**Navigation table for** c**ourse-text and lecture slides:** Artificial Intelligence (A Guide to Intelligent Systems) Negnevitsky, 3rd edition

General theme Hybrid Intelligent Systems: perceptron etc. data analysis. TSP. GA PSO comparison hybrid solutions, hybrid options, hybrid comparisons

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| --- | --- | --- | --- | --- | --- |
| **Lec07**  **(3 weeks)** | Perceptron | Linearly separable | MLP: prep for case study 4 | Hopfield | BAM |
| **Lec08** | Hebbian learning | Competitive (partial prep for case study 6, in your own time if u wish ) | Kohonen (prep for case study 7) |  |  |
| **Lec09**  **(2 weeks)** | GA1 | GA2:prep for case study 8 |  |  |  |
| **Lec10** | Evolution strategies | Genetic Programming |  |  |  |
| **Lec11** | Comparisons | Fuzzy Expert Systems | Neural Networks | Genetic algorithms |  |
| **Lec12** | Evolutionary neural networks | Multiple fuzzy rule tables | (off syllabus C++ NEAT) |  |  |
| **Lec13** | Case study 2  Expert systems (revision) | Case study 3  Decision-support fuzzy systems (revision) |  |  |  |
| **Lec14**  **(3 weeks)** | Case Study 4  Neural net for OCR etc. | (off syllabus C++ alternative) | Case Study 6 Iris Data  Comparing two types of NNs  Supervised/unsupervised learning | Wisconsin data | Case Study 7 Bad banks (not used) |
| **Lec15**  **(3 weeks)** | Case Study 8  TSP – GA ACO SA  (and off syllabus C++ comparisons) | Modify and extend case study 8 | PSO – TSP | (off syllabus, Flocking) | Case Study 9  Neuro-fuzzy decision support systems (prep for exam maybe?) |

**Practical and wiki work** (in the table below, **bold** denotes contributing work)

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| --- | --- | --- | --- | --- | --- | --- |
| Matlab notebooks etc. | Individual exercise Prac Type of exercise  No. | | | Abbreviated wiki question/topic Wiki | |  |
| Introduction to Matlab | Register @ Mathworks | - | Interactive tutorial | Compare Matlab, C++ etc. | (26) | 1 |
| **Perceptron\_XOR** (p.170) | Run; Does it solve XOR? | **1** | Self-directed exercise | **Modify to solve XOR** | **27** | 2 |
| **Perceptron\_XOR\_your\_initials** | Run; Modified to solve XOR3 | **2** | Self-directed exercise | (Is pre-processing still XOR?) |  |  |
| **XOR\_bp** (p.175) | Run; Does it solve XOR? | **3** | Self-directed exercise | **Improve performance** (p.185) | **28** | 3 |
| **GA\_1** (p.222) | Whilst not corrupting the program adjust the genetic operators such that it will not find a solution. | **4** | Self-directed exercise | **Is GA\_1 a sensible application?** | **29** | 4 |
| **GA\_2** (p.227) | Run several times to assess performance; insert “rand('seed',666666);” alter parameters so GA succeeds. | **5** | Self-directed exercise | **Create guidelines configuring the GA for the best.** | **30** | 5 |
| fuzzy\_mortgage (p.318) | Run, explain to others | - | Self-directed exercise | (Is this useful revision of term1?) | (31) | 6 |
| **digit\_recognition** (p.323) | Run | **6** | **Case study 4** | **Is noise a bad thing?** | **32** | 7 |
| Iris\_bp & **Iris\_compet** (p.332) | Run programs, submit 1st | **7** | **Case study 6** | **Compare performances** | **33** | 8 |
| Book1 and IFCS04r | Open files. | - | Case study 6b | Wisconsin data. Final 2 columns duplicates of 6 and 10 but with original missing values. **How were they replaced?** | **34** | 9 |
| **Iris\_bpIrisModifiedForWisconsin** | Run | **8** | Case study 6b | A hacked version of Iris\_bp to process the Wisconsin data. (Does it work?) |  |  |
| **GA\_TSP\_20** (p.344) | Run | **9** | **Case study 8** | **Is it a good solution?** | **35** | 10 |
| TSP 64 | Run executable | - | Case study 8 | (Run executable ‘TSP 64’, experiment with parameters, what can you conclude?) |  |  |
| GA\_TSP\_100\_100 | Run | - | Case study 8b | (Identify mutation parameter) |  |  |
| GA\_TSP\_OneCircshift | Run | - | Case study 8b | (Identify mutation parameter) |  |  |
| GA\_TSP\_TwoCircshift | Run | - | Case study 8b | (Identify mutation parameter) |  |  |
| GA\_TSP\_TwoCircshiftFlip | Run | - | Case study 8b | **Identify mutation parameter** | **36** | 11 |
| GA\_TSP\_TwoCircshiftFlipTourn | Run | - | Case study 8b | (Identify selection) |  |  |
| GA\_TSP\_TwoCircshiftTourn | Run | - | Case study 8b | (Do any of the ‘GA\_TSP\_100 series’ perform better? Plan a research strategy to find the shortest route.) |  |  |
| **ant\_system\_tsp** Qatar | Run | **10** | Case study 8c | command window type>> ant\_system\_tsp(@Qatar, 5000); |  |  |
| ant\_system\_tsp Qatar100 fake | Run | - | Case study 8d | command window type>> ant\_system\_tsp(@Qatar100a, 5000);  **For TSP how does GA and ACO compare?** | **37** | 12 |
| Steering 64 | Run executable | - | Self-directed exercise (off syllabus) | (Adjust separation, alignment and cohesion weightings to modify the simulation of flocking behaviour.) |  |  |
| (SPECT\_1 & SPECT\_2 | Run | - | Self-directed exercise | (prep for exam question?) |  |  |

OpenOverallLecsV4