

Building Design Tool

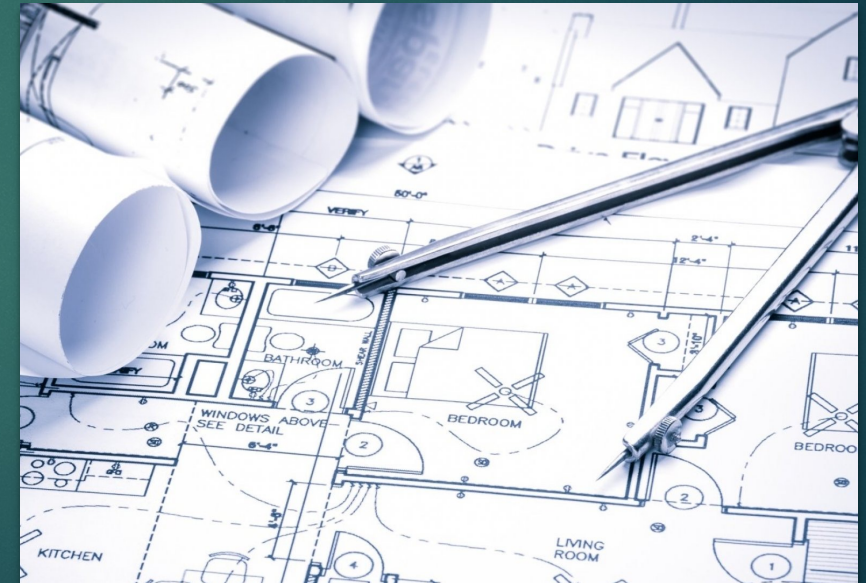
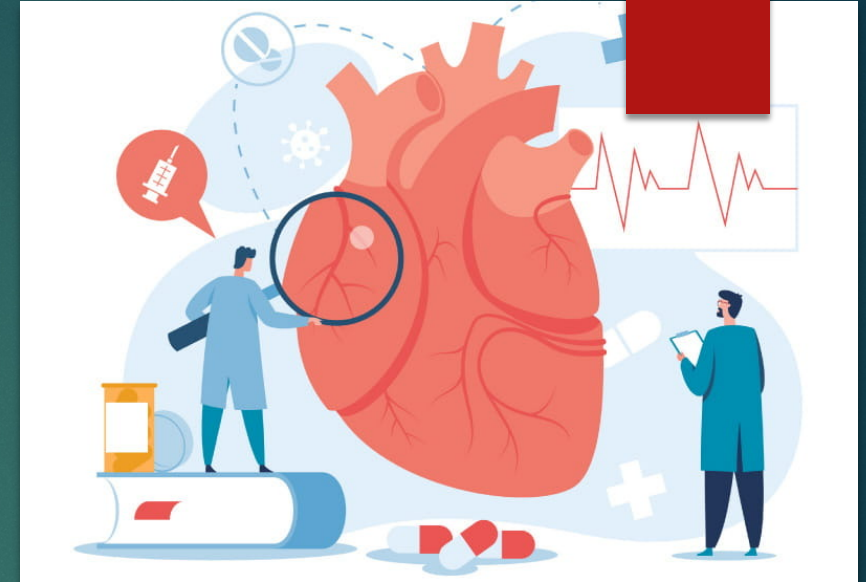
CREATE INFRASTRUCTURES USING AESTHETICALLY PLEASING IDEAS





Design Ideas for Architects

- ▶ The importance of accessibility services to accommodate individuals with dementia and/or cardiovascular disease.
- ▶ Dementia and cardiovascular disease depend on each other.
- ▶ Implementing two AI solutions as a guiding principle for architects to make informed decisions.



What will be covered in the presentation?



