PROJECT REPORT

Project Title: [University Admission Decision Machine]

Course Name: [Theory of Automata]

Course ID: [118692]

Instructor Name: [Miss Misbah]

Group Members:

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1. Introduction

1.1 Background:

University admission systems involve several stages i.e check documents, verification of marks, assessment of extracurricular activities, interview evaluation. These processes are handled manually in traditional university systems due to which many problems come like delay in results, lack of clarity, uncertainty in decision-making, etc. Keeping these problems in mind, we created a system by using the concept deterministic finite automata (DFA) where each stage is treated as a single state and through different transition decisions can be made..

1.2 Significance

The significance of our project is that we created the practical application of theory of automata beyond textbooks. In this project we designing the admission process as DFA due to which our system become more efficient and structured, ensure to make right decisions based on inputs. This system helps us to visualize the theoretical concepts can be applied to real-life decision systems like University admission processes.

1.3 Motivation

The motivation behind University Admission Decision Machine (UADM) is to build a clear and efficient system that makes right and consistent decisions. By applying concept of theory of automata, the goal of this system is to break down the complex admission logic into simple steps.

2. Related Work

A lot of research has been carried out from the application of theory of automata in modeling decision making in both academically and industrially. Most of the systems such as admission processing, authentication systems nowadays heavily rely on formal models to ensure clarity, certainty and correctness, making the system simple and easier to understand [1].

In theory of automata, DFA is a fundamental concept which is applied in the systems where decisions are depend on the inputs. Numerous research papers available on platform ‘IEEE Xplore’ that describe how DFA can work efficient in the decision making systems with clear accepting and rejecting conditions. By studying these papers we conclude that DFA can improve system clearness [2].

Additionally, university level projects and academic case studies show the use of deterministic finite automata in admission procedures, grading systems, etc. These studies proves that systems where we use automata based approach reduce ambiguity in the systems [3]

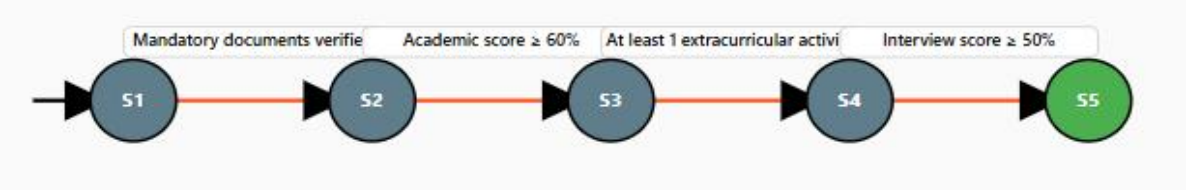
‘GeeksforGeeks’ which is educational platform also contribute to understanding the concepts of automata by providing practical explanations and examples of finite automata and their applications. This platform tells the difference between thoeritical concept of automata and real life systems [4].

3. Methodology

The methodology of this project is depend on how we design the university admission decision system using principles of DFA and we implement it through web based interface. The following steps are involved in the method for the making of this project.

3.1 DFA Design

Firstly, we design DFA for our project including multiple stages i.e verification of documents, evaluation of marks, extracurricular activities, interview evaluation. Based on the input conditions transitions occur between states. In the end DFA terminates at final state whether admission is accepted or rejected.



3.2 Implementation of the System

We created this project by using HTML5, CSS3 and JavaScript. The structure of the website created by using HTML5, then CSS3 used to make website responsive and user-friendly layout. Lastly, JavaScript used to make logic of DFA, handle inputs in each state, in the end determine final outcome based on the DFA design.

```
const States = {
  S1: "Documentation Submission & Verification",
  S2: "Academic Evaluation",
  S3: "Extracurricular Activities Check",
  S4: "Interview Evaluation (Percentage)",
  S5: "Accepted (Accept State)",
  S6: "Rejected (Reject State)",
};

// Student info form:
const studentInfoForm = document.querySelector('#studentInfo-form');
studentInfoForm.addEventListener('submit', function(e) {
  e.preventDefault();
  const name = document.querySelector('#studentName');
  const regNum = document.querySelector('#regNum');
  const program = document.querySelector('#program');
  Info = {
    name: name.value,
    regNum: regNum.value,
    program: program.value
  }
    document.querySelector("#admission-panel").classList.remove("hidden");
    document.querySelector("#studentInfo-panel").classList.add("hidden");
    currentState = "S1";
    updateUI();
})
```

3.3 Validation of Logic

By using different input combinations we validate the system. Our project gives suitable and appropriate results and it confirms that logic we implemented is correct and clear.

