



# Perspectives from an industrial PhD student

Arvi Jonnarth

WASP ID day, Januray 2022



# Who am I?

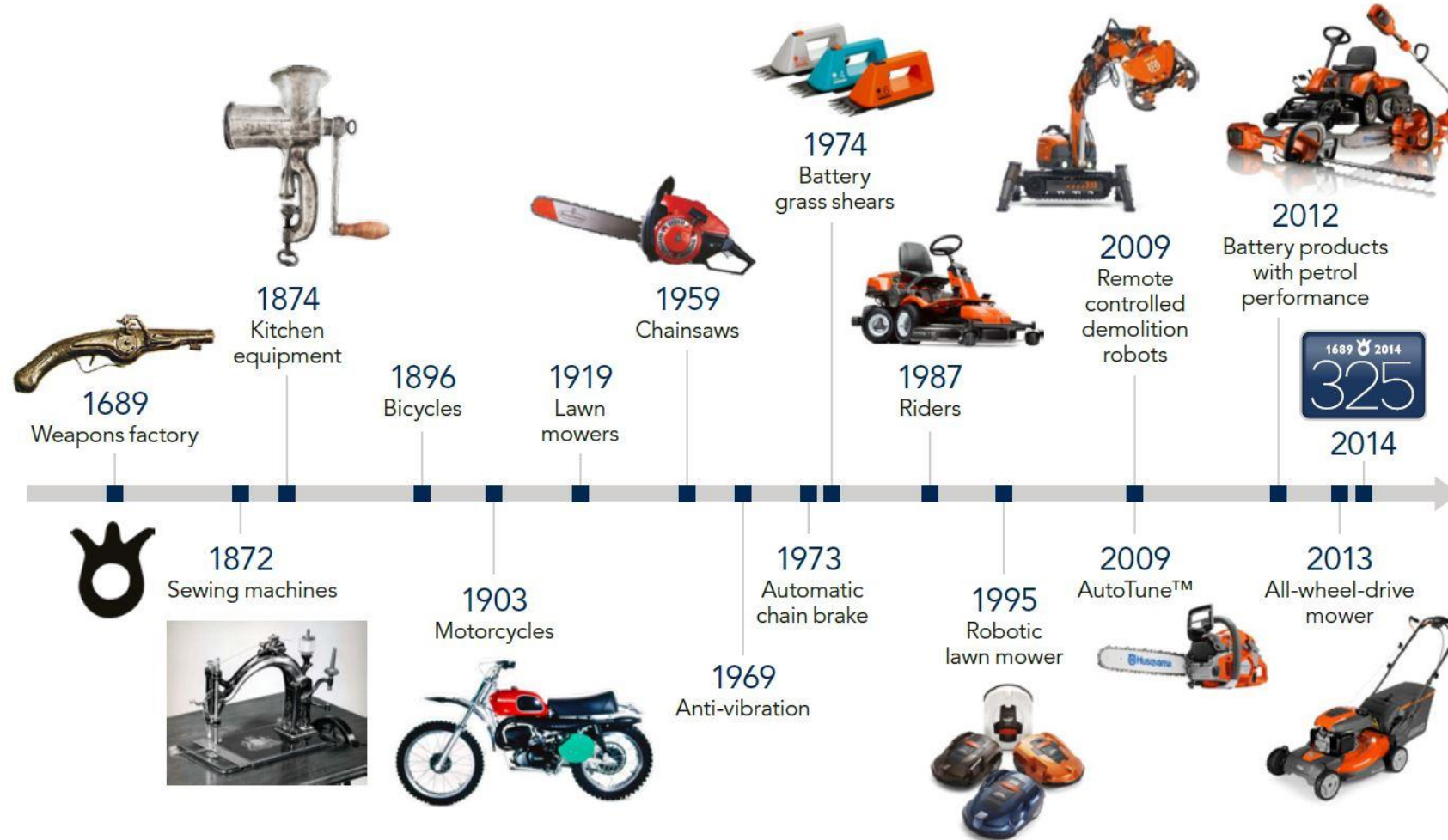
- Arvi Jonnarth
- WASP Industrial PhD student
- Linköping University
- Husqvarna
- Supervisors:
  - Michael Felsberg, LiU
  - Adam Tengblad, Husqvarna
- Research interests:
  - Computer vision
  - Reinforcement learning
  - Autonomous systems



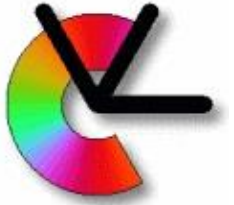
# My background



# Husqvarna



# Computer Vision Laboratory, LiU



## Topics within artificial visual systems:

- Computational imaging
- Detection, tracking and recognition
- Geometry
- Medical image analysis

## Graduated WASP PhDs from CVL:

- **Martin Danelljan** (affiliated):  
*Learning Visual Object Tracking*
- **Bertil Grelsson** (industrial PhD):  
*Vision-based Localization*
- **Gustav Häger** (academic PhD):  
*Visual Perception in Autonomous Systems*
- **Abdelrahman Eldesokey** (affiliated):  
*Uncertainty-aware CNNs*
- **Joakim Johnander** (industrial PhD):  
*Learning Segmentation in Videos*

