Knowledge Synthesis and Reuse

What if ?

Africa

Mongolia

Amazon

Let's annotate medicinal plants from all over the world, and build a collective knowledge which is portable, can be shared and enriched at any time

Let's build knowledge

Encouraging field-experts to transfer their knowledge through mobile devices

Everyone has expertise to communicate
Diversity is the key to a rich knowledge

Everyone can contribute to knowledge building
Cellular phone, handheld devices, tablets, internet café almost everywhere

Data storage is unlimited
Local, remote, virtual

Everyone can benefit from knowledge building
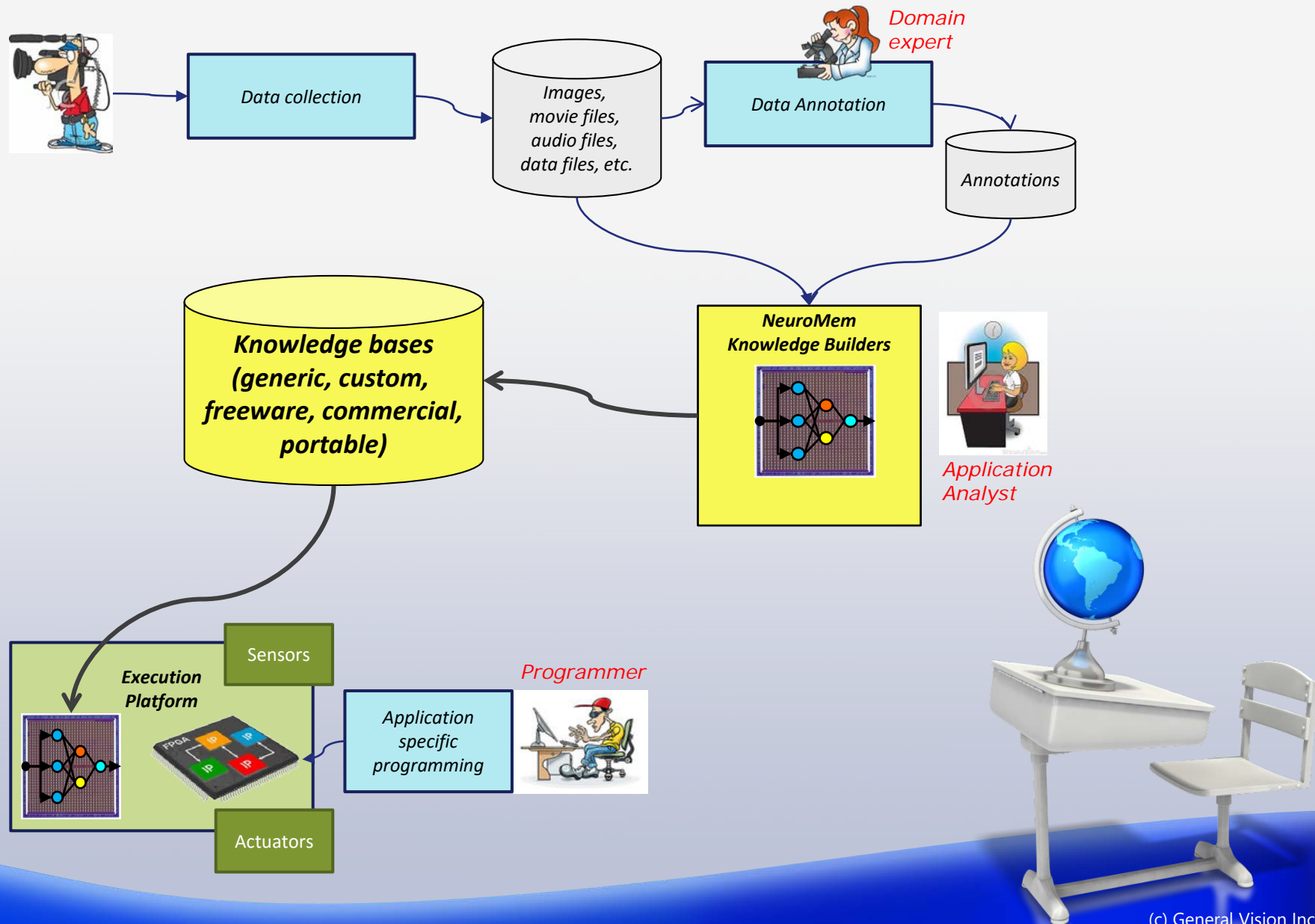Use repositories of knowledge, make income from annotations
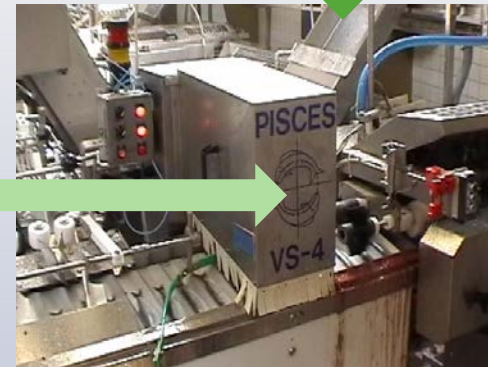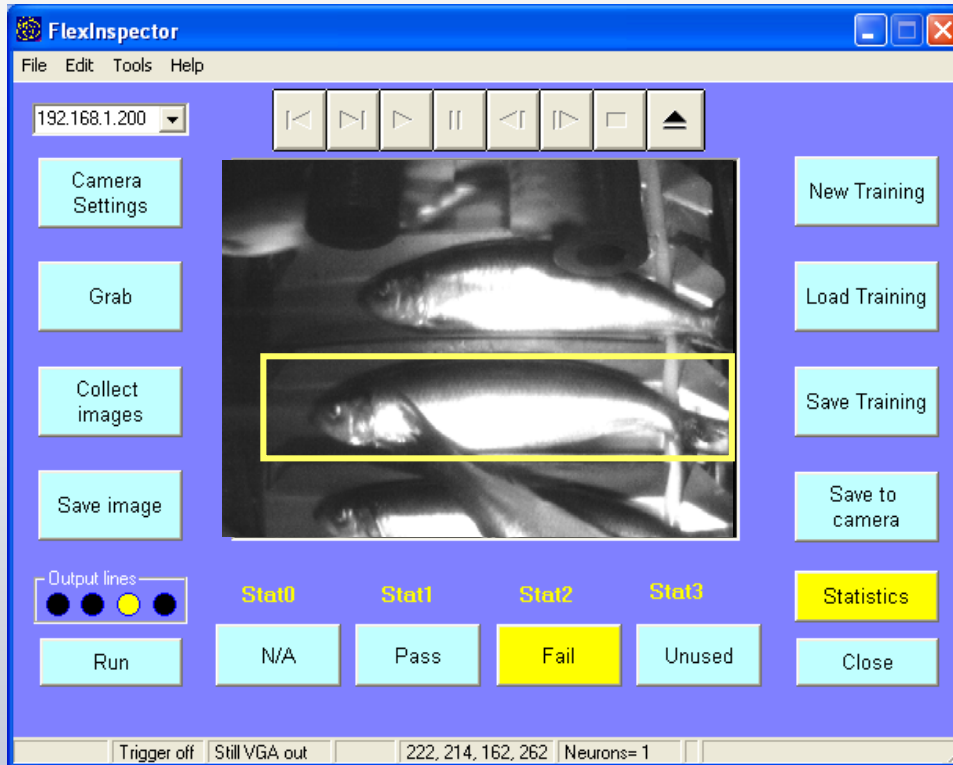
What is missing?
Building knowledge