4. Experiments and Results

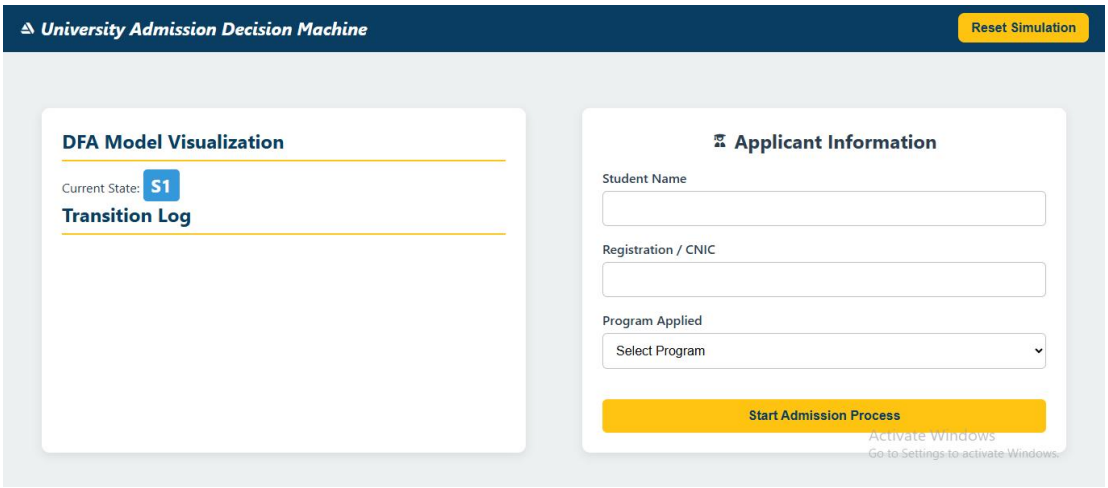


Fig 1: Home screen

Home screen of University Admission Decision Machine provides an overview of the system.

Fig 2: Applicant Form

Applicant form is used to gather information of students.

