2020 Comau MDP Project – Robotic 3D Tetris

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This presentation covers the Comau 2020 MDP project: Robotic 3D Tetris.

- Project Overview
- Our Solutions
- Results
- Next Steps
Our project measures the dimensions of an incoming item and determines the optimal location for it within a container.

Point cloud of an incoming item

GUI visualization of a packed container
Our system measures incoming items by merging two point clouds and creating a minimal oriented bounding box.
Our system packs items into the container using a modified version of the Online Bin Packing Heuristic.

Two items placed in a container

The corresponding Empty Maximal Spaces for the items
Our system displays data via two programs: a bin packing visualizer and a data and parameters interface.
The various components of our system communicate via the TCP/IP communication protocol.

A sample TCP/IP server

A sample TCP/IP client
Our system’s components met or made very good progress towards our original goals.

Our segmentation algorithm measures items within a 2.5% margin of error.

Our bin packing algorithm fills at most 75% of the container.
Our system worked as a whole and met our desired cycle time.

I can’t show what we’re packing, so you’ll have to take my word for it that these things are here.
More realistic item modeling & simulation would help our algorithms and the system as a whole better reflect reality.

An excerpt of the left view of our best packing case

Note the empty spaces between the items
The bin packing algorithm could be improved by cutting down on the empty spaces between items.

A top view of our best packing case
Combining the GUI’s components into a single program would increase ease of use.

Our current data and parameter interface

An early prototype of our GUI
In summary, our project successfully solved the problem we were presented with, but can still be improved.

- We met our goal for accurately measuring items
- Our bin packing algorithm fills 75% of the container (our goal was 85%)
- Our GUI is functional but could be a bit clearer

Questions?