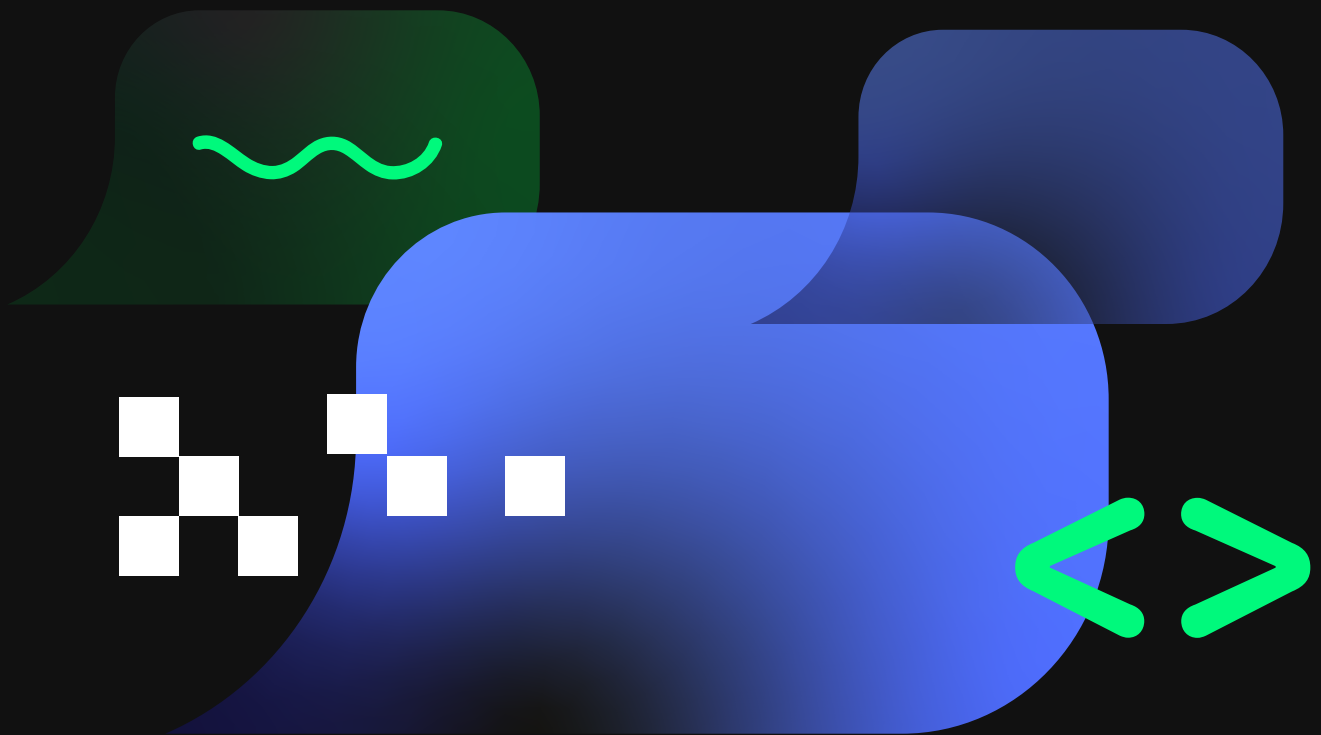




Inter IIT Tech Meet 11.0
IIT Kanpur



COGNITIVE GARAGE

● Low Prep

EASY AUTOMATION OF COMPLEX DECISION MAKING

The world is generating a lot of data, and everyone wants to use it for decision-making. However, the process of converting structured and unstructured data into knowledge that can be used for decision-making processes is complex. How do we automate complex decision making?



INTRODUCTION

The world is generating a lot of data, and everyone wants to use it for decision-making. However, the process of converting structured and unstructured data into knowledge that can be used for decision-making processes is complex. We have developed an innovative product for AI and Automation, using which a domain expert can develop a decision automation model to automate any complex knowledge-intensive task. A complex decision is based on a large number of parameters and can be either subjective or objective.

Our Knowledge studio is a completely no-code tool, where the domain expert creates a knowledge model using the following steps:

1. Define domain ontology/Domain terms. You define the parameters and their values.
2. Drag and drop parameters to create inference graph(s) or/and decision tree(s).
 - a. For the Inference graphs, either define the conditional probabilities or learn them from the data.
3. Merge the above to create a Knowledge Model.
4. Use the Knowledge Model to score the various available decision(s). Use the score to automate a recommendation/business decision. We provide a chatbot and scoring end-point for the Knowledge model.



Using the product, we already have 3 use cases implemented.

1. Government Welfare – We have identified 300 parameters of a family and a person. For example - income (Below poverty, Above poverty), House Type (Slum, Rural, Urban), and Caste (SC/ST, OBC, General). These parameters are used to create a decision tree for eligibility and an inference graph to score/prioritize the need of each person against various government schemes. So, for the welfare Knowledge Model, we have 300+ input parameters and 100+ Government schemes as decision(s).
2. Disease diagnosis – The Medical Knowledge model has 900 symptoms as input parameters and 200 diseases as decisions.. We have created inference graphs for various diseases. Based on the initial symptoms it asks the relevant questions and does the scoring against each disease.
3. Micro Financing – Using 50 input parameters we have a model which calculates the Score/Probability of that person returning the loan.

Our inference graph is based on a Bayesian network and you can go through the following to understand the Graph model.

<https://www.bayesserver.com/docs/introduction/bayesian-networks/>

What we are looking for is a use case from other domains where our product can be used to automate complex decision-making.



PROBLEM STATEMENT

You are required to work on a problem that requires a complex decision-making process, as seen in the examples above. We are looking for more such ideas and each of these problems could be a potential startup idea that could provide benefits of scale, improve accuracy, shorten the time or make better quality decisions based on facts and data.

Step 1:

You will first identify three use cases of our decision-making automation platform. For each use case, provide a brief description of the use case and the domain of the use case. Additionally, explain how each use case solves a complex decision-making problem and why it requires automation.

Submission format for Step 1: Maximum 0.5 page PDF, 11 pt font, 1.5 spacing for each use case.

Evaluation Metrics for Step 1

1. Complexity of decision model. It should not be a trivial decision that can be easily automated.
2. What will be the benefit of automating? Automation should solve a real-world need. We should never automate just for the sake of automation.

Submission Deadline: 28th January'23

**Step 2:**

After Step 1, all the teams will receive crisp feedback from the judging panel and you will be asked to proceed with one of the three use cases you submitted. At this stage, you will be required to dive deep into the problem statement and come up with the parameters that impact the decision. Explain the decision(s) required to be made and how they can be automated using data. Take note to clearly articulate the input parameters/nodes, decision(s), and the relationship between parameter and decision. List all parameters and their possible values and a description of how this impacts the decision. If you can graphically draw the nodes and relationships, that will be an added advantage. Also, provide the source(s) of the data that will be used to build the decision model.

Tip: Getting an interview/input from the domain expert is key to getting the right level of detail and understanding.

Evaluation Metrics for Step 2:

1. Understanding of the use case and the domain expert's input.
2. Understanding of data/parameters and modeling of the decision model/process/details.

Submission Format: PDF (No specific limit)

Submission Deadline: 9th February'23

Step 3:

Final presentation to evaluate your understanding of your submission and ask questions to measure the depth of your solution.



GRADING SCHEME

Step 1: 20%

Step 2: 50%

Step 3: 30%

TEAM SIZE

5-6 per team.