Stakeholder and Risk Assessment for Proposed Admissions Management System at SFU School of Computing Science

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***Abstract*—The Telperion Systems team has prepared this report in response to the School of Computing Science at Simon Fraser University's request for a new data-driven Admissions Management System (AMS). We offer a value-driven assessment of the potential benefits and risks that could arise is developing and deploying this system. We begin by defining use cases and identifying the project's stakeholders, the most important of whom we engage with directly. We then develop personas for the key stakeholders from our findings, and clarify their values to create a picture of those affected by the project. Our developed personas allow us to describe and analyze the tensions in values that may arise between stakeholders, where interests may conflict. These tensions are then categorized to identify the primary ethical challenges facing the project, prioritized for successful implementation and deployment.**

I. Introduction

The School of Computing Science at Simon Fraser University (SFU) takes pride in advancing cutting-edge research and offering a high-quality, flexible undergraduate program. SFU has a high commitment to quality education within its academic community that is experimental, interdisciplinary and fair for all. [1]. To maintain and to continue to grow this community, the inflow of students to the school must reflect these academic values. Currently, ranking applicants to the school is based on GPA, with the distinction between acceptance and rejection primarily determined by a lower cutoff set by the administration [2]. However, with the discontinuation of provincial standardized exams, the school has created doubts that GPA adequately reflects on the quality of applicants. As a result, the school administration is developing a new Admissions Management System (AMS). SFU has expressed a willingness to integrate artificial intelligence into the new system alongside the human-driven processes currently used to review applicants. Nevertheless, what potential implications for stakeholders, both within and outside the school, must be addressed under this more complex Admission Management System (AMS)? This is the question Telperion Systems aims to address through a value-driven analysis [3], focusing on understanding the scope of impacts and identifying potential challenges as the project advances.

II. Identified Use Cases

A. ***Primary*** *Use Case 1: Admissions Committee*

The *Admissions Management System* will serve as a tool for supporting the admissions committee in processing the increased amount of data that will be collected about applicants, using it to provide consistent metrics that will be compared against entry considerations to be decided on by the school administration. This will provide a method of ranking applicants for admission that does not rely solely on GPA, while keeping the process streamlined and within the current composition of the team. This aims to ensure the selection of high-quality candidates who align with the values and needs of the School [1] while not requiring the complete restructuring and retraining of the admissions committee.

B. *Use Case 2: Applicants*

Prospective students applying to SFU will interact with the AMS via an online web application portal. Through this, applicants will be able to submit transcripts and other academic records as well as, personal information and longer form content such as:

- Name
- Nationality and Self-Reported Ancestry
- Gender and Self-identifying Media (e.g. Photos)
- Phone Number and other contact information
- Location information about attended primary and secondary school
- Extracurricular activities
- Community Engagement
- Personal essays

This use case consolidates the application process, enabling direct submission of varied data to the admissions team without intermediary steps and significant human involvement.

C. Use Case 3: Administrative Staff

The administrative staff within the School of Computing Science will leverage the AMS's data analytics capabilities to monitor trends in applicant profiles and admissions outcomes. By analyzing intersecting dataset, staff can refine admissions criteria and improve the overall admissions process. Insights generated from the AMS will also inform requirements for future versions of the admissions system that may need a broader scope than the initial version Ultimately, the administration wants consistent admission outcomes and the ability to support the long-term vision for the school [2].

III. Stakeholder Groups

In identifying the key stakeholder groups for the Admissions Management System (AMS) at SFU School of Computing Science, we recognize several relevant parties, each with distinct roles and concerns regarding the project.

The **SFU School of Computing Science Administration** is primarily represented by the Department Head, who focuses on maintaining the academic reputation and stability of the department. The department head is concerned that poor admissions could harm the school's reputation, leading to more involvement in the admissions process than would typically be desired [2].

Prospective applicants are individuals seeking admission to the School of Computing Science, motivated by the opportunity to be accepted into a prestigious academic program. Their success in the admissions process depends on how well they present themselves as the best fit for the department's needs.

Faculty members, comprising both instructors and researchers, desire motivated and inquisitive students who will contribute positively to the academic environment. They aim to ensure that students accepted into the program are well-equipped to engage deeply with both the curriculum and research initiatives.

Current students at SFU consisting of both those at the **undergraduate** and **graduate** level. Undergraduate students seek peers who are knowledgeable, collaborative, and engaged, as these traits foster a supportive academic and social environment. Graduate students, who primarily interact with newly accepted students as teaching assistants (TAs), are interested in having committed and engaged undergraduates who enhance the learning experience for all students.

