

Project Title

Improving operational efficiency of scanning of medical records with Robotic Process Automation (RPA)

Project Lead and Members

Project lead: Sally Oh, Director

Project members:

- Lee Worn Jiun, Senior Manager
- Elisee Koh Wei Shan, Senior Manager
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Organisation(s) Involved

KK Women's and Children's Hospital (KKH)

Healthcare Family Group(s) Involved in this Project

Healthcare Operations

Applicable Specialty or Discipline

Health Information Management

Aims

To implement a reliable and efficient system solution to improve the efficiency of digitizing medical records by 50%.

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lessons Learnt

The initial system configuration and setup might be tedious but the benefits will be rewarding in the long term. The team invested time to 'teach' the system before it could recognise the documents. This teaching process is impeded by the huge magnitude of document library standing at 1636 document types. Once this process is completed, the accuracy and predictive ability of the system will improve progressively and take over the repetitive task with minimal human intervention.

In terms of change management, it is imperative to motivate the team to accept unlearning and embrace relearning in order to instil the growth mindset in them. Technology is ever evolving hence staff have to be constantly upskilled in order to drive innovation. Staff communication is also essential to assure them that RPA is not to replace their job but to aid them in eliminating the low value-added tasks, which will allow them to focus on more complex and meaningful tasks.

Constantly engaging the team to discuss implementation, identify approaches to overcoming problems and obstacles are imperative. No issue is too trivial and change champions must listen, value and be responsive to issues raised, no matter how micro.

Strong change champions and change agents are Managing transformational improvement projects that are aligned to hospital's strategies through operations analytics and streamlining of work processes and also working with various stakeholders in achieving and delivering the objectives. Effective project management and the use of established methodologies such as PDSA

Division management has also made it a priority to review internal feedback and attend work sessions regularly to sense and analyse staff sentiments. It is also important to close loop with the team through daily roll call and monthly work discussion groups.

Last but not least, leadership support on-the-ground initiatives is crucial first step and management buy-in indispensable.

Conclusion

See poster appended/ below

Additional Information

The system was piloted in July 2021 on a small scale and cutover to production in August 2021. Duration will be 11 months. HIMS has hosted field visits for other departments within the hospital such as KKH IVF clinic, Business Office and other institutions' HIMS departments who are keen to explore and deploy AI-powered RPA for their area of work where mundane and routine duties abound. At SingHealth level, the HIMS Shared Services who oversee 11 institutions initiated a feasibility study on potential RPA deployment for respective HIMS departments. The study is scheduled to complete by end of 2022.

Project Category

Technology

Care & Process Redesign

Keywords

Robotics, Machine Learning, Robotic Process Automation, Productivity, Man-Hour Saving, Time Saving, Cost-Saving, Change Management, Process Redesign

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Improving operational efficiency of scanning of medical records with Robotic Process Automation (RPA)

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Background & Opportunities

The need to improve clinicians' access to patient information drives the digitization of medical records from hardcopy to electronic means. Health Information Management Services (HIMS) department scans medical records as digitised copies and upload into the Scanned Medical Records (SMR) system for access by care providers.

