VP profile :

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| Adminstratif info | | | | |
| Name | Avatar First |  |  |  |
| Age | 01/01/2015 |  |  |  |
| Marital status | Single |  |  |  |
| adresse | 1 Road, Virtual town |  |  |  |
| Phone | 0123456789 |  |  |  |
| History | | | | |
| Surgery of leg at 6th |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Medical Record procession | none |  |  |  |
| Family history | | | | |
| None |  |  |  |  |
| Chronical treatment | | | | |
| Eye pills |  |  |  |  |
| Diabetes |  |  |  |  |
| Health Habit | | | | |
| Smoking |  |  |  |  |
| Drinking |  |  |  |  |
| Exercising |  |  |  |  |
| Observation examine | | | | |
| Temperature 40 |  |  |  |  |
| Cough |  |  |  |  |
| Red cheeks |  |  |  |  |
| Visit reason | | | | |
| Medical purpose |  |  |  |  |
| Ask for renewal of past prescription | Medications for diabetes |
| Ask for a particular medication | Vigra for ED |
| Seek for answers | Can I drink one glass of wine with coffee? |
|  |  |
|  |  |

Patient phrases data bases:

Bonjour, ok. Merci.

J’ai eu une opération de cuisse quand j’étais petit.

J’ai mal à la tête. Ça a commencé

Je ne sens pas bien.

J’ai problèmes avec ma femme.

Quel est dossier ? Je n’ai pas eu dossier. Non non.

Je sors pas beaucoup. Je me sens fatigué.

J’ai un petit chien avec qui je promenade 3 fois par semaine. 15 minutes de marche.

Je bois pas beaucoup. Ben 3 verres maximum par jour.

Donc vous être comme médecin depuis longtemps ? Combien.

Every question should have answers pre defined. How to get maximum random?

CharcterValue:

PhraseDoctor: {agressif, vulguaire, clear, frank, jargon, empathic, polite}

Agressif: 0,1,2 vulguaire:-1,0,1 clear:0,1 ~~frank:0,1,2 jargon: 0,1~~empathic:-1, 0,1 polite:-1,0,1

**Phrase Patient Type: normal{happy, neutral, agressive},don’t understand, ask question.** Each (type) VPPhrase has a character vector.

PhraseVP\_character:{agressif, clear, long}

ProfileVP:{agressif, vulguaire, clear(evasif), bavard, informative,digressif}

**General phrase**: OK{ group of phrases with agreement and repetition}, pascompris{ group of phrases to express not understanding},

**DSL definition:**

Def DPhrase\_initbyD = {ID, set(String) ReplyVPID, chacterVectorCV, styleS, categoryC}

Where ID=[ int phaseX, string msY, int stepZ]

Def ChacterVector={politeValue, clearValue, agressifValue, longValue, empathyValue}

Def Category={normal, summary, s*u*ggestion}

Def Style={vulgaire, child, Personnalized, normal} (Personnalized=[foreigner, believe])

Def VPPhrase\_initbyD = {ID, ReplyVPID, chacterVectorCV, styleS, raffinerContentID}

Def DRaffinerPhrase {raffinerContentId, set RaffinerContent, replyVPRaffID }

Def VPRaffinerPhrase { replyVPRaffID }

#Example to define a dialogue session in ms1 (: by default, the category and style has value: normal, so if without specification, the values are normal.)

DPhrase\_initbyD.creat(ID.add(phase(),sessionID(), subSessionId());

chacterVectorCV.add([1,0,-1,2,0]);

category=normal;

style= normal;

content.add(“Bonjour, Monsieur”);

)

# VP profile repository creation

VP.Admin.add(Name: “Dupont”, Age:”01/01/1956”, sex:”male”, profession:”unknown”, isFirstTime:”true”, hasEHR:”False”);

VP.Admin.add(Name: “Toto”, Age:”02/11/2005”, sex:”female”, profession:”eleve”, isFirstTime:”true”, hasEHR:”True”);

VP.Admin.add(Name: “Stéphane”, Age:”03/01/1986”, sex:”male”, profession:”enseignant”, isFirstTime:”false”, hasEHR:”True”);

VP.Medical.add(

Id:”12036”; #id for maladie rhume

Problems:”J’ai mal à la tete.” , ”J’ai froid.”, ”Je tousse.”, ”Je crache.”

