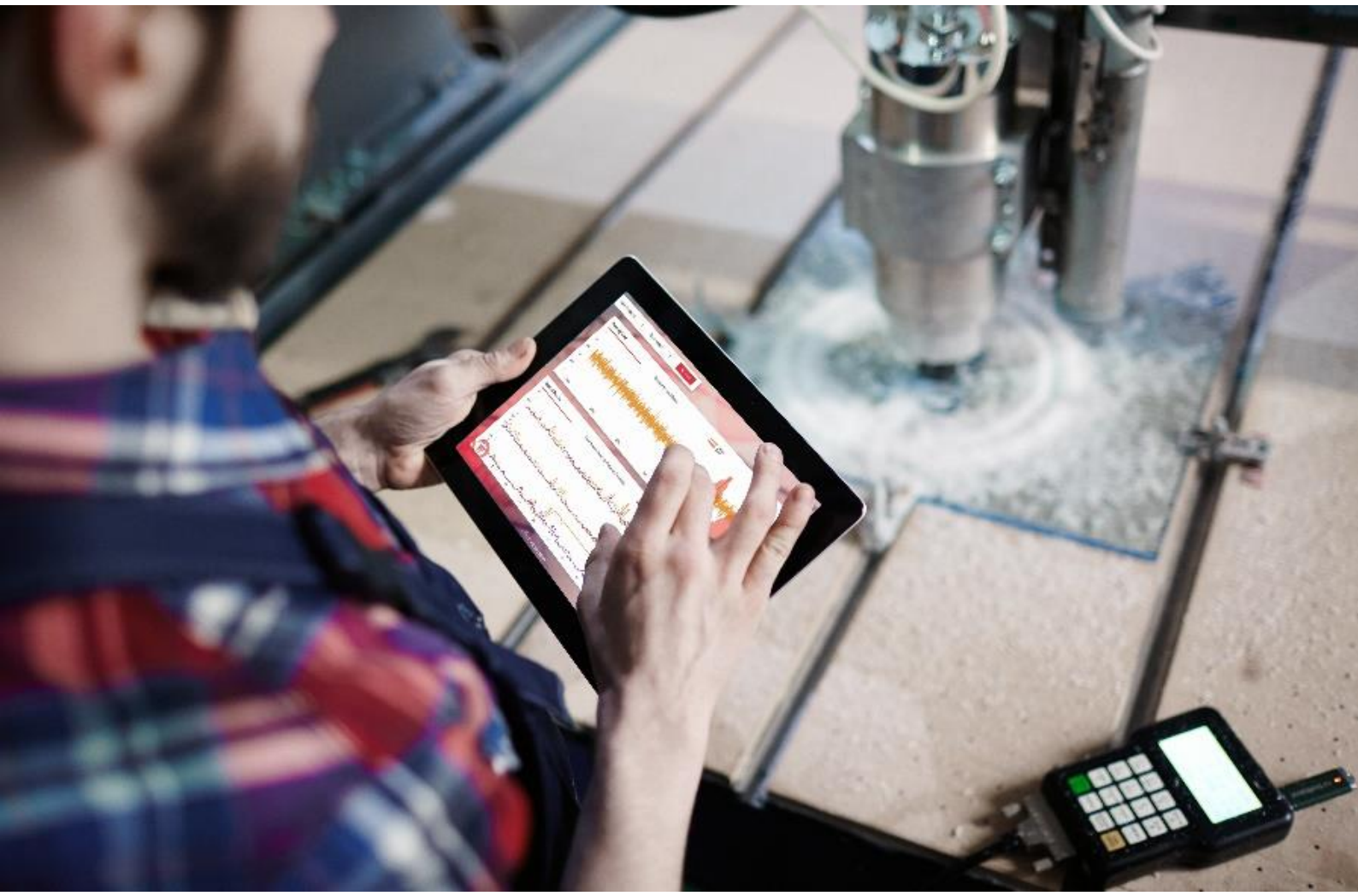
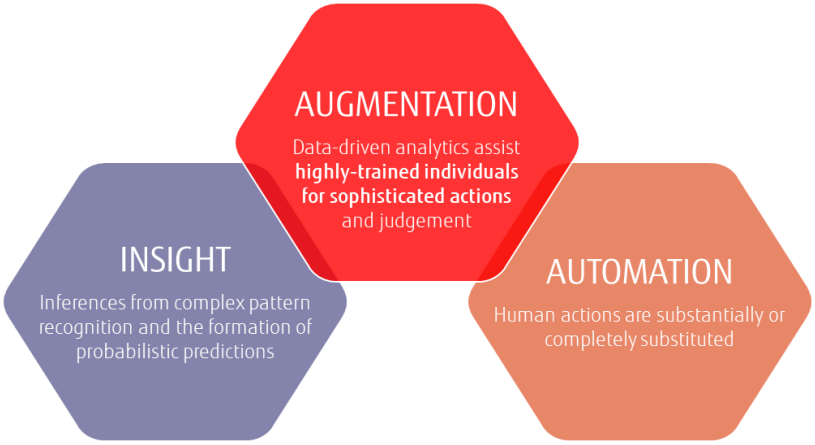
FUJITSU