Problem
Statement



Proposed
Solution



Data Sources



Measuring
Impact



Business Case



Ethical
Considerations

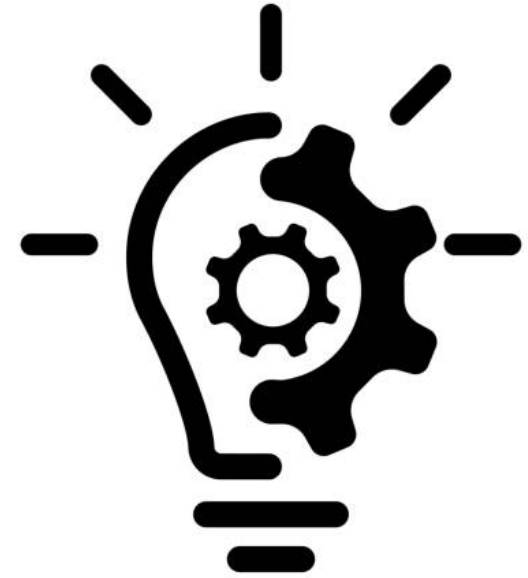


Future
Research

What is in it for you?

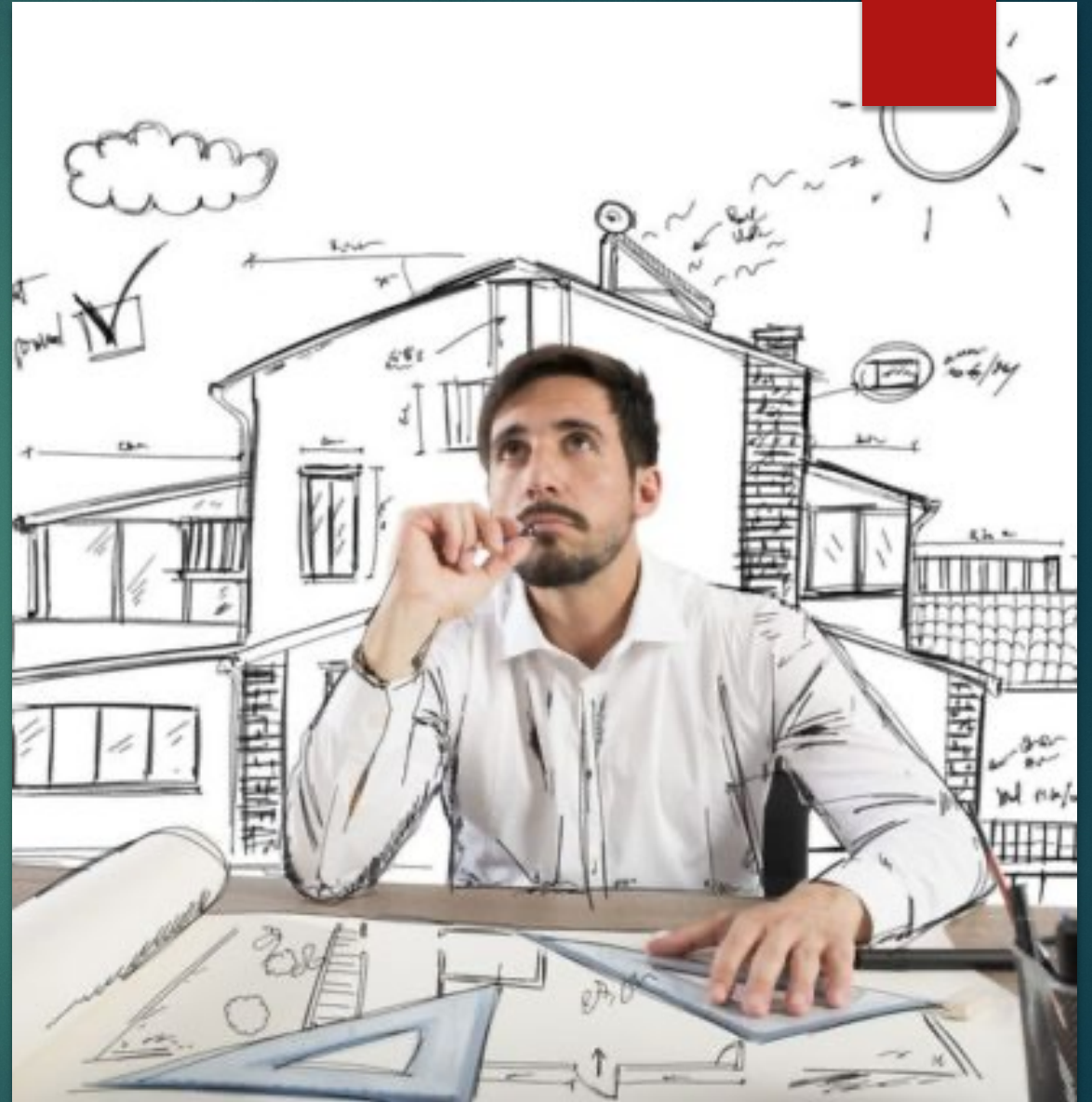
You will learn about:

- ▶ The practical uses of AI in accessibility.
- ▶ Challenges and benefits of developing in this field.
- ▶ Ideas for applying AI in your own work.
- ▶ Exploring this field and advancing it further.



Problem Statement

- ▶ There has only been a focus on adding accessibility to buildings
- ▶ Could patrons with a disability experience the aesthetic features of a building like the abled-bodied?



In What Form?



APPLICATION



IN-HOUSE DISTRIBUTION

Proposed Solution



Classification ML Model

- ▶ Use Machine learning designer to predict the type of disability to inform an uninformed patron.
- ▶ Store disabled patron medical records while rejecting healthy records from a database.

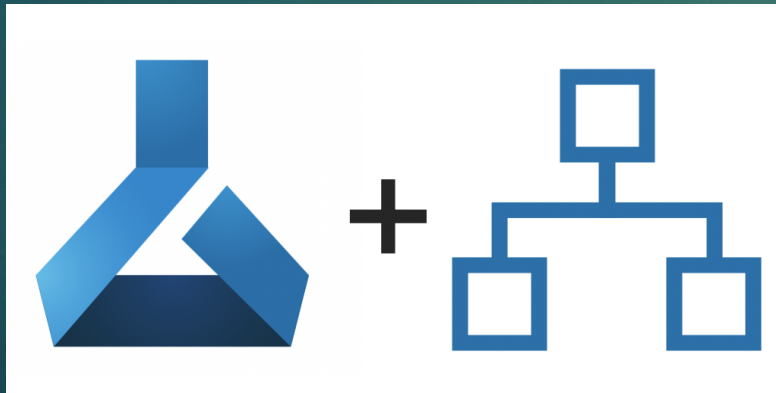
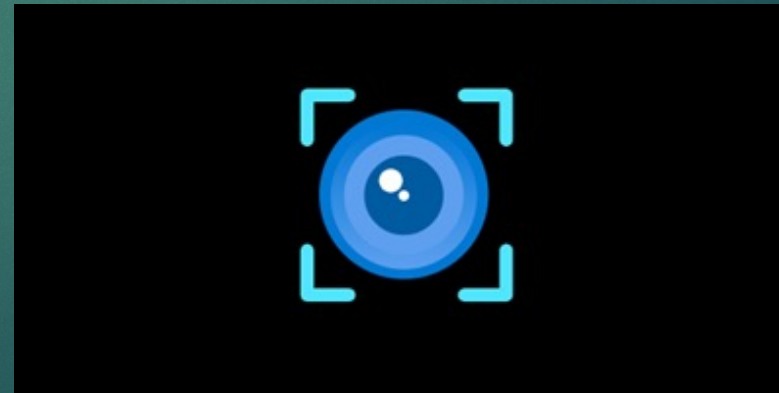


