

OPTIMISING BEARING PRODUCTION THROUGH DYNAMIC AUTOMATION

CHALLENGE OWNER

The Challenge Owner is a German based global automotive and industrial supplier, specialising in the manufacturing of high precision components and systems for engine, transmission, and chassis applications, as well as rolling and plain bearing solutions. With nearly 4,000 authorised sales partners worldwide, the company leverages local market insights to develop innovative products and solutions for the automotive and industrial sectors. It pioneers motion technology, striving to make mobility and industrial processes more efficient, intelligent, and sustainable.

This sector wide challenge is supported by the Advanced Remanufacturing and Technology Centre (ARTC), as part of the A*STAR Advanced Manufacturing Startup Challenge 2024, focused on the theme of “Artificial Intelligence in Manufacturing”. ARTC is led by the Agency for Science, Technology and Research (A*STAR), in partnership with Nanyang Technological University Singapore. ARTC’s expertise in advanced manufacturing and remanufacturing accelerates the transfer of innovation from applied research to industrial applications and solutions, building capabilities through collaboration with their industry members. A*STAR aims to catalyse startup challenge winners to co innovate and co deploy advanced manufacturing solutions through ARTC’s consortium.

To Note: Participants should approach this challenge with the intent to utilise A*STAR’s intellectual property to resolve the problem statement and give due consideration to license, post challenge.

CONTEXT

The Challenge Owner’s core product and service offerings include components and systems for vehicles with internal combustion engines, hybrid, and electric drivetrains. The company produces precision products that help reduce fuel consumption and emissions while enhancing driving comfort and vehicle dynamics. Its portfolio encompasses valve lash adjustment elements, variable valve train systems, chain and belt drives, and bearing supports for engine shafts. In the transmission sector, the company develops innovative components for various transmission types, including automated manual, double clutch, and continuously variable transmissions.

Their operational model features a complex production environment with ten lines, each staffed by operators handling three primary tasks: material transfer (bin picking), assembly, and measurement. The plant runs 24/7 in three shifts and is highly labour intensive, with operators often having to manage multiple lines. Operators also use manual pallet jacks to transfer parts from crates to their respective production lines.

The Challenge Owner faces challenges such as:

- Labour inefficiency. Lack of manpower and resources to manage multiple lines.
- Safety. Operators may undertake repetitive heavy lifting tasks.
- Precision and speed. Assembly and measurement processes need to be completed in an accurate and timely manner.

The Challenge Owner is open to exploring the potential of collaborative robots (cobots), dual arm lighter robot systems, vision systems, and artificial intelligence. The ideal solution should reduce manpower requirements, increase safety,

PROBLEM STATEMENT

How might we develop a dynamic automation solution that integrates with existing production lines to perform multiple tasks efficiently with a high level of precision, while enhancing worker productivity and safety?

Component identification range. Accurately identify and evaluate a wide range of parts, components, and products.

POSSIBLE USE CASES

1. Dynamic physical adaptation. Sarah, a production supervisor, finds an urgent order for a specific bearing type upon arriving at the plant. She uses the new

Solution Advantage (20%)

Quality of Innovation: Is the solution cost effective and truly innovative? Does it make use of new technologies in the market, and can it