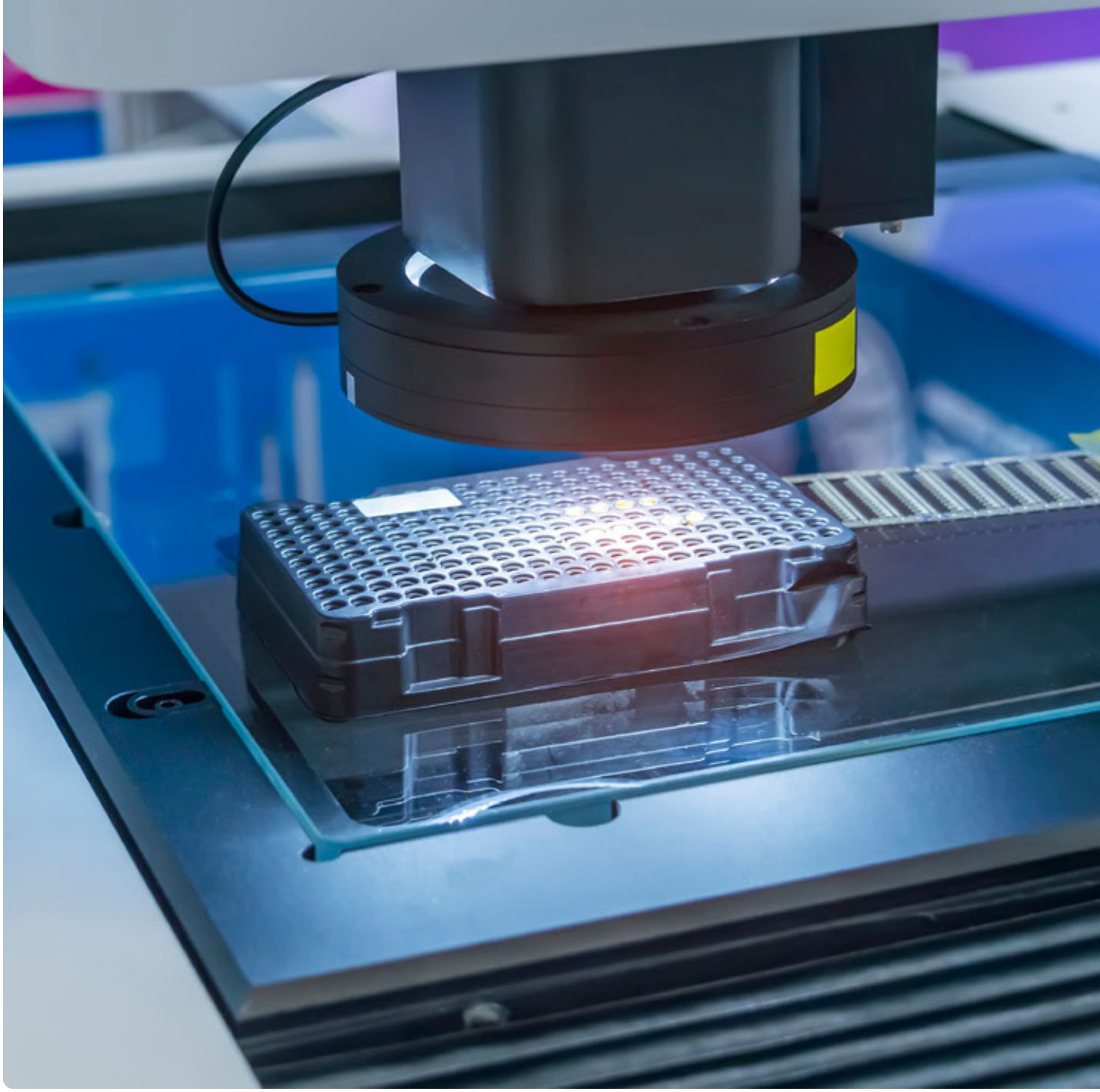
