Automation Lab project task in cooperation with AIS ultrasonic project

Sending ultrasonic waves towards an object and recognizing this object by the reflected wave is a solvable task in many situations. Your basic assignment will be to apply machine learning (ML) to the measurement data in order to perform the recognition task.

According to your project task in AIS you may choose one of the following projects:

- Object recognition using recurrent neural network (RNN)
- Object recognition using long short-term memory (LSTM).

Your project task in Automation Lab will be
1) to predefine objects to be recognized (depending on your individual AIS project),
2) to research into RNN or LSTM,
3) to decide for a specific RNN or LSTM as a basis for your technical solution (and to discuss your decision with your supervisor),
4) to write a software which is making use of the chosen RNN or LSTM in order to solve your object recognition problem,
5) to run experiments and report the results,
6) to discuss the results with respect to accuracy and precision,
7) to write a report using the given WORD-template. Use the title of the task as paper title.

Creating a stable system has the highest priority. It is more important to have a constantly running system recognizing (or detecting) one object than having a system recognizing many objects but showing malfunctions.

The problem has to be solved either using MATLAB, Python, C, C++, C# or LabView.

You must submit a printed report of your work containing a detailed description of your solution according to the steps 1 to 6 to the examination office of the faculty (building #1, room #212) by March 31, 2020. No maximum size given. Upload the source code files, the report file (Word-file) and the all the training data files on Moodle.

The presentations will be in conjunction with AIS. Every participant has to prepare a Power-Point presentation. Upload your Power Point presentation on Moodle before the presentation date.

Processing hints
You may work on the project individually or in a team. The maximum number of participants in a work team are two persons. One report per team.
Provide all necessary technical information needed to rebuild the solution. Please note that even if the technical task solved to 100%, the individual grade could be "5" (NOT passed) in case of a poor report. Use the given WORD-template. Submit the report in a loose-leaf binder with translucent front cover.

Deadlines
1. Report submission - 31 March 2020 during the opening hours of the examination office.
2. Upload of the source code, the report and all data files by 31 March 2020, 23:55.

I wish you success!
 A. Pech