"The support of the math group helped us transform how we sort products into fixed weight packaging. This avenue was fast, effective and productive for our team" - Compac

Compac Sorting Equipment is a global leader in the manufacture and supply of crop produce handling solutions. Through continuous innovative product development, the linking software to precision technical systems they aim to exceed customer requirements. Compac were able to raise a variety of challenges with the MISG group, including accurate modelling of fruit sorting machines.

PAST CHALLENGES

2004 Compac Challenge

Compac's equipment is designed to quickly and accurately assign fruit into bags and boxes with as little waste as possible using automated processes. Compac came to the MISG requiring solutions to two related problems that both required implementation into very high-speed processes. The challenges required particular expertise in operations research and optimising statistical processes.

The Boxing Problem

Fill boxes with a specific number of fruit, to a minimum weight, while having incomplete knowledge of what is already in the box, and maximising the number of boxes packed.

The Bagging Problem

Fill bags above a minimum weight, knowing what is in the bag, with no restriction on the number of fruit in each bag, and maximising the number of bags packed.

In each case the MISG team built computational models to simulate the physical situations and control algorithms to optimise the processes. The solution proposed by MISG was found to significantly outperform Compac's bagging processes, demonstrating significant improvements were possible. The work also demonstrated that Compac's current boxing method was near optimal, which was also useful for Compac.

2005 Compac Challenge

Compac required the accurate weighing of fruit weighing more than 250g, running on high-speed, high-capacity lanes. The challenge is to retain the high accuracy whilst compensating for mechanical springs and bouncing weights. MISG proved a model system that resulted in a faster and more accurate system. Compac could take this information and undertake further research into adaptive filtering, useful for larger fruit weights and faster line speeds.

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