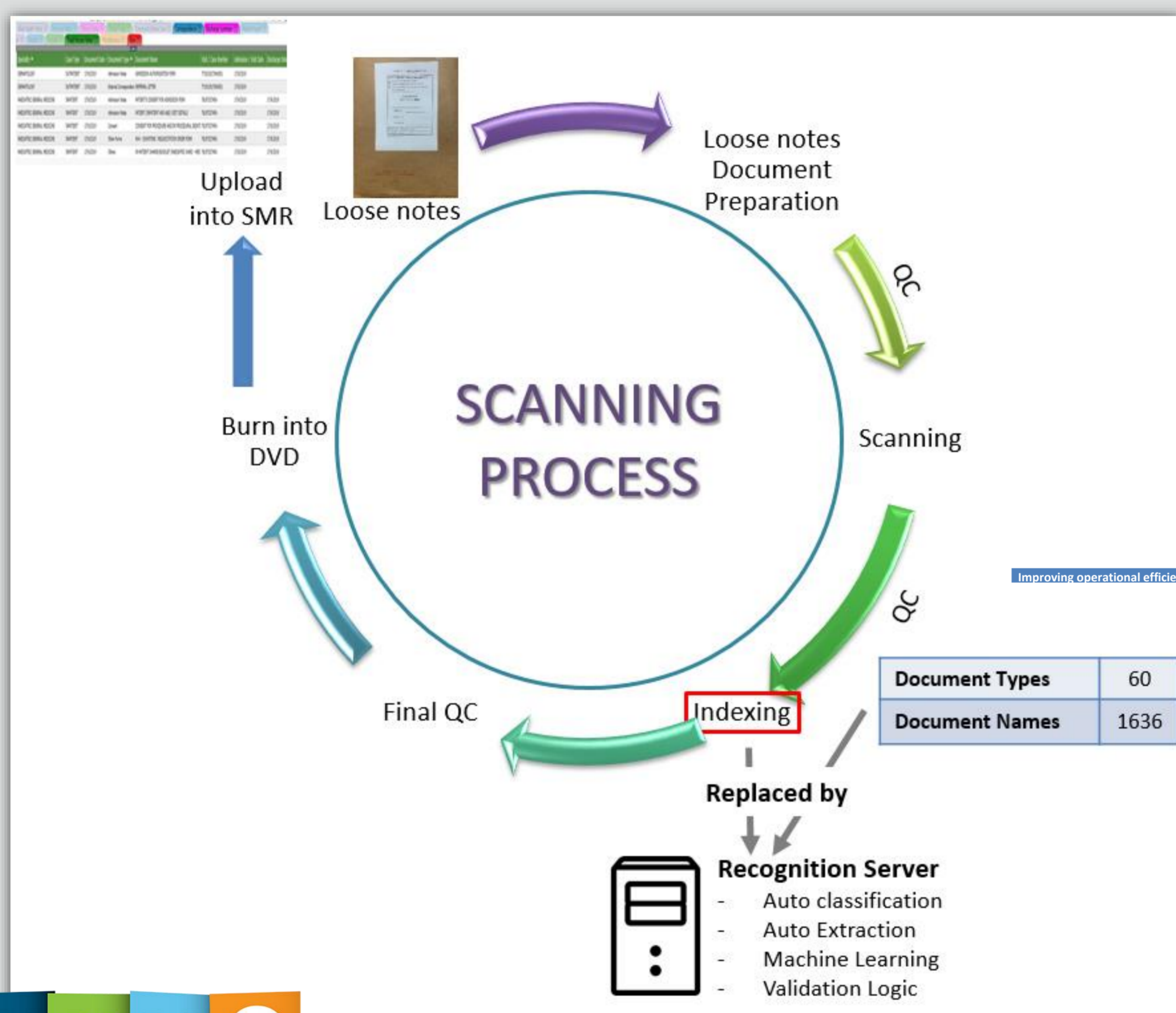
As part of continuous process improvement review, HIMS explored ways to streamline and optimize scanning processes so as to increase productivity while ensuring high quality output.

Aim

The aim is to implement a reliable and efficient system solution to improve the efficiency of digitizing medical records by 50%.

Methodology

HIMS carried out value stream process mapping and time-motion study for the 5 stages of the scanning process. From the exercise, Document Indexing stage was identified as a source of potential 'waste' in the current state.



WHY?

