2020 TSIA STAR Award Featured Application
Dell Technologies Services Digital Repair Initiative - Faster, Better, Smarter

Overview
Predictive analytics has become an essential part of how repair data and insights are being used to deliver a simple and hassle-free service experience for our customers – we call this initiative “Digital Repair.”

Digital Repair combines big data, artificial intelligence, and cloud computing to be the first AI enabled triage solution that reduces human intervention by automating both the troubleshooting & resolution steps in the repair process. To accomplish this objective:

1) We leveraged thousands of repair data records accumulated for over a decade.
2) We developed AI deep learning models (6 patents) to analyze the data and provide autonomous failure identification and recommended fix.
3) To bring the power of digital repair to the agent’s workbench, we designed a unique interactive user interface (UI) called the Expert Triage System (ETS). The ETS functions as a virtual co-pilot (augmented with AI) to guide technicians through troubleshooting steps to help pinpoint the system failure symptom, diagnosis process and recommended repair action.

Digital Repair is also being leveraged throughout Dell by integrating repair insights into other areas of our services ecosystem, like phone-based technical support, to drive end to end value for our customers.

Business Challenges
The legacy repair process often produces significant waste in parts consumption by replacing unneeded parts, along with causing higher rate of repeat repairs which resulted in a negative customer experience and ultimately costing Dell millions per year in parts and operational waste. In addition, the following roadblocks, impacts, and resolutions were identified:

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<tr>
<th>Roadblock</th>
<th>Impact</th>
<th>Resolution</th>
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<tbody>
<tr>
<td>Data Quality — noisy data</td>
<td>Caused unreliable model accuracy</td>
<td>Developed enhanced natural language processing text algorithms</td>
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<td>Created advanced user interface to collect data inputs</td>
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<td>Lack of structured data</td>
<td>Caused slower AI model growth</td>
<td>Developed standardized failure symptom dictionary</td>
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<td>Created augmented AI solution to guide technician</td>
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<td>Lack of digital skills and expertise</td>
<td>Extended development &amp; deployment timelines</td>
<td>Established partnership with Dell Data Science research team</td>
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<td>Partnered with external AI research teams (e.g. Gartner)</td>
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Lessons Learned: During the deployment of Digital Repair program the following key lessons identified:
- Customer - start by clearly defining customer value vs starting with technology
- People - early on it is critical to acquire & engage the right digital savvy leaders and digitally skilled workforce
- Process - design processes to be digitally enabled
- Eco System - integrate systems & tools to leverage the full value (end to end) of digital capabilities
**Business Outcomes**

Digital Repair - Services Whole Unit Depot Repair

- 75% reduction in No Fault Found (NFF) unnecessary parts consumed
- 22% reduction in repair process cycle-time
- 15% repair capacity scaling increase (During the pandemic, Digital Repair enabled additional repair capacity to support volumes diverted from the field to the depot)

Digital Repair provides Technical Support with component level repair data, which is integrated into Digital Resolution AI tools to enable improved Technical Support KPIs

- 30% reduction in repeat dispatches
- 25% reduction in NFF Parts dispatched
- 7% reduction in major parts dispatched

**Customer Outcomes**

- 5% improvement in CSAT scores
- 26% fewer repeat repairs
- 30% reduction in Customer contacts

**Next Steps:** In the past two years we have successfully improved the accuracy of the AI models using thousands of technical support and repair technician comments to create structured data that enable new analytics, predictive solutions, and real-time actions. Digital Repair provided autonomous repair solutions for ~15% of the whole unit repair volume and is planned to expand >70% this year. Digital Repair models have continued to mature from simple Machine Learning to complex Deep Learning algorithms aimed at accurately pin pointing failure and simplifying resolution. As the digital repair platform advances, we expect to drive significant cost savings through inventory reduction, service level improvements, cycle time optimization and parts consumption improvement.

Lastly, we plan to further expand the value of digital repair by enhancing the future of product design by developing an AI model that uses repair failure intelligence combined with design parameters to drive a more optimized product design. This intelligence from Digital Repair will also enable the Dell Product Group to select more reliable OEM components.

**Partner testimonial** “Following the direction and encouragement of Dell Technologies to pursue Digital Transformation across their global supply chain, CSAT Solutions has implemented Digital Repair which has become the standard for the future of our computer repair operations. With the self-learning capabilities of the system, in addition to completely saving diagnostic time based on the prediction, we've been able to integrate the predictive technology into our parts ordering system. This allows us to dispatch the replacement parts to the repair technician before the unit arrives, enabling us to swiftly repair the unit and return it to the customer. The result is improved accuracy, repeatability and accelerated processing time creating a world class customer experience.” - Richard Van Deventer, CEO, CSAT Solutions.

Digital Repair has become a catalyst that is inspiring advancements in technologies, people, and processes to achieve breakthrough performance that will drive a world-class customer experiences and enable great business outcomes in new and innovative ways.