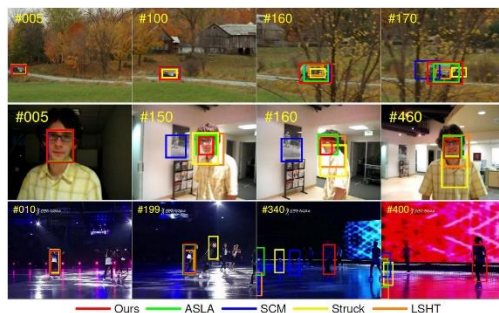


Image source: <https://liu.se/en/article/visuell-objektfoljning>

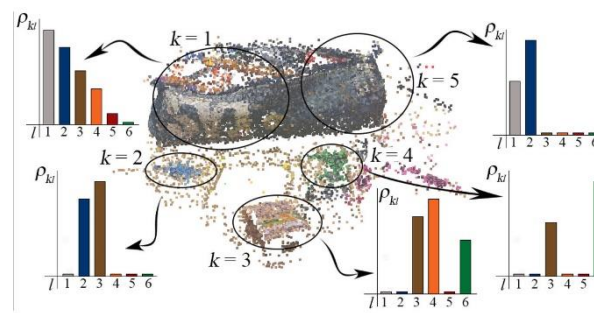


Image source: <https://liu.se/artikel/behandling-av-punktmoln>

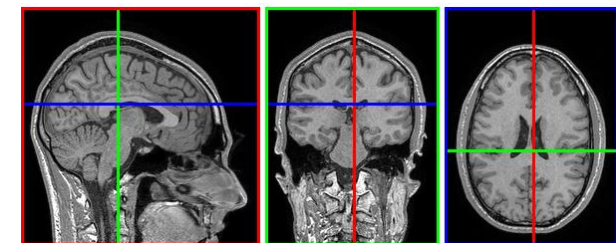
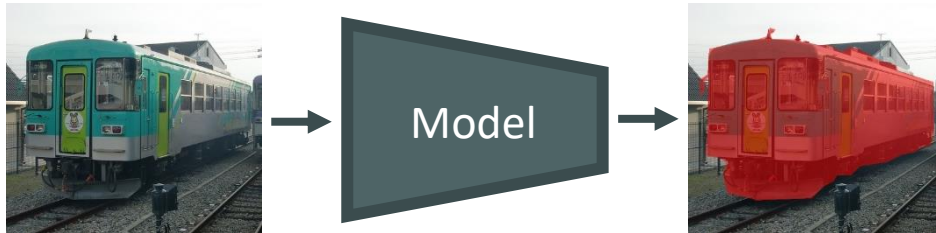


Image source: <https://www.cvl.isy.liu.se/>

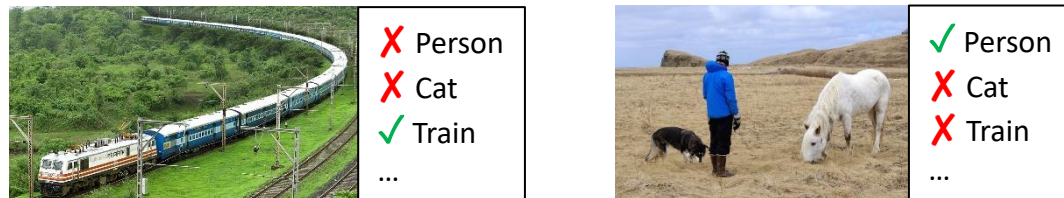
# Research

## Weakly-supervised semantic segmentation

Only image-level labels      Train on labeled data      Classify all pixels



Training data:





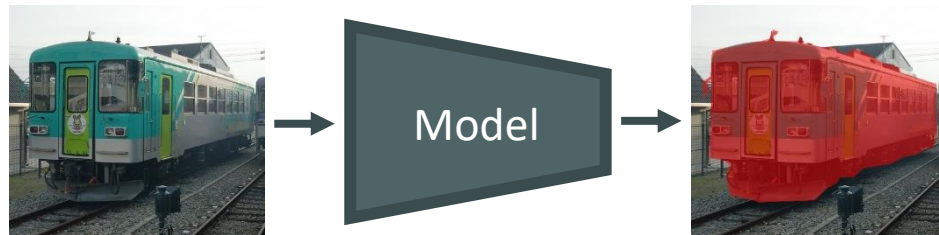
# Research

## Weakly-supervised semantic segmentation

Only  
image-level  
labels

Train on  
labeled  
data

Classify  
all pixels



Training data:



## Vision-based reinforcement learning for robot navigation



# Time and location



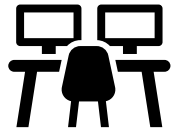
80% PhD studies, i.e. research, courses, conferences, seminars, etc.  
20% work for the company



50% at the university  
50% at the company  
(although mostly from home during the pandemic)



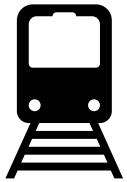
# Setup



Office both at university and company

Supervision meetings once a week

Both industry and academic supervisors



Live in Jönköping (close to Husqvarna)

Commute to Linköping

Hotel if multiple days

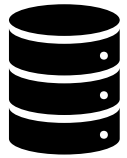
# Company work



Patent coordinator

Similarities with scientific research

Investigate & keep track of prior art



Development of data collection pipeline

Image data for object detection

Data annotation

# Reflections



## Bridge between industry and academia

- Company gets a good connection into the academic world
- Company can provide domain knowledge
- Company can provide platforms for experimentation



## Maximize knowledge transfer

- Technical seminars to present research results
- Research-relevant company work
- Company involvement in the studies



## PhD student perspective

- Good to have a connection to industry
- Two different perspectives
- Possibility to pursue own ideas



**Thank you for listening!**