MODELLING WITH NETLOGO – KPOP FANS BEHAVIOUR

Denisa Alexandru

1. Model description

OVERVIEW

This model is an attempt to mimic the behaviour of kpop fans (kpop is a music genre, where there are many different bands and artists). The fans in this model follow three kinds of behaviour depending on the situation. At first, each person lives their normal life before having discovered this music genre nor having chosen a band of their liking, so they move at random. Once they start liking a music band or an artist, they can either keep on living normally or start to group according to their preference (**each preference is shown by a different colour**) when there is an event such as a fanmeeting. When there is a music festival where all the singers perform, the fans attend and must put themselves in order (regular movement), because the bodyguards would take them out if they were to create chaos or groups. There are five band preferences modelled, each associated with a different colour: BTS fans in purple, SHINee fans in blue, Black Swan fans in burgundy, BigBang fans in yellow and Twice fans in light orange.

HOW IT WORKS

The kpop fans follow three movements: "random" "group", and "regular"

"Random" means that each person moves individually and differently from any other person.

"Group" means that they start flocking together according to their band preference, which in this case is represented by different colours. The “group” movement follows three rules: "alignment", "separation", and "cohesion".

- "Alignment" means that a person tends to turn so that it is moving in the same direction that nearby people are moving.
- "Separation" means that a person will turn to avoid another person with a different preference who gets too close.
- "Cohesion" means that a person will move towards other nearby people of the same preference (colour).
- When two people with a different preference are too close, the "separation" rule overrides the other two, which are deactivated until the minimum separation is achieved.

"Regular" means that if the person has any other person too close, they will distance themselves until they are at the same distance from all the other people.

HOW TO USE IT

First, press **“Setup”** to create the people, and press **“Go”** to have them start living their normal lives (**random movement**)

To make them form groups according to their preferences, press the **“Fangirl event”** button. This button has a double function. Firstly, it assigns the group preferences to each person. Each group preference is represented by a different colour: purple for BTS fans, blue for SHINee fans, burgundy for Black Swan fans, yellow for BigBang fans and light orange for Twice fans. Secondly, the people form groups according to their preferences.

The group forming can be stopped by unclicking the **"Fangirl event"** button. This allows to go back to a random movement. However, the group preferences are still maintained.

To create a regular movement (at a Concert), **the switch must be turned ON.** When the switch turns ON, the random and grouped movement stop and the regular movement starts automatically. It is important to be noticed that the grouped movement cannot be activated while the switch is ON. To go back to a random movement, the switch must be turned OFF. Once the switch is OFF, the "Fangirl event" button can be pressed to start a grouped movement again.

2. Graphic representation of the three types of point clouds

The coordinates are obtained directly from the Netlogo model. This is done by pressing the **"Export coordinates"** button, which creates a file where the coordinates can be saved. This is done three times: when the random movement is on, when the clustered movement is on, and when the regular movement is activated.

In RStudio, the coordinates from each file are extracted and plotted using the "plot" command.

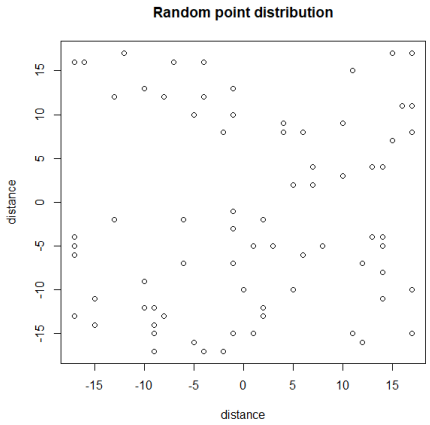

Figure 1. Space distribution of the agents following a random movement.

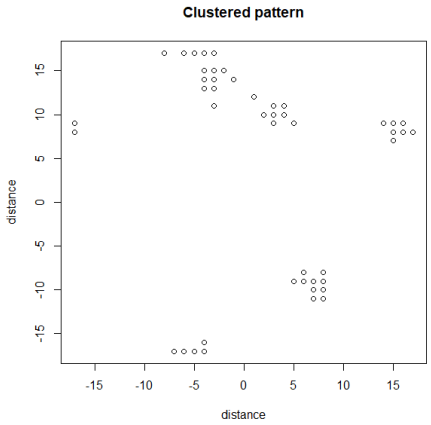

Figure 2. Space distribution of the agents following a clustered movement.