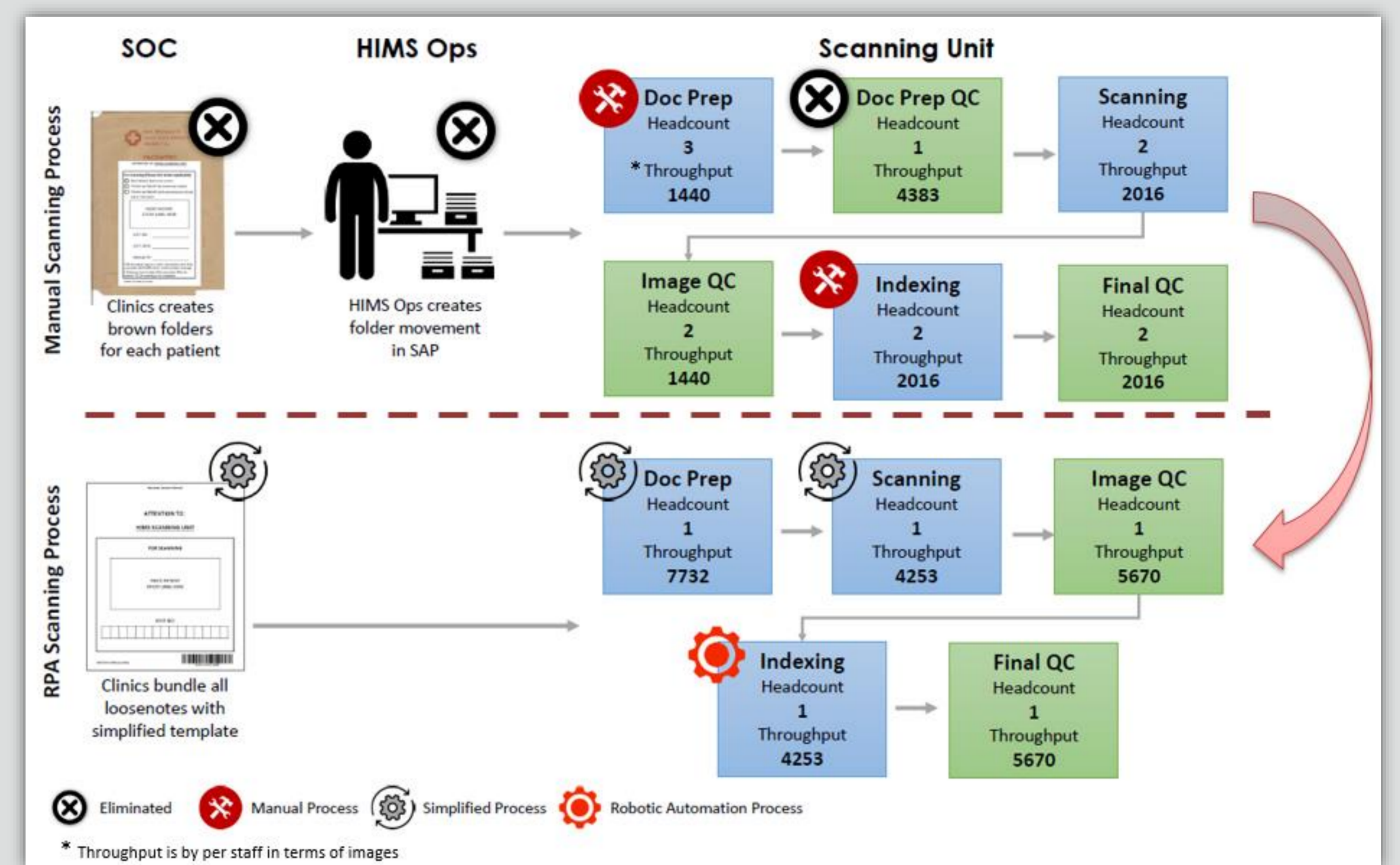
1. Highly manual and repetitive process.
2. Due to the magnitude of the Document Library, only a few staff is competent enough to perform document indexing.
3. Longer time needed to train staff and coverage not immediately possible.
4. Minimise or replace low value adding activities

It is imperative for HIMS to eliminate waste, reduce errors and improve production throughput by automating the indexing function in the Scanning process. HIMS began to research and do a horizon scan on available technological solutions that could meet the objective.

Solution

Together with the vendor, the team assess the possibility of adopting AI-powered Robotic Process Automation (RPA) as a feasible solution for its capability of handling high-volume, routine and repetitive tasks that require humans to perform.