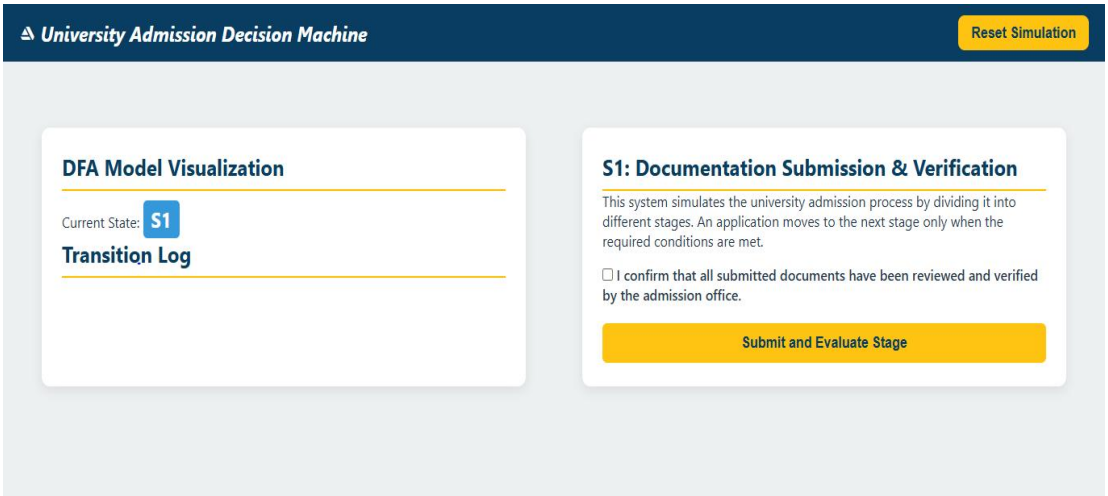


Fig 3: S1-Document Verification

Starting state S1, where documents are verified

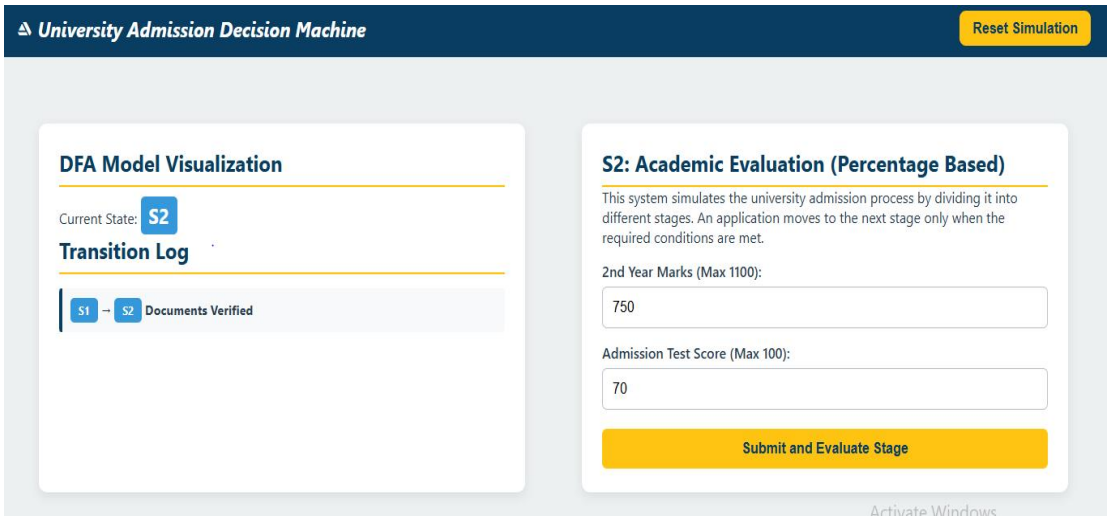


Fig 4: S2-Academic Evaluation

State S2, where evaluation of marks is done.

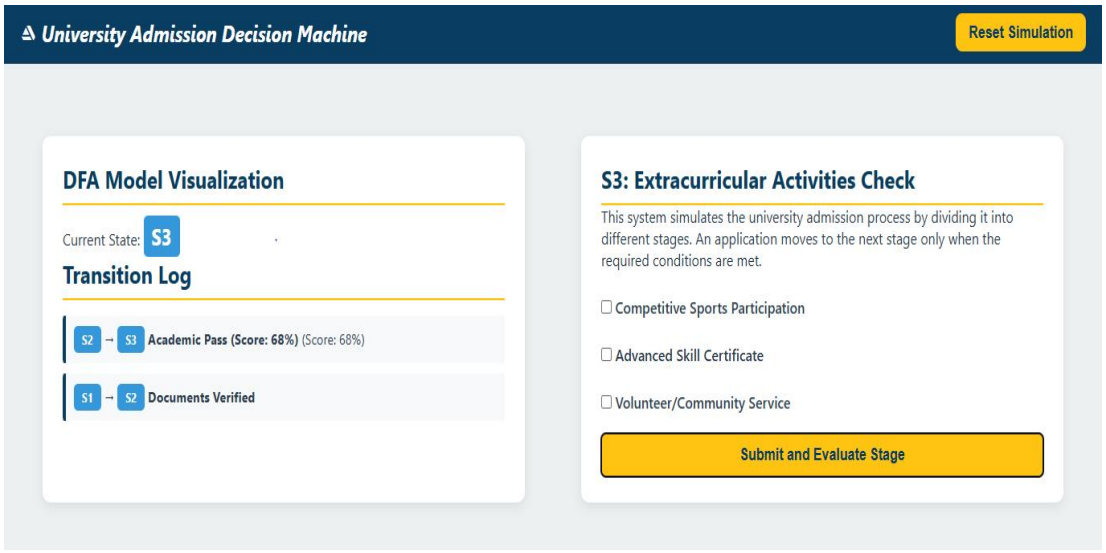


Fig 5: S3-Extracurricular Activities

State S3, where extracurricular activities are checked.

