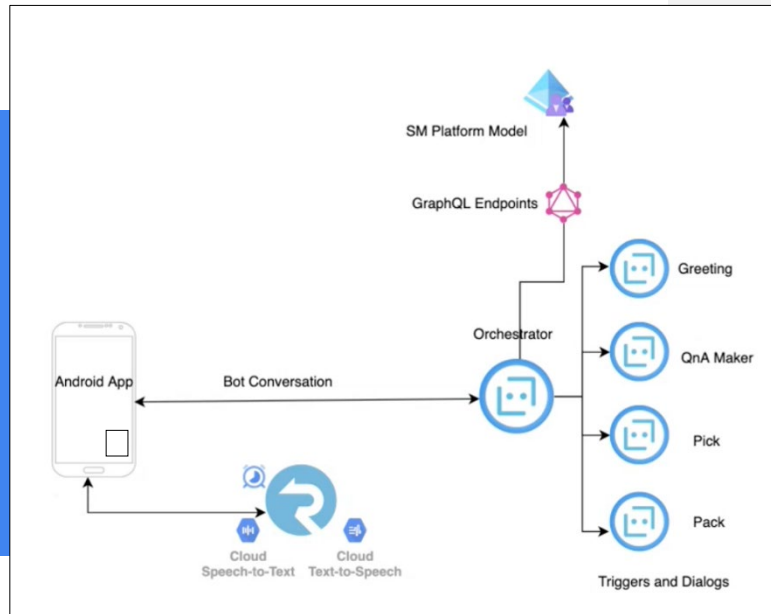


## PROJECT CASE STUDY

# Smart Warehouse with Augmented Reality



### PROJECT LEAD

Concurrency

### PROJECT TEAM

Clover Technologies

### PROJECT OBJECTIVE

Develop technology that will enable individuals with cognitive disabilities to work in a production warehouse. This will enable disabled individuals to participate in the manufacturing sector of the economy.

[MORE ON CESMII.ORG](https://www.cesmii.org)

## Industrial Internet of Things Enables Disabled Workers to Join Manufacturing Workforce

### BENEFITS TO OUR NATION

According to the Bureau of Labor Statistics, the 2022 labor force participation rate for persons with disabilities was 19%, significantly lower than the 65% rate for persons without disabilities. The implementation of machine learning and other smart manufacturing technology in this project resulted in the development of tools that will enable persons with disabilities to enter the manufacturing workforce. By tapping this underutilized talent pool, American businesses can access a skilled and diverse workforce, enhancing productivity and innovation.

### BENEFITS TO INDUSTRY

A 2008 DePaul University study showed that companies with robust diversity inclusion practices enjoyed greater workforce productivity and higher rates of employee retention than companies with non-inclusive workforces. Several other labor studies have shown that when disabled workers are placed in jobs appropriate to their skills, they often outperform other staff, with higher levels of efficiency, productivity, commitment, loyalty and job satisfaction. Workers with disabilities place a higher value on employment, are more highly motivated and tend to contribute disproportionately to their employer's bottom line. Any technologies that enable disabled worker participation in the manufacturing sector will propel the industry to higher levels of productivity and profitability. Inclusive hiring practices are good for business.

# PROJECT DESCRIPTION

## TECHNICAL APPROACH

- Implement a bot service which will automate cognition of human to machine interaction.
- Host the bot service on Microsoft Azure.
- Implement on-site collection of part identification and location data using the CESMII Smart Manufacturing Innovation Platform.
- Create a Smart Manufacturing Profile (SM Profile) for part data. The SM Profile will enable warehouse data capture and bot engagement.

## ACCOMPLISHMENTS

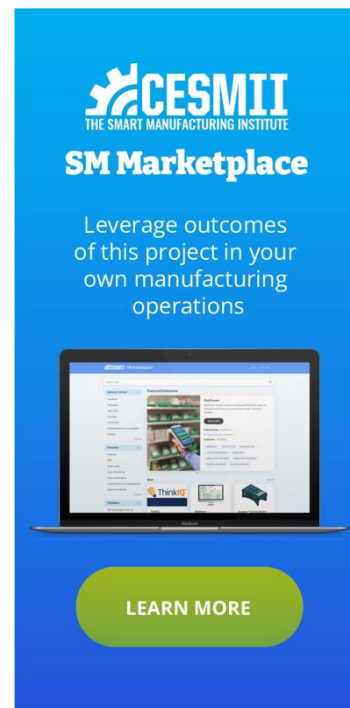
- Provisioned Azure Resources (Speech, Language Understanding, Natural Language Processing)
- Created SignalR Hub to act as a human to machine mediator
- Migrated bot framework to bot composer bot
- Implemented workflow on Android mobile App
- Integrated Azure bot, SignalR hub, mobile App and Application Programming Interface
- Completed Integration with CESMII Smart Manufacturing Innovation Platform

## DELIVERABLES

- Delivered Complete Conversational AI Source Code Package
- Delivered Warehouse Part SM Profile

## REUSABLE OUTCOMES / SM MARKETPLACE

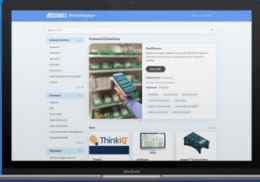
- Warehouse Part SM Profile



**CESMII**  
THE SMART MANUFACTURING INSTITUTE

### SM Marketplace

Leverage outcomes of this project in your own manufacturing operations



[LEARN MORE](#)

## PROJECT DETAIL

Budget Period: BP4  
Submission Date: 9/15/2022  
Sub-Award (contract) Number:  
4550 G ZA037  
SOPO: 2334

## FOR MORE INFORMATION CONTACT

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