The Power of AI and Edge Computing in Achieving Defect-Free Factories

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<table>
<thead>
<tr>
<th>System Board</th>
<th>Intel prototype, TGL U DDR4 SODIMM RVP</th>
<th>ASUSTeK COMPUTER INC. / PRIME Z370-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>11th Gen Intel® Core™ -5-1145G7E @ 2.6 GHz.</td>
<td>8th Gen Intel® Core™ i5-8500T @ 3.0 GHz.</td>
</tr>
<tr>
<td>Sockets / Physical cores</td>
<td>1 / 4</td>
<td>1 / 6</td>
</tr>
<tr>
<td>HyperThreading / Turbo Setting</td>
<td>Enabled / On</td>
<td>Na / On</td>
</tr>
<tr>
<td>Memory</td>
<td>2 x 8198 MB 3200 MT/s DDR4</td>
<td>2 x 16384 MB 2667 MT/s DDR4</td>
</tr>
<tr>
<td>OS</td>
<td>Ubuntu* 18.04 LTS</td>
<td>Ubuntu* 18.04 LTS</td>
</tr>
<tr>
<td>Kernel</td>
<td>5.8.0-50800-generic</td>
<td>5.3.0-24-generic</td>
</tr>
<tr>
<td>Software</td>
<td>Intel® Distribution of OpenVINO™ toolkit 2021.1.075</td>
<td>Intel® Distribution of OpenVINO™ toolkit 2021.1.075</td>
</tr>
<tr>
<td>BIOS</td>
<td>Intel TGLIFUI1.R00.3243.A04.2006302148</td>
<td>AMI, version 2401</td>
</tr>
<tr>
<td>BIOS release date</td>
<td>Release Date: 06/30/2020</td>
<td>7/12/2019</td>
</tr>
<tr>
<td>BIOS Setting</td>
<td>Load default settings</td>
<td>Load default settings, set XMP to 2667</td>
</tr>
<tr>
<td>Test Date</td>
<td>9/9/2020</td>
<td>9/9/2020</td>
</tr>
<tr>
<td>Precision and Batch Size</td>
<td>CPU: INT8, GPU: FP16-INT8, batch size: 1</td>
<td>CPU: INT8, GPU: FP16-INT8, batch size: 1</td>
</tr>
<tr>
<td>Number of Inference Requests</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Number of Execution Streams</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Power (TDP Link)</td>
<td>28 W</td>
<td>35W</td>
</tr>
<tr>
<td>Price (USD) Link on Sep 22,2020 Prices may vary</td>
<td>$309</td>
<td>$192</td>
</tr>
</tbody>
</table>

1): Memory is installed such that all primary memory slots are populated.
2): Testing by Intel as of September 9, 2020
The Future is Fueled by AI...

How Precision Manufacturing Gets Done

With the help of edge analytics and machine learning, Audi is transforming manufacturing.

>60% Maintenance, Inspection & Process Optimization*

...and the Future is Now

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*percentage of use case share of the global market in the year 2018 from the Industrial AI Market Report 2020-2025 by IOT Analytics GmbH published December 2019
Capturing Value at the Edge

**FOUR EDGE COMPUTE IMPERATIVES**

- **Law of Physics**
  - Speed of Light

- **Law of the Land**
  - Regulations

- **Law of Economics**
  - Cost of Bandwidth

- **Murphy's Law**
  - Connections Go Down

- **Cloud / Data Center**
  - Latency / Determinism
  - Privacy / Security
  - Limited Autonomy
  - Data / Bandwidth

Source: Gartner (May 2019)

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Evolution of Intelligence

Spot Known Defects
“This Looks Bad”

Discover Anomalies
“This Doesn’t Look Good”

Predict & Prevent Defects
“Factory Becomes Self-Learning”
Key Ingredients for Scale

Edge Compute HW and SW

- Control
- Learn
- Analyze
- Ingest
- Compute
- Accelerate
- Storage

Manageability

Security

Consistent Lighting

High-Definition Camera(s)
Deep Learning Acceleration For Edge AI

DeepLabv3-TF: 2.9x
MobileNet-SSD-CF: 2.8x
ResNet-50-TF: 3.6x
SSD300-CF: 3.9x
Squeezenet1.1-CF: 2.2x

11th Gen Intel® Core™ (Tiger Lake) Core i5-1145G7 relative inference FPS compared to Coffee Lake, Core i5-8500

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- Edge Device Qualification with Intel® Edge Software Hub | March 2nd 4:20pm CET
- Accessing Partner Hardware on Intel® DevCloud for the Edge | March 4th 8am CET

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