GTC 2019

VR/Immersive + Data Driven Decision Making

March 21, 2019
Vision – Do whatever it takes to lead innovation in construction and manufacturing

Mission – To offer our construction and manufacturing customers interconnected productivity solutions that automate the creation, simulation and validation of their projects.
Team of ~90 engineers and software developers.

Over 300 construction projects valued at >$20B since 2014.
  - Virtual Construction, optioneering, digital fabrication automation

Working in advanced manufacturing and software product development of the cmcore.io cloud productivity platform.

Offices in Vancouver, Canada and Tokyo, Japan.
Use cases discussed in this presentation –

1. Driving real time decision making with as-built reality capture + VR on prefabricated mechanical room
2. Robotics 3D milling simulation, post processing and validation
3. Leveraging immersive digital twin of robot cells for macro process simulation
4. Rapid robot swept path programming with auto post processing to live robot
5. Real time optimeering of kinematic simulation for construction sequencing using production model, experienced in immersive environment
6. Data pipeline, computer vision and ML
We will look at the results of fluid dynamic simulation of airflow (wind study) around a plaza
**Data Strategy**: Train CMBeast neural net with simulation output and site recognition with computer vision and ML

**Input**: Output from construction/manufacturing simulation

synthetic data

**Capture** synthetic images of structure being constructed with randomized camera positions and environment (lighting, weather, background, noise)

**Record** data about elements found in captured images

**Developed pipeline** generating 20,000 – 200,000 images a day, depending on resolution and complexity of the model

**Data preprocessing**: Parse through recorded data to extract what we want. Deploying data augmentation to overcome the gap between generated data that we used for training with real data we are gathering. Warping the lighting, colours and resolution to cover every edge case from real world.

**Training**: Image recognition and object detection neural network using captured images as inputs and the recorded live data as the labels