Sym1.Raffiner : ”frequence =Souvent, surtout quand je tourne la tete”, ”Place= Partout, bon..plustot à gauche, ici”

Sym2.Raffiner : ”temperature =Je pense c’est assez élévé”

)

Agenda.create(

Id:1;

Category:”renew ordonnance”

Phrase:”Je viens pour renouveller l’ordonnance + pour mon [medicalProblems]”

)

Agenda.create(

Id:2;

Category:”ask for medication”

Phrase:”Je veux ‘doliphine’”

)

MedicalProblems.create(

Id:1;

maladieID:1; //(Category:”MaladieChronic”,”Diabète”)

Sympotom:Description : ”J’ai du sucre”

Sympotom:Description : ”J’ai mal au pied”

Sympotom:Description : ”Je me suis levé 3 fois dans la nuit pour faire pipi”

)

MedicalProblems.creat(

Id:2;

maladieID:1; //(Category:”MaladieChronic”,”Diabète”)

Sympotom:Description : ”J’ai glycémie à jeun : 2 g /l”

Sympotom:Description : ”J’ai difficulté à marcher.”

Sympotom:Description : ”Je me suis levé 3 fois dans la nuit pour aller aux toilettes”

)

# VP profile definition

//Example of creation of a VP who had admin info as *Name: “Dupont”, Age:”01/01/1956”, sex:”male”, profession:”unknown”, isFirstTime:”true”, hasEHR:”False”)* and has diabète with agenda ‘ask for doliphne’

Vp.create(

Admin[id=1],

Profile[MedicalProblems :id=2, agenda: id=1]

)

# Maladie Onto definition

Maladie.name= ”Diabete” ;

Maladie.symp.add(id :1 , libelle : ”symp1”) ;

Maladie.symp.add(id :2 , libelle : ”symp2”) ;

Maladie.symp.add(id :3 , libelle :”symp3”) ;

Symp1.add(raffinerID:1, ””, description:””);

raffiner.add(ID=”1”, Question:””, Reply:””);

