

# RFID-based Apparel Management Expert System for Operator Task Allocation and Production Line Balancing

## 基於射頻識別技術的服裝生產員工分配及生產線平衡決策支援系統

In apparel manufacturing, decisions in operator task allocation and production line balancing greatly rely on the knowledge, experience and subjective assessment of production management. Their decisions are always found to be inconsistent and ineffective. Although current RFID-based data capture systems can facilitate the capture of production data and provide real-time reports, they cannot utilise the captured real time data for detailed analysis to assist the production management for better decision making. The RFID-based Apparel Management Expert (RAME) System utilising artificial intelligence techniques can generate effective and efficient solutions for operator task allocation and production line balancing. The patent application for this system is now in process.

在服裝生產流程，員工分配及生產線平衡方案依賴生產管理員的知識、經驗甚至直覺，他們的方案往往不是最有效的。雖然現時在市場裏有利用射頻識別技術的實時工場數據收集系統協助數據收集，並能提供實時生產進度報表，但是這些系統並未能協助生產管理員分析數據及提供生產改善方案。RAME系統應用人工智能技術，提供有效及快捷的員工分配及生產線平衡決策支援。



### Application 應用

The RFID-based Apparel Management Expert (RAME) System integrating with the real time production data captured by existing RFID system, adopts artificial intelligence techniques to generate effective and efficient solutions for operator task allocation and production line balancing of apparel manufacturers.

RAME系統連結現有的RFID數據收集系統，結合人工智能技術，提供有效及快捷的服裝生產員工分配及生產線平衡決策支援。

### Industry Benefits 業界效益

- Time Shortening on Staff Deployment
  - The system can shorten time spent on operator assignment of a production line before a new production order is released for processing.
- Increase of Production Efficiency
  - The system enables an efficient production distribution and effective solution on decision-making with collection and application of real-time data.
- 縮短生產員工分配決策時間
  - 新的生產單在某生產線上開始生產前，分配員工合適的生產任務（工序）所須要的時間大大縮短。
- 提高生產效率
  - 透過即時資料的收集及適當的利用，加上人工智慧演算法，作出有效的生產分配與控制決策方案，提高了生產效率。

## ||| Technological Breakthrough 技術突破 |||

- The RAME system is the first innovation on integration of RFID and artificial intelligence techniques.
- Unlike the existing RFID production data capture systems which can only capture data without analysis and generating solutions, the RAME system can conduct detailed data analysis, generate effective and efficient solutions for operator task allocation and production line balancing.
- RAME系統是首個把無線射頻識別技術及人工智慧技術結合起來的創新發明。
- 目前市場上所有服裝行業即時車間資料收集系統只能收集資料，欠缺分析，不能提供決策方案，RAME系統能提供有效及快捷的服裝生產員工分配及生產線平衡決策支援。

## ||| Key Features 特點 |||

- Efficiency Prediction Module: to predict the coming production efficiency of each operator.
- Intelligent Operator Assignment Module: to generate an optimal operator assignment of a production line before a new production order is released for processing.
- Intelligent Line Balancing Module: to generate an optimal re-balancing solution to the production management for adjusting the operator and workstation assignment.
- Intelligent Production Progress Prediction Module: to predict the production progress and completion time of each production order.
- 效率預測模組：預測每個員工未來一段時間的操作效率。
- 智能員工分派模組：可於新的生產單在某生產線上開始生產前，產生最佳的分配方案為員工分配合適的生產任務。
- 智能流水線平衡模組：在瓶頸工序出現後，可自動提供最佳方案，協助生產管理員調整員工與工作站安排。
- 智慧生產進度預測模組：為每個生產訂單的生產進度與完成時間提供準確的預測。

## ||| Licensing Details 獲取專利 |||

A non-exclusive licence covers:

- The knowhow including the patent document for the development of a Smart Process Flow Management Expert System for Agile Manufacturing of Apparel Supply Chain
- A technical manual of the system

非獨家專利授權許可包括：

- 服裝供應鏈敏捷製造的智能流程管理專家系統的技術和相關的專利權文件
- 系統的技術手冊

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