Intelligent Services:
Techincal Domain Model

What

Data Sparsity and Density
Specific algorithms for dense spacial data

- Monte-Carlo Simulations
- Convolutional Neural Networks

Data Dependency & Instability

- **Impact of Retraining**
  E.g., new labels introduced that impact previous inferences (new dog breed)
- **Notification of Changes**
  Some form of notification when data is changed in the training

Hardware Infrastructure

- Tagging Infrastructure
- Training Infrastructure
- Inference Infrastructure

Pre- and Post-Processing

- **Min/Max Image Sizes**
  E.g., 1px by 1px image should fail due to lack of data
- **Colour Depth**
  E.g., Grayscale images should only allow grayscale (non-colour) analysis

When

Preparation
Data Collection & Tagging

- **Tagging Techniques**
  E.g., Bounding box vs. bounding polygon
- **Curator QA**
  Quality of the data
- **Labelling QA**
  Quality of the labelling
- **Domain Vocabulary Ambiguity**
  Ambiguity in labels and techniques (e.g., Face vs. Body, Dog vs. Cat, Recognition vs. Localisation)
- **Diversity of Curation**
  Data boundary set
- **Diversity of Labels**
  Label boundary set

Training
Model Training

- Training Data
- Training Method

Operation
System in Production

How

Uncertainty
System is data dependent and not rule-driven

- **Potential**
  Potential ranges of probability distributions
  - **Distribution shape**
    Do not know what the distribution shape could even look like
  - **Engineer Awareness**
    Most engineers not aware of probability distributions
  - **Unknown Expectations**
    Impact of adversarial examples that occur naturally in the real world
- **Observable**
  No changes in API or schema but learned behaviour is different
  - **Non-Determinism**
    No guarantee in confidence stability that the results occur from day to day

Error-Handling
Errors are not foreseeable due to data dependency

- **Workflow Design**
  Handling the failure cases
- **Maintainence Design**
  Alarm and QA monitoring