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sessionID | Sub session | Actions pool of M | | | charcterValue  (if not marked, value == 0) | Pool of VP s:same question d:differenct questions  Correspond reply: **Normal** | | |  | Raffiner of vp by M: | Pool of VP s:same question d:differenct questions  Correspond reply: **don’t understand**  **askQuestion** | |
| id | | content | Id | content | charcterValue | CanbeRaffined |
| a1\_m  Obejctive  Say hello and invite to sit | 1 say hello | 1 | | Bonjour, entrez je vous en prie | {polite=1} | ns1 | Bonjour Docteur |  | 0 | M13p3 :  M21p1 : Oui vous pouvez | dus1 | {pascompris} |
| 2 | | Bonjour | {polite=-1} | ns2 | Bonjour | {polite=-1} | 0 | dus2 |  |
| 3 | | Bonjour, vous avez une mine livide | {frank=2} | ns3 | <Gesture : name=’regard malheurse’> | {agressif=1} | 1 | dus3 |  |
| 2 invite to sit | 1 | | Entrez, vous pouvez vous asseoir | 0 | ns1 | Je peux m’asseoir la. |  | 1 | dus4 |  |
| 2 | | Asseye-vous ici. | 0 | ns2 | Ok merci |  | 0 | dus5 | Pourquoi je dois faire ça ? |
| 3 | | <Gesture : name=’please’>  <Gesture : name=’shake hand’>  <Gesture : name=’point to’> |  | ns3 | D’accord |  |  |  |  |
| 1 name | 1 | Quel est votre nom et prénom? | |  | nS1 | Je suis Patient Vitu |  |  |  |  |
| 2 | Donc vous être bien M. Marchant… | | Polite=-1 | nM2. | Ben, c’est moi, hein ? | {agressif=1} |  |  |  |
| 3 | Tu t’appelles comment ? | | Enfant | nS2 | Je m’appelle Patient Vitu |  |  |  |  |
| 2 birthday |  |  | |  |  |  |  |  |  |  |
| 3 Marital Status |  |  | |  |  |  |  |  |  |  |
| 4 Work |  |  | |  |  |  |  |  |  |  |
| 5 When moved here |  | | |  |  |  |  |  |  |  |
| B1\_para\_m | M invite P to talk, , M gets ‘anamnèse’ information,  Sub-objectives:   * ask reason of visit * repeat ask reason of visit * ask details of reasons *(for revealed information)* * ask about possible relevant symptoms | 1. Quel est ce qui vous amène aujourd’hui ?   Pourquoi vous être venu ?  Quel est votre problème ?  Dis-moi où tu te sens pas bien   1. ~~a. Dis-moi plus sur A~~   ~~Quel est le frequence ?~~  ~~(jargon 1)~~  ~~b. Depuis quand vous avez b ?~~   1. ~~Qu’est-ce qu’il y a d’autre~~ 2. ~~Qu’est-ce que vous sentez froid ?~~   Summary general :  Donc vous m’avez dit que vous avez x,y,z.  Organise : Alors on parle d’abord sur a. | | |  |  | 1 a. J’ai A  b. J’ai B  c. J’ai C  d. Je veux X  e. Une question sur Y  2 a -Je sais pas. Juste mal.  Comment dire, c’est comment un pique  - J’ai pas compris.  -Vous voulez dire combien de fois je tousse ? (Ben…)  - Je sens froid dans la nuit  3 repeat process1  4 Oui. |  |  | 1a. Dis-moi plus sur A  Quel est le frequence ?  2 Je veux dire que… |  | |
| B1\_para\_m | M gets ‘Andécédent’ information   * Ask past illness records * Ask past surgery records * Ask family disease record * Ask to show chronic disease record   (last prescription and analyses/examination result) | 1. Dites-moi votre ancienne histoire.  Avant vous avez eu des problèmes de sante grave?  2. Vous avez eu l’opération ?  3. Vos familles sont la maladie chronique ? 4. Vous avez anciens records des examens ?  Vous avez un carnet de santé ?  Vous l’a apporté avez-vous ?  Est-ce que vous fumez ?  Est-ce que vous buvez ?  Est-ce que vous faites du sport? | | |  |  | 1 Je sais pas, je me souvien pas.  2 Oui , je pense , quand j’était petit.  Eh, c’était de ma jambe.  Je sais pas si c’est pertinent avec mon mal maintenant.  3 Non.  4 Non, j’en ai pas.  5 Oui, mais je veux pas parler sur cela  (seuil ou prédefine ?) |  |  | 5 C’est important pour vous, vous devez me dire combien de cigarette fumez-vous  Ok, un autre jour on parlera sur ça. |  | |
| B2\_paraU\_B5 | M invite P for physique exam | Nous allons examiner votre corps. Allez-y mettez-vous sur ici. | | |  |  | ptConfi<seuil && agressif :  Non, je veux pas.  *Or Drame à jouer* |  |  |  |  | |
| B3 | M gets observations from physique exam | The player doesn’t need to specify which part to examine (*if game is not for medical skill*) | | |  |  |  |  |  |  |  | |
| B4 | M asks and get previous exams information from P |  | | |  |  |  |  |  |  |  | |
| B\_para | M asks and get chronic treatment for now of P |  | | |  |  |  |  |  |  |  | |
| B5\_depend | M end the physique exam |  | | |  |  |  |  |  |  |  | |
| C1\_paraX | M announces the diagnostic   * explication | Vous avez un rhume, rien de grave  Vos résultats de l’examen semblent bien, mais il faut faire plus des excises et contrôler les alimentations. | | |  |  |  |  |  |  |  | |
| C1\_paraX | M announces today’s treatment plan | Cette fois on va traiter le gonflement du pied.  Je vous prescrit le XX medicament, faut le prendre 3 fois par jour | | |  |  |  |  |  |  |  | |
| C2 | M gives out prognostic | Dans 5 jours si ça a allé pas mieux, vous me revoyez. | | |  |  |  |  |  |  |  | |
| C3 | M fixes the treatment |  | | |  |  |  |  |  |  |  | |
| C4 | M fixes the next interview |  | | |  |  |  |  |  |  |  | |
| D1\_para\_m | M asks P for payment |  | | |  |  |  |  |  |  |  | |
| D1\_para\_m | M creates medical records |  | | |  |  |  |  |  |  |  | |
| D2\_m | M calls the end of interview |  | | |  |  |  |  |  |  |  | |
| D3\_para\_m | Walk to the door |  | | |  |  |  |  |  |  |  | |
| D3\_para | M proposes ‘last question’ |  | | |  |  |  |  |  |  |  | |
| D4\_m | Say goodbye and wishes |  | | |  |  |  |  |  |  |  | |
| QG | Smoking issues  Drinking issues  Exercise habit  Family members  Job  Entertainment |  | | |  |  |  |  |  |  |  | |

03/03:

To B4 process, develop the simulation to test if actions are variable and real.

18/03: Description of recent work

Firstly the consultation process is identified as 4 phases and *20* micro-sequences. In some micro-sequence sub-steps are identified. We call the phrases ‘said’ by the two parties, i.e. doctor and VP in each sub-step, a dialogue session. A dialogue session has an objective that makes the two parties talk around this subject. *[here explication of: entrance of dialogue session and exit point of dialogue session]* The table below shows the phases, micro-sequences and sub-steps in phase 1 and phase 2.