Given the need to develop a nuanced understanding of the AMS's potential impact, we prioritize the following key stakeholder groups, each offering their own perspective and values:

- **Department Administration (Department Head):** The Department Head plays a critical role in aligning the AMS with the school's strategic goals, ensuring that the admissions process upholds the institution's values.
- **Current Students (Undergraduate and Graduate Representatives):** These student representatives bring insights into how the admissions process impacts the academic environment from a student's perspective, including both those who are actively in the program and those who mentor others through TA roles.

By focusing on these groups, we can ensure that the AMS is designed to meet the needs of the stakeholders while also promoting transparency, fairness, and inclusivity in the admissions process.

IV. Engagement with Key Stakeholders

This step focuses on understanding the values of key stakeholders in the admissions process, considering both societal and individual needs [3].

A. Department Administration

Our primary representative of SFU Computing Science's administration though this process has been Dr. Angelica Lim, who is Department Head.

1) Interview: Social Context: Dr. Lim, as a key member of the admissions committee, plays a vital role in shaping the process, while the admissions team handles most of the technical tasks. Dr. Lim's focus is on student success and academic reputation. During the interview, she emphasized the complexity of balancing transparency with the need to protect decision-making details, particularly around non-academic criteria, to avoid appeals. [2]

2) Value Discovery:

a) Functional Values:: Currently the admissions process is GPA-driven, which is transparent regarding cutoffs for acceptance, based on GPA. However, other criteria are not disclosed due to resource constraints and to prevent perceived opportunities to game the admissions process. This suggests a constrained situation for applying new intelligent or else automated feature admissions raising concerns about fairness and equity.

b) Future Values:: Dr. Lim expressed interest in a new multi-metric system that leverages artificially intelligent elements to assist the admissions team. She emphasized that such a system should not replace the final-decision making of the committee and should be limited as a tool supplemental to current processes. She also emphasized the importance of transparency and trust with applicants. She acknowledged the challenges of balancing transparency with the complexities of AI integration and stressed the need for feedback mechanisms to improve the system.

3) Societal Values Analysis: Dr. Lim's reluctance to disclose all decision-making details reflects a potential lack of transparency, which may result in applicant distrust. The current GPA system, while intended to streamline the admissions process, could unintentionally place applicants from schools with stricter grading policies, and with backgrounds that have not been considered by the administration at a disadvantage, raising fairness concerns. Diversity initiatives, including quota systems, highlight a balancing act between promoting diversity and maintaining fairness. Dr. Lim has also confirmed that applicant data is deleted after one year, indicating a focus on privacy [2]; however, further clarification regarding specific

data handling practices could provide additional reassurance and ensure continued compliance regarding privacy rights.

4) Stakeholder Values Analysis: Dr. Lim prioritizes maintaining the academic reputation of the school, which may sometimes conflict with transparency if revealing decision-making details is seen as potentially harmful.

B. Current Students

Representative: Undergraduate and Graduate Student Representatives

An anonymous survey was conducted to gather insights on current undergraduate students' perceptions and experiences with the admissions process. Based on their responses to several key questions, we can infer some of the values students hold regarding the admissions and potential changes to the system.

- **Survey Results (Questions not limited to):**
  - *"On a scale of 1 to 10, how would you rate the fairness of admissions at SFU?"* 8
  - *"Did you apply to SFU before or after provincial exams were removed?"* After
  - *"On a scale of 1 to 10, how much would you trust the use of AI in the admissions process?"* 3
  - *"In your opinion, what are the 3 most important considerations in admissions?"* High School GPA, Extracurriculars, Motivation for Attending School
  - *"From your experience, what do you think SFU values most in admissions?"* Grades and high school curriculum

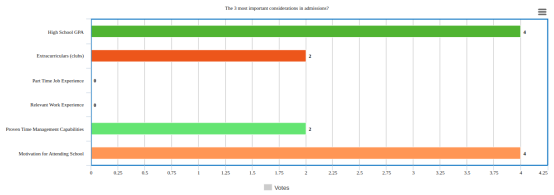

Fig. 1. Survey Results for "What are the 3 most important considerations in admissions?"

As shown in Figure 2, the majority of students claimed that personal identifiers such as gender and photo would be most unfair when asked about new data potentially collected for admissions.

