Decision Making Model for Project Selection of Bill and Melinda Gates Foundation

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1 Problem description

Bill and Melinda Gates Foundation (referred to as the Gates Foundation) is the main contributor to global health and the largest grant-making private foundation worldwide [1]. As it is the largest foundation, it is not surprising that the Gates Foundation receives many grant proposals. The Gates Foundation has to process all of the accepted proposals and give grants for eligible ones. As it is a huge workload, we are building the decision model for them to make a faster and better decision. Throughout this semester, we have reviewed many research including the annual letters, annual reports for years 2014-2018 and some researchers peer-reviewed publications that are analyzing the Gates Foundation's decision making process. A decision maker for our decision-making model is an individual or a group who are looking to start or improve the philanthropic activities of their company.

2 Model description

Our model was inspired by the credit model which was mentioned in the course book and has been taken from Bayes fusion model repository [2]. Basically, our model based on many chance nodes which show the world that the decision maker is facing. It shows the decision options and all relevant variables that we have considered with the possible outcomes. Basically, our model can be used as background knowledge for decision-making application. As the workload was very heavy, we have just created a decision-making model which would be useful in any decision-making system. We are going to explain the set of uncertainty nodes that are affecting the final decision.

3 Quantification of uncertainties

First, one of the main chance nodes is the one that represents the uncertainty cases that won't be funded for the Gates Foundation. There are five cased in which the Gates Foundation will not fund the grantseeker. We have added them to our model [3]. As soon as the decision maker will notice the existence of one of them, the grantseeker's proposal will get rejected.

Next, is the chance node that consists of the set of problem solutions which will increase the chances for the grant-seeking organization to get the funding. There are major challenges for 2019 that the Gates Foundation mainly focused on, so it clearly stated that the organization will highly focused on the proposals that are solving those issues. So, we have added set of 4 problems that they are trying to solve to our model including the uncertainty nodes that they will fund and won't fund [4]. These challenges are:

- Data Science Approaches to Improve Maternal and Child Health in Africa
- Environmental niches of Salmonella Typhi
- Increasing Demand for Vaccination Services
- Emerging Technologies for New Solutions in Global Health Priority Areas

Then, another important uncertainty that affects the final decision is the grantseeker's capability of tackling the challenge.

After that, the magnitude of change chance node represents the range of influence of the proposed paper. Another factor is the money that is the grantseeker is requiring. We made sure that the higher amount of money that the grantseeker is requiring will affect the outcome of the decision by making it a bit more complicated to make a decision. There are more main chance nodes that also affecting the final decision chance node, but they are not as important as the ones we have already mentioned above. The main chance nodes have many child nodes that are also influencing the decision (please see the attached Genie decision model).

4 Decision Model

We have structured the decision model for the Gates Foundation.

As can be seen in Figure 1, it is the skeleton of our decision model. The yellow node in the middle of the picture is the decision chance node that would give some insight for the decision maker regarding the grantseeker's proposal. Green chance nodes represent the 4 challenges that we have mentioned in Section 3 and the child nodes of those main challenge nodes for 2019. The red nodes beside the green ones represent uncertainty nodes in which the Gates Foundation will not approve the funding [4]

As a result of our genie model, we would like to show some examples of decision making model's performance.

Figure 2 represents the example of value changes for decision model. As we have mentioned before, there are main 5 nodes that directly affect the outcome of the final decision.