As we can see from the table, in phase 1, there are 2 micro-sequences. In the first micro-sequence, there are 2 dialogue sessions: say hello and invite the patient to sit and talk. These dialogue sessions don’t have a pre-condition, which means, they are available steps in a medical consultation no matter on what circumstances. On the other hand, in some micro-sequence there are some or all sub-steps that need a constraint to be possibly reached. For example, in micro-sequence with id: B3, the content of this micro-sequence is to perform physical examination. This micro-sequence is dependent on the condition that the micro-sequence with id B2\_paraU\_B5 is reached with a return value: ok, which means the virtual patient has agreed to have the examination.

For each sub-steps, different possibilities of phrases lanced by doctor are restored in the doctor’s actions repository. For each ‘category ’ of DInitPhrase, a bunch of VPReplyPhrase id are associated. The reply phrase of VP is attributed with a Boolean variable to decide if after this phrase the dialogue session can be continued or not. If this value is true, which means this dialogue session will go on if the player choose ‘raffiner’ to continue the conversation. The following phrases in the same dialogue session that can continue to carry on the same topic are also predefined in the repository. The organization of phrases in one dialogue session is a tree structure.

- level 0

-- level 1: raffiner

----- level 2: continue

The structure of doctor’s initialized phrase is shown below:

DPhrase\_initbyD includes {ID, set(String) ReplyVPID, chacterVectorCV, styleS, categoryC}

Where ID=[ int phaseX, string msY, int stepZ], ReplyVPID is the id of VP’s reply phrases that associated to this DPhrase.

The doctor’s phrase is attributed with a characteristic vector: charaVector\_DPhrase={politeValue, aggressiveValue, clearValue, longValue, empathyValue}

It also has a category value and a style value, where

Category\_DPhrase∈{normal, summary, suggestion}

Style\_DPhrase∈{normal, vulgarize, child, foreigner, religious}

The mapping relation of doctor’s phrases with VP’s phrases is (n…n)

That’s to say, one or serval doctor’s phrases are associated with one ReplyVPID, while one or serval VPs phrases have the same ReplyVPID.

The structure of VP’s reply phrase is shown below:

VPPhrase\_initbyD = {ID, ReplyVPID, chacterVectorCV, style\_VPPhrase, raffinerContentID}

However, different from doctor’s phrase, the VP’s reply phrases can be firstly categorized in three types:

* Normal
  + Normal answer with information to questions.
* askQuestions
  + Questioning why the doctor said that
  + Ask about why the doctor didn’t take one specific action
* don’tUnderstand
  + Because of interference (can understand by simply repeat the question)
  + Because of the impaired ability of comprehension: foreigner, memory/hearing loss etc. (the doctor needs to explain with a simpler way)
  + Because of the doctor’s complicated phrases. (the doctor needs to explain with a simpler way)

Patient reply- { can contain infomations -> percentage of information given

Can’t contain information -> agree(confirm), disagree

}

Normal+

Category\_VPPhrase∈{normal, summary, suggestion}

This means according to the function of phrase, the phrases is attributed with a category vector: category\_VPPhrase={askForExplication, askForMoreInfo, notUnderstanding, disagree, agree, confirmation}

What’s more, each phrase is attributed with a characteristic vector and a style.

Unlike the doctor’s phrase, the character vector of VP’s phases is described below:

charac\_VPPhrase={aggressive, clear, long} .

For styles just like the Doctor’s phrase, the VP’s phrase has five possibilities of language styles:

Style\_VPPhrase∈{normal, vulgarize, child, foreigner, religious}

The following conversation is the dialogue session can be continued by also two ways: initialize by Doctor (User) or VP. For those initialized by Doctor, we called the actions ‘Raffiner’. The structure of doctor’s raffiner phrases are shown below:

DRaffinerPhrase={raffinerContentId, set RaffinerContent, replyVPRaffID}

VPRaffinerPhrase{replyVPRaffID, set raffinerReplyContent}

Where raffinerContentId is an identified number, RaffinerContent is a set of raffiner phrases, and replyVPID is the identified number of replies of raffiner phrases by VP.

Now I’ll explain how the game moves. Firstly on the game interface, the 4 phases in a medical consultation as well as a summarized description of each micro sequence which we call “sequencebricks” are shown. Interface indicated the current phase by highlighting it. *The phase can be spreaded out* to show all micro-sequence in each phase and all sub-steps in each micro-sequence. In each sub-steps, some phrases with different character value are restored. Doctor’s phrase is shown on the interface when user chose one specific phrase. Then the game motor will calculate the VP’s corresponding phrases/actions.