Knowledge Building and Usage Workflow

Domain expert

Data collection → Images, movie files, audio files, data files, etc. → Data Annotation → Annotations

NeuroMem Knowledge Builders

Application Analyst

Knowledge bases (generic, custom, freeware, commercial, portable)

Execution Platform

Sensors

Actuators

Programmer

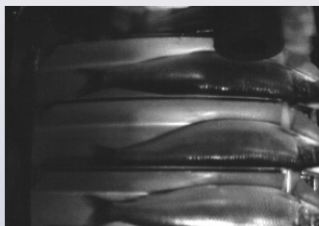*Application specific programming*

Example at Sea

- Knowledge = what is an acceptable herring
- Taught on-board by the fishermen
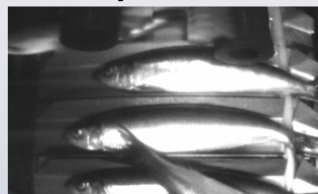- Fine tuned over several seasonal expeditions

One example is better than explaining "Why" with mathematical models
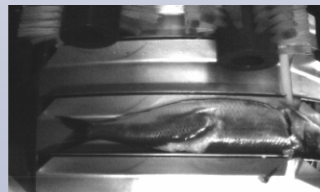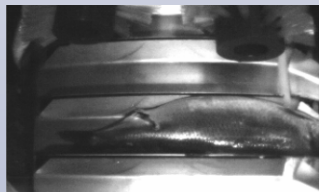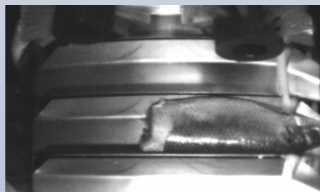