The document processing software was implemented in July 2021. It uses machine learning and artificial intelligence to automate the process of recognizing and understanding virtually any type of document and extracts the information for later processing or storage. The accuracy rate and predictive ability improve progressively when machine learning replaces humans in processing the validation logic and document classifications.



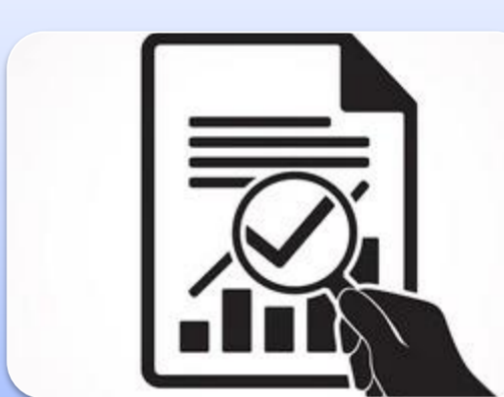
Send documents for scanning

- **Before:** Clinics create brown folders for individual patient and attach a cover sheet with patient information.
- **After:** Not required to use brown folders. Clinics bundle all documents and use patient separators with a simplified template, as system can populate patient information based on visit number.



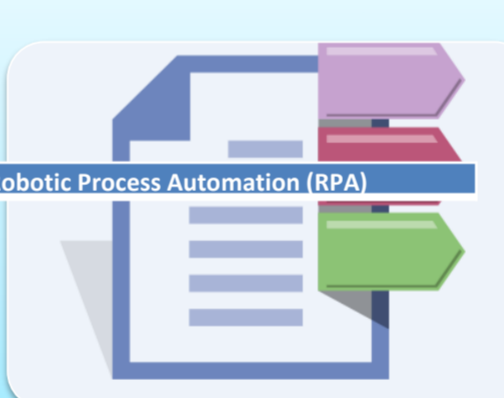
Document Preparation

- **Before:** Identify and sort according to the document type, ensure correct patient and removal of staples.
- **After:** Removal of staples. The rest of the processes not required as it will be automatically picked up by the system.



Document Preparation QC

- **Before:** Quality checks to ensure that the documents are identified and sorted correctly.
- **After:** Process eliminated. Quality checks not required as it will be picked up by the system.



Indexing

- **Before:** Assign indexes (19 fields) to every piece of document which includes patient information, visit information, document type and document name.
- **After:** Indexes will be assigned automatically by the system. Only require to handle exceptions for documents that are not recognized by the system.

Results

		Before Intervention	After Intervention	Savings / Improvement
Headcount		12	5	7 manpower for redeployment
Productivity Improvement (in images)	Doc Prep	1440	7732	5 times more
	Doc Prep QC	4383	Eliminated	Eliminated
	Scanning	2016	4253	2 times more
	Image QC	1440	5670	4 times more
	Indexing	2016	4253	2 times more
	FinalQC	2016	5670	3 times more

*Productivity was measured by per shift i.e. 7 hours

The outcome of the solution is summarized as follows:

- ✓ Effective use of staff resources: The manpower that are rostered for document indexing can be redeployed to other process streams to improve the throughput.
- ✓ Shorter turnaround time: Able to scan and upload the scanned medical records at a faster rate.
- ✓ Productivity: Improved by 2 to 5 times at different stages based on time motion study.
- ✓ Accuracy: Improved accuracy as the machine learns and processes more document types, from 67% to 86.5% in 3 months.
- ✓ Statistically, the new system shows significant improvement, with P-value < 0.05 (Chi Square).

Conclusion

With the AI-powered RPA solution, HIMS is able to achieve our aim to increase scanning productivity while ensuring high quality output. Other benefits include better staff satisfaction as the lower-value tasks are automated. This system is pertinent in the long run even upon completion of casenotes scanning as loose notes scanning process will still be ongoing, hence the benefits will be sustainable.