Predicting Edible Meat Casing Vigor via Explosions

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NI Products Used:
LabVIEW 2012
cDAQ-9188
NI 9201
NI 9203
NI 9263
NI 9422
NI 9481

Categories:
Advanced Control Systems
Automated Test

The Challenge
Replace a legacy DOS/ISA computer and application to control and monitor strength testing of edible meat casing with a state of the art LabVIEW application running on a current Windows OS.

The Solution
Leverage LabVIEW and the modular cDAQ chassis with C-Series modules to rapidly create an application that would acquire a multitude of sensor data while controlling air flow to rapidly inflate edible meat casing until burst.

Introduction
Data Science Automation (DSA) is a premier National Instruments (NI) Alliance Partner that specializes in automating and educating the world leading companies. Clients choose DSA because of DSA's deep knowledge of National Instruments products, disciplined process of developing adaptive project solutions, staff of skilled Certified LabVIEW Architects and Certified Professional Instructors, and unique focus on empowerment through education and co-development.

Approach
The Edible Meat Casing Strength (EMC) system was created due to DSA's client's needs for a robust, reliable and affordable hardware and software solution for predicting the strength properties of an edible meat casing. When the strength properties of an edible meat casing are known DSA's client would be able to tailor the physical and chemical makeup of the casing to maximize the casing's overall strength while minimizing the material needed to produce the casing. This optimization provided the best profit margins without compromising quality. To control and acquire data, DSA leveraged National Instruments LabVIEW's development environment with its unprecedented ability to integrate with hardware (National Instruments cDAQ USB hardware in this case) while providing the ability to create custom Intellectual Property (IP) (Figure 1) designs to specifically address the client's needs.

Legacy Control System
Prior to the EMC application, DSA's client used proprietary data acquisition boards which integrated with a DOS application for control and monitoring of the casing explosions. As the system aged, the proprietary hardware and the inability to upgrade the software resulted in expensive maintenance and less accurate than what is currently available from off-the-shelf NI products. When the original system PC stopped functioning, DSA was able to demonstrate that by integrating National Instruments cDAQ products with standard LabVIEW programming practices, DSA would be able to enhance the application while minimizing migration cost.

EMC Conception
The EMC system was created not only to replace an obsolete, expensive to maintain application but was also designed to increase the ability to accuracy of measuring edible meat casing strength. DSA's design integrated a National Instruments cDAQ platform due its ability to deliver high-speed data along with ease of use in flexible mixed measurement systems. National Instrument's LabVIEW programming environment provided DSA with the ability to create not only the required functionality but also aesthetically pleasing displays (Figure 2) that guaranteed the longevity of the application while minimizing production cost.

Longevity
The EMC application was designed to not only provide accurate results in predicting the strength of an edible meat casing but also to empower the client with the ability to troubleshoot any issues with the application, specifically with the acquisition hardware. This was a major concern that arose during use of the legacy application. The legacy application was adequate in many respects except when the application started to misbehave, particularly with the proprietary data acquisition boards. The previous boards had a tendency to fail intermittently. The previous application developer held the client "hostage" when the system started to go awry. By replacing the proprietary hardware and integrating the data acquisition with LabVIEW, DSA was able to empower the client with ability to troubleshoot their system by providing an easy to use diagnostic view (Figure 3) of the entire application. With this ability the client became more independent and self-reliant. Another benefit of the National Instruments hardware and software solution was the client's ability to have the flexibility to upgrade the software or install replacement hardware without affecting the software application. This ability ensured the client would continue to receive a return on their investment long after DSA had completed the deployment.

Benefits of Partnership
The Alliance partnership between Data Science Automation and National Instruments has allowed DSA to tackle many extremely complex engineering challenges while maximizing our clients' return on their investment. The EMC project was no exception. By selecting LabVIEW and USB cDAQ Data Science Automation was able to create a system that not only reduced the overhead costs but also greatly increased the client's productivity and profitability by enabling them to reduce excess material. Also by using National Instruments hardware and software, the EMC application was able to allow the client to purchase off-the-shelf equipment, specifically in the area of cDAQ and LabVIEW. These savings allowed additional investment in the development and enhancement their applications.

