminology, and coding standards for a better understanding of the medical terminologies. Such standardization of medical and procedural coding, would improve the quality of health care services and also ensure better data privacy and security.

Conclusion:

Automation has already been initiated in every vertical and its sub-processes within the healthcare industry. But with the acceleration of the new age technologies like AI & ML, Blockchain, RPA, etc., the entire process of healthcare delivery, third-party services,

insurance services, pharmaceutical, and healthcare ancillary services would get integrated into one automated system which uses the data from multiple sources, verifies and authenticates the sources, does deep drive analysis and provides a more accurate intelligent service to every entity in the health care ecosystem. This would also enable Computer-Assisted Coding wherein the medical coding is also automated to some extent with help of Electronic Health Records, Optical Character Recognition, Natural Language Processing (NLP), AI/ML. This would also enable automated risk-based underwriting, policy issues, automated-claims adjudication, and payment integrity – Auto verification, prevention and detection of frauds, etc. Further automation with AI would accelerate robotic surgery in every branch of health science with IoT or smart sensors or devices integrated with PHR for real-time monitoring, risk classification, and early detection of diseases. More importantly, it would enable the policymakers in streamlining the existing health care policies, support evidence-based research, better disease control & cost management, and develop sustainable health care programs ensuring quality health care for everyone.

Bibligraphy

- U.S. Department of Health and Human Services, (2021), Health Information Privacy, USA. https://www.hhs.gov/hipaa/for-professionals/regulatory-initiatives/index.html
- Greg Garner (2021), Understanding the five main HIPAA Rules, HIPAA Exams, USA.
- https://www.hipaaexams.com/blog/understanding-5-main-hipaa-rules/
- David C. Kibbe (2001), What the HIPAA Transactions and Code Set Standards Will Mean for your Practice, Family Practice Management, American Academy of Family Physicians, USA, November/December 2001. Pg. 28 to 32. https://www.aafp.org/fpm/2001/1100/p28.html
- Center for Medicare and Medicaid Services (2021), Regulations and Guidance, Administrative Transactions Overview, CMS, USA.
- https://www.cms.gov/Regulations-and-Guidance/Administrative-Simplification/Transactions/TransactionsOverview
- MoH&FW (2021), National Digital Health Blueprint Report, Ministry of Health & Family Welfare, New Delhi.

- https://www.nhp.gov.in/NHPfiles/National_Digital_Health_Blueprint_Report_comments_invited.pdf
- Kumar Anurag, and Sarwal Rakesh (2021), Health Insurance for India's Missing Middle, NITI Aayog, Government of India, New Delhi.
- https://www.niti.gov.in/sites/default/files/2021-10/HealthInsurance-forIndias MissingMiddle_28-10-2021.pdf
- AAPC (2021), All about Medical Coding, American Academy of Holdings, LLC, USA.
- https://www.aapc.com/medical-coding/medical-coding.aspx
- International Healthcare Accreditation Organisations, https://en.wikipedia.org/wiki/List_of_international_healthcare_accreditation_organizations
- Mansour, W.; Boyd, A.; Walshe, K. (July 2020). "The development of hospital accreditation in low- and middle-income countries: a literature review". Health Policy and Planning. 35 (6): 684–700.
- Kristen Lee (2020), Population Health Management, TechTarget, USA. https://searchhealthit.techtarget.com/definition/Population-health-management-PHM
- Trisha Torrey, (2020), Overview of Disease Management, Verywell Health, USA. https://www.verywellhealth.com/disease-management-2615164
- Daniel Schlegel and Antonio and Russo (2021), Cognitive Advantage for the Insurance and Health Insurance Industry in Switzerland, Deloitte, U.K.
- https://www2.deloitte.com/ch/en/pages/innovation/articles/cognitive-advantage-for-the-insurance-and-health-insurance-industry-in-switzerland.html

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