Maple Leaf Foods

Accelerating the Digital Manufacturing Journey from MES to Advanced Analytics (AI/ML)

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Agenda

• Introductions
• Maple Leaf Heritage
• Heritage IoT Project
• Delivery Approach
• Use Cases
• Benefits
• Lessons Learned
MAPLE LEAF FOODS

“The most sustainable protein company on earth is digital”
Canada’s leading branded protein company, employing more than 11,000 people, we are:

- Canada’s largest prepared meats and poultry producer
- Vertically integrated to facilitate strategic supply scale and enable Raised Without Antibiotics (RWA)
- Top 10 pork producer in North America, largest in pork raised without antibiotics
- Leading refrigerated plant-based protein player in the U.S.
- Leader in sustainability including sustainable meat
Our six core strategies fuel our vision

- Lead in sustainability
- Invest in our people
- Make great food
- Broaden our reach
- Build a digital future
- Eliminate waste
THE VISION

3 PILARS

MLF DIGITAL ECOSYSTEM

New Ways of Working
New Ways of Running Operations
New Ways of Engaging Consumers

FEED  FARM  PROCESSING  DISTRIBUTION  RETAIL  CONSUMER
Highly trained & standardized workforce working safely and efficiently using **interactive digital solutions**.

World class performance on equipment downtime through connected operations, **predictive maintenance** and technology enabled technical team members.
Implement scalable and cost-effective technology solutions to address strategic operational priorities:

- **Line Management** – OEE to Maximize Asset Utilization
- **Operating Rhythms** – Production Progress, Short Interval Controls, Downtime Annunciation and Response
- **Performance Metrics** – Near Real Time Digital Dashboards
- **Plant Analytics** for Sustainable Continuous Improvement

**Line side HMI, TV + Mobile tools for near real time Awareness and Response, driving Operational Excellence on the production floor**
Heritage Plant Facts

• 1000 employees
• 500,000 sq ft
• Produce 60 million kgs of deli meats and wieners
• Wiener operation produces 800,000,000 hot dogs per year
• Winner of the BRCGS as the Site of the Year for the Americas in 2022
  (BRCGS: Brand Reputation Compliance Global Standard)
Deli Formulation and Stuffing
Plant Layout

Slice Halls
Heritage Plant - IoT project

- Objective: Yield Improvement (reduce waste / loss)
- IoT: Internet of Things
  - New IoT Sensors & Data Collection
  - Advanced Data Analysis
- Leverage existing AVEVA footprint
  - MES / SCADA
CI Step Change to influence end to end value chain.

Heritage Digital Operations Use-Cases

1. Ensure Log Length, Width, Shape Consistency
   • With camera, measure length, width, shape with 100% sampling. Feedback if not in-control

2. Ensure Slicing Operating Performance
   • Monitor operating parameters for deviations from vs. best demonstrated and vs. recipe setpoints

3. RTE Yield Tracker and Predictor
   • Project end-of-day yield to assist with resource assignment and daily ops planning

4. Batch House Schedule Optimizer and Visual Indicators
   • Support BH scheduling with optimizer tool (ensure utilization and no exit conflicts)
   • Provide visual cues for when Cook cycle is complete

5. Analysis to Optimize Batch House Thermal Profile
   • Data Science work to investigate affect of consistent logs on thermal control scheme

6. Ensure Stuffing Operating Performance
   • Monitor operating parameters for deviations from vs. best demonstrated and vs. recipe setpoints

7. Minimize Pickle Changeover Losses
   • Avoid draining end of run by metering actual usage

8. Visual management for Pickle
   • Monitor WIP, Schedule, Scrap to improve efficiencies
• Cygnus Consulting
  • Design, Engineering, Installation (IoT Sensors), MES modifications, Commissioning, Startup (Site Work)

• Braincube
  • Data Analytics
Use Case 1: Log Lengths

• Use Case 1
  • Objective: Improve slicing yield by reducing ends loss
  • Primary requirement: Monitor all logs for length, width, shape and provide indication that correction is required
Use Case 1: Solution Architecture

- Continuous Improvement
- Braincube
- MES
- New Control Panel (PLC/HMI/Camera/Stack Light)
- Clipper
- Stuffer
- Log Length Monitoring
- Operators
- Mezzanine
Use Case 5: Batch House Thermal

• Problem
  • Thermal loss is the biggest contributor to yield loss

• Primary Requirement
  • Integrate temperature probes and oven data to determine optimum temperature profile for each SKU
• Benefit Realization
  • Overcooking reduced through detailed temperature profile and updated cook times
Use Case 5: Solution Architecture

Braincube

MES

AVEVA

PLCs, Probes

Updated Recipes

Continuous Improvement
Use Case 2: Slicing Parameters

- Objective: Increase yield by reducing giveaway and ends loss

- Primary requirement: Monitor current parameters and notify on deviation from best demonstrated
Use Case 2: Solution Architecture

Braincube

Order, Item, Equipment, Settings, KPIs

MES (AVEVA)

Comparison

Deviations

Operators

Updated Parameters

Continuous Improvement

Slicers

Parameters

Operators
Operator & Supervisory Dashboards

- Provide real-time and actionable Information to Operators and Supervisors
- Color coding for easy visuals on Large screen monitors
Digital Twin Technology for Machine Learning, AI & Advanced Analytics

Raw Data from people, systems and machines

Process Map
Data transformation Model

Structured
Digital Twin Builder includes
✓ Lag Time
✓ SME (human knowledge)
✓ Flow

Updated in Real-time
Digital Twin

Contextualized Data Models by Product

Advanced Analytical Apps
Real-time Center lining dashboard for Analysis of variance

Live Dashboards with multiple indicators for process control
Benefits

• The slice hall use cases yielded the best results, following by batch house and stuffing use cases.

• The slicers are recipe based. Those parameters vary by SKU and tribal knowledge was the best source before IOT system. We would run better yield on one shift and bad on the other for same product. Due to frequent turnover, new operators needed to learn the settings over time. Also, the key metrics from the slicers were only available on the slicer HMI.

• With IOT and Braincube, we were able to narrow down ideal settings based on best output days per product. Those are displayed via a dashboard to supervisors and operators. We also contextualized key machine metrics with data from MES (Yield etc.) to give actionable information to supervisors.

• The project resulted in an increase of gross profit by 10-12% by reducing waste in the following areas.
  • Consistent WIP log Length – reduced large end piece losses.
  • Consistent Log cook – reduced over cook and quality losses in the ovens.
  • Improved Weber Slice parameters, increasing yield and minimizing losses at finished good slicing.
Lessons Learned

• Focus on business objectives not technology
  • IoT and AI are hot topics but do not deliver returns in themselves
  • Focus was on yield
  • Benefits were identified for each use case and measured post implementation

• Involve the end user early
  • UX workshops, requirements sessions

• Vision is hard
  • Prototype and experiment before implementation

• Leverage existing infrastructure
  • With IoT it can be tempting to re-invent the wheel
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Questions?
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State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

Thank you!
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