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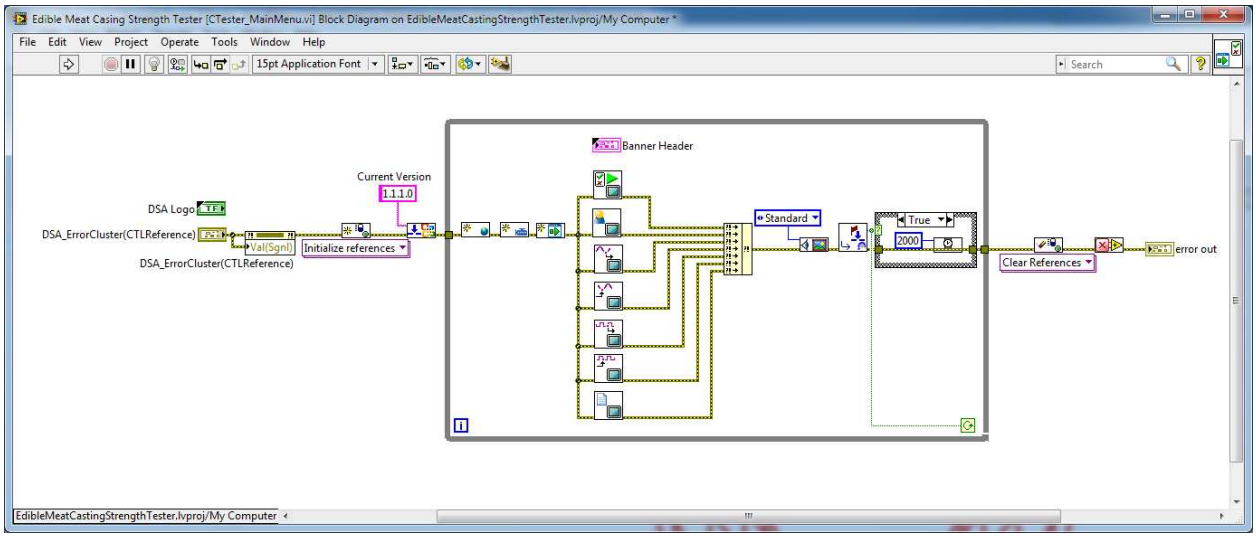

