Deep Learning Architectures

- **Research Problem & Questions (you can also come up with your own)**
  Masters: What kind of new deep learning architectures can we create?
  - Design new libraries and proof of concepts experiments for allowing deep models to be used efficiently

- **Summary**
  - Deep learning architectures are in their infancy. We are at a point in time where we can try out new architectures which may have significant contributions to the machine learning research community

- **Advisors:**
  Dr. Michael Lew - mlew@liacs.nl
  Dr. Erwin Bakker

- **Background preferred (depends on the project):**
  - image processing, C, C++, Python, Caffe, TensorFlow

Salient Point Detectors

- **Research Problem & Questions (you can also come up with your own)**
  - Which pixels are the most important? How can we find the most consistent salient point locations and can we improve the results by training?

- **Summary**
  - Salient point detectors are necessary to many computer vision algorithms, but current approaches give low quality results. How can we make them more consistent over changes in viewpoint, rotation and scale?

- **Advisors:** Dr. Michael Lew (mlew@liacs.nl) and Dr. Erwin Bakker
- **Background Preferred: image processing, C, C++**

Learned Computer Vision Features

- **Research Problem & Questions (you can also come up with your own)**
  - Can we learn the optimal (or better) features and/or sampling patterns for computer vision problems?

- **Summary**
  - What are better or optimal features for challenges such as stereo vision, moving object detection, rotation, scale, etc? The human eye for example has a logarithmic sampling pattern – is this in some way optimal for stereo vision and other vision tasks?

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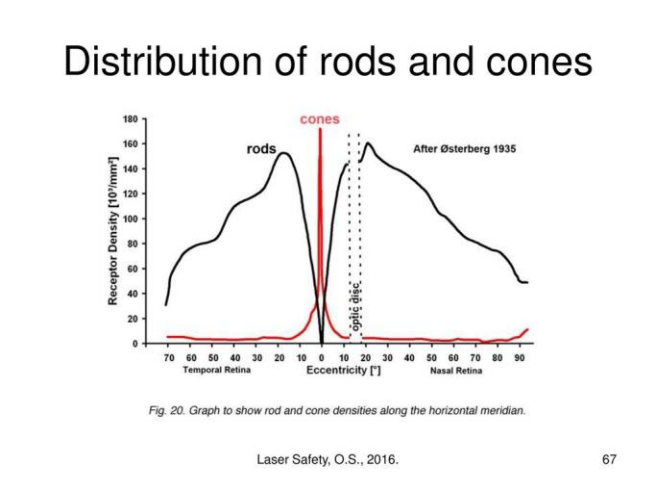
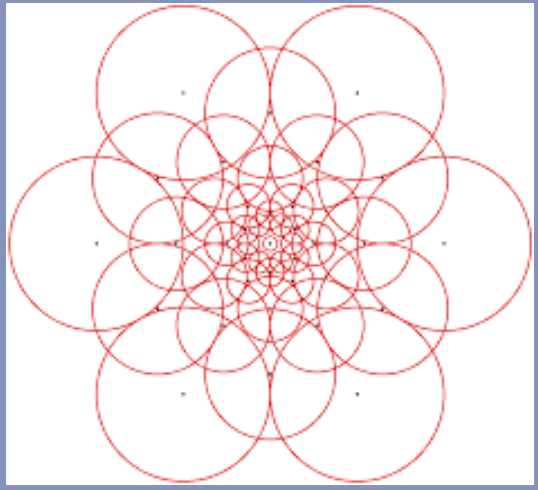
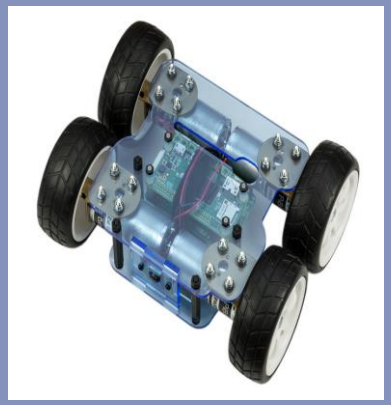




LIACS Media Lab: **Robotics Projects**



Compact Neural Networks

- Suitable for embedded hardware, e.g., NVIDIA Jetson Nano

Plastic Neural Networks

- Using neural plasticity on networks that keep on learning.

Or, … your robotics project?

Contact: Dr. E.M. Bakker

E-mail: erwin@liacs.nl

LUMC & LIACS Joint Projects

- **Research Problem & Questions (you can also come up with your own)**
  - Can we improve medical diagnosis, classification and understanding using modern machine learning approaches such as deep learning?

- **Challenges**
  - Machine learning from relatively small medical datasets?
  - Learning interactively with a medical expert as a guide?
  - …

- **Advisors:** Dr. Michael Lew (mlew@liacs.nl) and Dr. Marius Staring (LUMC)
- **Background Preferred: image processing, C, C++**