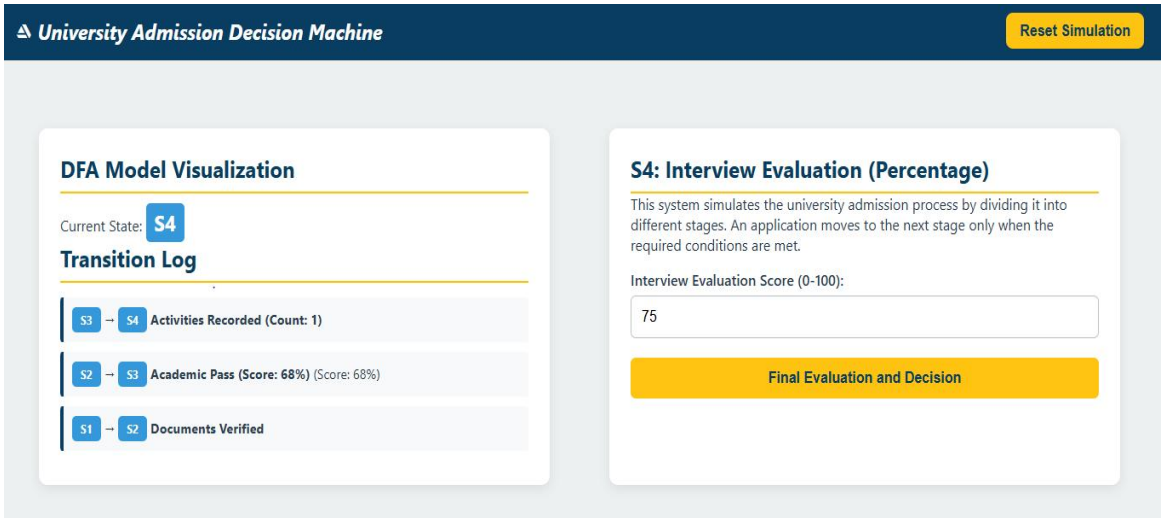


Fig 6: S4- Interview evaluation

State S4, where evaluation of interview is done.

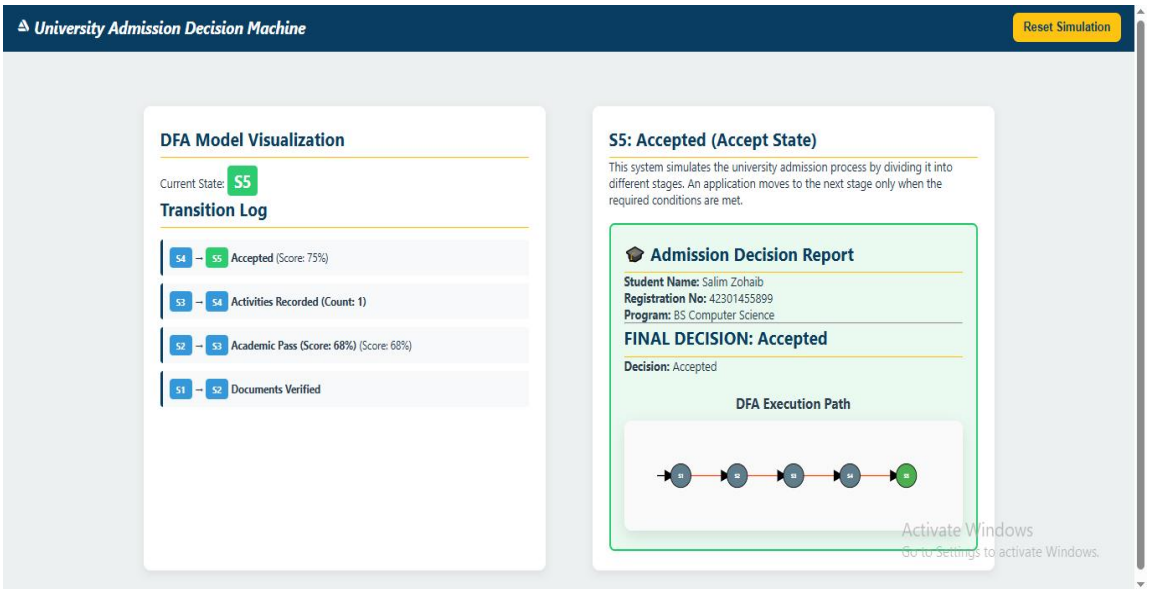


Fig 7: S5-Accepted (Accept state)