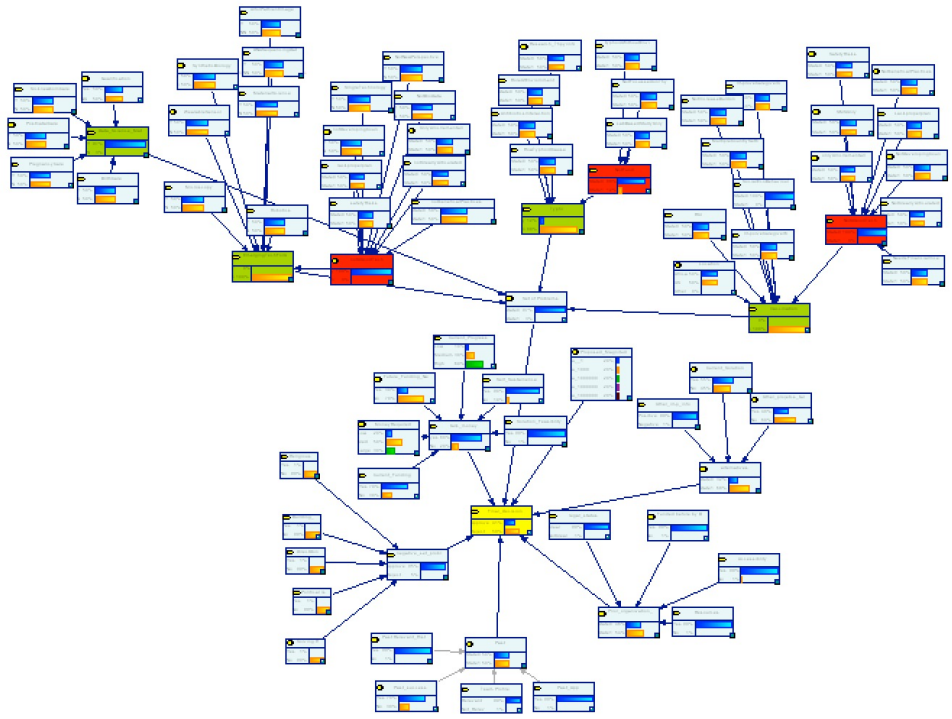

Figure 1: Decision model for the Gates Foundation

Those are the cases when the Gates Foundation won't give the funding for. As in our example, as soon as the decision maker witnessed the presence of building/capital campaigns solution proposal it rejects the proposal right away.

Another good example is the showcase of the chance nodes that are affecting the decision maker's final decision.

As can be seen in Figure 3, medium level money required, proposed solution feasibility, high current progress would increase the chances of getting the funding.

5 Challenges

We have faced many challenges in this project. The major one was spending to much time on data analysis. We have collected data for funding recipients for four years (2015-2018). It was obtained by open source database [5]. We have spent much time on finding the connection between those datasets for each year, which was not substantially helpful. Although it helped to understand the background knowledge of the decision-making process.

Another challenging part was the broadness of the problem. This organization's structure is huge. Every year they have funded over 100 different organizations in 7 different programs with spending more than 2 billion on the funding[6]. So, it was challenging for three people figure the structure out for the whole organization.

We have intensely looked for the data about the rejected proposal which would have made

