Introducing The Hartree Centre and Kainos
The Hartree Centre, a world leading research organisation across Industry 4.0 and Kainos a specialist digital transformation partner are collaborating across key sectors to deliver the next wave of transformation.
Kainos Group plc is a leading UK-based provider of Digital Services and Platforms.

Who we are

Kainos
Meaning ‘innovation’

32 years
Successful in business

Over 1,400
Exceptional people

6 years
Sunday Times Top 100 Companies to Work For

Over 290
Blue-chip customers

13 offices
Across the UK, Ireland, Europe and USA

Experts
Across Healthcare, Government and private sector
The rise of IOT

We’re live the IOT age

• Device price has dropped – these are commodity items which are ruggedised
• Connectivity is easier
• Bandwidth and storage and processing technology can cope with the volumes of data generated
• Emerging standards and support from Cloud computing providers
• Equipment pre-supplied with sensor data
• Emerging success stories
• Autonomous vehicles show that this technology is reliable enough to protect human life
• Real-time and edge analytics has come of age (see later)
• We need this technology to solve today’s problems: making same infrastructure do more (e.g. TfL)

Industrial IoT market is estimated to reach USD $195.47 billion by 2022. Over 50 billion devices will be connected by 2020.*

*Carl Solutions
Creating value for a single organisation

- Equipment optimisation – in real-time
  - Maximising time that plant and machinery is doing productive work
  - Spread workload to prevent uneven wear across assets
  - Detect mis-use and target operator training / invalidate warranties

- Predictive (or condition-based) maintenance
  - Minimising disruptive, unexpected downtime
  - Minimising needless expensive routine maintenance
  - Optimise engineering workforces
  - Root cause analysis for faults
  - Improve safety
  - Reduced equipment redundancy (smaller fleets, etc.)

- Power management and environmental efficiency
  - Intelligent plant and building power-down

- Maintain quality
  - Detect conditions that cause product defects (e.g. machinery drifts out of tolerance)
In wider ecosystems there are additional benefits

- Equipment optimisation
  - More efficient use of infrastructure (empty bins when they need it, grit the right roads etc. etc.). $1T of savings worldwide over next few years.
  - Adapt to air quality measures
- Predictive (or condition-based) maintenance
  - Avoid environmental disasters
- Power management and environmental efficiency
  - Turn on street lighting where people are / smart dimming of lights
- Traffic and transport management (Intelligent Transport Systems)
  - Real-time traffic management; long-term planning
- Re-selling data
  - Footfall
CBM benefits

Figure 1. Maintenance strategy continuum

- <50% OEE*
- 50%-75% OEE
- 75%-90% OEE
- >90% OEE

Reliability: OEE and uptime

Level I | Level II | Level III | Level IV
--- | --- | --- | ---
**REACTIVE**
Fix when broken

**PLANNED**
Scheduled maintenance activities

**PROACTIVE**
Defect elimination to improve performance

**PREDICTIVE**
Advanced analytics and sensing data to predict machine reliability

* Original equipment effectiveness

Source: Deloitte analysis.
We solve Difficult Data

MOST ORGANISATIONS REMAIN PREDOMINANTLY INSIGHT POOR – the overriding need is to identify and understand key datasets and then integrate and share them to continuously drive more informed decision making, greater customer engagement and operational efficiency. We offer a range of services for customers looking to extract value from data and increase their digital maturity.

INITIATION
Machine Learning Proof of Value projects unlock the potential of advanced analytical techniques such as prediction to add value to existing data sets. We work with you on business case identification, use case exploration and data sourcing.

PLATFORMS
We deliver mission-critical, scalable data processing platforms for cross-enterprise analytics and data exploitation, using our agile data engineering teams. Our architectures cover the full Big Data stack from hardware to user-facing tools and consider the future exploitation needs of the organisation. We have particular expertise in delivering and supporting cloud platforms and cloud transition.

INSIGHT
An analytics, data visualisation & performance analysis factory generates data products including powerful algorithms, dashboards and embedded intelligence that can be directly applied in a business context. We often work in blended teams, helping customers to build an enduring capability.
Kainos has been selected by Telensa, a leader in smart street lighting and smart city applications, as lead partner to build and support the City Data Guardian trust platform.

City Data Guardian is a secure-by-design trust platform that puts cities in control of their data – applies privacy policies, ensures regulatory compliance and makes data available to improve services and drive future city revenues.

The platform collects, stores, secures, manages and analyses data from Telensa’s Multi-Sensor Pods, which gather and fuse sensor data from devices, including camera and radar imaging, to measure levels of traffic, footfall, pollution and noise.

Using machine learning and AI, data collected is used to provide a more accurate view of urban areas and how they are used. More information at https://urbandataproject.org.
Tagueri: Data-driven plant efficiency

We worked with engineering specialists Tagueri looking to optimize the efficiency of advanced cutting machinery for creating metal components.

The sensors on each machine provided a reading every second – although this was initially provided to us as a historic data file, we created the engineering platform to ingest the data in real time using Azure PaaS services for IOT solutions.

We created a real-time data visualization and a machine-learning model that would predict the completion time for each piece of work.

The solution can be used to optimise the use of the machines, for example distributing workload amongst the machines to maximize the time machines are productive.

The platform has Cloudera at it’s core.
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