State S5 (accepting state), which represents that admission of student is accepted..

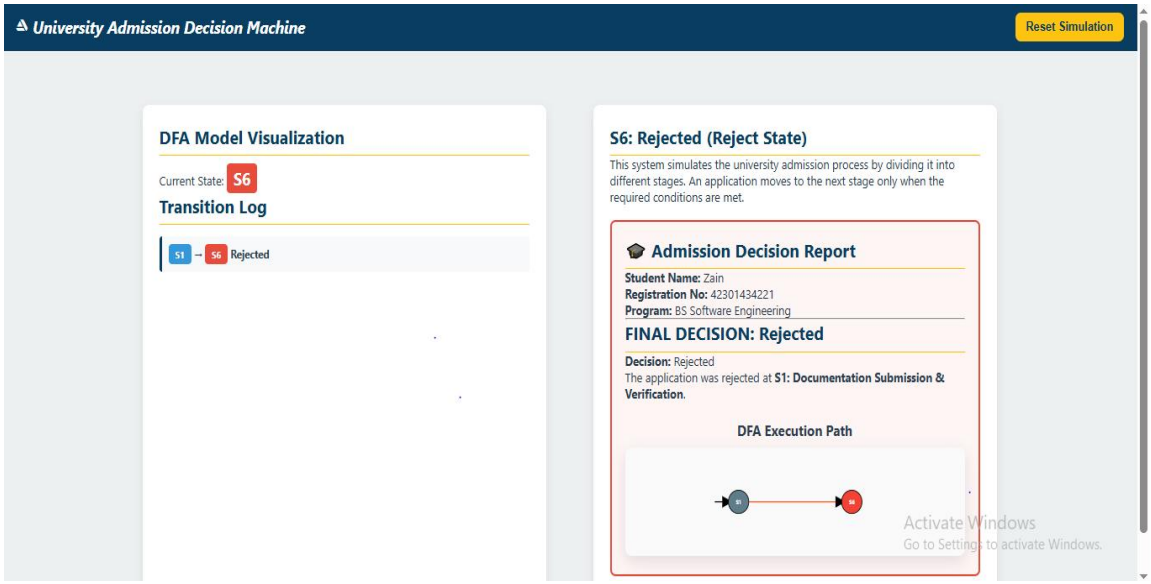


Fig 8: S5-Rejected (Rejected state)

State S6 (rejecting state), which represents that admission of student is rejected..

5. Conclusion

In conclusion, this project shows that how theoretical concepts of automata applied in real life admission systems. Each step of the process is represented a state and decisions are made through defined conditions rely on student performance and information. Overall, this projects taught us how we can implemented concepts of automata effectively to build real life decision-making systems which is reliable and efficient. Therefore, this system helps us to visualize the states precisely through which we understand the flow of decisions clearly. This system also strengthen logical thinking and problem-solving skills for the real-world systems.

6. References

[1] Hopcroft, J.E, & Ullman, J.D. (2006). Introduction to automata theory, languages and computation (3rd Ed.). Pearson Education.

[2] IEEE Xplore Digital Library. (n.d.). Applications of deterministic finite automata in decision-making systems. https://ieeexplore.ieee.org/Xplore/home.jsp

[3] Khemuka, Atul Ravi, "Workflow Modeling Using Finite Automata" (2003). Graduate Theses and Dissertations. 4https://scholarcommons.usf.edu/etd/1406

[4] GeeksforGeeks, “Introduction of Finite Automata” Available at: https://www.geeksforgeeks.org/theory-of-computation/introduction-of-finite-automata/