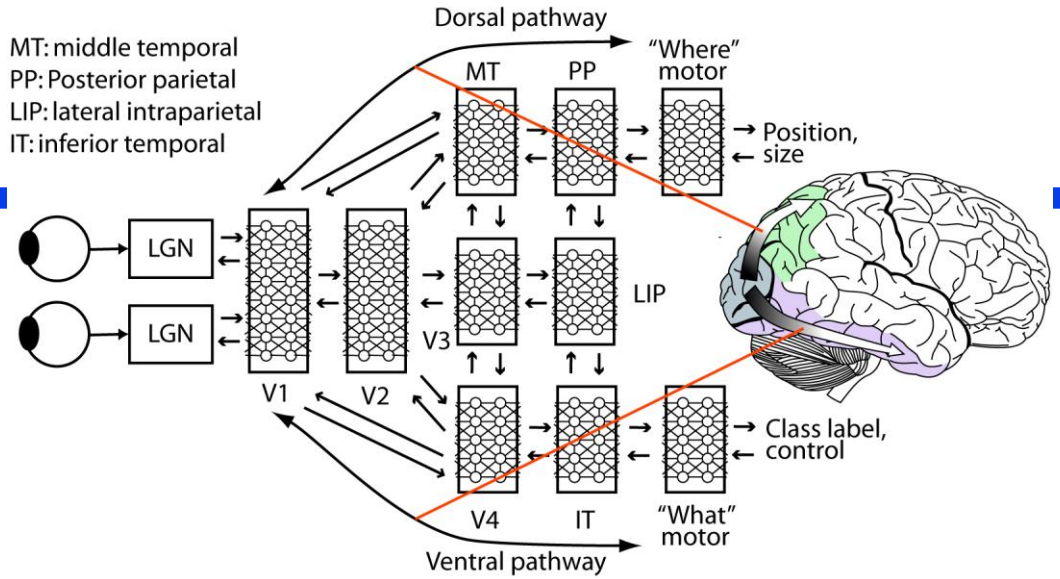

Spatiotemporal Where What Networks

Juyang (John) Weng

with lab. members

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Areas of Research Interest

- Brain- and psychologically inspired computer vision:
  - **~20 years of research**
  - **Cresceptron, SHOSLIF, HDR, SASE, MILN, WWN**
- **Problems addressed:**
  - **Vision: attention and recognition in complex and natural settings**
  - **Input: images, video, sound, text, range, multimodal**
  - **Output:**
    - **Object type, object location, object segmentation (extensive)**
    - **Video events (newer)**
    - **Text understanding (newer)**

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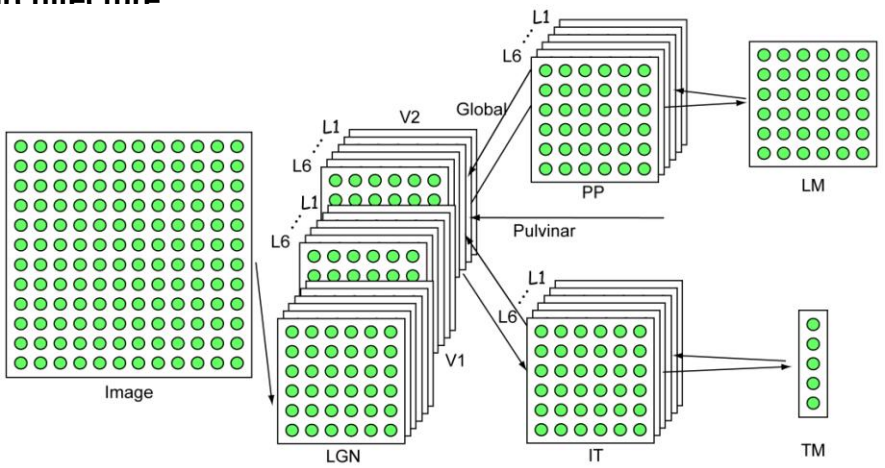
Unique Capabilities

- **WWN: an integrated solution to a wide variety of video processing problems for general settings**
- **Cortex inspired enabling technology:**
  - **Dually optimal neuronal layers:**
    - **Spatial optimality: minimum representation error given limited number of computing elements**
    - **Temporal optimality: best update scheme at every time *t*, given limited training experience**
  - **Spatial mechanisms:**
    - **Filter out background: Laminar cortical architecture**
    - **Find key objects: Top-down attention**
  - **Temporal mechanisms:**
    - **Detecting and recognizing events: temporal abstraction as temporal prior**



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Embodied Intelligence Laboratory

Seeking Specific Capabilities

- System integrators
- Language processing capabilities
- Other machine processing techniques

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