Figure 1: Software IP

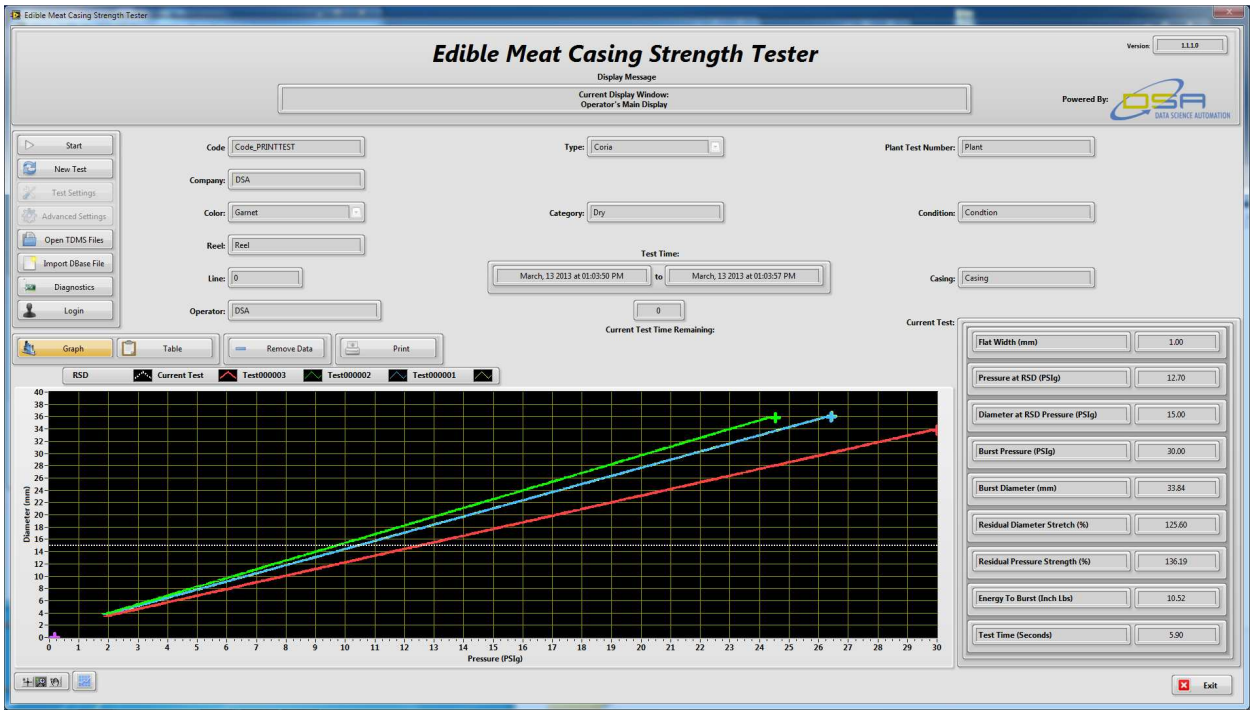

Figure 2: Main Users Display

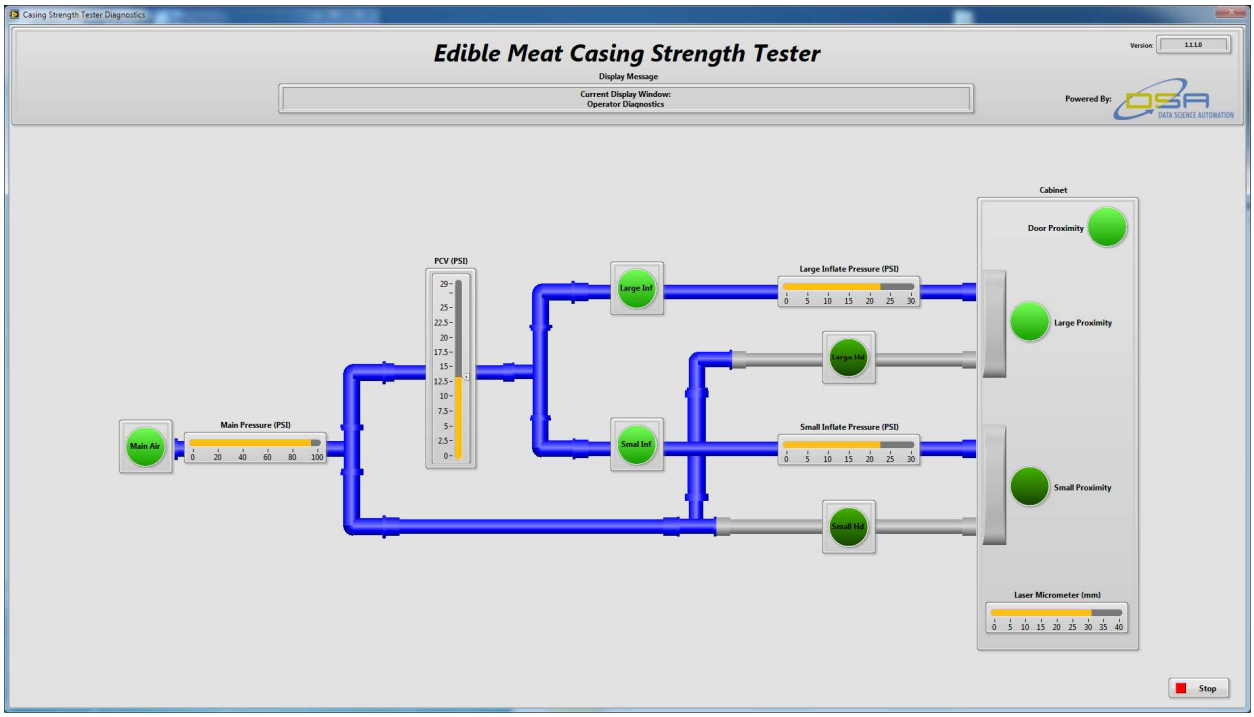

Figure 3: Diagnostics