USE CASE Scaling AI projects in the NHS: Leading digital change, interoperability and innovation



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Al Transformation at Scale

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Consultant Clinical Scientist, Head Clinical Scientific Computing | Guy's & St. Thomas NHS Foundation Trust PEOPLE | PLATFORMS | POLICY

Director| Fellowships in Clinical Artificial IntelligenceAI Transformation Lead| AI Centre for Value Based Healthcare



Centre of Excellence in Al



Industrial Strategy Challenge Fund - From data to early diagnosis and precision medicine challenge

- £10M one of five Centres of Excellence for digital pathology, radiology, AI and machine learning, and enabling integrated diagnostics
- £16M from Office for Life Sciences Department of Health and Social Care as additional scale up funding to three of the Centres
- Around £10M of in-kind matched funding from 15 industry partners





UK Research and Innovation

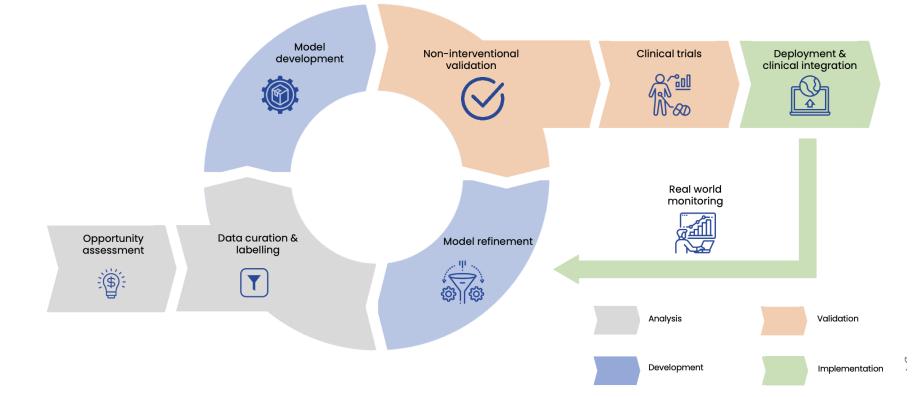


Department of Health & Social Care



Bridging the gap between AI innovation and adoption





Al Lifecycle



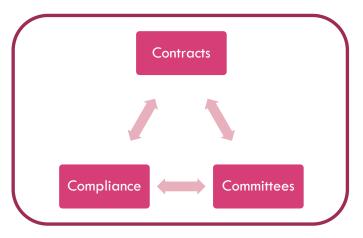
Data Curation

The AI Centre is committed to using data safely to improve health care

Projects are reviewed by

- Data Access Committee
 - Includes patient representation
- Centre Management Committee

Al Centre projects can only access anonymised or pseudonymised data





Model development





Partnerships between industry, Academia and the NHS



10

Projects have gone through product development, testing & deployment





Projects in active development with a further 6 in early-stage research











Successes: clinical pathway models Cancer surgery planning

Background	7 million CT and MRI scans are performed every year up to 30% of these used for planning surgeries
Project	Innersight3D – a CE marked, AI powered surgery planning software tool that creates 3D models from existing CT and MRI scans for 2 separate pathways
Support	We are further developing, testing and regulating Innersight3D for Kidney and Lung cancer surgery



Prof. Prokar Dasgupta using Innersight3D



Successes: clinical pathway models

Radiotherapy Planning

Background	Image contouring allows clinicians to see areas of interest, AI can be used to enhance the contouring process
Project	Mirada Medical DLC Expert is a deep-learning auto-contouring solution
Support	We helped train DLCExpert on curated clinical data to improve model accuracy and create a more generalisable model
	Project completed, and now GSTT carrying on further development for deployment





Successes: clinical pathway models

Hypoxic Ischaemic Encephalopathy

Background	Babies asphyxiated from birth can suffer from HIE and can lead to permanent neurological deficit or even death. MRS can be used to measure lactic acid in the brain for prognosis.	Gix
Project	Automate and integrate the spectroscopic analysis of brain metabolites in neonatal brains for immediate prognosis to improve patient care and communication with parents.	B
Outcome	24 hours -> 30 seconds Median time to results	



Deploying AI in hospitals



Deployment of more and more AI models becomes an increasingly complex task to manage, creating large technical debt.



Interoperability is a particular challenge for healthcare due to heterogeneity in clinical systems and patient data models.



Evidence generation needs to be at the centre of the design, since many deployments of AI still require research and analysis of their performance.





