AI project

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Summary of ideas to present

01
Pictoblox Project

02
Issues we faced

03
Things we learned

04
Sus_face AI

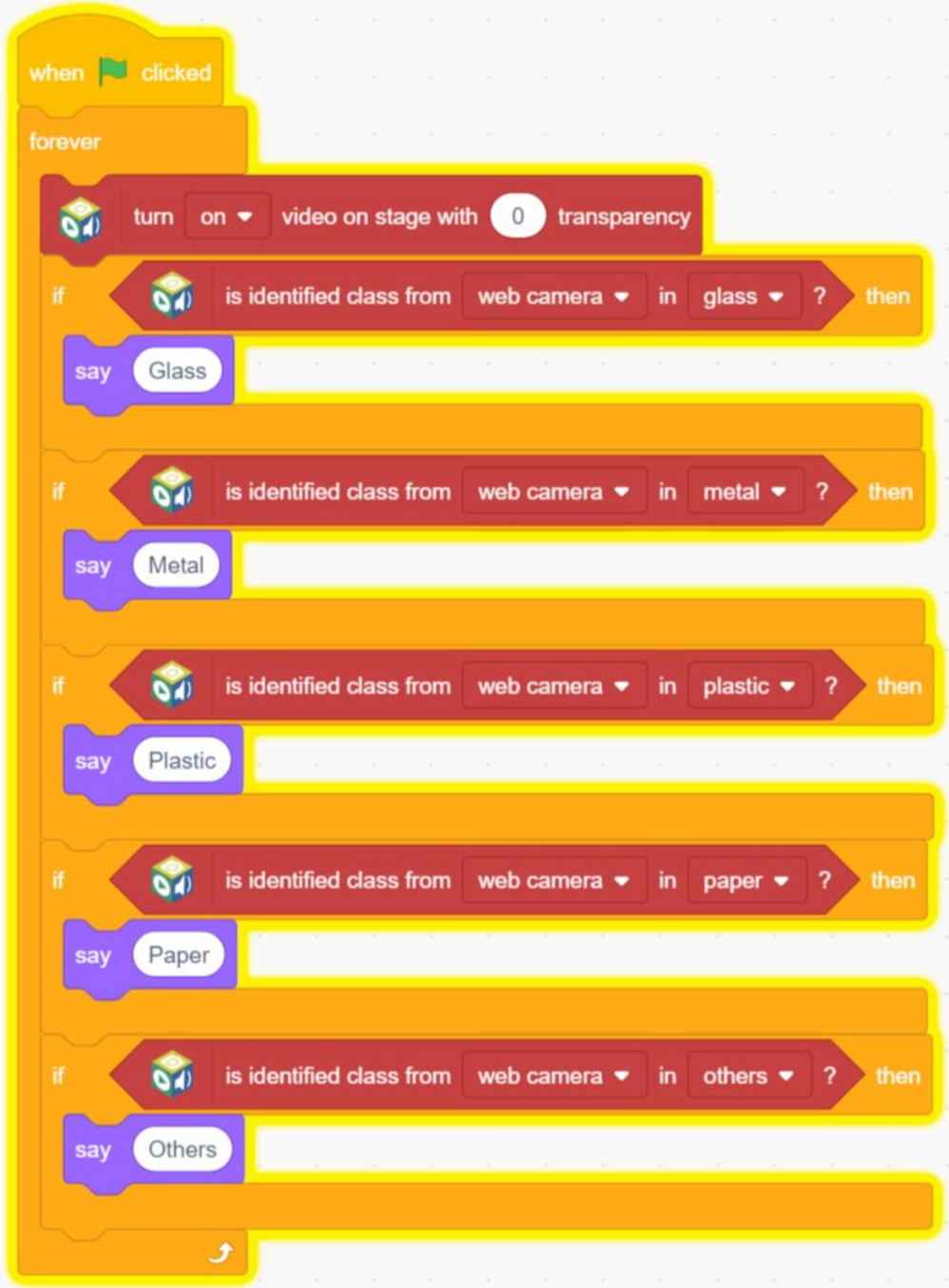
05
Issues we faced

06
Things we learned

PICTOBLOX

Description of project

- to help sort items based on material of the object
- used teachable machines
- data: items from home and school


when clicked
forever
turn on video on stage with 0 transparency
if is identified class from web camera in glass ? then
say Glass
if is identified class from web camera in metal ? then
say Metal
if is identified class from web camera in plastic ? then
say Plastic
if is identified class from web camera in paper ? then
say Paper
if is identified class from web camera in others ? then
say Others

Issues we faced

- plastic and metal were too similar
- not enough variation of objects (shapes were too similar)

Things we learnt

- small data means a less accurate prediction
- poor data also affects prediction

