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Amrita Vishwa Vidyapeetham develops app to detect engineering defects

Amrita Vishwa Vidyapeetham has developed BearingVisionAI, an application to inspect mechanical products such as bearings, gears, shafts etc. Developed by the Tribology Research Group from the Tribology and Interactive Surface Research Laboratory (TRISUL) at the Chennai campus of the Institute, the app aims to make inspections faster and accurate for original equipment manufacturers, process industries, and engineering MSMEs.

Users need to upload an image of the surface to be inspected and the app identifies the type of failure and quantifies the damage in a few seconds. The app can be customised as per the requirement of the customers, a press release said.

Source: Table 1.2: CBRE Research

FOOT NOTE

An App that spots little niggles in big machinery in engg industry

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When he was an applications engineer in the heavy engineering industry, Dr Shubrajit Bhaumik had seen how physically demanding it was to inspect bearings, gears, shafts and other heavy machinery parts on a tight deadline and file a quick report.

"Tribologists inspect the friction parts and depending on their report, the maintenance team decides the maintenance schedule," he says. "During my stint in the industry, I saw how difficult this process can be. In steel and cement industries, due to high environmental temperature and harsh operating conditions, it becomes difficult for applications engineers to give a report immediately."

Currently centre head and principal investigator, tribology and interactive surfaces research laboratory (Trisul) in the department of mechanical engineering at Amrita Vishwa Vidyapeetham, Bhaumik has used his industry experience to come up with a solution to the on-site inspection issue – the BearingVisionAI App. Developed by the Tribology Research Group from Trisul at the university's Chennai Campus, it makes on-site inspections much easier. An AI-integrated application, BearingVision is the joint effort of Bhaumik and his colleague Dr R Prasanna Kumar (associate professor, co-investigator, School of Computing) alongside three third-year students from Artificial Intelligence, School of Computing (M Shree Prasad, G Jeevan Sendur and G Venkata Krishna Kumar) and one third-year mechanical engineering student (Manohar Reddy).

HOW IT WORKS

- Just click a photo of the part from a mobile phone and upload the image on the app
- The app works like an Xray and diagnoses the problem in real time
- The engineer checks and detects the failed part sitting in his office
- He files a report immediately and the part is replaced immediately

The app's biggest USP is how simple it makes on-site diagnostics. "Users simply click a photograph of the surface to be inspected and upload the image. The app identifies the type of failure and quantifies the damage within seconds," says Shree Prasad. For the students themselves, the AI/computing collaboration with mechanical engineering was a big learn.

MAKING IT EASY: Members of the team, led by Dr Shubrajit Bhaumik, from the Tribology Research Group at Amrita Vishwa Vidyapeetham's Chennai campus that has developed the BearingVisionAI App that is making waves in the heavy engineering industry, helping detect tiny niggles in quick time

"The experience of working in a multi-disciplinary project is priceless," says Venkata Krishna Kumar. "Applying the concepts we learned in our coding classroom to a real-time core mechanical engineering problem was exciting. It was a perfect blend of coding and core engineering," adds Jeevan Sendur. For mechanical engineering student Manohar Reddy, the learning involved in selecting various algorithms along with his AI teammates is what he appreciates the most.

What the team is also chuffed about is how market-friendly the app is. "The app can be customised to detect failures of any mechanical element," says Bhaumik.

The team worked on the project for eight months and has now filed a patent for the app. "Once we get connected to industry, we need their requirements and we will be able to customise the algorithm," says Bhaumik. The team is planning to take this product to the market as soon as possible. "We are now open to industry so they can use this technology directly and we are planning on licensing this product," he adds.

"We run a lot of projects for industry," says Bhaumik. "We work on failure analysis for example. We also work on developing self-lubricating products and coatings and the app was developed in this background."