The Brain Information Flow Format

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We have formalized a format to describe connectomic information flow, consisting of circuits corresponding to neural circuits and connections between circuits. It is intended to describe specifications for brain-inspired artificial intelligence – the research and development of which we have been promoting.

Recent advances in computational cognitive neuroscience and machine learning have raised researchers' interest in brain-inspired AI. As human beings are the only available exemplars of general intelligence, reverse-engineering the human brain would be a viable way to create artificial general intelligence.

Meanwhile, to create brain-inspired AI in a biologically plausible way requires engineers to have knowledge in neuroscience. Since acquiring such knowledge demands a considerable amount of effort, it is desirable to present neuroscientific specifications in a form accessible to engineers. Thus, we have been preparing the description of the whole brain reference architecture (WBRA) and created a format for WBRA based on commonly used information flow diagrams. The brain information flow format is defined as a simple ontology, where a circuit has information on sub-circuits and annotations on functionality, taxons, references, and implementation, and a connection has information on input and output circuits and annotations. Circuits with the output cells being unique in the computational perspective are called uniform circuits. Uniform circuits and connections hold information on the neurotransmitter, modulation type, and (taxon-dependent) size.

The format is deployed on Semantic MediaWiki to describe brain parts. The data will be available in the OWL format as well.

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