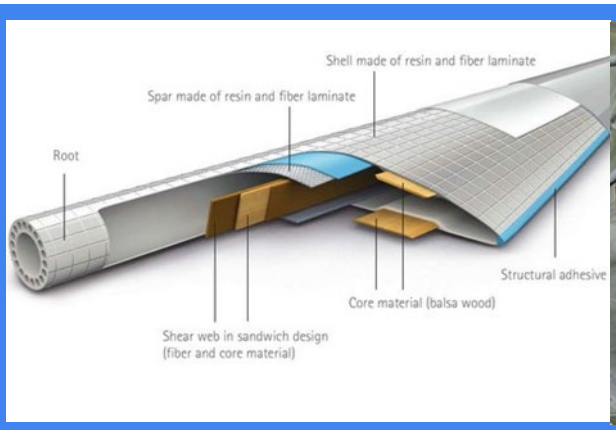
Industry
Renewable Energy
Composites
Aerospace & Defense
Marine

Technologies
Sensing
Augmented Reality
Machine Learning

Solutions
Operational Efficiency

PROJECT CASE STUDY

Augmented Reality for Smart Manufacturing of Wind Turbines



PROJECT LEAD

Spiral Science & Technology

PROJECT TEAM

GE Renewable Energy

PROJECT OBJECTIVE

Develop a reusable Smart Manufacturing Profile for an Augmented Reality Platform for serving visual work instructions for processing parts. Integrate a surface defect prediction model into the CESMII Smart Manufacturing Innovation Platform.

MORE ON CESMII.ORG

Augmented Reality and Artificial Intelligence Tools Yield Significant Cost Savings in Composite Manufacturing

BENEFITS TO OUR NATION

The implementation of augmented reality (AR) and artificial intelligence (AI) in carbon composite manufacturing will benefit a range of American industries, from aerospace to renewables to transportation. Augmented reality reduces process times by providing real-time overlays of digital information onto the physical workspace, streamlining inspection and rework tasks. Adopting these advanced technologies will improve efficiency, reduce costs, and improve quality for finished carbon composite products. This not only contributes to the competitiveness of American industries, but also positions the nation as a world leader in advanced manufacturing, fostering economic growth and the creation of high paying manufacturing jobs.

BENEFITS TO INDUSTRY

The synergy of augmented reality and artificial intelligence not only accelerates production efficiency and reduces costs but also elevates the industry's overall competitiveness. The adoption of these technologies signifies a commitment to innovation and operational excellence, positioning carbon composite manufacturers at the forefront of advanced manufacturing practices. Implementing these technologies enhance productivity, sustainability, and the industry's capacity to meet the demands of a rapidly evolving market.

PROJECT DESCRIPTION

TECHNICAL APPROACH

- Develop an Augmented Reality (AR) system interface and back end.
- Create the AR Smart Manufacturing Profile.
- Set up real-time data exchange.
- Collect quality data and build data model for automated defect detection.

ACCOMPLISHMENTS

- Developed Augmented Reality User Interface
- Developed platform architecture for:
  - Headset Application (for data collection)
  - Web Portal (for data extraction)
  - Content API (for connecting the headset and the Web portal)
  - Cloud storage (for image data)
  - Database (for structured data)
- Trained models for defect detection and defect identification
- Published Inspection Application to the CESMII Marketplace

DELIVERABLES

- Delivered Alpha version of the Augmented Reality App interface
- Delivered Beta version of the Augmented Reality App interface and web portal
- Published Augmented Reality SM profile to the CESMII SMIP
- Delivered trial dataset
- Delivered Python code
- Delivered Machine Learning models
- Validated operation of Inspection System at industrial partner site

REUSABLE OUTCOMES / SM MARKETPLACE

- Augmented Reality App Interface
- Augmented Reality Web Portal
- Digital In-Process Inspection Application for composite manufacturing
- Augmented Reality Corrosion Control System

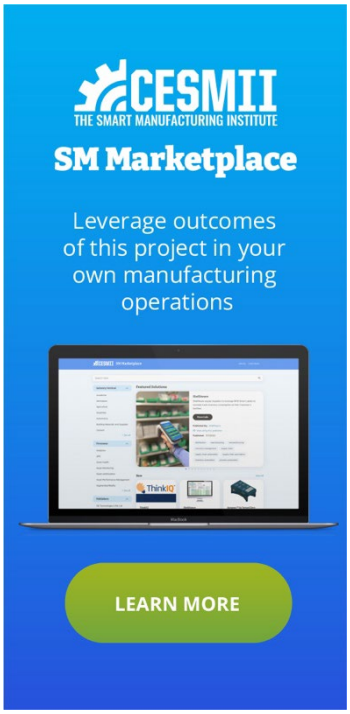
RESULTS

↑ $60k

Annual savings per production line by reducing blade inspection time from 60 minutes to 20 minutes per blade.

↑ $160k

Annual savings per production line by reducing blade inspection analysis time from 3 hours to 1.5 hours per blade.



PROJECT DETAIL
Budget Period: BP5
Submission Date: 12/18/2023
Sub-Award (contract) Number:
4550 G LA088
SOPO: 2348

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