

Lab Assessment - Intelligent Robotics Lab

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The Intelligent Robotics course has a substantial practical component. This component of the course is aimed at familiarising you with a number of important *general* skills in addition to building robots.

1 Skills

The set of general scientific skills that it is hope you will build include:

- A practical understanding of commonly employed scientific methods and their application to engineering science.
- Scientific record keeping, including keeping a clear lab book.
- Some commonly used statistical analysis techniques and their applicability.
- Working in a team, including task allocation and division of labour.

Although computer science is a scientific degree, these skills, common to most scientific disciplines, are seldom taught to the computer science student within a computer science course. As such, this course is an opportunity for you to get a broader understanding of engineering science in general.

2 Help

The laboratory demonstrator will be on hand during lab sessions on a drop-in basis to assist in technical issues, such as advice on projects, equipment use, missing or faulty equipment, and so forth, as well as questions regarding experimentation, analysis, and record-keeping.

Drop in sessions are:

- Tuesdays 2pm – 4pm
- Thursdays 3pm – 5pm

It is expected that at least one member of each team will attend at least one lab session during the week so that the lab demonstrator may assess the teams progress and offer advice accordingly.

Bertram Dandy, working as electronic technician, will sometimes be able to help students outside of demonstration times with semi-urgent matters. He can be found in his lab/office across from the student robot lab.

Sufficient documentation on the hardware and software that you will need to build your robots can be found at <http://www.cs.bham.ac.uk/resources/courses/robotics/docs/> and at <http://www.cs.bham.ac.uk/resources/courses/robotics/kit/>

3 Lab-based Assessment

In order to structure the lab sessions, the lab demonstrator will be looking at each team's work each week during the term. This will not contribute directly to the final mark - the aim is to help each team produce a good quality of experiments and writeups. This will be particularly helpful with the assessed final project. For information about the final project an assessment, see <http://www.cs.bham.ac.uk/resources/courses/robotics/assessment/> or the project handout.

Each week the demonstrator will want to see your team's labbook. The demonstrator will give a mark for any experiments conducted. Additionally, by the end of the term it is expected that you will have conducted at least one experiment from each of the following categories:

- An experiment testing a hypothesis.
- An experiment comparing the performance of two components or designs.
- An experimental analysis involving a t-test.
- An experimental analysis involving a check for either:
 - Whether two designs or components behave identically.
 - Whether one design or component fits an expected pattern of behaviour.
- An experimental analysis involving a χ -square (chi-square) test.
- An experiment measuring the sensitivity and specificity of a sensor.
- An experimental analysis involving a ROC analysis.

These categories are not all mutually exclusive and two or more usually will be present in a single experiment. Indeed, most statistical methods are designed specifically for certain kinds of experimental setups.

The demonstrator will also check that your team is functioning well and working together as a team, and will discuss with you your proposed projects and/or designs.

Note that before you start work on your assessed project it is suggested that you try building an exploring robot, a robot that makes use of the camera, and a robot that makes use of scanning sonar, so that you are somewhat familiar with the limitations of the equipment before you attempt the project. See <http://www.cs.bham.ac.uk/resources/courses/robotics/exercises/> for more information about the proposed lab exercises.