

# ARTIFICIAL INTELLIGENCE IN HEALTHCARE

Annotate | Train | Deploy

## Trending

The advent of digital technologies in healthcare has led to an explosion of medical data. It is estimated that 2314 exabytes (one exabyte = one billion gigabytes) of medical data will be produced in the year 2020, compared to 153 exabytes generated in year 2013.\* This sizeable data generated has the potential to build highly accurate AI models.

Healthcare industry is also witnessing a new wave of AI-fuelled technology innovation, primarily due to the advancements in computing infrastructure and deep learning architectures, delivering reliable performance comparable to human experts.

The advancements in AI technologies have led the industry to explore AI for improving their internal processes, as well as adding value to their customer-facing products. This has resulted in an increase in the development of AI-based Software as a Medical Device (SaMD).

*\*Stanford Medicine-2017*

## Opportunities & Challenges

Companies willing to adopt AI require access to inter-disciplinary expertise, such as business intelligence, data science, machine learning, etc. to identify potential areas of opportunity, generate insights, and build meaningful and differentiated solutions.

Data is a primary ingredient for building AI-based solutions and hence it is imperative for businesses to have quality annotated data to build highly accurate AI models while having a necessary data security infrastructure in place.

One of the major hurdles in the adoption of AI by the healthcare industry is the haze around the regulatory requirements. This makes it essential for companies to have a clear understanding of regulations and best practices to expedite their AI-based developments, for e.g. establishing clear expectations on quality systems and good ML practices, conducting premarket review for AI-based SaMDs, etc.

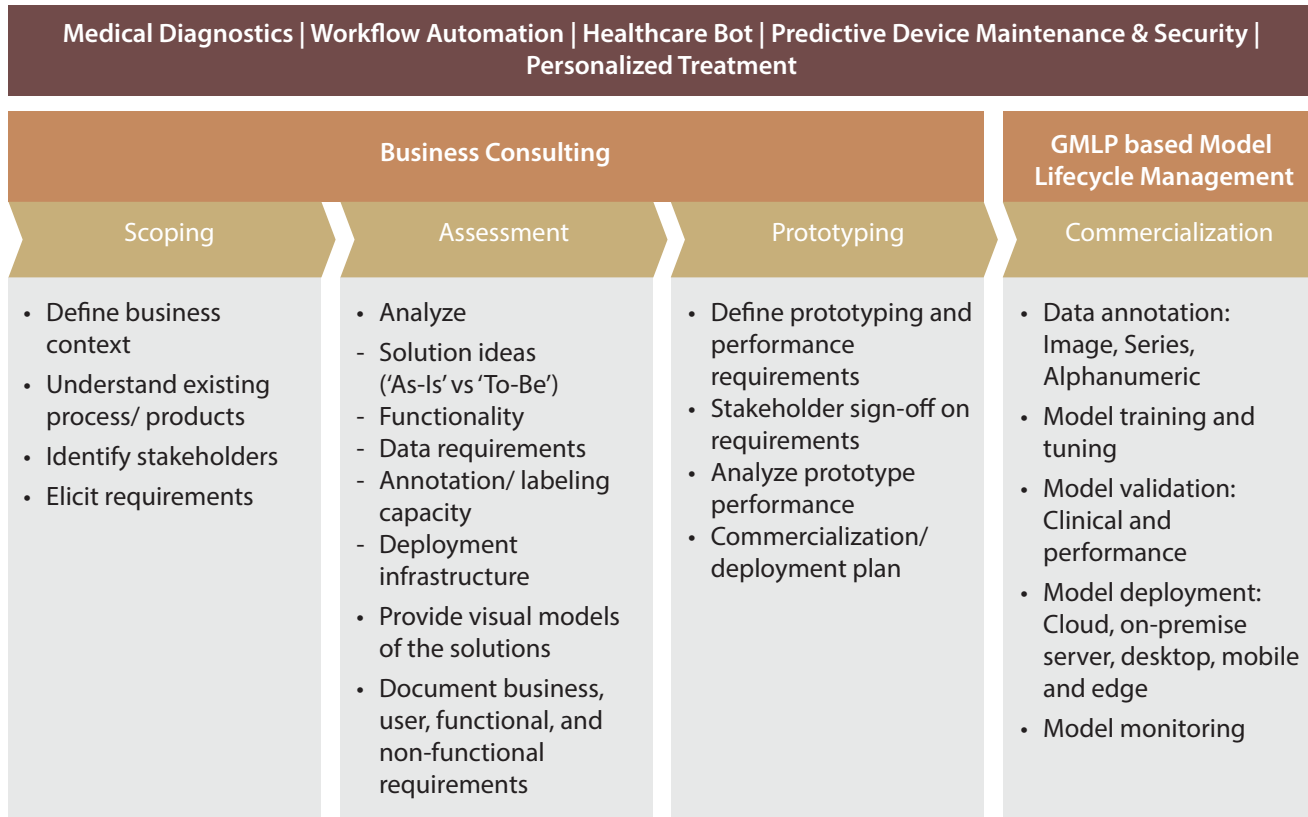


## Benefits for Consumers

- Delivering high accuracy models extremely close to human experts while significantly reducing episodes of errors and discrepancies
- AI-based predictive analytics to proactively monitor and gather insights from patient data, to create alerts, in case of adverse events
- Integrated AI-driven healthcare solutions to improve overall efficiency, thereby reducing healthcare cost for the patients

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## AI Services Framework



## Differentiators

- State-of-the-art computing infrastructure and transfer learning capabilities on established AI models such as Inception, VGG, ResNet etc. for rapid prototyping
- Multidisciplinary team of highly trained annotation experts, clinicians and data scientists
- Standard QA methods and processes to ensure high quality annotations of medical data
- ISO 27001:2013 certified IT infrastructure for data security
- Model lifecycle management adhering to Good Machine Learning Practices (GMLP) and Total Product Lifecycle (TPLC) approach recommended by the FDA

## Cases

### Advanced image enhancement of low fidelity images and decision support system for better outcomes

- Enhanced the 1.5T MRI images using deep learning driven pixel enhancement techniques achieving resolution comparable to 3T MRI images
- Developed customized auto-encoder based feature extractor module for 3D brain MRI images
- Exceeded state-of-the-art performance in classification of brain MRI images

### Model Lifecycle Management: Algorithm for detection of microbial objects in the microscope images with accuracy >95%

- Analyzed legacy image processing based algorithms and evaluated the performance
- Executed feasibility phase and established deep learning-based object detection algorithm
- Annotated large microscope image data set with the help of expert microbiologists
- Optimized and deployed algorithm on NVIDIA Jetson TX2 embedded platform
- Developed a platform for continuous retraining for enhancing the accuracy over the product lifetime

