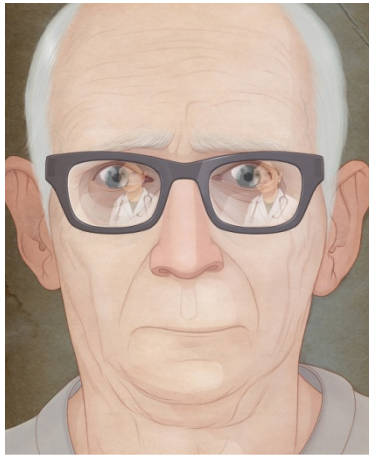
Acorformed Project
Data-Driven Model of Virtual Patient for doctor social training

Catherine Pelachaud
CNRS-LTCI, Télécom-ParisTech

Context

❑ Impact of breaking bad news



- ✓ Disease evolution
- ✓ Adherence with treatment recommendation
- ✓ Side effects of the medication
- ✓ Survival probability

...

HAS

HAUTE AUTORITÉ DE SANTÉ

French High Authority of Healthcare

➢ **Workshop: simulation with actors**

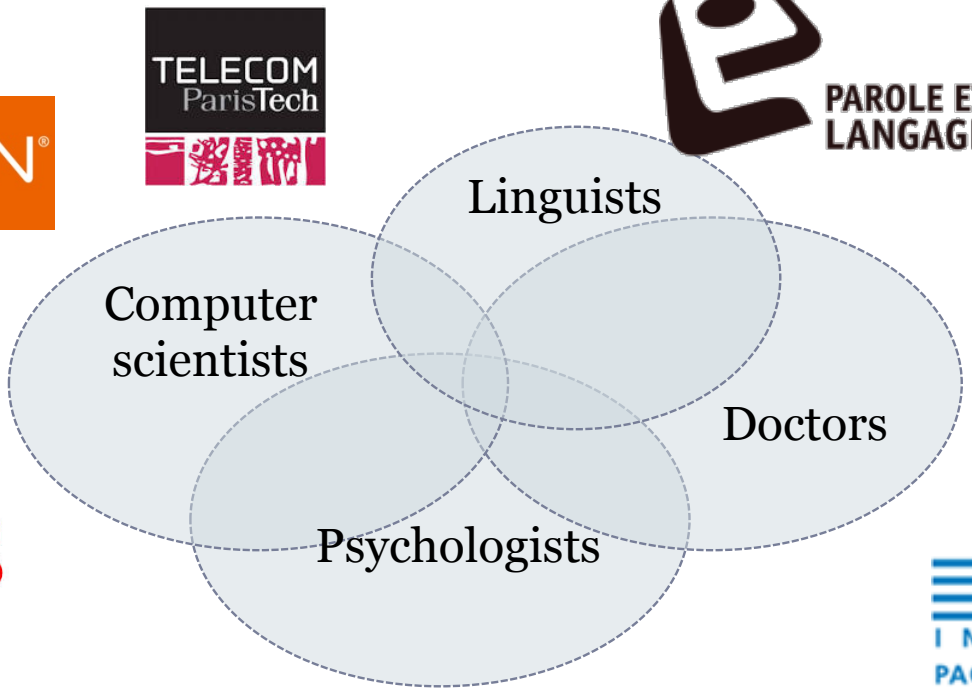
Illustration : Richard Wilkinson, 2011

General objectives of the Project

- **To train doctors with virtual patient**
  - **« Natural » interaction**
    - ✓ Real situation
    - ✓ Natural language interaction
    - ✓ Multi-modality
  - **Behavioral measures of *performance***
  - **Different degrees of *immersion***

Methodology

- **Pluridisciplinary approach**

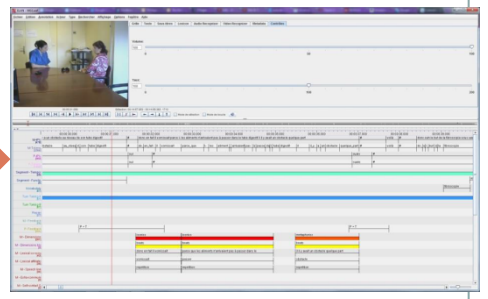


Acorformed Project
Virtual Reality for Training Doctors to Break Bad News

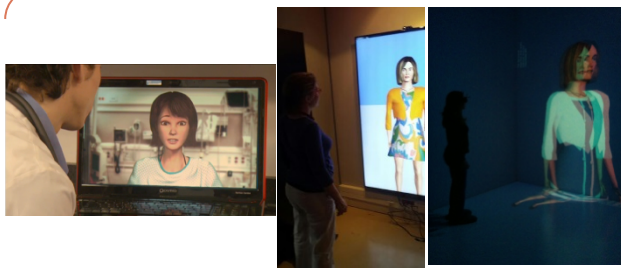
PROJET FINANCÉ PAR L'ANR - PROJECT FUNDED BY THE ANR

