Digital Twinning for Control and Fault Diagnosis

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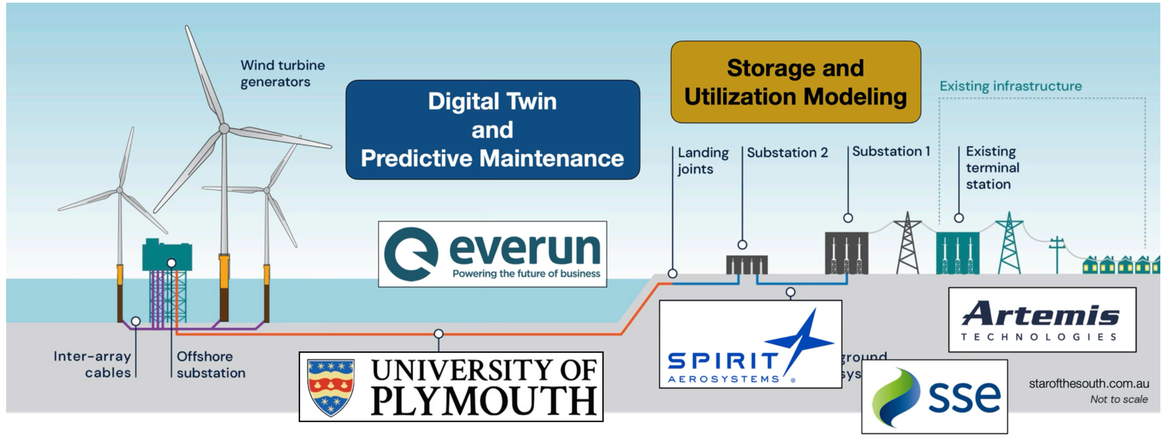
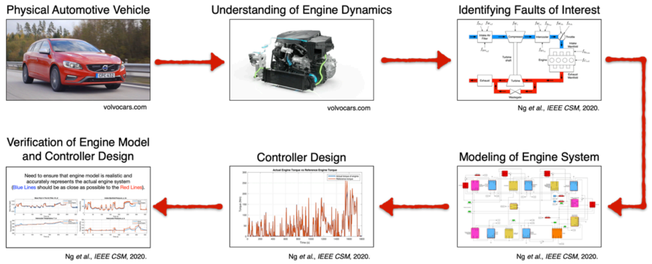
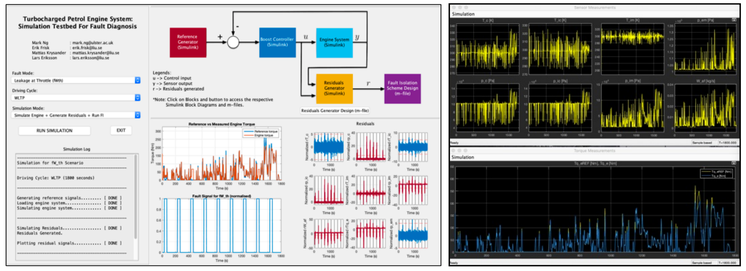
Research Website

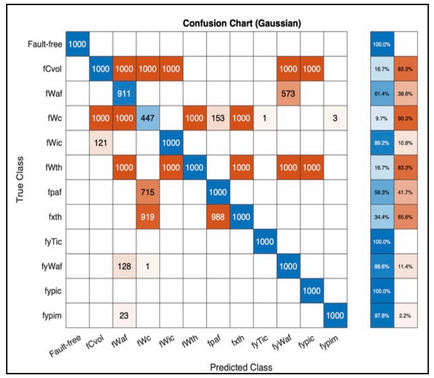


Digital Twin of an Automotive Engine System

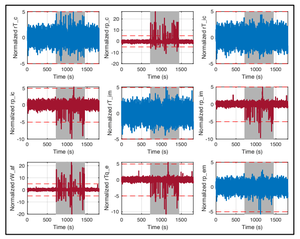


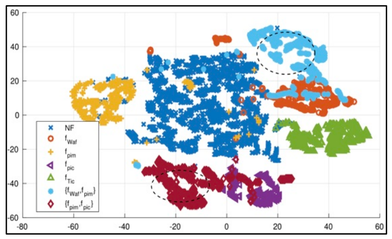


Simulation GUI and Telemetry Visualizations



Classification and Diagnosis





Residuals Analysis

Multidimensional Data Analysis

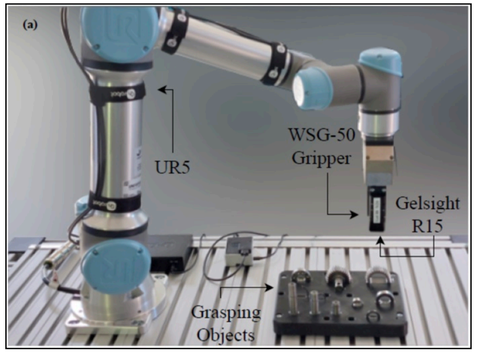
GitHub

IEEE CSM Paper

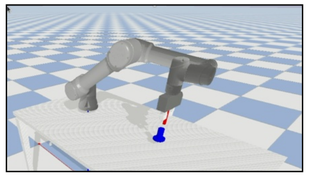
Digital Shadow of a Manufacturing System

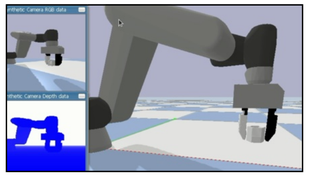
IEEE CCTA Paper

Paper #2

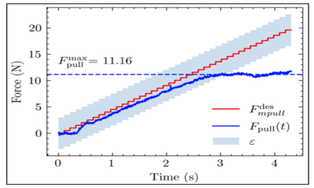


Actual Physical System

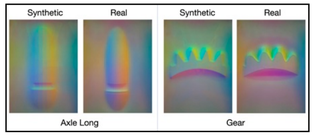




Digital Shadow



Dynamics Prediction



Generation of Synthetic Data

Other Collaborators and Partners

Select Key Publications

- "Predicting Maximum Permitted Process Forces for Object Grasping and Manipulation Using a Deep Learning Regression Model," ***IEEE CCTA***, 2024.
- "Learning to Predict Grip Quality from Simulation: Establishing a Digital Twin to Generate Simulated Data for a Grip Stability Metric," *arXiv*, 2023.
- "A Realistic Simulation Testbed of a Turbocharged Spark-Ignited Engine System: A Platform for the Evaluation of Fault Diagnosis Algorithms and Strategies," ***IEEE Control Systems Magazine***, 2020.
- "Design and Selection of Additional Residuals to Enhance Fault Isolation of a Turbocharged Spark Ignited Engine System," ***IEEE CoDIT***, 2020.
- "Combining model-based diagnosis and data-driven anomaly classifiers for fault isolation," ***CEP***, 2018.
- "Real-Time Closed-Loop Color Control of a Multi-Channel Luminaire Using Sensors Onboard a Mobile Device," ***IEEE Access***, 2018.
- "A Sliding Mode Observer for Infinitely Unobservable Descriptor Systems," ***IEEE TAC***, 2017.
- "Development of a prototype smart home intelligent lighting control architecture using sensors onboard a mobile computing system," ***Energy & Buildings***, 2017.
- "A combined diagnosis system design using model-based and data-driven methods," ***IEEE SysTol***, 2016.
- K. Y. Ng, "Design and Development of A Simulation Environment and A Fault Isolation Scheme on A Volvo VEP4 MP Engine," **R&D HQ, Volvo Car Corporation**, Gothenburg, Sweden, Tech. Rep., 2015.