Automated data collection

- Clinical experiences and accuracy of stereoelectroencephalography using the robotic arm Cirq
- Aging, mitochondrial dysfunction, and cerebral microhemorrhages: a preclinical evaluation of SS-31 (elamipretide) and development of a high-throughput machine learning-driven imaging pipeline for cerebromicrovascular protection therapeutic screening
- Multimodal neuromonitoring in the nordic countries: experiences and attitudes - a multi-institutional survey
- Implementation of Integrated Patient-Reported outcome collection in outpatient cranial neurosurgical Practice: Results of qualitative interviews
- Enlarged perivascular spaces under the dorso-lateral prefrontal cortex and severity of autism
- White matter hyperintensity severity modifies gut metabolite association with cognitive outcomes
- WDRIV-Net: a weighted ensemble transfer learning to improve automatic type stratification of lumbar intervertebral disc bulge, prolapse, and herniation
- Accelerated symptom improvement in Parkinson's disease via remote internet-based optimization of deep brain stimulation therapy: a randomized controlled multicenter trial

---

Automated data collection refers to the process of gathering information automatically, without the need for direct human intervention. This can be achieved through various technologies, software, and sensors that are programmed to collect, process, and store data without manual input. Automated data collection is commonly used in diverse fields such as business, manufacturing, healthcare, research, and technology. Here are some key aspects of automated data collection:

Technologies and Methods: Sensors and IoT Devices:

Sensors, including temperature sensors, motion sensors, RFID (Radio-Frequency Identification) tags, and IoT (Internet of Things) devices, are commonly used for real-time data collection. Barcode and QR Code Scanning:

Automated data collection systems use barcode and QR code scanning technologies to quickly and accurately capture information from products, assets, or documents. Machine Learning and AI:

Machine learning algorithms and artificial intelligence can be employed to automate data collection and analysis, extracting insights from large datasets without explicit programming. Automated Surveys and Forms:

Online platforms and software can automate the collection of survey responses and form submissions, making it more efficient to gather information from a large number of respondents. Web Scraping:

Automated programs, known as web scrapers, can extract data from websites and online sources, facilitating the collection of information for analysis or integration into other systems. Data Loggers:

Data loggers are devices that automatically record data over time. They are commonly used in environmental monitoring, manufacturing processes, and scientific research. Automated Data Entry:

Software tools can automate the process of entering data into databases, reducing errors and increasing efficiency compared to manual data entry. Advantages of Automated Data Collection:

Efficiency:

Automated data collection systems operate quickly and consistently, reducing the time required for data gathering compared to manual methods. Accuracy:

Automation minimizes the risk of human errors associated with manual data entry, resulting in more accurate and reliable datasets. Real-Time Monitoring:

Many automated systems provide real-time data, allowing organizations to monitor and respond to changes promptly. Scalability:

Automated data collection can easily scale to handle large volumes of data, making it suitable for applications ranging from small-scale operations to enterprise-level systems. Cost-Effective:

In the long run, automated data collection can lead to cost savings by reducing labor costs associated with manual data entry and minimizing errors that may incur additional expenses. Integration with Systems:

Automated systems can seamlessly integrate with other software and systems, facilitating data flow across different parts of an organization. Considerations and Challenges: Data Privacy and Security:

Protecting the privacy and security of automated data is crucial. Organizations need to implement robust security measures to safeguard sensitive information. Quality of Data:

While automation enhances accuracy, the quality of data is still dependent on the initial design and configuration of the automated systems. Maintenance and Updates:

Automated systems require regular maintenance and updates to ensure their continued effectiveness and compatibility with evolving technologies. Ethical Considerations:

The ethical use of automated data collection, especially in areas such as surveillance and AI, is a growing concern. Organizations must consider the potential impact on privacy and human rights. Training and Implementation:

Proper training of personnel and careful implementation of automated systems are essential to avoid issues such as misconfiguration or misuse. Automated data collection plays a pivotal role in enhancing operational efficiency, decision-making, and innovation across various industries. As technology continues to advance, the capabilities and applications of automated data collection are expected to expand further.

Hanrahan et al. aimed to demonstrate how process mapping can be used to identify reliable areas of documentation in the patient pathway to target structured data entry interventions.

This mixed methods study was conducted in the largest pituitary centre in the UK. Purposive snowball sampling identified frontline stakeholders for process mapping to produce a patient pathway. The final patient pathway was subsequently validated against a real-world dataset of 50 patients who underwent surgery for pituitary adenoma. Events were categorized by frequency and mapped to the patient pathway to determine critical data points.

Eighteen stakeholders encompassing all members of the multidisciplinary team (MDT) were consulted for process mapping. The commonest events recorded were neurosurgical ward round entries (N =

212, 14.7%), pituitary clinical nurse specialist (CNS) ward round entries (N = 88, 6.12%) and pituitary MDT treatment decisions (N = 88, 6.12%) representing critical data points. Operation notes and neurosurgical ward round entries were present for every patient. 43/44 (97.7%) had a pre-operative pituitary MDT entry, pre-operative clinic letter, a post-operative clinic letter, an admission clerking entry, a discharge summary, and a post-operative histopathology pituitary multidisciplinary (MDT) team entries.

This is the first study to produce a validated patient pathway of patients undergoing pituitary surgery, serving as a comparison to optimise this patient pathway. They have identified salient targets for structured data entry interventions, including mandatory datapoints seen in every admission and have also identified areas to improve documentation adherence, both of which support movement towards automation [1].

1)
Hanrahan JG, Carter AW, Khan DZ, Funnell JP, Williams SC, Dorward NL, Baldeweg SE, Marcus HJ. Process analysis of the patient pathway for automated data collection: an exemplar using pituitary surgery. Front Endocrinol (Lausanne). 2024 Jan 12;14:1188870. doi: 10.3389/fendo.2023.1188870. PMID: 38283749; PMCID: PMC10811105.