Doctors

Corpus of doctor training



Evaluation



Speech reco.
Eyes Tracker
Facial expressions detection

kinect

Integration

Extraction

Verbal and non-verbal annotations

Virtual patient's behavior model

CHU ANGERS CENTRE HOSPITALIER UNIVERSITAIRE

INSTITUT PAOLI-CALMETTES

LSIS

PAROLE ET LANGAGE

TELECOM ParisTech

CRVM centre de realite virtuelle de la mediterranee

IMMERSION imagination, interaction…

Methodology

❑ Model *based on real data*

✓ ***Audio-visual corpus ofdoctors-patient interaction***

- 22 simulations (5h45 of video) – *7mn à 25 mn*
- Types of patients (conciliant, agressif, etc.)
- *Undesirable events (death,digestive perforation, etc.)*

✓ ***Instructions provided to actors***

✓***Description of the area of breaking bad news***

Analyze of real data

PAROLE ET LANGAGE

Linguists

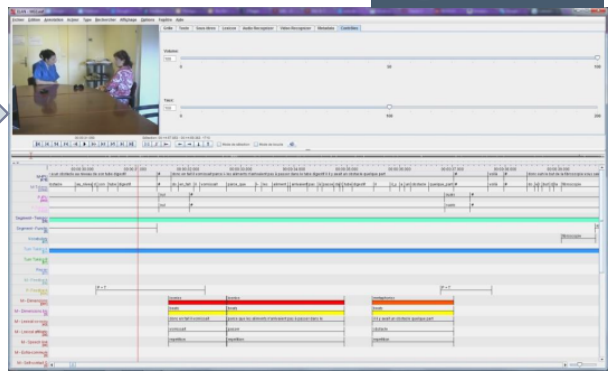
Computer scientists

LSIS

Annotation and transcription

Gestures, feedbacks, gaze, smiles, dialog acts

ORTOLANG



Elan

SPASS

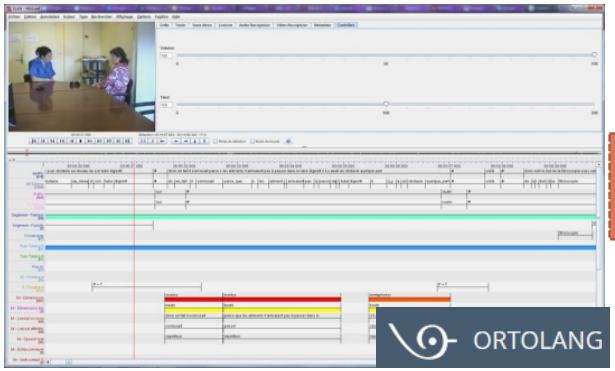
Automatic extraction of inter/ intra modalities relations

Intra- and Inter-relations between modalities of patient/doctor

ex. what triggers a feedback of the patient ? *How quickly ? Duration?*

The Virtual Patient

- **Stochastic model of the virtual patient's behavior**



Automatic extraction

Intra- and Inter-relations between modalities of patient/doctor

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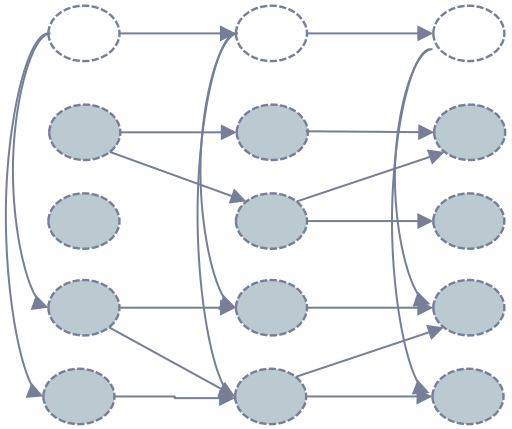