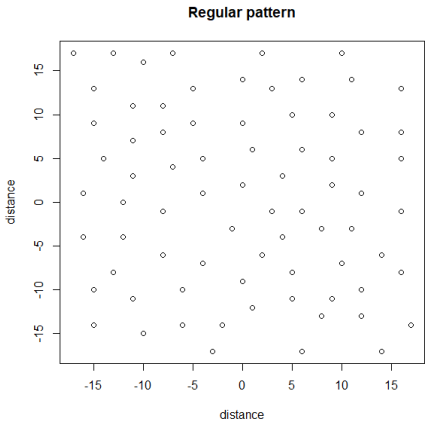

Figure 3. Space distribution of the agents following a regular movement.

3. Statistical analysis

To analyse whether the agents were distributed at random or not, spatial statistical tools were used, such as the F, G and K functions. These functions compare the empirical data with a null distribution (the results from random sampling). If the patterns observed in the empirical data are similar to the ones in the null distribution, the agents are more likely to be randomly distributed.

This was done with RStudio. The coordinates from the files generated using the **"Export coordinates"** button were extracted, and then analysed using the R commands Fest, Gest and Kest, corresponding for each of the functions.

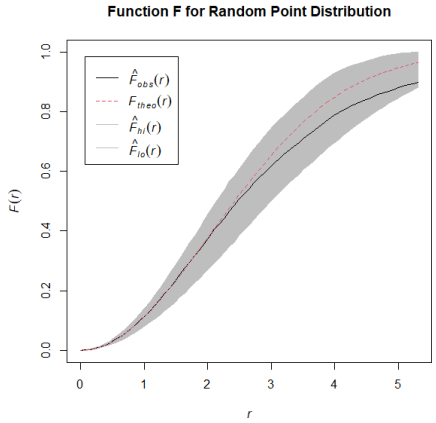

Figure 4. Statistical analysis with Function F of the random distribution of points in space. The point distribution line (**black line**) is in the envelope (**grey zone**), which means that the random movement is indeed random.

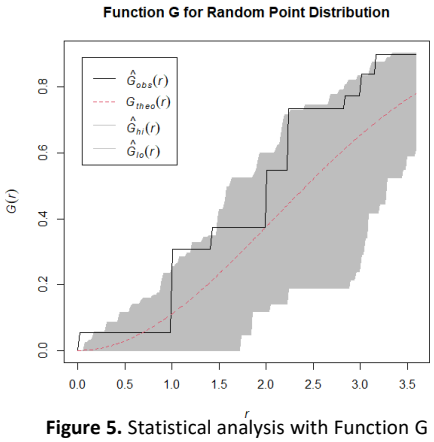

Figure 5. Statistical analysis with Function G of the random distribution of points in space. The point distribution line (**black line**) is in the envelope (**grey zone**), which means that the random movement is mostly random. However, it presents slightly clustered patterns

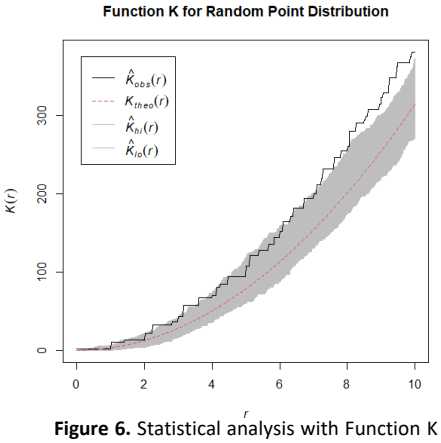

Figure 6. Statistical analysis with Function K of the random distribution of points in space. The point distribution line (**black line**) is in the envelope (**grey zone),** which means that the random movement is mostly random. However, it presents slightly clustered patterns

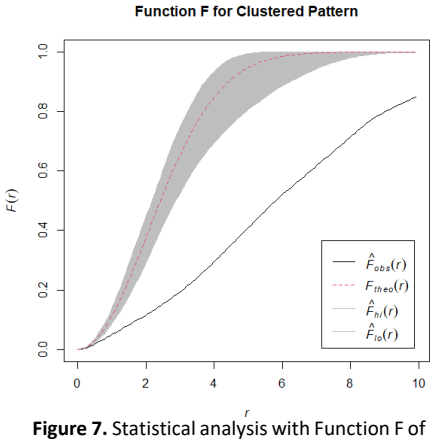

Figure 7. Statistical analysis with Function F of the clustered distribution of points in space. The point distribution line (**black line**) is under the envelope (**grey zone**), which means that the clustered movement is indeed clustered.