From these responses, we can safely assume that current students value fairness and transparency in the admissions process. Their lower trust in AI suggests concerns about technology's role in decision-making, while a preference for GPA and extracurricular involvement indicates that they see academic performance and well-roundedness as critical factors for ensuring their acceptance. Furthermore, the reluctance towards adding an essay question response, resume and any personal identifiers suggests a desire to keep the process straightforward and focused on quantifiable achievements.

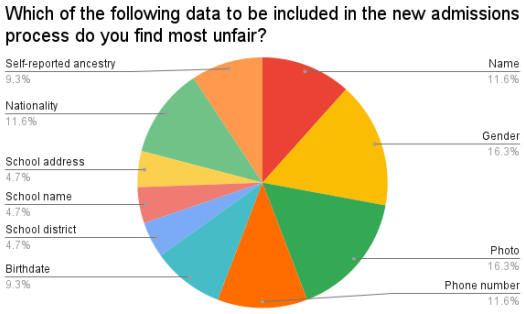

Fig. 2. Survey Results for "Which of the following data to be included in the new admissions process to you find most unfair?"

V. Mapping Personas and Identifying Values

In this step, we develop personas based on the insights gathered from interviews, surveys, and secondary research. Personas help organize the information collected from stakeholders, highlighting their roles, constraints, and values. These personas provide a deeper understanding of the goals, preferences, and challenges faced by key stakeholders in the admissions process [3]. Below, we present two personas that illustrate contrasting perspectives of stakeholders toward SFU admissions.

A. Persona 1: Dr. Lim, Department Head - Admissions Committee Member

Dr. Lim's primary goal is to oversee a fair and effective admissions process, selecting candidates who are likely to succeed in the program and maintain the department's academic reputation. She finds satisfaction in contributing to student success, shaping the department's future, and upholding the integrity of the admissions process. Working with committed faculty and motivated prospective students adds to her job fulfillment. Central administration supports her work by managing technical aspects of the admissions , while faculty members contribute insights on candidate qualifications. Current students, as representatives of the program's success and diversity, are also important stakeholders. However, Dr. Lim faces challenges, particularly regarding transparency, as revealing too many details could lead to appeals, and evaluating applicants based solely on GPA may not capture each candidate's full potential. Currently, she relies on existing admissions software to review applications, assessing GPA and supplementary materials, but supports integration of AI-based tools to improve decision-making, emphasizing the importance of transparent communication with applicants about these tools. Dr. Lim is guided by values of academic integrity, student success, and diversity, striving to balance fairness with efficiency. Her role reflects key societal values, including transparency, fairness, and diversity, as she navigates the constraints of institutional requirements.

B. Persona 2: Joey, Student Applicant

Joey's primary goal is to gain admission to SFU's Computer Science program, where he hopes to achieve academic success and engage socially. To strengthen his application, Joey maintains a high GPA, participates in extracurricular activities, and prioritizes a rigorous high school curriculum. Although he sees potential in AI to make the admissions process more efficient, he has concerns about the fairness and transparency of such technology. Joey values SFU's emphasis on academic performance, as it allows him to feel more in control over his application through his GPA. However, he is critical of the weight placed on high school prestige, feeling it could create an unfair advantage for some applicants. He also dislikes the inclusion of an essay and resume, preferring a simpler, grade-based evaluation. Joey applied after the removal of provincial exams, and he understands that SFU's admissions process now relies heavily on GPA, without considering personal narratives or broader achievements. His core values center around *fairness*, *meritocracy*, *access*, and *inclusivity*; advocating for an admissions process that fairly assesses applicants' holistic potential. Joey's persona also reflects broader societal values of *transparency*, *trust*, *fairness*, and *diversity*, expressing a desire for an admissions process that is clear, consistent, and minimizes biases associated with school prestige.

VI. Discovering Value Tensions

In the previous sections, we identified societal and stakeholder values through persona development, forming the basis for aligning technology with stakeholder needs. However, these values often conflict, leading to tensions, where individual or institutional goals clash with broader societal values [3]. This section explores key value tensions and their potential impact on the design and implementation of the admissions system.

A. Value Tension 1: Fairness vs. Academic Integrity

Values in Tension: Fairness and Academic Integrity

Tension Description: Dr. Lim prioritizes academic integrity, selecting students who meet high academic standards, and favors applicants from prestigious schools. Conversely, Joey, the applicant, values fairness and believes that emphasis on GPA with high school prestige disadvantages students from lesser-known institutions. The challenge is balancing academic rigor with equitable access for all applicants.

