iMerit

CASE STUDY

>99%
ANNOTATION QUALITY

COMPUTER VISION FOR ROBOTIC SURGERY

This top three medical device manufacturer partners with iMerit to employ computer vision models that boost surgical safety.

THE CHALLENGE

During robotic surgery, computer vision AI models are deployed to monitor countless criteria like instrument performance, disease progression, and adverse events. This data can identify improvements in procedures that enhance patient survival, surgery efficacy, and recovery time.

A typical surgery can generate several gigabytes of high resolution video footage. Before it can be used by an AI model, a medical expert needs to perform pixel and frame level annotation of key events and

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> *Surgery data is vital. It was essential that our model was making accurate identifications.*
>
> Digital Solutions Engineer

structures. Once annotated, ML algorithms can use this data for advanced real-time surgical visualization and real-world evidence of surgical instrument functionality.

This leading global medical device manufacturer typically annotated hospital surgery footage using their own medical experts. As data volume grew, this company needed an annotation partner that could scale operations while ensuring quality and expertise.

THE SOLUTION

This company chose iMerit for its HIPAA-compliant processes, US-based team, and diverse team of

surgical and endoscopic experts. iMerit proposed a hybrid workflow solution of specialized healthcare annotators trained through iMerit's medical curriculum in anatomy and surgery. Instead of experts performing the annotations, iMerit's doctors-in-the-loop would perform quality checks.

This hybrid workflow substantially reduced project costs compared with other vendors, without compromising quality or scalability. To annotate the surgical video footage, iMerit's specialized annotators drew bounding boxes around robotic surgery tools. Annotators also noted things such as device position, incision angles, and color of the device. They marked time events of instrument firing and made note of adverse events like bleeding.

Long tail events and pathologies were routed to experts for review and support. A robust quality

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> *iMerit's workflows have made them an invaluable partner.*
>
> Digital Solutions Engineer

control and quality assessment process ensured data quality and benchmarking showed even better results than experts alone.

THE RESULT

Thanks to iMerit's industry-unique hybrid workflows, annotations were completed months ahead of schedule. Data analysis found that annotations met > 99% accuracy by intersection over union and +/- 3 frame specificity versus gold set data. After training their model and comparing measuring model performance, they found a substantial 12% increase in the model's recognition accuracy.

Today, this data is being used to continually enhance surgical efficacy and outcomes. This medical device manufacturer continues working with iMerit to further enhance their robotic surgery and endoscopy models, while also creating new devices and innovations thanks to outcomes related to this project.

BOTTOM LINE IMPACT

>99%	+12%	ACCELERATED
Annotation Quality	Computer Vision Accuracy	Patient Recovery Time

About iMerit

iMerit provides end-to-end data labeling services to Fortune 500 companies in a wide array of industries including agricultural AI, autonomous vehicles, commerce, geospatial, manufacturing, government, financial services, medical AI and technology. iMerit employs more than 5,500 full-time data annotation experts in Bhutan, Europe, India and the United States.

info@imerit.net | imerit.net in

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