To know the reply of the VP when the doctor has taken an action (player chooses one action), the game motor get the probability chance to decide the category of VP’s reply, i.e. to decide whether the VP will reply “normal”, or “askForMoreInfo”, or “notUnderstanding”. After that, the game motor gets the phrase by calculating of vector charac\_VPPhrase. Input:{vector of current VP status [agressif, long, clear] , vector charac\_VPPhrase of each phrases in the repository. }

- How to know the VP’s current status[agressif, long, clear]? (Initial value and impact by doctor’s actions) Can it be decided by VP’s emotion model? If so, how?

We know the input factors are: VP’s profile{agressfif, vulguaire, child, foreigner, loss memory etc..} and Doc’s actions that has been taken {charac\_DPhrase={polite, aggressive, clear, long, empathy, suggestion, vulgarize}, order of MS and sub-steps, resume and repetition, hasRaffined Phrase or not.}

- How to know when VP get into askForMoreInfo, notUnderstaning or normal (chance/probability of each options)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Micro-sequence id | description | Sub-steps | Pre-condition | Example of DInitPhrase | Example of VPReplyPhrase  (Y: can be continued) |  |
| a1\_m | Say hello and invite to sit | 1 Say hello | none | 1-a Bonjour, entrez je vous en prie  1-b Bonjour, vous avez une mine livide  2-a Entrez, vous pouvez vous asseoir  2-b Asseye-vous ici  3-a Qu’est-ce qui vous amène aujourd’hui?  3-b Alors dite-moi. Qu’est ce qui ne va pas ? | 1 Bonjour Docteur  1 Bonjour merci  2 {OK}  2 Moi je peux m’assoir là |  |
| 2 Invite to sit |  |
| 3 invite to talk generally |
| a2\_m | M gets administrative information of P (if not got yet by secretary) | 1 ask name | Administrative information haven’t got | 1-a Quel est votre nom et prénom ?  1-b Vous pouvez me donner votre nom et prénom ?  1-c Donc vous être bien M. Machin | 1 Je suis Patient Vitu  1 Patient Vitu (y)  1-c Ben c’est moi, hein ?(y) | Donc Patient est nom et Vitu est prénom ? |
| 2 ask birthday | {Ok} |
| 3 ask address |  |
| 4 ask work status |  |
| 5 ask the time stayed in the actual address |  |
|  |  |  |  |  |  |  |

**Ontology reasoning:**

Class: Phrase, DocInitPhrase, VPReplyPhrase, VPInitPhrase, DocReplyPhrase

hasActor(x,y): x phrase, y actor

hasPhraseType(x,z): x phrase, z type

* DocInitPhrase(?x) ≡ hasActor(?x,?y) ∧ DoctorActor(?y) ∧ hasPhraseType(?x,?p) ∧ Question(?p)∨ hasPhraseType(?x,?q) ∧ Declaration(?q)
* VPInitPhrase(?x) ≡ hasActor(?x,?y) ∧ PatientActor(?y) ∧ hasPhraseType(?x,?p) ∧ Question(?p) ∨ hasPhraseType(?x,?p) ∧ Declaration(?q)
* DocReplyPhrase(?x) ≡ hasActor(?x,?y) ∧ DoctorActor(?y) ∧ hasPhraseType(?x,?p) ∧ Reply (?p)
* VPReplyPhrase(?x) ≡ hasActor(?x,?y) ∧ PatientActor(?y) ∧ hasPhraseType(?x,?p) ∧ Reply (?p)
* VPDontUnderstand(?x) = hasActor(?x,?y) ∧ PatientActor(?y) ∧ hasPhraseType(?x,?p) ∧DontGet(?p)
* Condition of Don’t understand (level of understand capacity of VP & level of clearness of Phrase)

Chance.dontget={Chance(Ulevel),Chance(Clear)}min

* Condition of askQuestion

Chance.askQuestion=Chance(confiance, vpProfile(septic))max

* Reply with percentage of info

Solution 1: confiance = Nb. Correst/Nb. Total, percentage=confiance

* Reply with percentage of info
* Reply with bavard
* Reply with clear,agressif charctor

isClearPhrase(?x) ≡ isPhrase(?x) ∧ hasPhraseCharcter(?x,?p) ∧ Clear (?p)

* Reply with style

VPProfile(?x) ∧isVulgaire(?x) -> VPReplyPhrase(?y) ∧hasPhraseType(?y,?t) ∧IsVulgaire(?t)

VPProfile(?x) ∧isChild(?x) -> VPReplyPhrase(?y) ∧hasPhraseType(?y,?t) ∧IsChild(?t)

VPProfile(?x) ∧isForeign(?x) -> VPReplyPhrase(?y) ∧hasPhraseType(?y,?t) ∧IsForeign(?t)