CHAPTER 1: GATHERING DATA

Description of Data

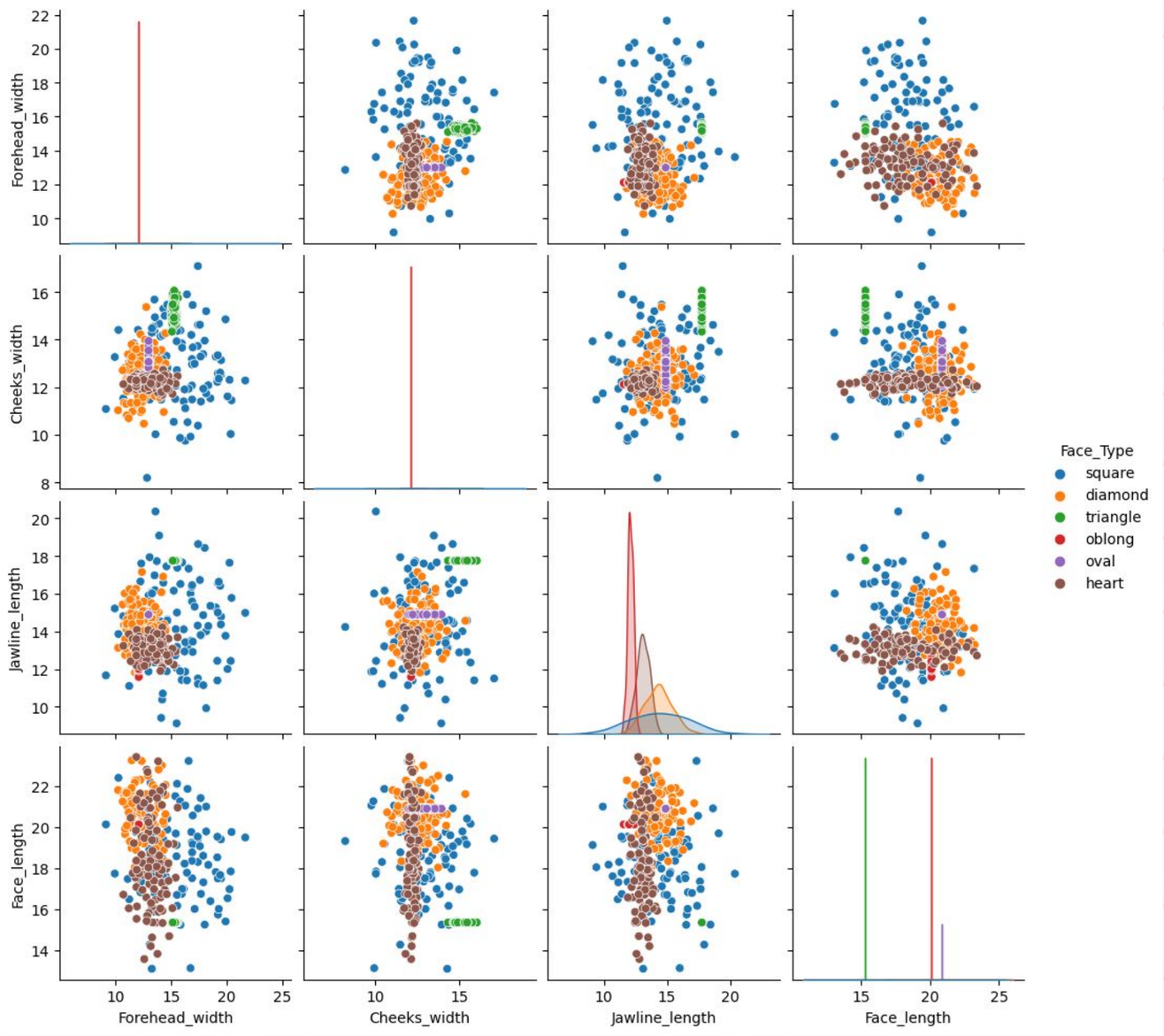
- The faces data which contains the features such as forehead width, cheeks width, jawline length, face length and the target which is the face type.

