Possible CDT projects

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Possible areas

- Vision as Inverse Graphics
- Condition Monitoring in Intensive Care Units
- Other topics in probabilistic machine learning
Vision as Inverse Graphics

- It is hard to get rich, annotated image data of object classes
- Key idea: build a computer graphics stochastic scene generator that models the variability in object *classes*
- Key advantage: large numbers of images and associated ground truth can be generated
- Microsoft studentship
Issues:

- Building a stochastic scene generator (graphics): model object shape and appearance variability, object co-occurrences and relationships
- Inference: recognition networks to infer object identities, poses, illumination etc
Condition Monitoring in Intensive Care Units

discrete state

continuous state

observations
t=1
t=2
Quinn, Williams, McIntosh (2009)
Developing this model

- Working with Neurological ICU, Southern General Hospital, Glasgow
  - Modelling control inputs, e.g. drug pumps, ventilator settings
- Working with Neonatal ICU, Royal Infirmary of Edinburgh
  - Modelling sepsis. Work so far compares proven sepsis with controls, but there is more to do wrt intermediate diagnoses ("mixed growth")
- Possible work on applications to power grid systems