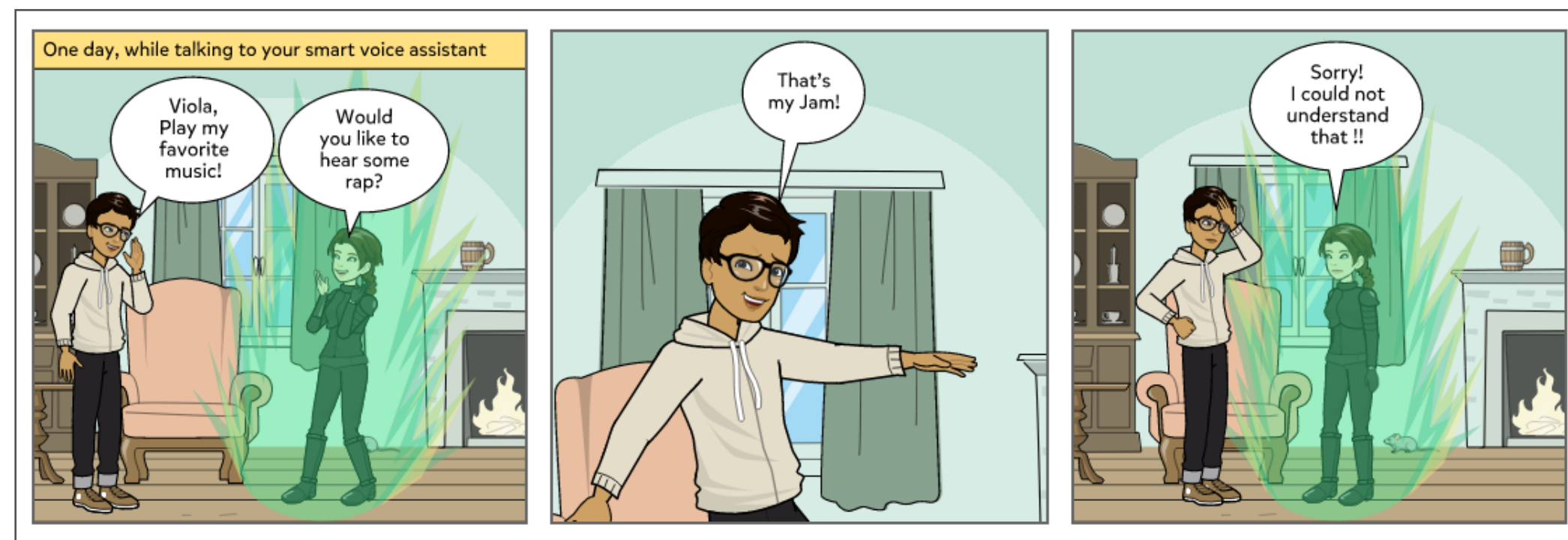




TOWARDS COMPUTING INFERENCES FROM AN UTTERANCE



If you talk to your smart voice assistant just like talking to another human, you will get the response, "Sorry, I don't understand that!" many times. It is because the machine could not make out the inferences of your utterance.

The meanings M of an utterance U in context C are given below.

C: "Madam, Shall I book a cab to the airport or the railway station?"

U: "I've got a train to catch."

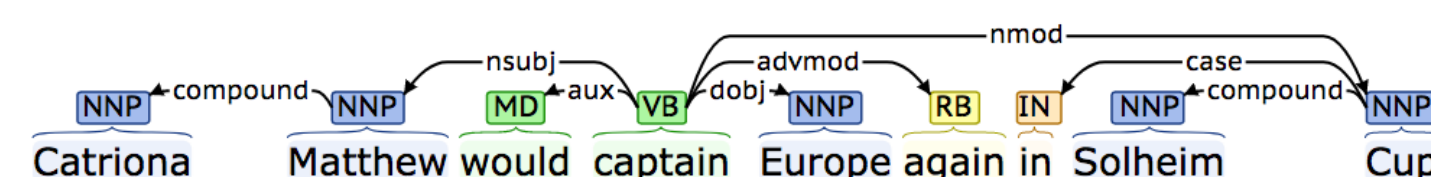
M: Yes. Please book a cab to the railway station.

C: "Shall we go and meet the boss now?"

U: "I've got a train to catch."

M: No. I have to leave now.

Figure 1. Example of a computed inference



Catriona Matthew had captained Europe before

OBJECTIVE

We research on computing inferences of human utterances to reduce conversational failures ("Sorry, I don't understand that!") in human-machine interactions. In our research, we aim to compute inferences based on the presence of some syntactic trigger words, study the types of inferences, and collect and annotate non-polar answers to polar questions, which is a significant pattern of implicating utterances.

Types of pragmatic inferences

- Presupposition
- Entailment
- Conventional implicature
- Conversational implicature

Table 1. Types of implicatures

Type of Implicature	Context	Utterance	Implicature
Scalar	Who made these donuts?	I made some of these donuts.	I did not make all of these donuts.
Generalised	Did you call John and Benjamin?	I called Benjamin.	I did not call John.
Particularised	Did you drink the milk I kept on the table?	The cat seems to be happy.	No. I did not drink milk. The cat might have drunk the milk.
Relevance	How about going for a walk?	Isn't it raining out?	No. I am not coming for a walk now.
PopeQ (Pope Question) as a response	Are you sure you can take care of yourself this weekend?	Can a duck swim, mother?	Yes. I am sure I can take care of myself.
Metaphor as a response	Do you like her?	She is like cream in my coffee.	Yes. I like her a lot.
Tautology as a response	Do you want to taste my Hamburger?	Hamburger is hamburger.	No. Hamburgers are not too good to taste.
Hyperbole as a response	Are you hungry?	I could eat a horse.	Yes. I am extremely hungry.
Idiom as a response	I could have been more careful.	It is useless to cry over spilled milk.	It is useless to be sad about what had already happened.

Table 2. Sample of the data

Context	Utterance	Implicature	Source
Can I call you in a little while?	It is four in the morning. I am going to sleep	No.	Movie
It is bad. Isn't it?	We should get you to the doctor.	Yes.	Movie
Were you pleased with last week's convention?	Nothing went as planned.	No.	EFL test
Let me help you with those packages?	Thanks, but it is only three quarters to the block.	No.	EFL test
Would you like to go with us for coffee a little later?	I am off caffeine. Medical restriction.	No.	EFL test

METHOD AND DATA

How do we compute inferences?

Inferences such as presuppositions and conventional implicatures are generated based on syntactic triggers identified from the tense of the verb in the utterance and the presence of words such as **again**, **further**, **regrets**, **accuse**, etc. in the utterance. These inferences are computed by analyzing the syntactic structure (Fig. 1) of the utterance obtained from dependency parsing. For computing the inferences from the utterances occurring in a context, a dialogue generator will have to be trained on the implicating dialogue data collected on a large scale.

Where can we find the data with inferences?

We collected the conversational data from TOEFL listening comprehension questions and movie scripts from IMSDb. The annotated data can be accessed by scanning the QR code on the right.

