**GLASGOW COLLEGE, UESTC**
**Final year individual**
**PROJECT RISK ASSESSMENT**

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| **Student Name:** | Bingyi Liu |
| **Student UoG & UESTC IDs:** | 2839982L<br>2022190904030 |
| **Project Title:** | Design and Implementation of Road Crack Detection System Based on YOLO Network Model |
| **Supervisor (1st) Name:** | Yulin Wang |

The supervisor should think ahead and set out a work plan for the student. All potential hazards should be identified and necessary control measures made clear to the student. This risk assessment must be signed by the supervisor and the student, before work begins.

**WORK ACTIVITY**

***Please provide a description of the project plan:***

Develop an offline road crack detection system on a laptop equipped with a Ryzen 9 5900HX and RTX 3080. Primarily use public datasets (e.g., CFD, CRACK500, SDNET2018, SUT-Crack), and construct a small local validation set (approximately 100–300 images). Train and compare YOLOv8 and YOLOv11 models, incorporating a lightweight attention mechanism; export models to ONNX and TensorRT formats; implement a graphical user interface using Qt, supporting offline inference on images, folders, and videos. If a small amount of self-collected data is required, only capture images in safe areas (e.g., sidewalks and parking lots), strictly avoiding traffic lanes.

**HAZARDS**

***Please identify ALL significant hazards associated with the project e.g. electrical, chemical, biological, mechanical etc. (use separate sheet if necessary):***

**Hazards:** When collecting data near roads (such as self-collected data), there may be risks such as oncoming traffic, slips/trips, inclement weather, and low lighting.

**Control Measures:** Only film on sidewalks or enclosed areas; do not work in open lanes; wear a high-visibility reflective vest; strictly obey traffic laws; work only during daylight hours; avoid working in inclement weather such as rain or lightning; arrange for a companion to serve as an observer when necessary; and do not enter the lane for filming.

**Hazards:** Electrical equipment and heat risks: Laptops, power adapters, USB cameras, external hard drives, and other devices; prolonged GPU training may cause heat buildup.

**Control Measures:** Use standard power supplies and cables and inspect them regularly; maintain unobstructed heat dissipation channels; place the device on a hard, flat surface; keep away from liquids; use a surge-protected outlet; monitor device temperature and schedule appropriate breaks during extended training sessions.

**Hazards:** Prolonged sitting and eye fatigue (ergonomic issues).

**Control Measures:** Adjust desk and chair height and monitor eye level; follow the 20-20-20 rule (look 20 feet away for at least 20 seconds every 20 minutes); schedule short breaks; use a wrist rest when necessary.

**Hazards:** Data Privacy and Compliance: Self-collected footage may accidentally contain identifiable information such as faces and license plates.

**Control Measures:** Prioritize the use of public datasets; minimize the acquisition of identifiable information when collecting data; if unavoidable, automatically blur faces and license plates before storing data; store data locally with restricted access permission; do not share raw data containing personally identifiable information.

**Hazards:** Cybersecurity and Data Integrity: Potential risk of malware or data corruption when downloading code, models, and datasets.

**Control Measures:** Download files only from trusted sources; verify file hashes; keep operating systems and antivirus software up to date; use version control tools (such as Git/DVC); and regularly perform encrypted backups to external hard drives.

**Hazards:** Moving equipment during short outings.

**Control Measures:** Use a backpack or equipment box for carrying; avoid overloading; follow the correct carrying posture; plan the route reasonably to reduce the distance and time of carrying the load.

**TRAINING**

***Will the student receive relevant safety training?*** ☑ ***Yes*** ☐ ***No***

***Details of Training:***

School/college-level safety training (DSE/ergonomics, electrical safety).

Basic roadside safety precautions before outsourcing.

Data protection and anonymization practices (face/license plate redaction).

Safe use of build tools such as Qt/ONNX/TensorRT in lab/office environments.

