

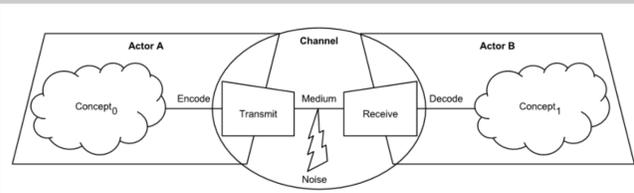
# Adaptive Capability Profiling Framework

Matthew Bell  
m.j.bell@lboro.ac.uk

Colin Machin  
Roger Stone

The research contained in this poster describes the key features of a framework allowing people and technology to be profiled. The framework provides flexible description of capabilities and requirements allowing assistive technology and adaptations to be dynamically suggested in response to changing user needs.

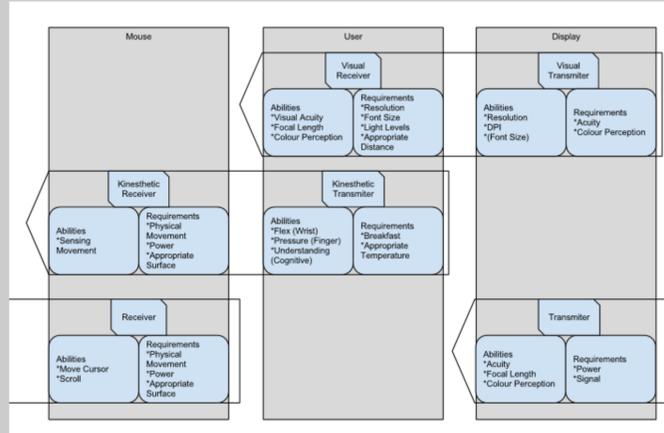
## Shannon-Weaver



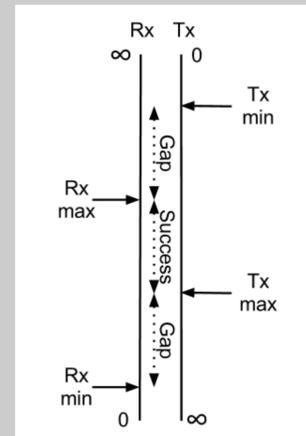
The Shannon-Weaver Model describes the process of transferring a concept from one person to another. As they are unable to be transmitted directly a concept has to be encoded into a message which can be sent through a channel of communication via a medium (audio, visual, electronic etc.). Assuming successful transmission the message can be decoded.

## Interaction

In order to pass a message from a transmitter to a receiver, the transmitter must have the capability to transmit and the receiver must have the capability to receive. The figure below, demonstrates how capabilities are paired. Each capability works in a single direction and has a series of requirements that have to be fulfilled in order for it to be present.



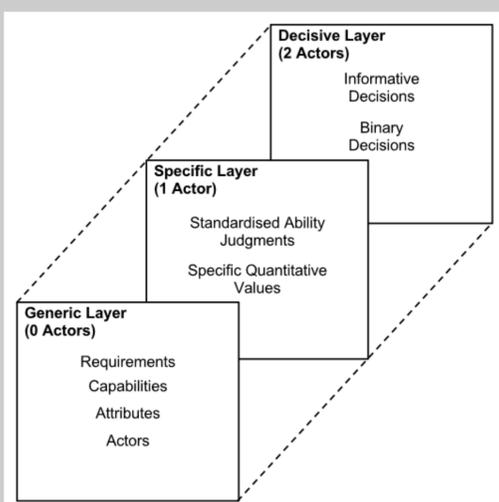
## Channels



An ability is a quantifiable capability. A pair of abilities must have a common range within which they can both operate in order for successful communication to be possible.

A speaker able to produce sound between 0-5dB cannot transmit a message to a person with the ability to hear in the range 10-50dB. A hearing aid used bridge the gap may have the ability to 'hear' 3-7db and produce 0-20dB.

## Layers



Layers of abstraction allow language used to describe capabilities to be separated from the storage of quantitative data and the decisions made as a result of comparing abilities between actors.

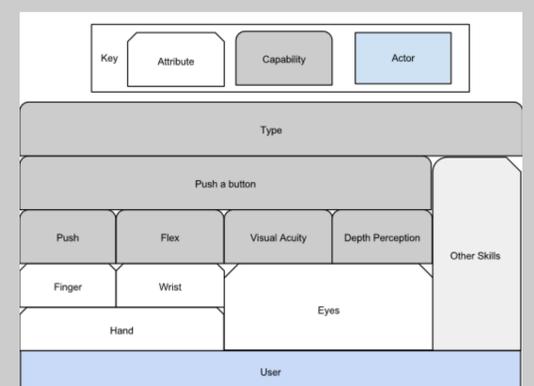
## Abstraction

Semantic languages RDF and OWL can be used to store capability data along with associated meta-data to allow reasoning to be used matching users with appropriate assistive technology given a complex set of changing requirements.

```

:user      :has      :hand
:hand      :has      :fingers
:fingers   :can       :grip
:mouse     :require  :move
:move      :require  :grip
:user      :ableTo   :mouse
    
```

## Levels



Within each layer, levels of abstraction allow the attribution of capabilities to actors to be modelled by building structures gradually using atomic elements. Complex tasks can be broken down into human capabilities.

In the event of an incomplete profile related data can be used to infer missing abilities.