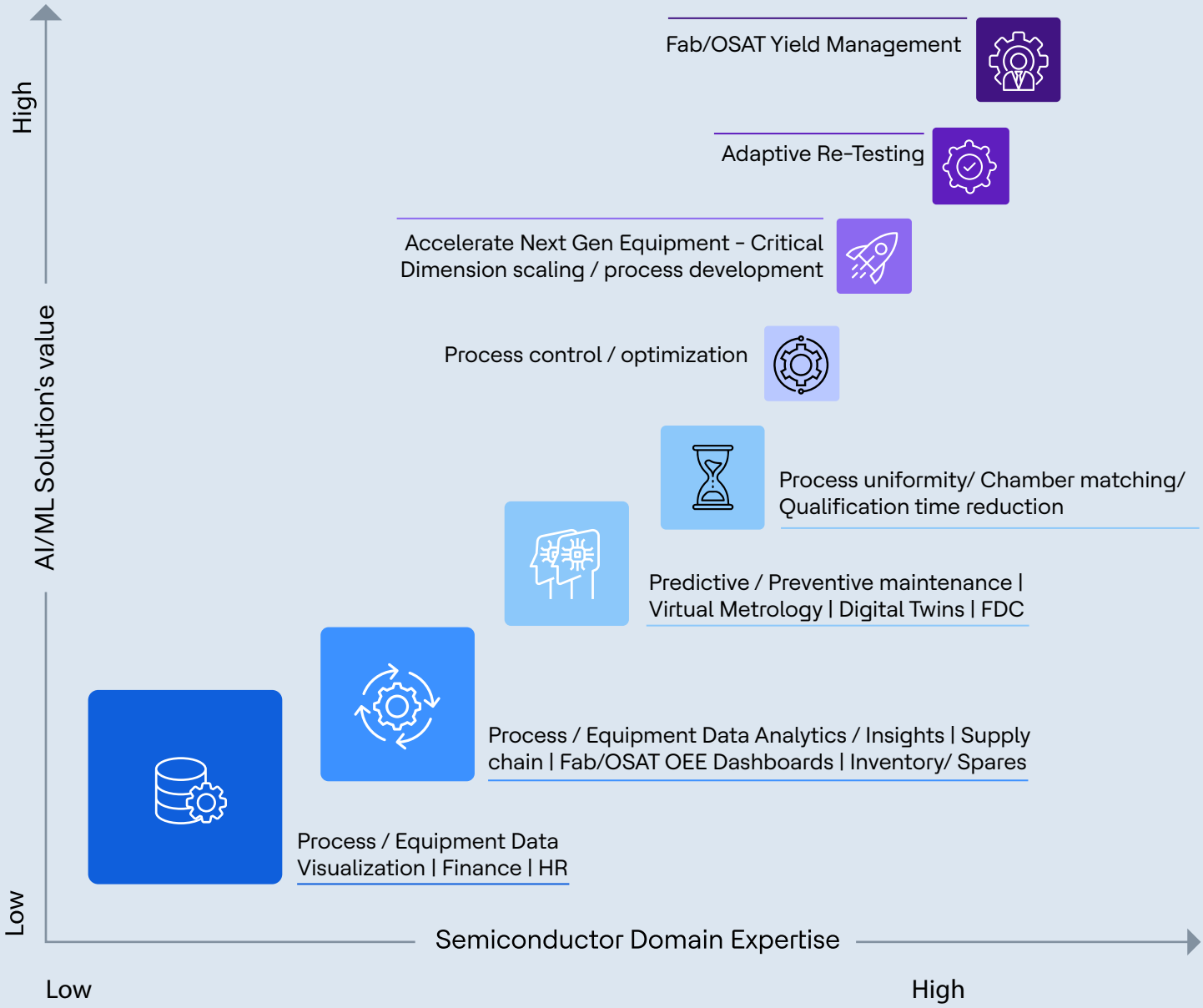
HCLTech | Supercharging Progress™