AIDE A new OS for the hospital





1995





2012

2021

- 1. One of the earliest photographic plates from Roentgen's experiments was a film of his wife, Bertha's hand with a ring, produced on Friday, November 8, 1895.
- 2. Setzner1337, CC0, via Wikimedia Commons

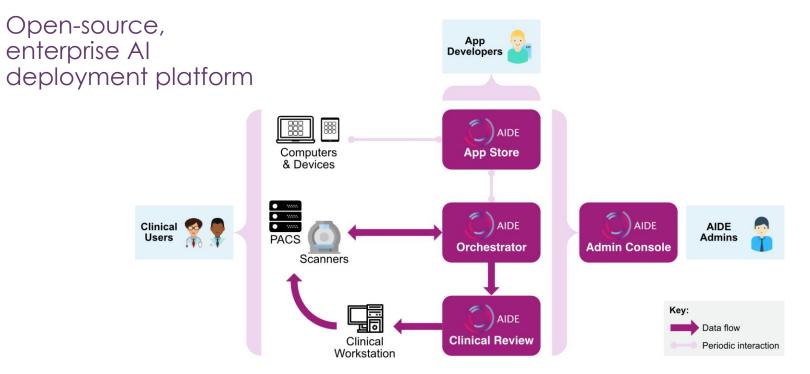
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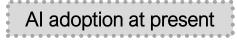
AIDE

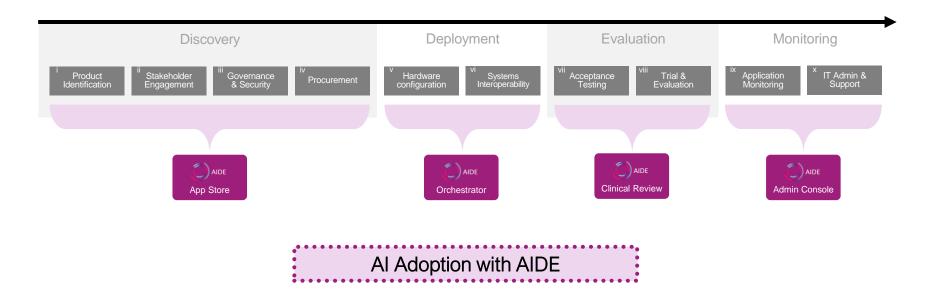
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A medical AI operating system for the hospital



The Al Adoption Pathway: At present & without AIDE





AI Evaluation Service

Transparently and in line with best practice

Evidence the utility and effectiveness of medical Al

Allow hospitals to effectively exercise choice

Al evaluation service to generate the evidence

Differentiate products according to quality

Build consensus on best practice, patient experience, and outcomes.



Al Buyer's Guide assessment template

Acknowledgments

The AI Lab is extremely grateful to **Haris Shuaib and the AI Board** at Guy's and St Thomas' NHS Foundation Trust (GSTT), who filest devised and developed an assessment template, and have been happy to share their work.

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 both regulated medical devices (such as software as a medical device) and those healthcare AI products that are not within remit for such regulation; 					> 6. Publication
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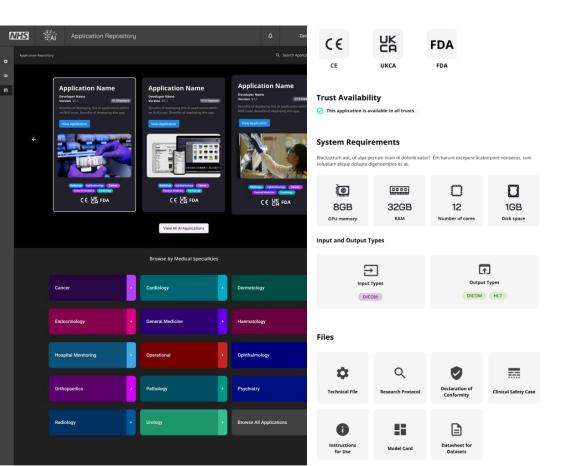
Scaling up digital clinical trials

Deploying in shadow mode

QA & research mode

Centralised reporting

App store with associated documentation



Rolling out across England

Al lifecycle management | Cloud-ready architecture | NHS "FUBL

Package algorithms with compliance documents

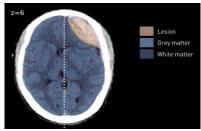
NHS "FUBU" repository

Complex and composable pipelines



AIDE apps First wave





AI automated stroke CT analysis

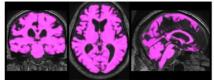


KING'S College

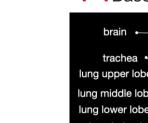
Al-driven motion-corrected 3D fetal MRI



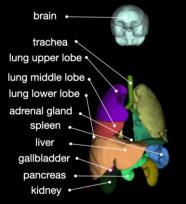
Brain Volume Fraction



AI-derived automated brain MRI volumetrics

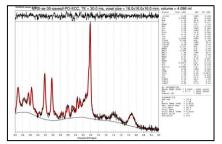


- Universitätsspital Basel



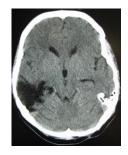
Automatic CT contouring





MR Spectroscopy modelling

Industry partner



AI head CT

+ many more...

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Breaking down the barriers between tech and healthcare