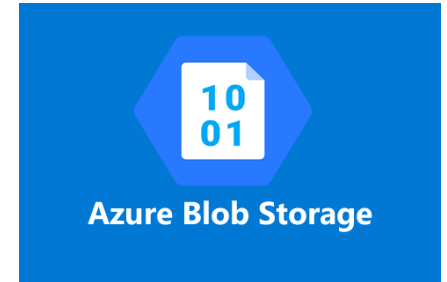
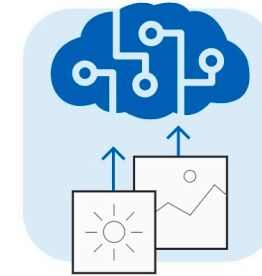
Image Classification Model

- ▶ Use predicted outcomes from the designer tool as tags to train the image classification model.
- ▶ Show certain images to a certain disability using the custom vision studio.



Azure Resources/Tools Overview

- ▶ Azure Machine Learning Classification Model
- ▶ Azure Custom Vision Service
- ▶ Azure Inference Cluster
 - Azure Kubernetes Service(AKS)
- ▶ Azure Blob Storage
- ▶ Azure Command Line Interface(CLI)
 - Using PowerShell or Bash Commands



Azure Kubernetes Service (AKS)

Data Sources

- ▶ The two datasets that we will be using are Dementia Prediction Dataset and Cardiovascular Disease Detection.
- ▶ Dementia Dataset: classifies individuals as either demented/converted or non-demented
- ▶ The age group tested were adults from the age of 40 years and above.
- ▶ Cardiovascular Dataset: classifies individuals as healthy or suffering from cardiovascular disease

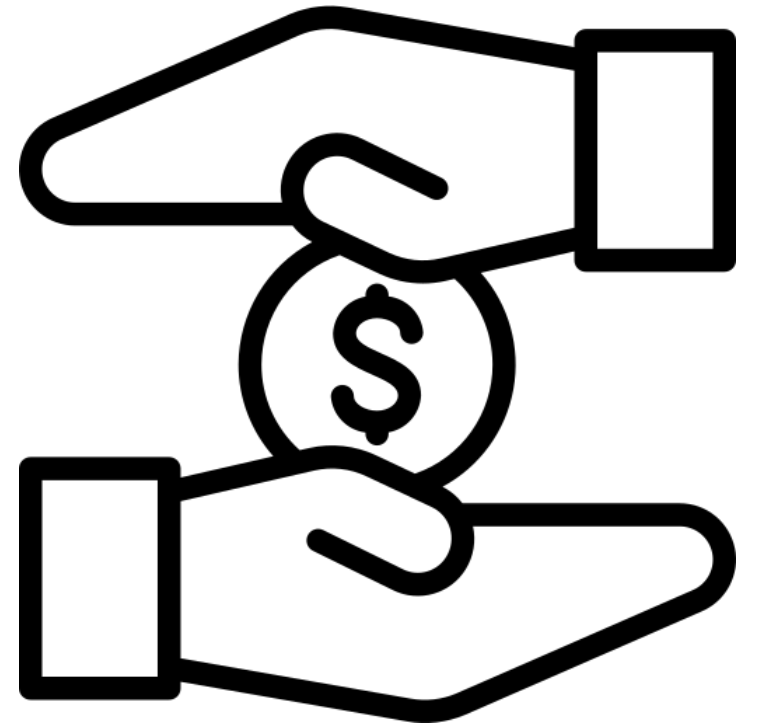
Dataset links:

<https://www.kaggle.com/datasets/bhadaneeraj/cardio-vascular-disease-detection>

<https://www.kaggle.com/datasets/shashwatwork/dementia-prediction-dataset>

Business Case

- ▶ The project has economic benefits.
- ▶ Dementia patients cost a **significant amount**.
- ▶ Preventative care is cheaper than routine or primary care.
- ▶ Funding comes from government grants.
- ▶ Costs include research, training the model, and platforming for clinics to use.