Why is this fish acceptable?
Right specie for the present expedition and
Acceptable size for the season and
Non damaged scale and
Proper orientation in the tray for the feeder

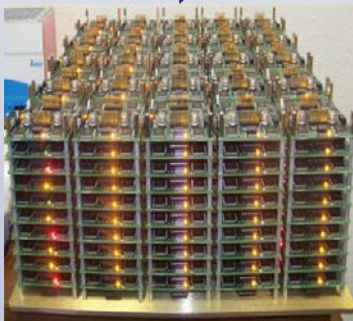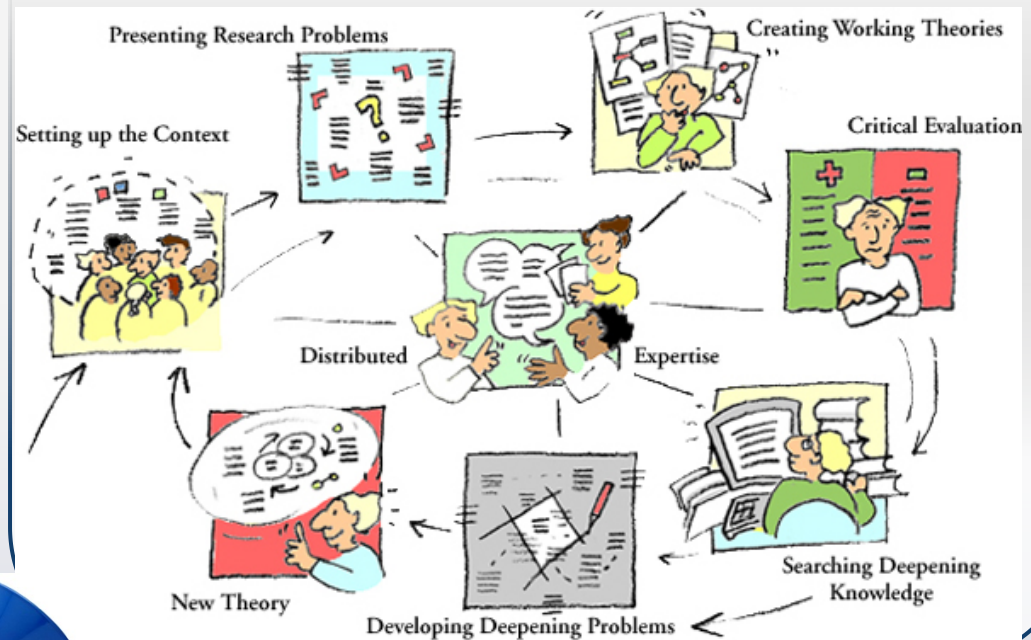If all is fine except orientation,
then Recycle

Reject everything else...

From information to CogniGrams

NeuroMem 1MCube:

- Highly scalable network of neuromorphic memories
- Pattern learning and recognition accelerator
- Build=in model generator
- Exact or fuzzy matching
- High speed learning
- High speed recognition
- Can synthetize non linear problems

Presenting Research Problems

Creating Working Theories

Setting up the Context

Critical Evaluation

Distributed   Expertise

New Theory

Searching Deepening Knowledge

Developing Deepening Problems

Classes of Knowledge Bases

- ## Always-on or initial knowledge (KN0)
  - Used at the power-up and running continuously
  - Triggers the use of the next contextual recognition
  - Example for phones and tablets
    - Intended to spare the battery and awake the phone only when necessary. The "necessary" can be (1) the detection of a pair of eyes looking at the screen. The recognition can take as little as 10 microseconds every second to spare the battery life

- ## Contextual knowledge (KN2)
  - Knowledge built and validated ahead of time and loaded to run a specific recognition
  - Example for phones and tablets
    - Recognizing a monument in a city, a product in a storefront

- ## User knowledge (KN3)
  - Knowledge built in real-time and on the chip by the user
    - Teach a new event or object from scratch
    - Expand a contextual knowledge by adding the new examples selected by the user.
  - Example for phones and tablets
    - A philatelist can teach an example of a stamp he wants to add to his collection and use his phone as a scanner when going to stamp exhibit.