VIB - Greta

TELECOM ParisTech

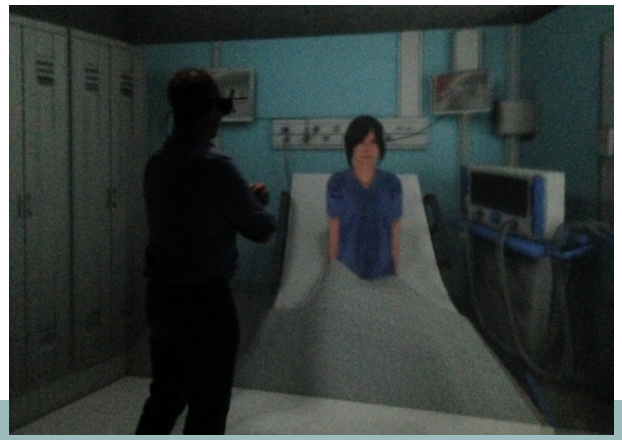
LSIS

The virtual patient

❑ The virtual patient

✓ *« Believable » virtual environement*

- Appereance of the virtual patient
- Area of breaking bad news

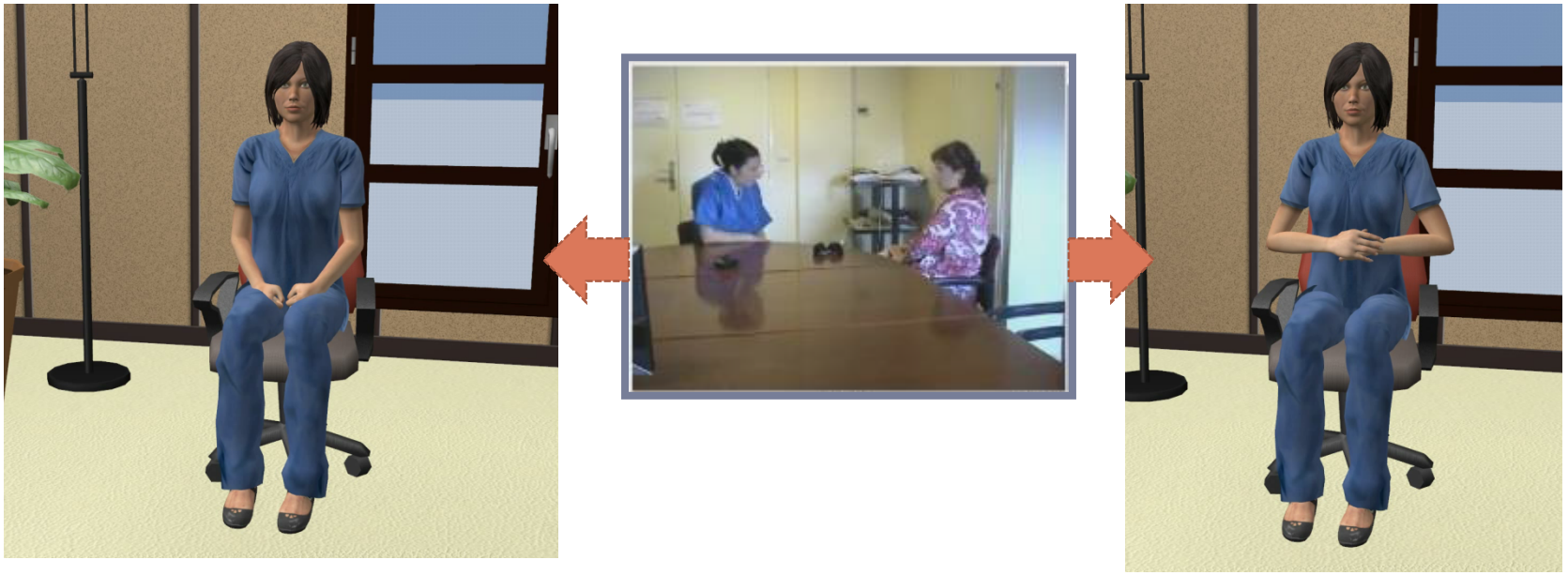


The virtual patient

❑ The virtual patient

✓*Librairy of specific non-verbal behaviors*

Identification and simulation of stereotypic gestures of the corpus

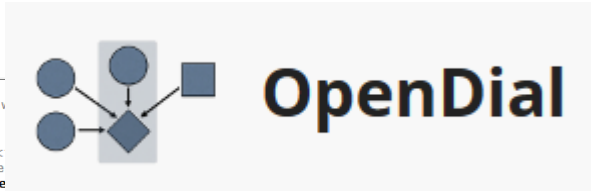


The dialog model

Speech recognition

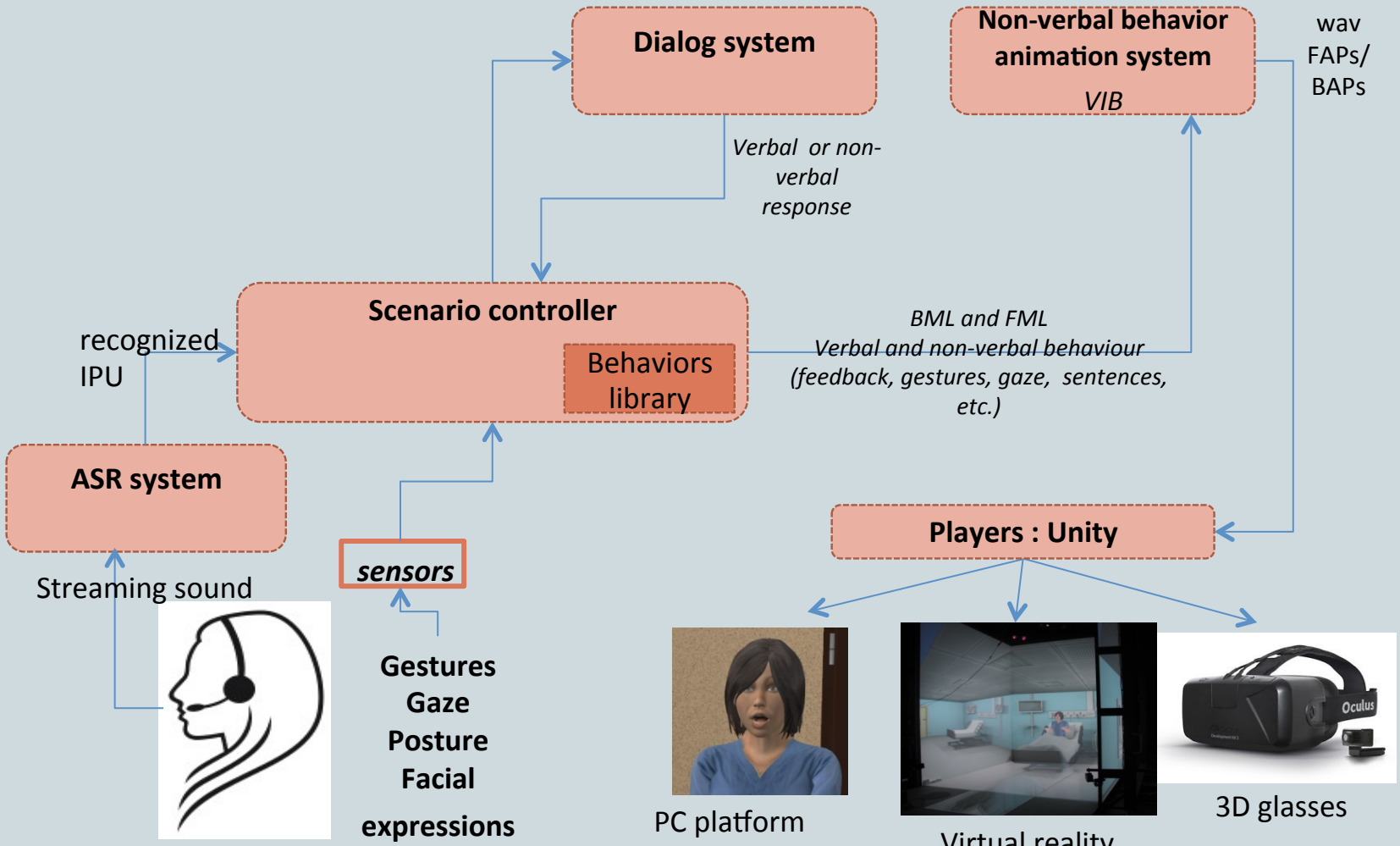
✓ *« Pre-defined» Scenario of 15mn*

- Digestive perforation -




```
- <domain>
      <!-- the domain specification
  - <initialstate>
      <!-- Starting prompt -->
      <!--variable id="u_m"> <
      <!-- We start the dialogue
    - <variable id="current_phase
        <value>0-Initialisation</value>
      </variable>
      <!-- -->
  </initialstate>
    <!-- model répondant à une uttérance du doteur -->
- <model trigger="u_u">
    <!-- phase 0 : salutation -->
  - <rule>
      <!-- doctor's salutation -->
    - <case>
      - <condition>
          <if relation="contains" value="bonjour" var="u_u"/>
        </condition>
      - <effect prob="1">
          <set value="Greeting(patient)" var="a_u"/>
        </effect>
      </case>
  </rule>
    <!-- phase 1 : -->
  - <rule>
      <!-- 1a - État : Alors, madame Brun, comment vous vous sentez ? Les anti-douleurs vous soulagent ?
      -->
    - <case>
      - <condition operator="or">
          <if relation="contains" value="vous sentez(-| )vous" var="u_u"/>
          <if relation="contains" value="vous vous sentez" var="u_u"/>
          <if relation="contains" value="anti(-| )?douleur(s)?" var="u_u"/>
        </condition>
      - <effect prob="1">
          <set value="Ask(feeling)" var="a_u"/>
          <set value="1a-État" var="current_phase"/>
        </effect>
      </case>
```

Main Architecture



Illustration

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