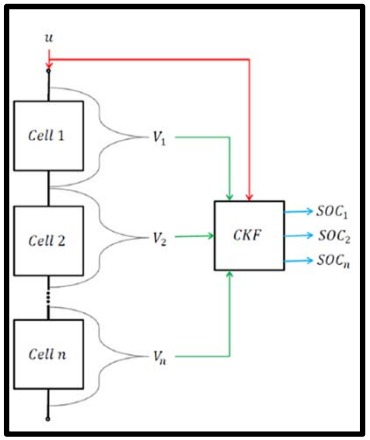
# A Multi-Purpose, Intelligent, and Reconfigurable Battery Pack Health Management System

## Technology

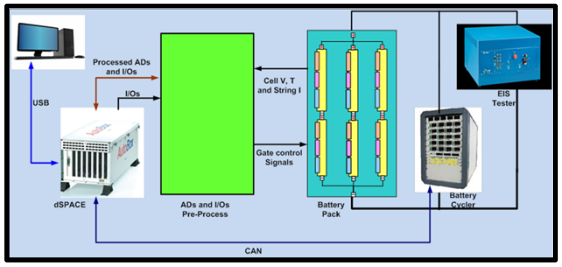
**This project is developing:**

**(i) novel algorithms for the collective estimation of charge and health in lithium-ion battery packs,**




**(ii) novel model-based approaches for health-conscious battery control,**

**(iii) novel reconfigurable architectures for pack-level energy management.**




**Altogether, these three sets of contributions are revolutionizing battery health estimation and management at the system/pack level.**

## Advantage and Differentiation

- **Experimentally-validated improvements in both offline and online estimation accuracy and speed for:**
  - **Thermo-electrochemical battery model parameters**
  - **Battery states (e.g., state of charge)**
- **Fast, tractable algorithms for nonlinear model-predictive health-conscious battery pack management**
- **A fully reconfigurable battery pack testbed for algorithm development and validation**

## Performance Targets

- **Compared to standard model-based control and extended Kalman filtering (EKF) based on light battery usage data (e.g., FTP cycling of EV batteries), our project aims to:**
  - **Double battery parameter estimation accuracy**
  - **Cut estimation time (for 2X accuracy) by 100X**
  - **Reduce likelihood of extreme charging/ discharging in heterogeneous packs by 25%**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