

---

# AI Programming by Children

How children can learn about technology, computing, psychology and perception while creating AI apps of their own design

— Ken Kahn, University of Oxford —  
toontalk@gmail.com

---

These slides are available

[tinyurl.com/ai-programming-kahn](https://tinyurl.com/ai-programming-kahn)

*Really the full 60-minute long version*

# From 1977

## AI FOR CHILDREN

There are several good reasons why children should write and interact with AI programs, a few of which follow:

- 1) Children are encouraged to think explicitly about how they solve problems. Hopefully the children will thereby improve their ability to

describe and understand their own thoughts.

- 2) The problem domain to which the AI programs are applied is learned, and in a new and perhaps better way
- 3) If children are to program, then AI can be an interesting open ended problem domain for that programming
- 4) The children will learn about AI which is a subject, in the opinion of the author, that is as important as spelling or history.

## Three Interactions between AI and Education

# AI cloud service interfaces are complex

Designed for use by professional programmers

```
$(function() {  
    var params = {  
        // Request parameters  
        "visualFeatures": "Categories",  
        "details": "{string}",  
        "language": "en",  
    };  
  
    $.ajax({  
        url: "https://westus.api.cognitive.microsoft.com/vision/v1.0/analyze?" + $.param(params),  
        beforeSend: function(xhrObj){  
            // Request headers  
            xhrObj.setRequestHeader("Content-Type", "application/json");  
            xhrObj.setRequestHeader("Ocp-Apim-Subscription-Key", "{subscription key}");  
        },  
        type: "POST",  
        // Request body  
        data: "{body}",  
    })  
    .done(function(data) {  
        alert("success");  
    })  
    .fail(function() {  
        alert("error");  
    })  
});
```

# The challenge create child friendly interfaces

Why do this in Snap!?

1. Is a powerful language
2. Is a superset of the popular Scratch language
3. Is easy to extend without touching the source code
4. Runs in every modern browser
5. Can connect to Arduinos and Raspberry Pis
6. Is free open source software

# And machine learning without cloud service

[Tensorflow.js](https://www.tensorflow.org/js) appeared in 2018

It supports training and prediction in the browser (uses the GPU)

New Snap! blocks enable one to

- train their programs to recognise images
- use the locations of face and body parts
- transfer painting styles to images
- compute with 300 dimensional representations of words

And more coming!

# Current eCraft2Learn Snap! library

Demo:

<https://ecraft2learn.github.io/ai/>

# Questions?

The Snap! programs are available at [ecraft2learn.github.io/ai/](https://ecraft2learn.github.io/ai/)

These slides are available at [tinyurl.com/ai-programming-kahn](https://tinyurl.com/ai-programming-kahn)

This research was supported by the [eCraft2Learn project](#) funded by the European Union's Horizon 2020 Coordination & Research and Innovation Action under Grant Agreement No 731345.

