

HMI Using Gesture Recognition

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Motivation

HMI → Human Machine Interface

Current HMI systems that are being used in industrial settings suffer from some major drawbacks

Lack of Mobility



Figure 1: Stationary HMI system

Inefficient



Figure 2: In industrial environment, workers are fully covered in safety gear or suits which make it hard for workers to control current HMI's

Gesture Recognition

Design a new HMI system using Gesture Recognition that will lead to more mobility and greater efficiency.

- ❖ AcceleGlove developed by Anthrotronix contains six accelerometers that measure orientation and motion with 18 degrees of freedom.
- ❖ SAM (Special Applications Module) by OLDI will be used for communication purposes, and the data will be sent to a PLC controller (Programmable Logic Controller).



Figure 3: AcceleGlove



Figure 4: SAM



Figure 5: PLC

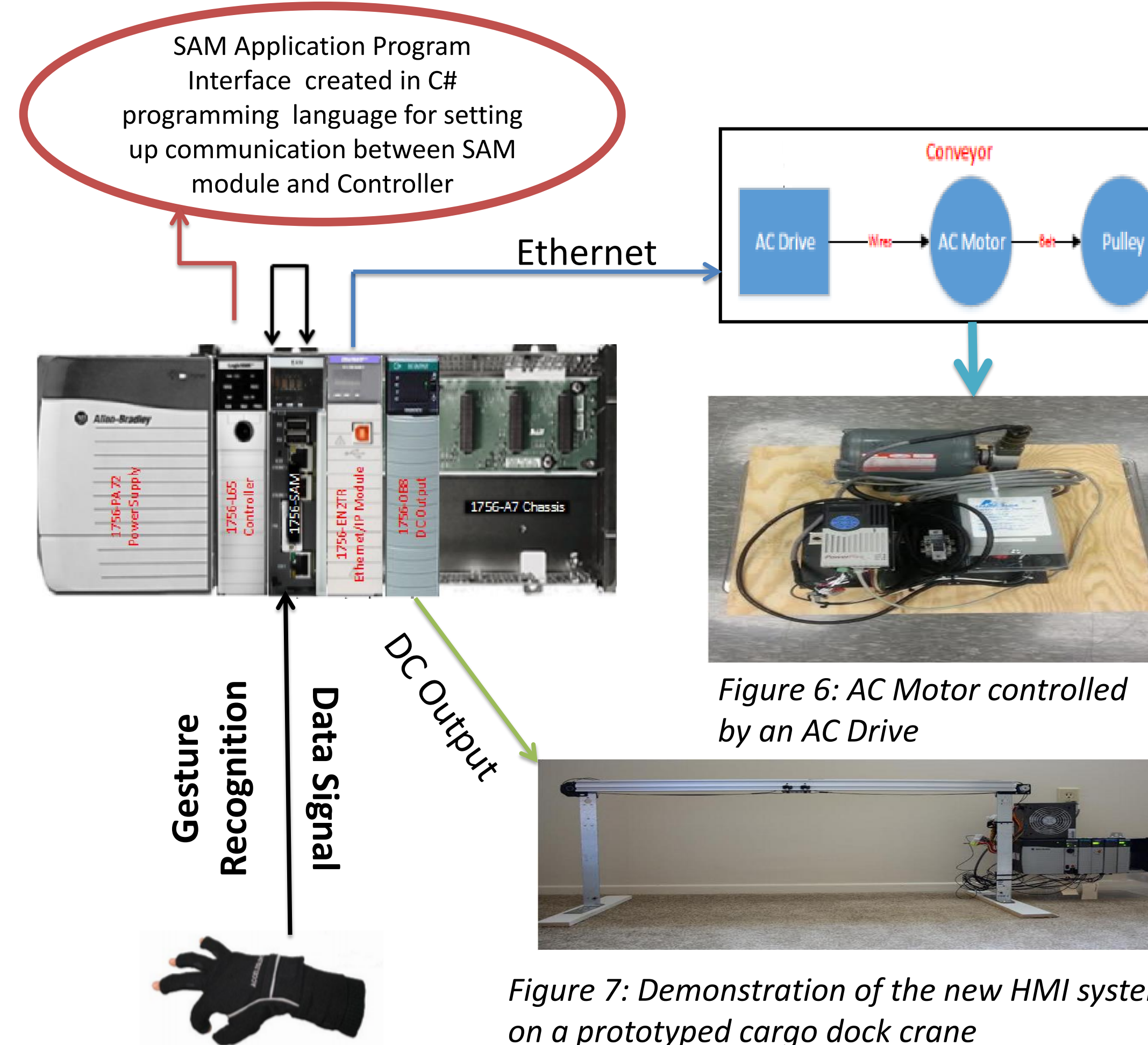
Design of HMI

Design Concept → Gestures made by the user wearing the AcceleGlove will be seen as signals by the SAM module. The SAM module will process those signals and send it to the controller. The controller will be capable of interpreting those gestures and translating them into doing something meaningful.

Challenges:

- ❖ Algorithm that will interpret the gestures and change it into meaningful data
- ❖ Communication between SAM and PLC
- ❖ Design a system that will demonstrate the new HMI

Solution



New HMI

Improvements:

- ❖ Mobility
- ❖ Safety
- ❖ Efficiency and Simplicity

Application

Industrial Application



Figure 8: Cargo Dock Ship



Figure 9: In metal industry workers have to work near extremely high temperatures

Medical Application

- ❖ Patients with cerebral palsy can use gesture to move their wheel chair
- ❖ Training surgeons

Future work

- ❖ Upgrade to a Wireless Glove
- ❖ Calibration of the glove for different hand sizes
- ❖ Calibrating accelerometers for more precision

Conclusion

- ❖ Old HMI systems : Fixed and Inefficient
- ❖ New HMI system: Increased Mobility and Efficiency
- ❖ Industrial workers who work in unsafe environments can use the new HMI and work from a further and safer distance

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