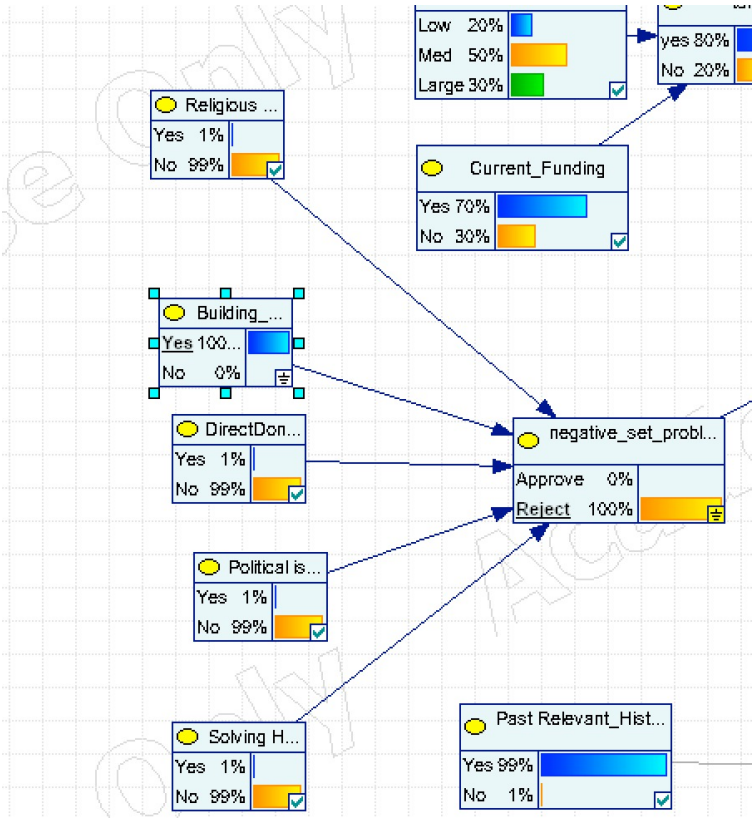

Figure 2: Example values changes for the decision model

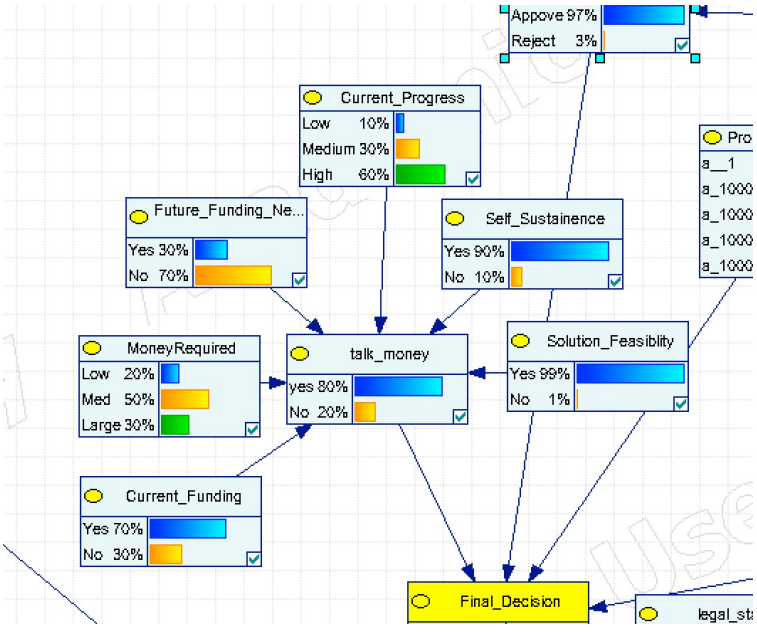

Figure 3: Example values changes for the decision model

our decision model more robust. We even contacted 10 different employees of the Gates Foundation, including the people who work as a data officer, specific program's associate officer, to ask for help with the project regarding the rejected applicants. Unfortunately, no one has been got back to us. Anyway, this was a good experience to work on.

6 Future work

If we had more time, we could definitely have done better decision making model after which we could create the app in which the decision model would be used on the back-end. Another future scope of this project would be being persistent with getting data about rejected applicants/grantseekers. This kind of dataset would help us to understand better the decision making process of the Gates foundation.

References

[1] McCoy, D., Kembhavi, G., Patel, J., & Luintel, A. (2009). Research & Practice in Assessment, 8, 1325. *The Bill & Melinda Gates Foundation's grant-making programme for global health.* The Lancet, 373(9675), 1645-1653.

[2] *Bayes Fusion interactive model repository.* Retrieved from `https://repo.bayesfusion.com/bayesbox.html`

[3] The Gates Foundation *What we don't fund* `https://www.gatesfoundation.org/How-We-Work/General-Information/What-We-Do-Not-Fund`

[4] Challenges of The Gates Foundation *Challenges* `https://gcgh.grandchallenges.org/challenges`

[5] Awarded Grants of The Gates Foundation *Awarded grants* `https://www.gatesfoundation.org/How-We-Work/Quick-Links/Grants-Database`

[6] Bill and Melinda Gates Foundation *The Gates Foundation* `https://www.gatesfoundation.org`