Data engineering and AI services for the semiconductor ecosystem



Advanced analytics improves end-to-end yield, enabling semiconductor companies to better manage cost pressures and sustain higher profitability. Smart manufacturing brings new insights and automation leading to significant production cost savings while improving product reliability. Our investments in Artificial Intelligence (AI) and Internet of Things (IoT) based solution accelerators have resulted in getting us recognized as leaders in Industry 4.0 and Digital Twin technologies. With a growing talent pool of data scientists, spanning data engineering and AI services, we are well positioned to solve the below key use cases in semiconductor industry. The size of boxes indicates the quantum of work in each use case.

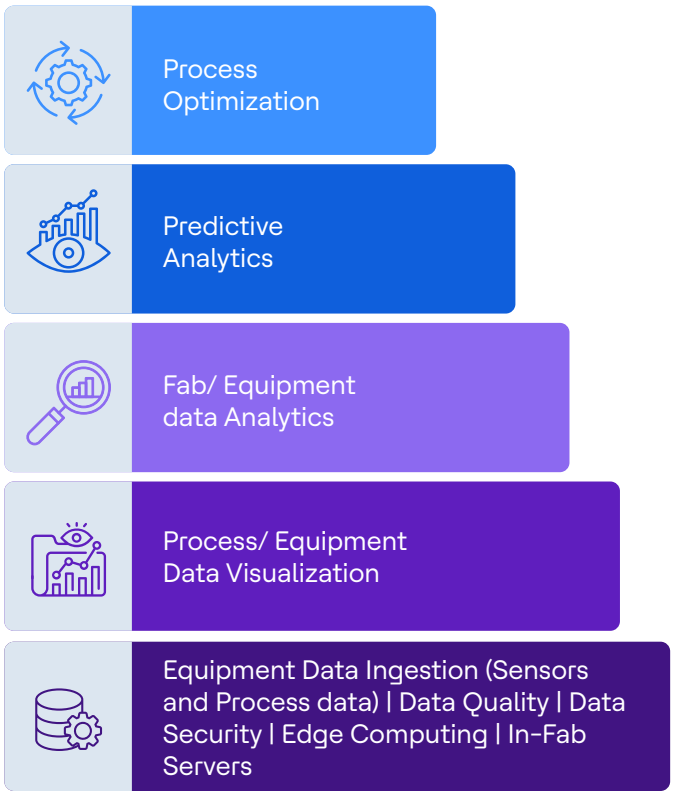
AI/ML use cases in Semiconductor Wafer Fabrication enterprise

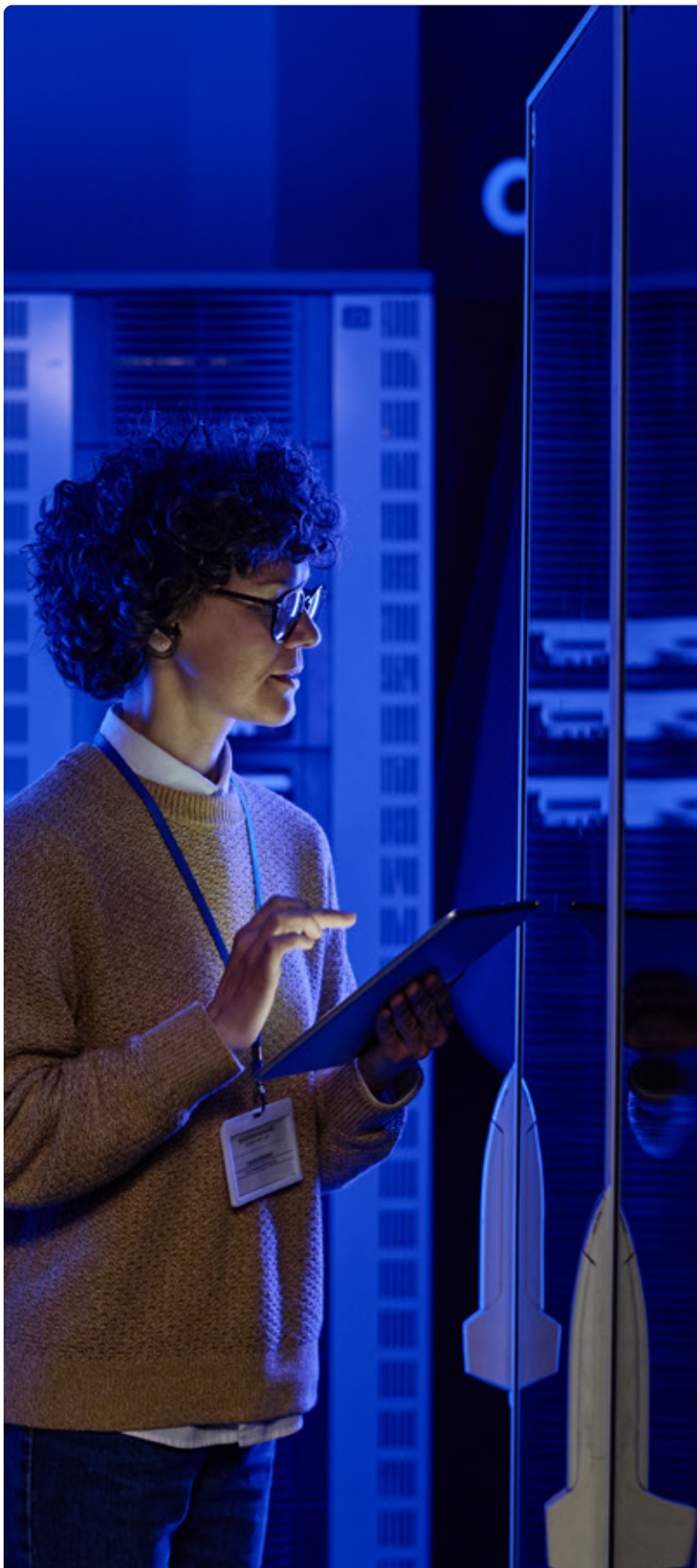


Building blocks for high-value use cases

A comprehensive data engineering strategy ensuring acquisition, automation, validation, and quality checks is critical to the success of all the use cases that deliver high value. With data security concerns in Fabs/Outsourced Semiconductor Assembly and Test (OSATs), typically the equipment use cases are hosted on a dedicated in-factory server outside the system running equipment process. The illustration below shows a typical building block to scale and deliver high value use cases in semiconductor industry.