***Who will provide Training:*** *The first instructor (Yulin Wang) and college/school safety resources, assisted by laboratory technicians when necessary.*

***Is the training adequate to control all hazards that have been identified?*** ☑ ***Yes*** ☐ ***No***

**COSHH**

***Will the COSHH regulations apply?*** ☐ ***Yes*** ☑ ***No***

***If Yes, please detail all COSHH assessments the student is required to read:***

**SUPERVISION**

***Will the student be supervised at all times?***

***If Yes, please name people who will provide supervision:*** ☑ ***Yes*** ☐ ***No***

Regular check-ins (weekly/fortnightly) by the first tutor, Yulin Wang, who also provides ad hoc support via email or meetings.

**CONCLUSION**

***Are you satisfied that risks are adequately controlled?*** ☑ ***Yes*** ☐ ***No***

***If No, what further measures will be taken to reduce risk to an acceptable level?***

***(e.g. written scheme of work, physical controls, engineered solutions etc.)***

**Ethical Gateway Questions** (Please answer the following questions.)

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| Does the study involve vulnerable participants or those unable to give informed consent?<br>*(e.g. children, people with learning disabilities, your own students)* | Yes ☐ No ☒ |
| Does the study require permission of a gatekeeper for access to participants?<br>*(e.g. schools, self-help groups, residential homes, hospitals)* | Yes ☐ No ☒ |
| Is it necessary for participants to be involved without consent?<br>*(e.g. covert observation in non-public places)* | Yes ☐ No ☒ |
| Does the study involve sensitive topics?<br>*(e.g. obtaining information about sexual activity, substance abuse)* | Yes ☐ No ☒ |
| Is blood, tissue samples or any other substances be taken from participants?<br>*(e.g. blood, urine, stools, skin)* | Yes ☐ No ☒ |
| Does the study involve intrusive interventions?<br>*(e.g. The administration of drugs, hypnosis, physical exercise)* | Yes ☐ No ☒ |
| Are financial or other inducements be offered to participants?<br>*(With the exception reasonable expenses or small tokens of appreciation)* | Yes ☐ No ☒ |
| Does the study investigate any aspect of illegal activity?<br>*(e.g. drugs, crime, underage alcohol consumption or sexual activity)* | Yes ☐ No ☒ |
| Will work reveal personally attributable confidential information (written, audio or video), or cause undue distress, degrade personal dignity, or infringe human rights?<br>*(eg. Show characteristics of someone's personality, cause distressful emotions, participant will need to be stressed beyond what is considered normal for them, contacting people under threatening circumstances)* | Yes ☐ No ☒ |
| Does the work involve, environmental issues?<br>*(e.g. Relates to real life environmental judgements, such as climate change, species and habitat loss, and pollution.)* | Yes ☐ No ☒ |
| Will the work present ethical problems for tutors, or the university, or participating companies or organisations?<br>*(eg Will the work infringe intellectual property rights.)* | Yes ☐ No ☒ |
| Are (non-human) animals involved with the work?<br>*(e.g. Might the work inflict physical or psychological cruelty, pain, disfigurement or unnecessary restraint)* | Yes ☐ No ☒ |

*If the answer to any of the ethical gateway questions above is "Yes", or if there are any other significant ethical issues, then further ethical consideration is required.*

***In any proposal involving human participants clear explanation of how informed consent will be obtained, how confidentiality will be observed, how the nature of research and the means of dissemination of the outcomes will be communicated to the participants must be provided.***

*Summarise below the ethical issues involved in the proposal and how these will be addressed.*

***Summary of Ethical Issues***

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| *This project does not recruit any human participants and relies primarily on publicly available, non-identifiable datasets. Where limited self-collection is performed, every effort will be made to avoid the collection of identifiable information. If this is unavoidable, automated anonymization (e.g., blurring faces or license plates) will be performed before storage or analysis. The project does not involve biological, chemical, or clinical procedures. Data will be stored locally, with restricted access, for academic research and teaching demonstrations only.* |

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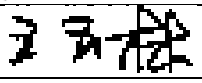
| Signed (student): Bingyi Lin | Date: 2025.10.28 |
| Signed (1st Supervisor):  | Date: 2025.10.28 |