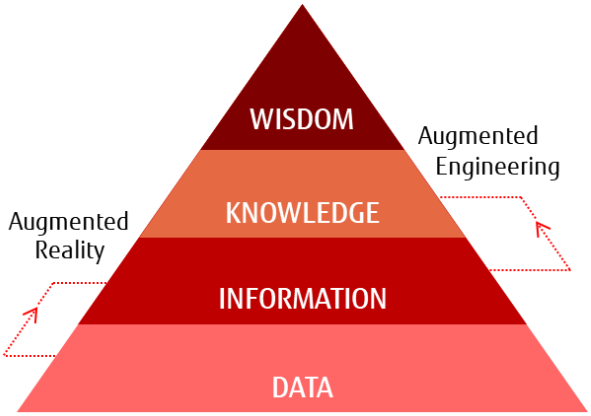
Augmented Engineering

Artificial Intelligence in Complex Environments



Being familiar with automation in its various facets, manufacturing and production businesses are increasingly comfortable in transitioning AI from an experimental to an applied technology. A fertile area of AI Deployment resides in human-centric *Augmented Engineering*, the conjunction of Augmented Reality and Artificial Intelligence that assists and augments the highly trained individual, such as the skilled engineer, technician, medical doctor or operator.

From Physical to Cognitive Structuring



Augmented Reality is now a widely known-concept which, in terms of the DIKW framework, can be placed at the interface between data and information. AR generally presents contextual information against a backdrop of a physical reality and is useful to many, independent of their skill. In contrast, AE provides recommendations derived from knowledge of the context, and so particularly relevant to a subset of individuals whose training and expertise are critical to the decisions they make.

It is in contextualizing the problem that we can see the differences between these forms of augmented AI, between data processed into information (AR) and information formulated as knowledge (AE). The second level of data restructuring present in the AE domain allows for better decision-making and more assured action. And as such, human-centric AE adds value to the business and the individual workplace alike.

Applications of Augmented Engineering

For AE to truly assist the specialist three conditions must be met:

- Repeatable, but not repetitive tasks,
- Subject to human error, where a failure would have a non-negligible impact
- The task is directly on the critical path to business offering. The operator is still in full control and is accountable for the decision, but with the added assistance from the AI 'augmenting' their capabilities.

One area that depends heavily on human interpretation and where Augmented Engineering is gaining traction is Manufacturing Quality Control. AI algorithms for such augmentation of human expertise can have common foundations (e.g. Time Series, 3D non-destructive testing), though need precise adaptation and validation for the specific use case. Yet their ability to support the engineer to gain time and precision in critical decision-making means such augmentation is an irresistible aid for manufacturing efficiency and top-line competitiveness. And we can certainly project that this form of augmented engineering will become a necessary component in all complex production lines.

Another example is the use of AI in contaminant analysis laboratory processes. Fujitsu are partnering with an end-user in this sector to design and implement a new digital architecture around its essential chromatogram analyses. With an AI platform at its core, this digital architecture will deliver augmentation functions to accelerate the technician's interpretation and deliver new business application services.

We can see augmentation also in the use of Fujitsu's AI-Solver, a data-driven technique that learns from physics-based simulations to instantly predict a fluid flow response in a new context, assisting product developers in virtual prototyping. And looking further afield we can easily imagine how the medical field can also benefit from human-centric AE. For instance, extracting relevant data from medical literature to inform better decision-making or identifying anomalies in medical images more rapidly. Ultimately, this enables the practitioner to spend more time with the patient, reduce human error and save on healthcare costs.

Conclusion

Augmented Engineering goes beyond Augmented Reality's value proposition, offering engineers solutions that not only provide facts, but also recommendations through their ability to contextualize such data. As sectors that are familiar with automation, manufacturing and production businesses are ideally-positioned to transition AI from an experimental to an applied technology and look at the next level of augmentation capability from data-driven analytics.

And as parting thought, AE may very well be one of the solutions that can help companies rebound and reposition as the dialogue related to COVID-19 shifts into a recovery perspective.