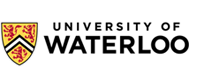


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| **MICROSOFT AZURE & AI PROJECT PLANNING TOOL** |

Project Name: Accessibility: Building Design Tool

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| PROBLEM STATEMENT  What’s the problem you are attempting to solve?  What’s the underlying cause of this problem? Why is it important?  The use of artificial intelligence/machine learning helps architects improve accessibility in new and old projects. Many structures today only have the basics in accommodations, and some do not have any at all. Not enough is being done to be inclusive of people with disabilities, which means those people do not get to live a customary life. One of the worst problems, which we will focus on, is inconvenient navigation through buildings. People with mobility issues (wheelchairs, crutches, canes, etc.) may often have an especially miserable time moving through crowded buildings with narrow hallways, inconvenient doors, congestion at elevators, far distances to bathrooms, etc. While all parts of the building may still be technically accessible (therefore legal), it is not a pleasant experience for those who actually need to move through it. | PROPOSED SOLUTION  How will your project solve the problem that you have identified? Briefly describe the technological innovation you are proposing.  An AI program that predicts the traffic flow of people in corridors, elevators, rooms, etc., to predict areas of congestion. An architect would be notified of these locations and could improve the design to allow for people with mobility issues to traverse a building more easily. The AI may predict when hallways are too narrow, or when bathrooms are too far from the workspace, or when there are too few elevators nearby, or anything else that may inconvenience those who already have trouble getting around.  This is a machine learning solution. It predicts the position of people in the building at any particular time. |
| TASKS TO COMPLETE  What specific tasks must you carry out to accomplish this solution? These may be technical and/or logistical.   * Research further into architecture and accessibility standards for buildings (see Future Research) * Collect data (see Data Sources) * Set up virtual machines for machine learning and train a model * Deploy model as a feature or plugin for architectural design software   For this case, Azure HDinsight would be a possible solution. Essentially the flowrate of people in various locations can be expressed as a graph, with each location as a node with corresponding flowrate and other information. Azure HDinsight would allow customized data structure analysis thus to determine the efficiency of different location. Also, privacy can be achieved by removing all personal information when importing the data into the data structure. To gather the data, Azure computer vision using Object Detection can allow a machine to count people for us to quickly gather a dataset via a camera setup in a building. | DATA SOURCES  What data sets are you planning to use for your artificial intelligence and/or cloud computing project? Why?  We would need to train a dataset with information of how people commonly traverse a building. This would help us monitor the flow in a building. We would collect data on traffic flow from any businesses who choose to participate. Data may include floor plans, employee work schedules, daily customers, and of course, how people typically move through the building. We’re thinking of using services like Google Maps as an example for predicting routes through buildings. Survey results and data from people with disabilities on what they like about certain buildings could also be added. |



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| MEASURING IMPACT  What positive impact will your project have on society? How will you measure it? How will you mitigate negative social and environmental impacts?  The impacts of such a project will allow for more people to experience a more inclusive and accessible life. It can allow them to enjoy many things a person with no disabilities enjoy. This could be measured through surveys of those with disabilities. By providing a more convenient experience for those who normally have trouble getting around (physically disable, blind, etc.), we could help them feel more comfortable in public and less ashamed of their condition. | BUSINESS CASE  How will your project be economically viable and financially sustainable? How does it have positive impact while generating revenue?  More people with mobility disabilities can more easily reach places they could not before allowing more businesses to do more business. It would allow business to expand to allow people with disabilities to work comfortably for them, this would bring in a lot of talent into the workforce and let a company thrive. It may also attract more disabled customers if they know the building nicely accommodates them. The service itself (as used by architects) could even be free if we find businesses willing to share their data for charity. In the case of a not-for-profit, we would rely on donations for developing the AI. |
| ETHICAL CONSIDERATIONS  How does your project take into consideration ethical issues like anonymity, confidentiality, consent, privacy, safety?  People with disabilities may require certain amenities, and they are the project's target audience. Making something understandable is a good place to start when it comes to being ethical. Code of ethics will be followed. Safety can be taking into consideration by making sure it is User friendly and understandable, so no harm is done. Privacy and confidentiality can be brought into account when users are disclosing their accessibility concerns and/or when using accommodations with consent of any disclose information. | FUTURE RESEARCH  What future research must be done to improve your project or to further address the problem that your identified?  The reliability of the model must be check by comparing it to some real locations. We would need more research on current accessibility standards. With further research on different countries and their standards allowing for software that can be used more universally. We would also need to better understand architecture, and how an architect would typically respond to concerns such as, “This hallway is too narrow.” |