Semiconductor use cases





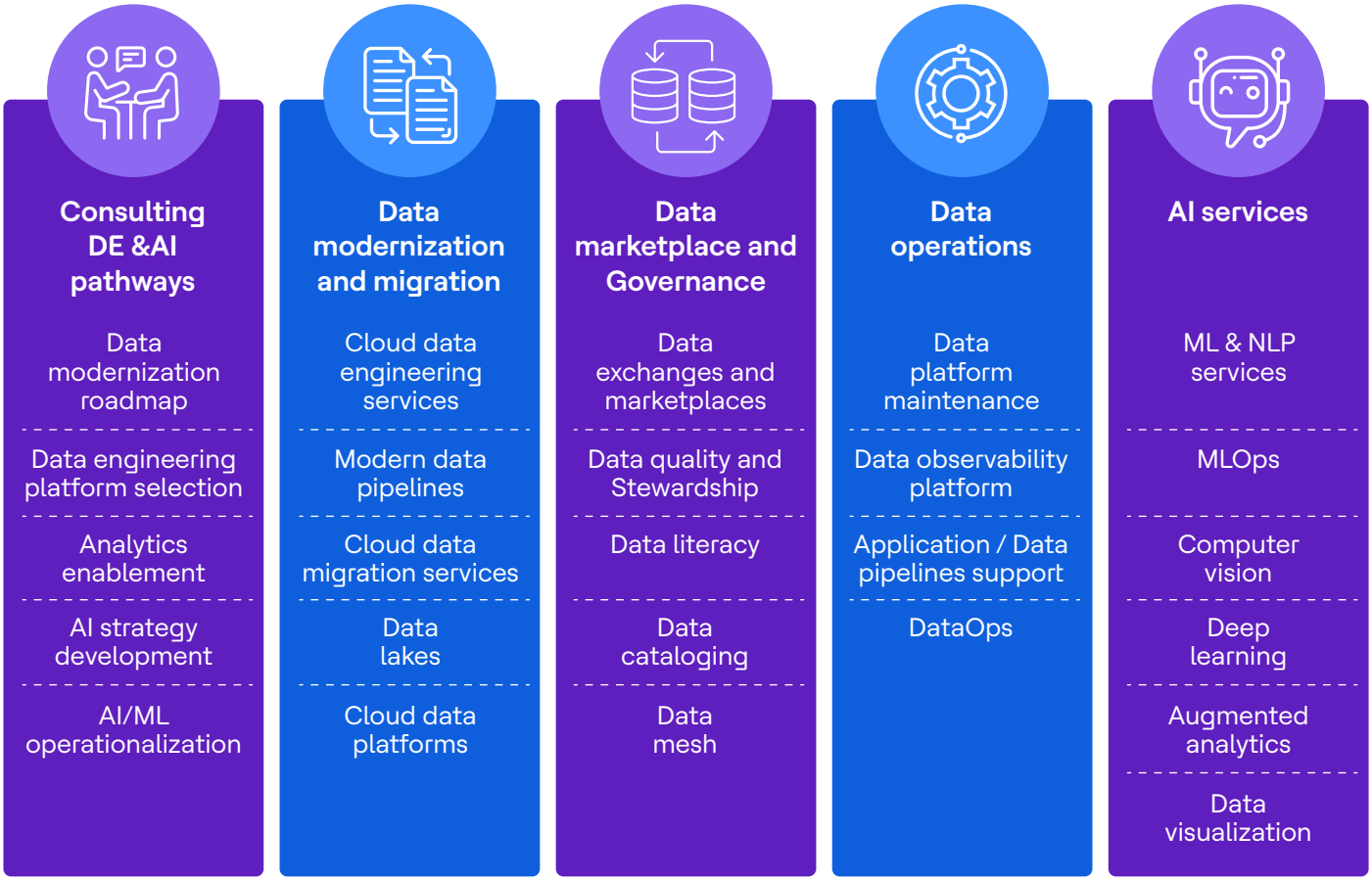
Key challenges

Most use cases that are driven by images have reduced dataset and require complex pre-processing of images to improve their quality before they can be used to extract advanced features. Process variations in the Fab cause data drift, requiring implementations that leverage deployment/ development of Machine Learning Operations (MLOps) platforms. Some key challenges include:

