

OPPONENT RECORD

Thesis compiled by:

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Title of thesis:

Extending Reynolds' flocking model to a simulation of sheep in the presence of a predator

Opponent:

Christoffer Wiss

Was it easy to understand the underlying purpose of the project? Comments.

The underlying purpose was easy to understand. The purpose is mentioned in the introduction of the report and is then explained in more detail in its own section.

Do you consider that the report title justly reflects the contents of the report?

The title of the report justly reflects the contents. The report describes an attempt to implement modifications to Reynolds' flocking model so that it can simulate sheep's response to a predator in a 2D environment, which can clearly, with the exception of it being in 2D, be deduced from the title.

How did the authors describe the project background? Was there an introduction and general survey of this area?

An introduction to the area of simulating flocks was given, with a focus on Reynolds' model. There was also a section given to the animal behaviour, with a focus on sheep. The descriptions in these parts were well done, short and to the point.

To what degree did the authors justify their approach of tackling the problem?

The approach that the authors used to see if they could implement a simulator, which used a modification of Reynolds' rule, was adequate given that their the problem was largely based on the premise of modifying Reynolds' model and see if it worked well with regard to a 2D based environment, predator and sheep.

Did the authors discuss the extent to which the prerequisites for the application of such an approach are fulfilled?

The authors spent a considerably amount of time to summarize the prerequisites in the approach section. Later on in the discussion section an amount was dedicated to see if they managed to fulfil these prerequisites and to what extent.

Is the approach adequately described?

The approach is adequately described with the exception of minor details such as forgetting to explain a few variables in the formulas and how the predator was implemented in the simulator.

Have the authors set out their results clearly and concisely?

The authors have set out their results clearly and concisely by describing the test scenario in each subsection's title, followed by a figure from the test and thereafter provide an introductory sentence, which summarizes the results, followed by more details of the results in the following sentences.

Do you consider the authors' conclusions to be credible?

The authors' conclusions are credible and based on earlier discussion section, where the results were analysed and compared against studies on the subject. The conclusions are also stated in a scientific and delicate manner, which ensures that no bold statements are made.

What is your opinion of the bibliography? What types of literature are included? Do you feel they are relevant?

An extensive bibliography is given, a large part of it consist of books and scientific journals which increases the credibility of the project. The sources are in, for the project, relevant areas such as computer graphics, animal behaviour and numerical simulation.

Which sections of the report were difficult to understand?

The model section of the approach, which describes the math behind the different simulation rules that are used, took some time to decipher and understand. It was first after having read through the whole report that the meaning of all the rules was understood. It is worth mentioning though that the model section, while a bit hard to understand, is well structured and overseeable which makes it plausible, given time, to understand and perhaps implement the model.

Other comments on the report and its structure.

Well written abstract which summarizes the report in a good manner. Good use of images in the results part. Well done structure of the report, relevant terms are provided in the background and introduction so that the reader is familiar with them when encountering them later on.

What are the stronger features of the work/report?

One of the strongest features with the report is its accessibility. It is also well written while still managing to stay interesting.

What are the weaker features of the work/report?

As mentioned above, the model description in the approach section can be a bit hard to understand at first. A few parts of the text, such as the meaning behind the second set of multipliers, suffer from being mentioned early on but not being fully explained until several sections later.

What is your estimation of the news value of the work?

It is hard to deduce from the report how many people that have previously managed to do these kinds of modifications to Reynolds' model. The report shows that it is possible though to modify Reynolds' rule with good results. It also emphasizes the possible application areas and that these kinds of simulations will be increasingly important in the future as more data is created and thus needs to be understood and visualized. In the light of this aspect the work can certainly be estimated to have a high news value.

Summarize the work in a few lines.

A well written report of the work to implement modifications to Reynolds' model. The sections are clearly labelled, have a good introductory sentence and are usually easy to follow. It is apparent that the authors have spent a considerable amount of time to make their work as accessible to others as possible, something that should be applauded. It is also good of the authors to provide and acknowledge, in true scientific manner, critique of their own problem statements and work so that it is understandable to the reader that they are aware of some of the potential errors with their work and results. By doing some restructuring of the model section, combined with some explanatory text, the resulting report will surely be even greater.

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Questions to authors:

1. How is the predator implemented in the simulator?
2. How large amount of work would be needed, given the current implementation, to adapt the simulator to a 3D environment?
3. How would an implementation of pheromones in the simulator affect the simulation? Do you think it would result in the simulation being better, worse or the same?
4. Given more time, what would you like to implement or improve in your simulator?
5. Did any particular problems occur during your work? Why/why not?
6. You mentioned in the report that when you used a limited visual range the sheep did not converge to a stable state but rather moved constantly. Do you have any theory on why this happened?