

ELEC-E8120 SMART FORESTRY MACHINES (SP) Spring 2024(5 p)

- Nordic Cut-to-Lenght forest harvesting and Silviculture
- Positioning in forest
- Machine vision, LiDARs and SLAM in forest, creating map of trees (Forestrix-project);
- Machine vision based quality measurements (Metrix&MetrixPro);
- Automated silviculture of young forests (NeoSilvix),
- Augmented reality HMIs (COMBAT);
- Kinematic models of harvester and forwarder;
- Semiautonomous forwarder (Autologger), NMPC in the automatic driving in forests.

Course arrangements

- Lectures: Arto.Visala@aalto.fi on Mondays in the beginning (maybe also on Wednesday later) 12:15-12:00 TU4
 - Lectures cover the main content of the course.
 - The automatic driving in forest is illustrated in a small Polaris eATV-project, done individually.
 - Exam or 7 x Study Diaries 65 % and the report of the project above 35%.
 - Study Diary is a one A4 page summary about each lecture set, written by hand. Take a photo, convert it to pdf and sent arto.visala@aalto.fi.
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Field robotics; autonomous terrain vehicles, Data from ATV platforms used in projects



ELEC-E8120 - Smart forestry machines, Lectures 2024

1. Current CTL Forest Machines, Harvester + Forwarder;
2. Forest SLAM with LiDAR, Localization and Mapping;
3. Machine Vision in Forest SLAM;
4. Machine perception in the harvester head for basic and quality measurements
5. Semiautonomous cleaning of young forests, NeoSilvix;
6. Automatic control of the forestry crane or boom;
7. Automatic driving in terrain, semiautonomous forwarder, Autologger

Current CTL Forest Machines, Harvester + Forwarder

- The best way to learn the state of art current forest machines to look at www-pages of the leading companies. Videos illustrate the operation. Look particularly what is represented about control systems and harvesting information systems.
- Smart machines means semiautonomous operations in easy conditions and that the machines with modern perception devices are becoming producers of big data.

<https://www.ponsse.com/#/>

<https://www.deere.com/en/forestry-and-logging/cut-to-length-logging/>