**The Feathers Problem**

**In Artificial General Intelligence**

Richard Keene – May 12, 2022

As any technology is being invented or researched, it is important to know which features of the system are important and which are not.

For example, when the Wright Brothers were inventing the airplane, they had to decide what part of birds are necessary for flight, and which are not. Are wings necessary? (yes) Are feathers required? (no) Must the airplane be able to flap its wings? (no, well it can work) Must the wings be able to bend? (yes, but now we use ailerons.) Must the aircraft run or jump on legs to get going? (no) Is the cross sectional shape of the wing important? (yes)

With Artificial General Intelligence (AGI) we see all the brain features that evolution has arrived at, and one must decide which features are important. Here is a bit of a list and guesses as to what is important:

* Do we need 86,000,000,000 neurons? (no, that is way overkill due to a biological system having to survive continuous neuron losses.)
* Do we need to pulse encode information? (no, pulse encoding serves two purposes in biological systems, immunity to temperature and sugar level, and pulses let one decode short time sensitive signals like sound direction.)
* Does the system need to map concrete and abstract features of the environment to clusters and “maps”? (yes, there needs to be structure of some kind)
* Does the system have to solve a problem? (yes, but not the narrowly focused problems such as what CNNs do. The only problem to solve is passing one’s genes to the next generation in biological systems. Out system has no such need, so ‘thinking’ is the problem to solve..)
* Does the system have to be clocked? (no, biological systems are free running chaotic systems.)
* Can the system be clocked? (yes, on computers one can do single time steps and simulate continuous free running, if and only if the steps are small enough.)
* Are hormones, emotions, and the chemical aspects of brains necessary to have true AGI? (no, but might be worth simulating so the thinking is relatable?)
* Does the exact pulse curve, learning feedback method, and quantum effect matter? (no)

These are just a few of such questions that can be asked and must in the end be answered to achieve AGI.