Are SNCF's TGV trains always late?

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1 Introduction

A graph is a way to represent dependencies between entities, each dependencies is represented by an edge between two (or more) vertices. It is a very convenient way to represent many problems in computer science because most of the time we get rid of any combinatorics issues such as exponential complexity and so on. It is also a way to represent real things such as traffic and evolution of things. The main issue with graph is that they are mainly adapted for computers than for human especially when they are very heavy. The visualisation of network problematic is now a hot topic in many fields of research such as traffic, cloud computing, scheduling and so on. The Big issue with networks visualisation is that we do not visualise a big network the way we visualise a small one, we do not visualise a thick network the way we visualise a light one, or a directed one. There is such a high variety of graphs and there is no ready to wear only made-to-measure. But this article will expose some good methods that we can use for graph representation in order to solve a problematic. In this article we will lean on a question to solve, and try to use the best graph representation methods in order to answer this question. The question is ”Are SNCF trains always late?”. This problematic is very relevant because it concerns everyone and then we will be able to see if the representation we will use is adapt to a non-computer-scientist public. The SNCF train networks is a very thick graph so the representation will be adapted to this problematic, this article will show you why the adjacency matrix fits our problematic, why it is very interesting on directed graphs, and how we will deduce some other informations from it. Then we will use some barchart representation in order to show the evolution of a specific node in the graph. The user graphical interface will be very user friendly, the user will have to click on any box of the matrix in order to see some informations about the traffic of this specific line. The adjacency matrix representation: In order to solve the problematic, the main idea is to visualise the network train station by train station. With the adjacency matrix, each station will be represented in a line and in a column and for every existing train line between two stations, the corresponding square will be colored regarding the quality of the traffic, see next paragraph. As instance, where the line Marseille collide with the line Lille, we color the square with the right color. Thus, when all this representation is done, every line between station will be color regarding the quality of traffic. Now it is quite important to notice that an A to B line is different than a B to A line we will have some differences in the quality of traffic, and those differences will jump right to the eyes of the public. (show matrix picture) The choice of colors: The color choice is very simple, good is represented by the green color and the worst it gets, darker the red will be. As instance, the line Marseille Lille is getting worst all over the years, so you can see in the representation that each month the green is becoming more and more red. This choice of color is due to the fact that red means bad for everyone and green means good, it also remind traffic lights so it's a good choice of color for this kind of problematic. (article des premiers łtre passs) The barchart representation: When we click on a specific square, one which represent a line between two stations, some additional data are gathered. Thus we are able to represent the evolution of traffic quality month by month all over the year. this representation is very user friendly because it's simple to use, the user will have to click on the lines he is interested on, Moreover, the informations is hidden until the user wants to learn more about a specific line. And we have some additional we the user puts his cursor on a specific month, there is a feedback on the reason why traffic was delayed during this specific month. Many way to sort the matrix, many way to visualise:

References