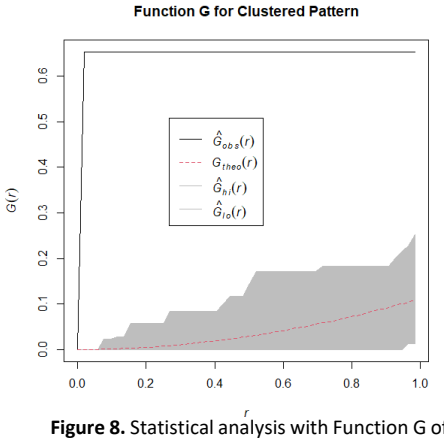

Figure 8. Statistical analysis with Function G of the clustered distribution of points in space. The point distribution line (**black line**) is above the envelope (**grey zone**), which means that the clustered movement is indeed clustered.

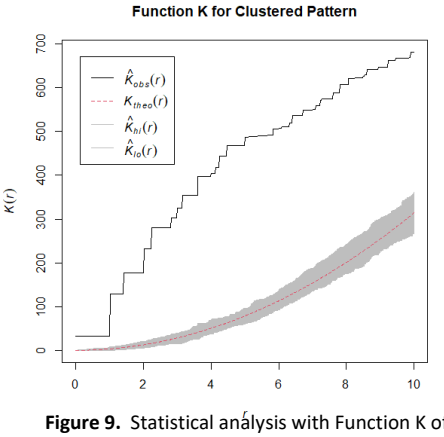

Figure 9. Statistical analysis with Function K of the clustered distribution of points in space. The point distribution line (**black line**) is above the envelope (**grey zone**), which means that the clustered movement is indeed clustered.

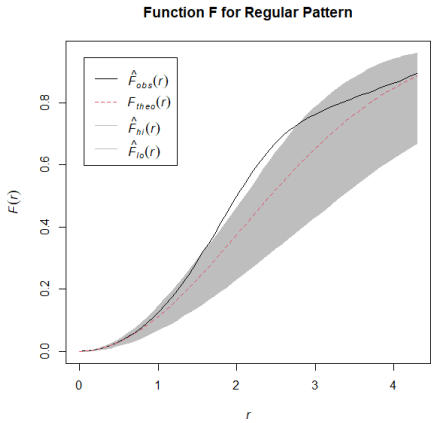

Figure 10. Statistical analysis with Function F of the regular distribution of points in space. The point distribution line (**black line**) is above the envelope (**grey zone**), which means that the regular movement is indeed regular.

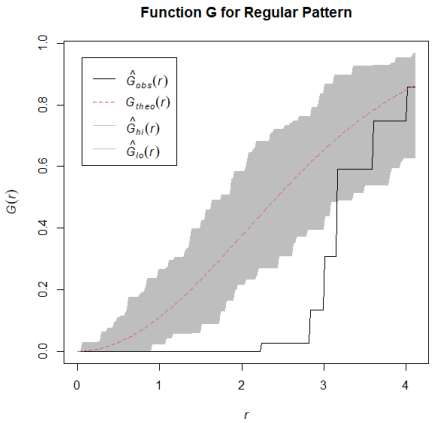

Figure 11. Statistical analysis with Function G of the regular distribution of points in space. The point distribution line (**black line**) is under the envelope (**grey zone**), which means that the regular movement is indeed regular.

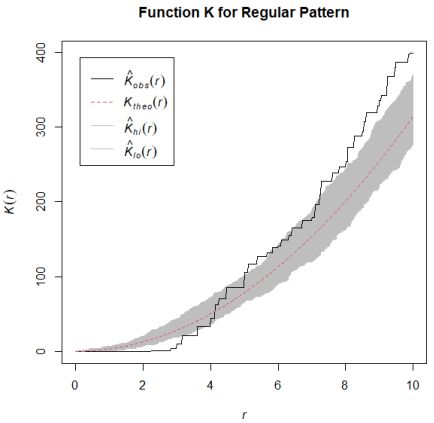

Figure 12. Statistical analysis with Function F of the regular distribution of points in space. The point distribution line (**black line**) is under the envelope (**grey zone**), which means that the regular movement is indeed regular.