B. Value Tension 2: Transparency vs. Transparency

Values in Tension: Transparency (Stakeholder vs. Societal Perspective)

Tension Description: While Dr. Lim supports transparency, she must protect sensitive data and prevent disputes over decision-making. Joey, however, seeks transparency in understanding how AI evaluates applications, particularly to ensure fairness. This creates a tension between institutional discretion and the applicant's demand for clarity.

C. Value Tension 3: Efficiency vs. Applicant Rights

Values in Tension: Efficiency and Applicant Rights

Tension Description: Dr. Lim values the efficiency of AI in processing applications quickly and consistently. Joey, however, is concerned that this efficiency could overlook the nuances of his academic background, emphasizing the need for personalized consideration in evaluating applicants. The challenge is balancing speed with a fair, individualized review.

VII. Synthesizing Value Tensions into Ethical Challenges

After identifying key value tensions, risks, and needs in the previous steps, it becomes possible to group these elements into thematic areas. By organizing the conflicts thematically, we can identify the most pressing ethical challenges related to the admissions process at SFU. [3] The following sections summarize the value tensions, the ethical risks, and the thematic priorities, culminating in a set of ethical challenges that need attention.

A. Value Tensions Identified

See VI on discovering Value Tensions for details.

B. Ethical Risks Identified

One of the key risks associated with **bias in AI algorithms** is the potential for these systems to unintentionally reinforce existing disparities. For example, if an AI system is trained on data that reflects educational imbalances, it may end up favoring applicants from well-known or prestigious schools, thereby excluding capable students from less privileged backgrounds.

Privacy Issues arise when efforts to increase transparency in the admissions process risk exposing applicants' personal information, potentially violating privacy laws and regulations. Therefore, it is crucial to strike a balance between openness in the admissions process with robust data protection.

Erosion of Trust occurs if applicants perceive the admissions process as overly opaque or driven solely by automated or not-human factors, leading them to lose confidence in the fairness of the system. Such a loss of trust could damage SFU's reputation and potentially alienate future applicants.

C. Organizing Themes and Priorities

Theme 1: Fairness and Inclusivity

The challenge of designing an admissions process that is both fair and inclusive, ensuring equal opportunities for students from diverse backgrounds while maintaining academic standards. Ensuring fairness is a central value for both the university and the applicants. Given its importance, this theme holds a high priority, as fairness is crucial for maintaining the integrity and reputation of SFU's admissions system.

Theme 2: Transparency and Trust in AI

The challenge lies in building a transparent admissions system that effectively integrates AI technology in a manner that fosters trust among applicants while also respecting privacy and confidentiality. While the need for transparency is vital, the use of AI must be balanced with human judgment to avoid

eroding trust. This challenge holds a priority of medium to high, as transparency and trust are crucial for the long-term success of the AI-assisted admissions process.

Theme 3: Privacy and Data Security

The challenge is striking the right balance between the need for transparency and ensuring strict compliance with privacy regulations. Protecting sensitive applicant information while maintaining transparency in the process is essential to avoid legal repercussions and preserve applicants' trust. This challenge holds a priority of medium, as privacy is legally mandated, but transparency and data security must be considered within the broader ethical concerns.

D. Finalized Ethical Challenges

1. Ensuring Inclusive Fairness in Admissions

The challenge lies in addressing academic standards while avoiding the reinforcement of socio-economic disparities. The admissions process must evolve to be inclusive of diverse student backgrounds without sacrificing the quality of education at SFU.

2. Building Trust in AI Processes

Ensuring that AI is used transparently and ethically in the admissions process is critical. The system must be designed to maintain human oversight, which will help foster trust while preventing biases inherent in automated systems.

3. Safeguarding Applicant Privacy

To enhance transparency without violating privacy laws, SFU must ensure that sensitive applicant data is protected. This includes using secure systems for data processing and finding ways to disclose relevant information without risking exposure of private details.

E. Conclusion

In conclusion, key ethical challenges in SFU's admissions process include ensuring fairness, fostering transparency while protecting privacy, and balancing trust in AI with human oversight. The primary risks involve AI bias, privacy concerns, and the erosion of trust. To address these, the admissions process must be more inclusive, transparent, and secure, maintaining academic standards and fairness. AI integration should be cautious, with human judgment central to avoid biases and protect privacy. These challenges emphasize the need for a balanced approach to technology in education, improving efficiency and equity without compromising trust or fairness.

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