

## Background

- Artificial Intelligence (AI) algorithms have been developed for **image analysis**, but have yet to be applied to medical images of children with Cerebral Palsy (CP)

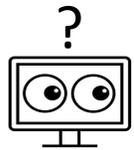


- The **Hemi-NET** study collected MRI brain scans from **over 200 children** with Hemiplegic CP (HCP) which were categorized into four common brain injury patterns:



- 1) **MCA** Patterns of Arterial Infarction
- 2) Periventricular (**PV**) Injury Patterns
- 3) Unilateral **Brain Malformations**
- 4) **Other**

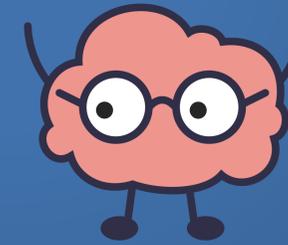
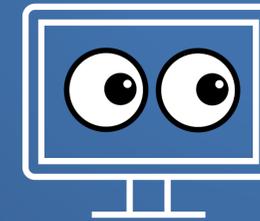
## Research Question



How can an AI model be trained to **classify brain injury patterns** for children with Hemiplegic CP from MRI brain scans?

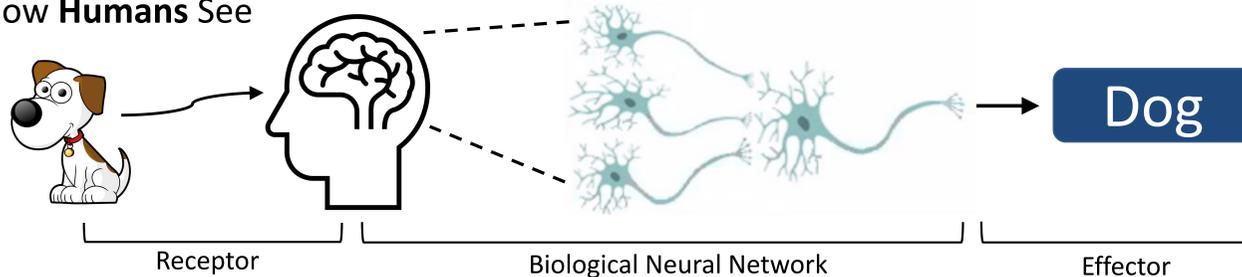
MRI brain scans can be analyzed with an AI algorithm called the **convolutional neural network (CNN)**, inspired by the **neurons** in the human brain

Hi there

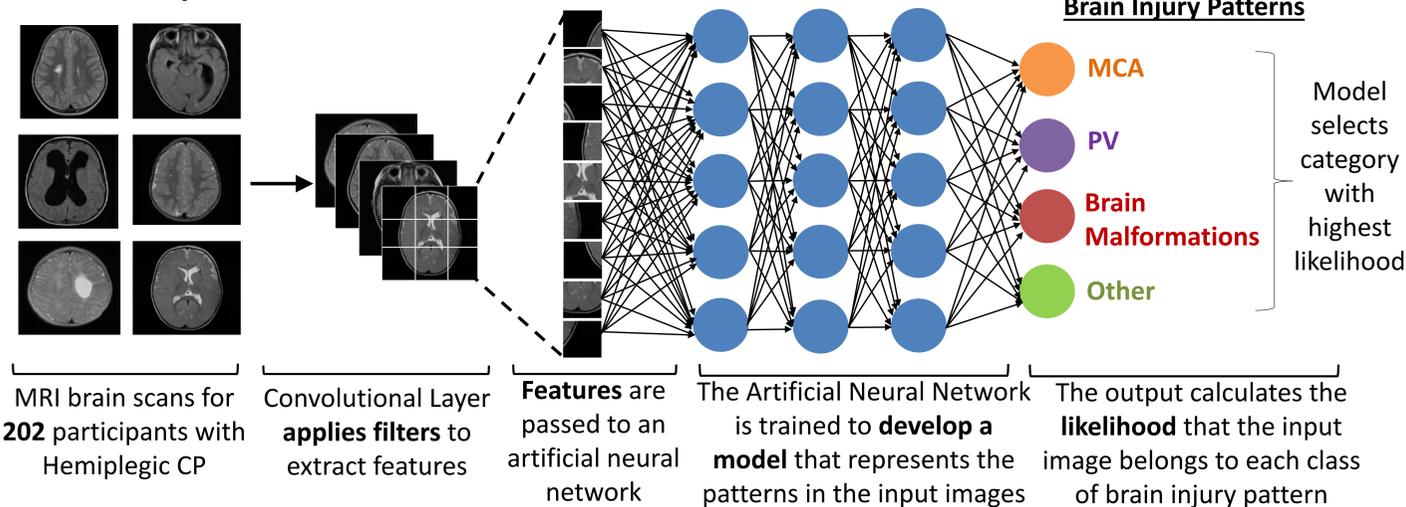


## Training a Convolutional Neural Network to Classify MRI Brain Scans

### A. How Humans See



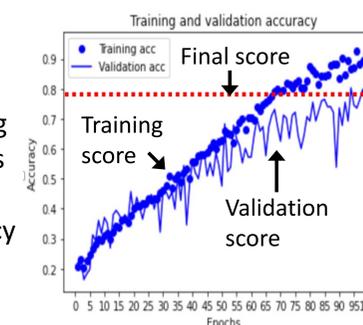
### B. How Computers See



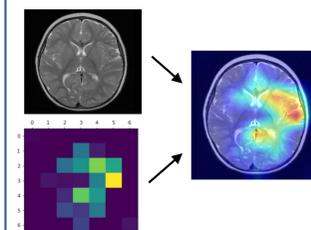
## Evaluation Methods for CNN

### Track Model Performance

Track model performance during the training process by graphing the progressive accuracy scores of both training and validation datasets



### Visualize and Interpret Results



The "Grad-CAM" method can be used to highlight areas of an image that contribute the most relevant features to the resulting classification by mapping the gradients of the last convolutional layer onto the original image.

## Discussion



**Potential:** Using AI for medical image interpretation has potential to improve efficiencies in preliminary diagnoses



**Impact:** Once validated, AI models may assist a neuroradiologist as part of the MRI reporting process by analyzing a large number of images quickly and accurately



**Next steps:** Perform analysis and evaluate results