A Problem Statement

The submitted work is a paper on the potential or actual applications within the concept of intelligent transportation system of using one or more of the following techniques **only**:

- Rule-based systems (including logic);
- Clustering;
- Search algorithms;
- Finite-State-Machine (FSM)
- AI and the Internet (using either microdata, semantic technologies or processing social media intelligently)

A.1 Software: As part the work, you are expected to develop a **small** piece of software that links the concept of, or aspects of, intelligent transportation system and one or more techniques stated above. Your focus is not on transportation, but what how the specified techniques can be used. It is also not reallyabout great programming but more about you coming up with a solution to a problem using AI techniques and producing a good justification.

The full code will not be handed in for the assignment, but extracts of code can be used within the report to highlight important points. No demonstration will be required as standard, but the tutor reserves the right to see a demonstration of the solution if they need to for marking purposes.

You are allowed to use the code you have found as long as it is clearly referenced inside the text and it does not belong to another student.

A.2 Illustrative Examples: The following examples can be used, but are provided here mainly to illustrate potential areas, other ideas are welcomed.

- A routing algorithm using search techniques (e.g. BFS, DFS or A*) and the road junctions as nodes in a graph. Could include a comparison of different techniques.
- If historic data was produced (you can make it up yourself) with co-ordinates of accidents (can just be considered as co-ordinates on a graph).
    - Could clustering techniques be used?
    - Could a very simple rule-based system in prolog be used to predict likely places for accidents?

B Report

B.1 Basic Requirement

- One or more of the techniques specified, used within an aspect of intelligent system is discussed;
- Only a brief focused discussion of intelligent transportation is need;
- Discussion of intelligent transportation system and AI in combination is discussed;

- Solution – Matches section A.1. Please note the actual software build, on its own, only accounts for approx. 20% of the marks; analysis of the results, comparisons between techniques is where more of the marks are available.
- Conclusions discuss the advantages and disadvantages of these techniques based on the evidence.
- Satisfactory summary of appropriate literature is produced.
- **Harvard referencing.**
- The headings specified in C are used

B.2 Advanced
See marking guide for further advice.

The assignment should ONLY be submitted through the appropriate TurnItIn link for this assignment on NILE. Please do not submit the assignment to the Student Assessment Office and do not try to submit code files they are not required for this assignment.

C Report
Your report is expected to include the following (please use the headings Introduction, Background, Solution, Conclusions; References)

- Approximately 2000 words – this total does not include code, tables, reference list and figures.
- Introduction
  - Introduction to the problem and the report with any necessary references.
- Background
  - An explanation of any theory, background research and references that are need for the reader to understand the problem
  - Relevant background on Intelligent Transport Systems and AI to your problem with any necessary references.
  - Introduction and Background could be combined into one section if you feel it is appropriate.
- Solution
  - The software is a requirement and should be used to demonstrate your argument. Therefore, the testing included should clearly support your argument as well.
  - Reference any sources
  - Show testing of the system relevant to your argument – so testing it to show its relevance to the topic and any comparisons you can justifiably make.
- Conclusions
  - A summary of what **you have** found from both literature and any experimentation you may have done
  - A set of conclusions (justified by literature and experimental evidence) that you drew from the work and should include **your opinion**, ideally with the necessary supporting evidence:
- References.
  - Remember Harvard Referencing only (see the Potentially Useful Starting Point section on the next page for example of referencing)

- Any sources including those for code, images and references sources used must be referenced.

Deliverable 2: Orginiality Report
An originality report from TURNITIN – by submitting it to TURNITIN through the link this will be done automatically.

Potentially Useful Starting Point.
The Computing team within the University of Northampton has being working on developing systems are can be part of or can contribute to an Intelligent Transport System). Vehicle to Vehicle Networking (Al-Khalil et al, 2013), which has the potential to be used within an Intelligent Transport System (ITS) to pass information around the networking of traffic problems. Al-Dabbagh et al (2018) suggested a novel routing approach to reduce the median level of congestion on the road; the focus in this was on reducing the level of the congestion on the roads by providing different routes to the same destination.

