

Press release



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Dr. AI - Bosch facilitates medical diagnosis with artificial intelligence

Vivascope cell-analysis platform named CES 2020

Innovation Award Honoree

- **Intelligent:** Edge-computing machine-learning algorithms detect abnormalities in bio samples and thus support faster diagnosis and treatment
- **Connected:** Exchange of digital data enables remote analysis, peer consulting, and expert review
- **Easy operation and integrated battery** allows use in remote and resource-constrained locations

Bengaluru, India. 1 in 1.5 million – a ratio that can have dire consequences. In some regions of the world, there is just one pathologist – only one clinical expert capable of analyzing bio samples for diseases and disorders – for every 1.5 million people. As a result, people either have no access to laboratory diagnostics, or they have to make an expensive and time-consuming journey before they can consult a pathologist. The few practicing pathologists that are available tend to work under time pressure, leading to delays and human error. To make medical diagnostics more accessible, Bosch has developed Vivascope – a compact device that not only creates digital microscopic images of body cells, but also analyzes them using advanced machine-learning algorithms. Vivascope has been recognized as a CES® Innovation Award Honoree in the “Tech for a Better World” category.

“Artificial intelligence and connectivity offer enormous opportunities, also in the healthcare sector. We at Bosch are working on connected solutions and artificial intelligence that serve people and improve their quality of life,” says Marc Meier, president of Bosch Healthcare Solutions GmbH. “True to our ‘Invented for life’ ethos, Vivascope helps detect potential diseases and disorders more quickly and

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easily.”

Analysis within 15 minutes, over 30 distinct conditions

Especially in remote areas and in facilities that do not have access to high-end equipment, patients may have to wait anywhere from three to eight days to receive any findings following the collection of samples. Vivascope is designed to remedy this situation. Currently, almost two-thirds of clinical diagnosis is done manually, by means of a conventional optical microscope. The accuracy of the diagnosis also depends on the pathologist’s expertise and experience. A combination of a large number of samples and labor-intensive methods impacts not only the time taken but also the accuracy of the findings.

Vivascope can analyze human cell morphology in a short time. Its inbuilt AI algorithm analyzes cells’ form, shape, and structure. It categorizes them and detects minute deviations. Vivascope was developed with the support of clinical physicians and laboratory experts in India. It is expected to be launched there in mid-2020. Further regions are to follow. Up to now, the platform has been trained with more than 30,000 images and in excess of 9 million discrete points of cells, and is capable of extracting 165 distinct features from each individual cell. It is able to carry out an automated evaluation within 15 minutes and to provide the pathologist with information on more than 30 possible diseases or clinical disorders. In addition to evidence-based reporting, each analysis is validated by a pathologist to ensure precise diagnosis.

Vivascope achieves the same results with the thousandth sample as with the first, since the algorithm does not grow tired and is not susceptible to human weaknesses. “Incorporating innovative features enabled by cutting-edge technologies, the product is well placed to make a significant difference to people and to the world of pathology,” says Sri Krishnan V., the senior vice president responsible for innovation and incubation at Robert Bosch Engineering and Business Solutions Pvt Ltd in India. The information provided by Vivascope relieves medical laboratory personnel of the time-consuming and tedious burden of manual analysis steps. It allows them to focus on more complex cases and on diagnosis, so that accurate results are achieved faster. Especially in regions where there are very few pathologists, but not only there, this is a huge benefit.

Easy access to the lab - from anywhere

While Vivascope can support pathologists all over the world in the remote evaluation of different samples, for people living in vast hinterland regions it offers a possibility of access to laboratory diagnostics. “If the patient cannot come to the laboratory, the laboratory comes to the patient,” says Guruprasad S., vice president at Robert Bosch Engineering and Business Solutions in India and business domain leader for its healthcare activities. The product requires only a simple power-on, and can be seamlessly integrated into hospital and laboratory information systems. The inbuilt battery pack ensures more than six hours of continuous operation, even in black-out conditions. The data stored in the cloud

can be shared digitally with other laboratories – anytime, anywhere in the world.

As it is an open and digitally connected platform, the device enables further academic processing by the research community and peer-to-peer collaboration. In addition to the CES “Tech for a Better World” Honoree, the platform has also received the European Product Design Award 2019 in the Industrial and Life Science Design/Medical/Scientific Machinery category.

Bosch at CES 2020:

- **BOOTH: Tuesday to Friday, January 7-10, 2020**, in the Central Hall, booth #12401
- **FOLLOW** the Bosch CES 2020 highlights on Twitter: **#BoschCES**

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About Bosch Healthcare Solutions

Bosch Healthcare Solutions GmbH is a wholly owned subsidiary of Robert Bosch GmbH. The subsidiary was established in 2015 with the aim of developing products and services that improve people's health and quality of life. About 120 associates (state 2019) are currently employed at the company's headquarters in Waiblingen, Germany. The subsidiary's solutions draw on the Bosch Group's core competencies: sensors to collect data, software to evaluate that data, and services based on this data analysis.

About Robert Bosch Engineering and Business Solutions Private Limited

Robert Bosch Engineering and Business Solutions Private Limited is a 100% owned subsidiary of Robert Bosch GmbH, one of the world's leading global supplier of technology and services, offering end-to-end Engineering, IT and Business Solutions. With over 20,000 associates, it's the largest software development center of Bosch, outside Germany, indicating that it's the Technology Powerhouse of Bosch in India with a global footprint and presence in US, Europe and the Asia Pacific region.

About Bosch

The Bosch Group is a leading global supplier of technology and services. It employs roughly 410,000 associates worldwide (as of December 31, 2018). The company generated sales of 78.5 billion euros in 2018. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 460 subsidiary and regional companies in over 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At nearly 130 locations across the globe, Bosch employs some 68,700 associates in research and development.

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