AN ARTIFICIAL INTELLIGENT CHAT-BOT TO HELP THE BLIND

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Blindness is a challenge

Visual impairment affects 253 million people globally and 4 million in the UK

- Blindness costs the NHS £4.9 billion per year
- For the blind, independent living is a big challenge & assistive services are few & costly

Visual chat-bots are a solution

- Visual chat-bots are artificially intelligent (AI) agents that can have conversations about visual scenes – like Siri with "eyes" Is there an
 - The blind user asks the visual chat-bot a question

 Using machine learning, the visual chat-bot can helpfully

> respond Yes, to

obstacle in

front of me?

your left

Vision Neural Network

An image is a matrix of pixels. Each pixel is represented by three numbers:

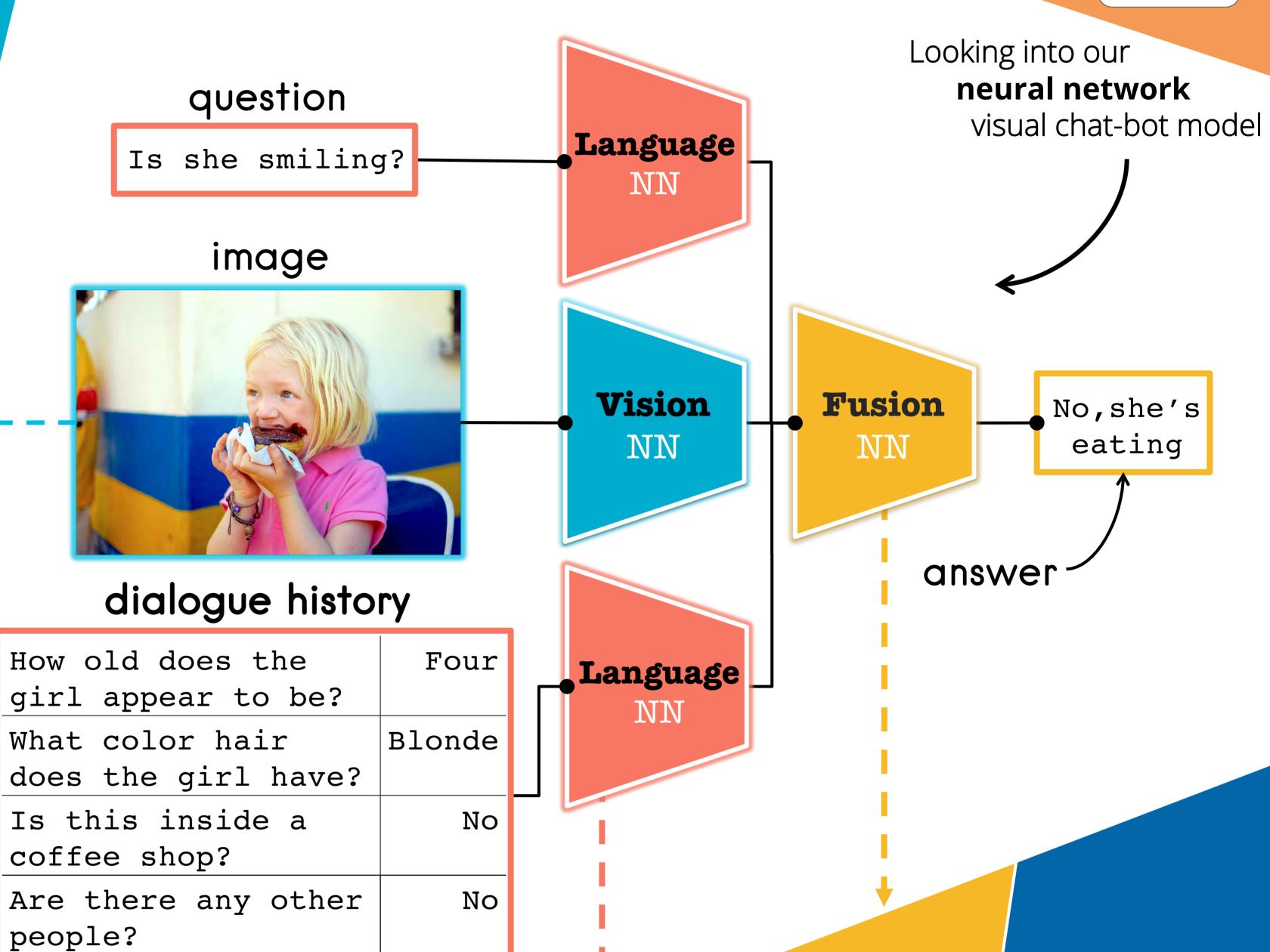


The Vision NN transforms the matrix into a number vector

The vector represents the image: * objects

- * layout
- * colours

VISUAL CHAT-BOT



Language Neural Network

We define a vocabulary of words (1. obstacle, 2. person, 3. avoid...)

Using the vocabulary indices, each question/answer can be represented as a number vector

The Language NN transforms each vector into another vector which captures:

* word sequence *grammar * sentence meaning

Fusion Neural Network

The Fusion NN fuses the question, image and history into a single vector

This vector corresponds to a sequence of vocabulary indices – the answer words!

We reward the chat-bot if the answer is grammatical & sensible

We penalise the chat-bot otherwise, thus 'teaching' it Future

Collect a dataset that captures real-world scenarios faced by the blind

Scale-up the visual chat-bot to handle real-time video

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