Microsoft Cost Calculator

\$200/Month

**Upkeeping
and training**

Measuring Impact

How this MLT can Benefit Society

- ▶ Connection between dementia and cardiovascular disease.
- ▶ Can predict and diagnose both diseases up to two years before symptoms appear.
- ▶ Help with decision making and preparation for these illnesses.

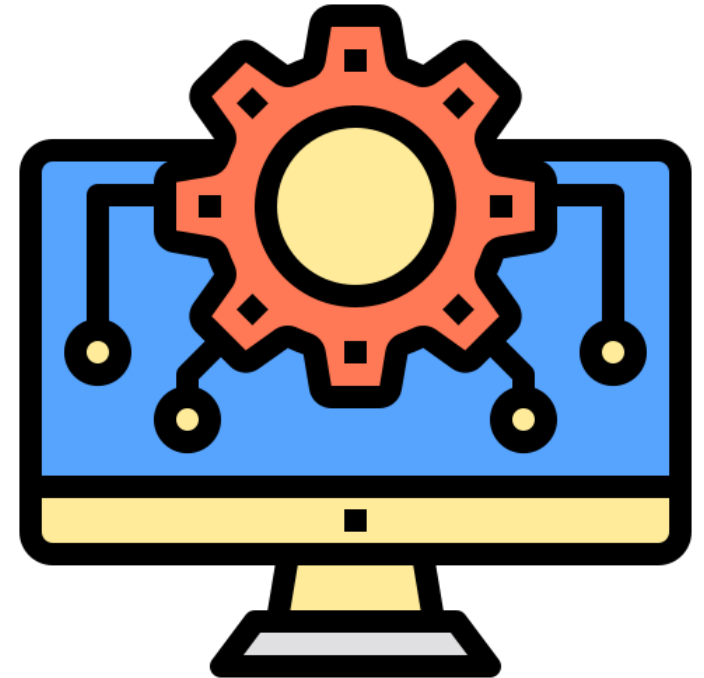
**Helps people lead safer lives,
creating a positive impact on
society**



Measuring Impact

Measuring and Mitigating Negative Impacts

- ▶ Regular scans and examinations
- ▶ **Not** 100% accurate
- Enhancing algorithms to increase accuracy rates and mitigate false negatives



Ethical Considerations

- ▶ Privacy and security
- ▶ Consent
- ▶ Safety and Reliability
- ▶ Inclusiveness



Responsible AI



Future Research

- ▶ Consideration of multiple diseases instead of two.
- ▶ Improve machine learning model performance by feeding more data.
- ▶ Receive and incorporate user feedback.
- ▶ Implement feature Re-engineering for effectiveness and efficiency.





Q&A Session

Are there any questions?

Sources Used

- ▶ <https://www.nih.gov/news-events/nih-research-matters/risk-factors-heart-disease-linked-dementia#:~:text=Risk%20factors%20include%20aging%2C%20diabetes,to%20the%20development%20of%20dementia> (Research on how dementia and cardiovascular disease are linked together)
- ▶ <https://microsoftlearning.github.io/AI-900-AIFundamentals/instructions/02b-create-classification-model.html> (Steps to train and deploy an ML classification model using the designer tool)
- ▶ <https://microsoftlearning.github.io/AI-900-AIFundamentals/instructions/03a-classify-images.html> (Steps to train and deploy an image classification model using the custom vision portal)
- ▶ <https://learn.microsoft.com/en-us/azure/machine-learning/concept-responsible-ai> (In-depth explanation of what is responsible AI and why is it important)
- ▶ <https://research.aimultiple.com/data-collection-methods/> (Various techniques in order to improve an AI solution)
- ▶ <https://learn.microsoft.com/en-us/dotnet/maui/ios/deployment/publish-in-house?view=net-maui-7.0&tabs=vs> (Publish an IOS app for in-house distribution)