

Computer vision and shapes recognition course SASSARI 2015

Teacher

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Abstract

This course focuses on the mechanism of shape and plants recognition for agriculture purposes. During it the teacher will discuss how to use digital technology for checking field plants density, plants diseases, weeds classification, animal protection etc. Teacher will present common methods for huge area of shapes recognition purposes, neural networks based solutions. During the second day workshop the students practically improve their gained skills. Teacher will lead them to develop (in Java and Encog or Neuroph) easy shape recognition application. Third day is scheduled as laboratory workshop and workshop for solving student individual problems. Students will try to use digital camera for weeds images collection. At the end of course the student will be able effectively use common IT technologies for shape recognition application.

Monday:

Introduction into the subject. Main theoretical part. It's really useful to have personal computer with Java SDK installed.

From – till	Subject	Description
9:30 – 11:30	Digital photography for agriculture purposes	<ul style="list-style-type: none">• Check field plants density• Check plants diseases :• Bacterial, viral, fungal, missing nutrients or water, more sun etc.• Check weeds inside plants field• Check baby weeds• Check animals at field:• Deer protection during mowing fields (big problem in Czech)• Baby weeds images collection• Animals image collection (thermovision, normal video stream and 3D models construction)<ul style="list-style-type: none">◦ Deer allocation via drone (one CCD Camcorder, Thermovision, J.Pavlicek, J. Bartoska & CULS team project - Deers)
11:30 – 12:30	Lunch	Ice breaking, discussion about fundamental problems
12:30 - 15:30	Data stream filtration	<ul style="list-style-type: none">• Convolution Matrix• Common filtration algorithms (Sobel, Canny, J. Pavlicek filters for automotive solutions)• Custom filters
15:30 – 16:00	Coffee brake	
16:00 – 18:00	Java tools	Neuroph: <ul style="list-style-type: none">• Easy application for shape recognition• Mobile application (Android studio) Encog: <ul style="list-style-type: none">• Introduction• Practical experiment
19: 00	SASSARI	Who takes me around Sassari (Italian only): <ul style="list-style-type: none">• Practical Italian language course for the teacher ☺

Tuesday:

Practical workshop. It's really useful to have personal computer with Java SDK installed.

From – till	Subject	Description
9:00 – 12:00	Workshop	Java image recognition example project (4 hours) <ul style="list-style-type: none">• Design of custom shape recognition methods<ul style="list-style-type: none">◦ Using maven and J. Pavlicek & P. Hanzlik library◦ Adding new functionalities here• pictures resampling<ul style="list-style-type: none">◦ Practical experiment• training set construction<ul style="list-style-type: none">◦ Practical experiment• teaching network<ul style="list-style-type: none">◦ On local machines or by using J. Pavlicek Ahtena server.
12:00 – 13:00	Lunch	Ice breaking, discussion about fundamental problems
13:00 - 16:00	Custom project	<ul style="list-style-type: none">• Custom project consultation• Test (10 queries)• Custom schedule for Wednesday
16:00 – 16:30	Coffee brake	To make schedule for evening
19: 00	SASSARI	Who takes me around Sassari (Italian only): <ul style="list-style-type: none">• Practical IT language course for the teacher ☺

Wednesday:

Laboratory. If you can, you take your digital camera. Teacher owns one and will be sharing it.

From – till	Subject	Description
10:00 – 12:00	Laboratory (in the nature)	Image collection by digital tools and current tools training: Using common digital (may be infrared too) camcorder, common tablet using Collection of pictures with nature light, flash Mud polluted weeds or other weeds leaves damage problems
12:00 – 13:00	Lunch	Ice breaking, discussion about fundamental problems
13:00 - 16:00	Custom project	<ul style="list-style-type: none">• Custom solutions for volunteers
19: 00	SASSARI	Who takes me around Sassari (Italian only): <ul style="list-style-type: none">• Practical IT language course for the teacher ©

Thursday and Friday

Time for individual problem solving. The teacher is available for students, who need individual help in shape recognition area.