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'Chatter Box' computer will unravel the science of language

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Scientists are to use a powerful super computer to mimic the part of the brain that controls speech and language function to better understand what goes wrong after brain damage caused by trauma or stroke.

Psychologists at The University of Manchester have teamed up with colleagues in the School of Computer Science to develop the speech and language model using a computer system that will be up to 1,000 times more powerful than a standard PC.

Dubbed 'Chatter Box', the £940K, five-year study is linked to the £1 million 'Brain Box' project that aims to build this new breed of computer based on biological principles that will enable it to carry out highly complex functions like those performed by the human brain.

"The human brain contains about one hundred billion nerve cells or neurons that each have to make a simple decision as to whether to 'fire' or not," said Professor Steve Furber, in the School of Computer Science.

"Each neuron's decision is based on how many other connecting neurons have fired recently. When this simple computation is distributed over billions of neurons, it is capable of supporting all the highly complex behavioural characteristics exhibited by humans.

"The Brain Box computer is being built using simple microprocessors that are designed to interact like the networks of neurons in the brain allowing it to replicate sophisticated functions such as speech."

Once the team have successfully produced the machine they will use it to build a model of normal human language capable of reading, comprehending, speaking, naming and repeating basic words in English.

"To train such a model using existing computer simulators would take far too long – possibly more than a lifetime," said Dr Stephen Welbourne, in the School of Psychological Sciences.

"We will validate this model by showing that damaging it can lead to the same patterns of behaviour as those found in brain-damaged individuals.

"We will then use the model to predict the results of different speech therapy strategies and will test these predictions in a population of stroke patients who have linguistic problems.

"Our goal is to understand how the brain supports language function, how this breaks down after brain damage and the mechanisms that support recovery and rehabilitation."

Source: University of Manchester