faces_data.csv

	A	B	C	D	E
569	13.33751468	11.9516044	13.60289481	21.64070177	heart
570	12.97567457	11.86299102	14.06957126	20.45631325	heart
571	13.35818001	12.32567746	12.62920001	15.35060292	heart
572	12.89171117	12.22181789	12.27556989	20.32245018	heart
573	13.49118162	12.39373556	13.92900055	16.9709781	heart
574	12.86764827	12.00238433	13.01533334	15.66827614	heart
575	12.99487392	12.04992011	12.95917199	20.21714951	heart
576	12.23927111	11.94005239	13.55300103	21.62440383	heart
577	12.82976917	12.36955983	12.51312696	15.41705018	heart
578	14.84165905	12.19957134	12.77297865	14.6823793	heart
579	14.79071308	11.89515787	12.41365144	17.37593745	heart
580	14.18246048	12.22979177	13.55134032	17.902687	heart
581	14.25242812	12.30610433	13.32067959	15.32234189	heart
582	12.62888015	11.94705785	12.16670107	19.45412739	heart
583	13.72597973	12.11004829	12.76933993	18.07213614	heart
584	11.93753976	12.00783589	13.4464593	17.91453321	heart
585	14.15606508	11.79712643	13.85074164	16.74941826	heart
586	12.45000427	12.3942503	13.2645437	16.9324071	heart
587	11.87299914	12.32458386	13.0086237	19.8276238	heart
588	13.22313056	12.34373081	13.5841785	16.29520221	heart
589	14.62601674	11.94139047	12.74845428	16.72191519	heart
590	13.76454198	12.13804007	13.87005408	21.40814017	heart
591	12.57420398	12.30366308	12.86151038	21.1623689	heart
592	11.40127344	12.32438079	12.41645992	20.4421678	heart
593	12.98553141	12.00643599	12.87067628	18.02258327	heart
594	11.89926839	12.03641694	12.71460038	23.40405988	heart
595	13.31493862	12.1080236	13.09420825	19.3608252	heart
596	11.90952514	12.17957918	13.42662706	21.31275551	heart
597	13.33812626	12.36563659	13.50783757	18.84844942	heart
598	13.19363117	12.15901138	13.60415383	14.19630615	heart
599	14.05435957	12.38468961	13.30658283	16.02749313	heart
600	11.89713195	12.28627699	13.58646207	18.35716742	heart

CHAPTER 2: PREPARING DATA

Relevant charts/diagrams



Relevant Math

$$\frac{dE}{d\alpha_m} = \frac{d(\sum_{y_i=k_m(x_i)} w_i^{(m)} e^{-\alpha_m} + \sum_{y_i \neq k_m(x_i)} w_i^{(m)} e^{\alpha_m})}{d\alpha_m}$$

$$r_{im} = -\left[\frac{\partial L(y_i, F(x_i))}{\partial F(x_i)}\right]_{F(x)=F_{m-1}(x)} \quad \text{for } i = 1, \ldots, n.$$

$$F_{m+1}(x_i) = F_m(x_i) + h_m(x_i) = y_i$$

$$E = \sum_{y_i=k_m(x_i)} w_i^{(m)} e^{-\alpha_m} + \sum_{y_i \neq k_m(x_i)} w_i^{(m)} e^{\alpha_m}$$
$$= \sum_{i=1}^{N} w_i^{(m)} e^{-\alpha_m} + \sum_{y_i \neq k_m(x_i)} w_i^{(m)} (e^{\alpha_m} - e^{-\alpha_m})$$

$$\gamma_m = \arg\min_{\gamma} \sum_{i=1}^{n} L(y_i, F_m(x_i)) = \arg\min_{\gamma} \sum_{i=1}^{n} L\left(y_i, F_{m-1}(x_i) - \gamma \nabla_{F_{m-1}} L(y_i, F_{m-1}(x_i))\right).$$

$$\sum_i \phi(i, y, f) = \sum_i \ln\left(1 + e^{-y_i f(x_i)}\right).$$

$$L_{\text{MSE}} = \frac{1}{n} \sum_{i=1}^{n} (y_i - F(x_i))^2$$

$$-\frac{\partial L_{\text{MSE}}}{\partial F(x_i)} = \frac{2}{n}(y_i - F(x_i)) = \frac{2}{n} h_m(x_i).$$

$$\frac{\sum_{h_{t+1}(x_i)=y_i} w_{i,t+1}}{\sum_{h_{t+1}(x_i)\neq y_i} w_{i,t+1}} = \frac{\sum_{h_t(x_i)=y_i} w_{i,t}}{\sum_{h_t(x_i)\neq y_i} w_{i,t}}$$

$$F_0(x) = \arg\min_{\gamma} \sum_{i=1}^{n} L(y_i, \gamma),$$

$$F_m(x) = F_{m-1}(x) + \left(\arg\min_{h_m \in \mathcal{H}} \left[\sum_{i=1}^{n} L(y_i, F_{m-1}(x_i) + h_m(x_i))\right]\right)(x),$$

CHAPTER 3: CHOOSING A MODEL

Model chosen

- We initially wanted to use Decision Tree model, which gave us 85% accuracy
- But we wanted a model that gave us a higher accuracy
- We tried to use Ada Boost Classifier which gave 25% accuracy.
- Then we tried to use Hist Gradient Boosting Classifier which gave 95% accuracy
- We settled with that