- Data drift/process variations
- Complex image enhancement
- Data sharing
- Reduced dataset
- Real-time processing
- High-volume/ speed data
- Data strategy/ automation

Our data engineering and AI solutions

We have invested in the future of Data and Analytics through our unique solutions, partnerships, and acquisitions. Bolstered by Star Schema's (Data engineering and analytics company acquired by us) expertise, we provide end-to-end service offerings in Data engineering and AI. From consulting for an organization, data modernization/engineering roadmap to developing Extract, Transform, Load (ETL) pipelines, modeling and managing your big data in data lakes/data warehouses, developing data visualizations to developing computer vision/deep learning-based solutions to our customers – we cater to your data engineering needs end-to-end.



Our credentials

- We possess best-in-industry co-innovation labs in Redmond Washington, Cupertino, Chennai and Noida for Microsoft AI platform, Cortana Analytics, Cloud covering all mobile stacks and SUP, mobile payments, D2C innovation, UX, Modern full stack, Big data and more.
- We are a niche partner with key players including, IBM, Actian, Tableau, Alphaa.ai, Databricks, Cloudera, Denodo, Matillion, Snowflake, Alteryx, and more. Our Ecosystem partners include, MS Azure, AWS, and Google Cloud Platforms.
- We are positioned as leaders by renowned analysts- IDC, AVASANT and ZINNOV for our AI services, Microsoft Implementation services, Applied AI and Advanced Analytics services, and Data management and Data analytics, respectively.

10,300+ SMEs

150+ Global customer

30+ Marquee technology partners

25+ Solution offerings and IPs

Success stories

Enhanced customer engagement for a large NA based technology conglomerate

HCLTech's team is responsible for managing a large amount of customer data (including digital engagement, behaviour, renewals, telemetry, etc.) and provides ML services for enhanced customer engagement by selecting the right contact for journeys (adoption, renewals), email scoring and more.

Technology Stack: Git, GCP, Spark Ml-lib, Hadoop, pySpark

Key value delivered:

- Integrated with digital campaigns to find customer propensity.
- Simplified tooling to orchestrate and manage multi-phase machine learning workflow.
- Faster integration, continuous and automated deployments.

Developed a recommendation platform for a large telecom service provider

HCLTech helped the customer by developing a recommendation platform for multiple ML predictive services. A map-reduce based big data technology, was transformed into state-of-the-art Scala-Spark-Machine Learning Platform. The platform expanded to serve cross-section of services across sales, marketing and personalization.

Key value delivered:

- Blanket marketing to targeted, predictable marketing, expand digital upgrades.
- Increase in Sales, personalization, store operation optimization and customer satisfaction.
- Helped in Operational improvements through Issue trends.

Enabled predictive maintenance for world's leading ion implanter equipment manufacturer

HCLTech's AI/ML solution helped the customer prevent several source failures, which were leading to unplanned maintenance.

Key value delivered:

- Data Analytics model predicted the Remaining Useful life (RUL) of the source based on source parameter data.
- Alert generated when the RUL decreases below threshold.

Success stories

Facilitated anomaly detection for a leading semi equipment customer

HCLTech assisted in inspection of Semi-Equipment by a using Image Processing technology to detect anomaly.

Key value delivered:

- Early automated defect identification: To compare the image with golden data image and detect/classify anomaly.
- Improved the product quality.
- Reduced manual effort more that 60%.

Supported in productivity improvement for a leading inspection equipment customer

HCLTech provided AI/ML based framework with multiple deep learning and machine learning algorithms to identify the root cause analysis of defects in materials using computer vision.

Key value delivered:

- Productivity improvement: Days effort of inspection reduced to minutes.
- Early root cause analysis will be enabled, resulting in significant improvement in yield.
- Automation of manual inspection has cut the down the budget allocated for manual efforts significantly.

Enabled auto-tuning for world's leading ion implanter equipment manufacturer

HCLTech helped the customer in tuning the beam by predicting the beam parameters.

Key value delivered:

- Model was deployed on tools at the customer site and validated with real time data. Predicted parameters needed no manual tuning as they generated good recipes.
- Wafer implant interruptions due to beam tuning parameter error reduced by 90% (implies yield improvement).

Learn more about how HCLTech can help you in supercharging your semiconductor innovation journey. Reach us at hclsemi@hcl.com.