Reference

Al-Dabbagh MSM, Al-Sherbaz A, Turner S (2018) The Impact of Road Intersection Topology on Traffic Congestion in Urban Cities Proceedings of SAI Intelligent ssyems Conference pp. 1196-1207

Al-Khalil AB, Al-Sherbaz A, Turner S (2013) Enhancing the Physical Layer in V2V Communication Using OFDM–MIMO Techniques 14th Annual Postgraduate Symposium on the Convergence of Telecommunications, Networking and Broadcasting Vol 1, pg 10.

Note 1: Please see and use the marking scheme on the next page for further guidance. It is there to help you with the assignment and provide self-feedback.

Note 2: This is an artificial intelligence assignment and not primarily about intelligent transportation systems or about programming.

	A to A+	A-	B	C	D	F+	<F+
Critically appreciate the theoretical background to the enable the development of intelligent systems. (Introduction and Background) 20%	**As in A- but level of understanding shown is of an excellent level in both sections.**	**As in B but the level of understanding shown is at a very high level.**	**As in C but majority of the materials use to support this are taken from journals. Appropriate level of criticality**	**Sound understanding of the theoretical basis. Shown in the Background.**	**Basic understand of the theoretical background shown in the discussion in the Background Limited critically.**	**Solution does not meet criteria for D.**	
Critically articulate the **difference** between these various artificial intelligence methods. (Background and potentially Solution) 20%	**As in A- but also some evidence of original insights are supported insights.**	**As in B strong evidence of insights in this area being drawn and supported by appropriate reference sources and experimental evidence.**	**As in C. Some evidence of insights being drawn and supported by appropriate reference sources and experimental evidence.** **Majority of the materials use to support this**	**Good level of articulation basic differences between at least two artificial intelligence methods in-line with the assignment brief.** **Reader should be left with**	**Can articulate basic differences between at least two artificial intelligence methods in-line with the assignment brief.**	**D- but not some of the techniques are not inline with the assignment brief.**	**Unsatisfactory attempt.**

			are taken from journals.	**the impression that the you have a good or better understanding of the various options.**			
Critically evaluate a variety of methods for developing intelligent systems. (Background) 20%	**As in A- but the clarity and explanation of all aspects are at an exceptional level.**	**As in B but it should be clear from the background why the particular solution will be investigated.**	**As in C but to a high level. Some indication from the background why the particular solution will be investigated.**	**Basic report requirements met. To a satisfactory level.**	**As in C but limited in one aspects.**	**As in D but more than one aspects.**	**Unsatisfactory**
Critically appraise, to a satisfactory level (conclusions) 20%	**As A- but the discussion shows strong linkages to what is the report already in particular the background and the solution.**	**As B with excellent level of criticality**	**As C well supported arguments using referencing appropriately. Also Makes some reference to what literature or**	**Satisfactory level of critical appraisal of various methods and their advantages and disadvantages to a particular application.**	**Basic level acceptable for a Level 6 assignment of various methods and their advantages and disadvantages to a particular application.**	**Limited critical consideration or content does meet the requirements appropriately.**	**Unsatisfactory**

			experiment show. **AND** **Some insights in how blockchain and AI in general have advantages and disadvantages**	**Also** **Makes some reference to what literature or experiment show.** **OR** **Some insights in how blockchain and AI in general have advantages and disadvantages.**			
Develop a range of typical complex applications using artificial intelligence	**As A- but with the solutions are a B or above and excellent level of testing**	**As B with more than one solution to at least C with a high standard of testing. High level of**	**As C but with a more than basic solution in terms of its functionality. As examples (i) building two small**	**Meets the requirements for the basic solution but with some minor improvements.**	**Basic Solution produced**	**Slightly below the basic solution.**	**Unsatisfactory solution.**

methods. Demonstrate the application of programming skills to complex situations (Solution) 20%		**insights drawn and described in the written description of the solution**	**systems to compare approaches; (ii) Combining more than one technique.** **Appropriate level of insights drawn and described in the written description of the solution including the testing.**	**Good standard of testing**			