[8]
```
# Create Decision Tree classifer object
clf = DecisionTreeClassifier()

# Train Decision Tree Classifer
clf = clf.fit(X_train,y_train)

#Predict the response for test dataset
y_pred = clf.predict(X_test)

```

[9]
```
# Model Accuracy, how often is the classifier correct?
print("Accuracy:",metrics.accuracy_score(y_test, y_pred))

```

```
Accuracy: 0.8555555555555555
```

```
AdaBoostClassifier
AdaBoostClassifier()
```

- what does ".predict()" do?

```
# add comments here

predictions = clf.predict(X_test)

# what does "accuracy_score" does and what does it mean?
# add comments here

from sklearn.metrics import accuracy_score
accuracy_score(y_test, predictions)
```

```
0.25
```

CHAPTER 4: EVALUATION

Description of Evaluation results

- Explain the analytical methods or techniques used.
- Present the main findings and insights derived from the analysis.

Results

- Precision

95% accuracy

```
from sklearn.metrics import accuracy_score
accuracy_score(y_test, predictions)
```

```
0.95
```

- Recall

excellent

CONCLUSION: HOW WOULD YOU DEPLOY THE MODEL

Model Deployed to….

Deploy into website, connect this backend AI with React/Flask frontend

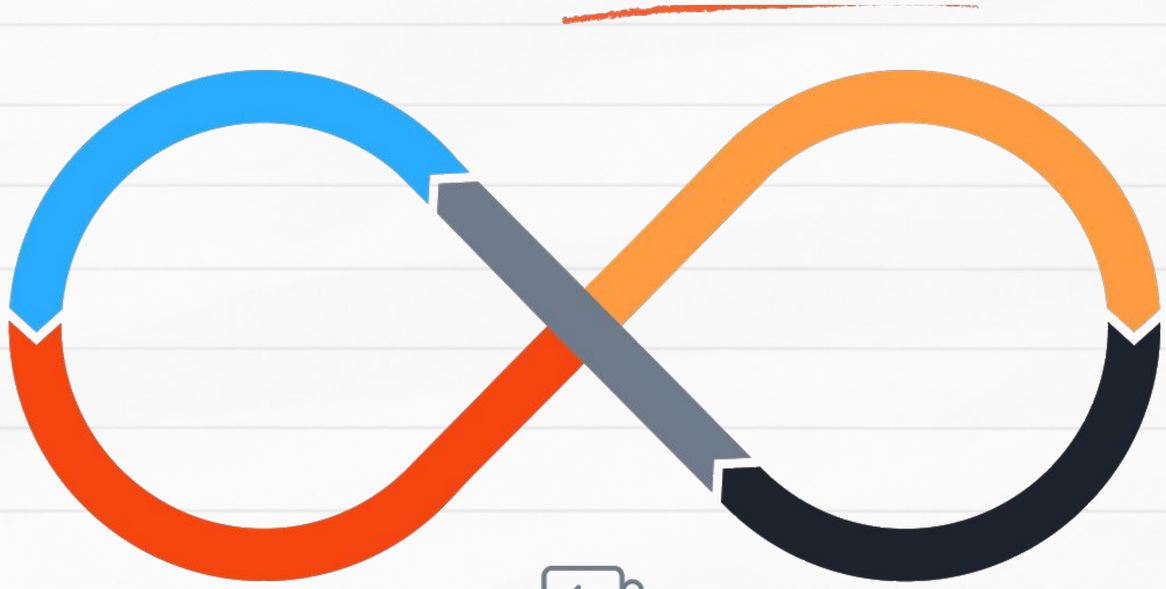
Can also create android and iOS application with this AI

Thank You!

Design thinking reference

- The next few slides are about design thinking
- You can use them as a reference to your presentation
- Do share how you’ve applied the steps of design thinking in your presentation

Design Thinking



Empathize
Understanding people

Ideate
Generating your ideas

Define
Figuring out the problem

Test
Refining the product

Prototype
Creation and experimentation

Key Process 1: Emphatise

- Understand the needs of humans in their daily lives.
- Identify laborious tasks that could be made easier using technology.

Key Process 2: Define

Clearly articulate the problem or challenge

- Eg, design a robot capable of effectively performing a laborious task at home.

- Why is it important for us to identify the problem?

Key Process 3: Ideate

- How can I solve this?
- What are some ways?
- What sensors I might incorporate?

Key Process 4: Prototype

- Design your own model.
- Take inspiration from the Internet or the past lessons.
- How can the model be programmed?

Key Process 5: Test

- Does the code work?
- How do you gather feedback?
- How do you test the solution?
- How do you publicise the solution?