

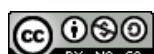
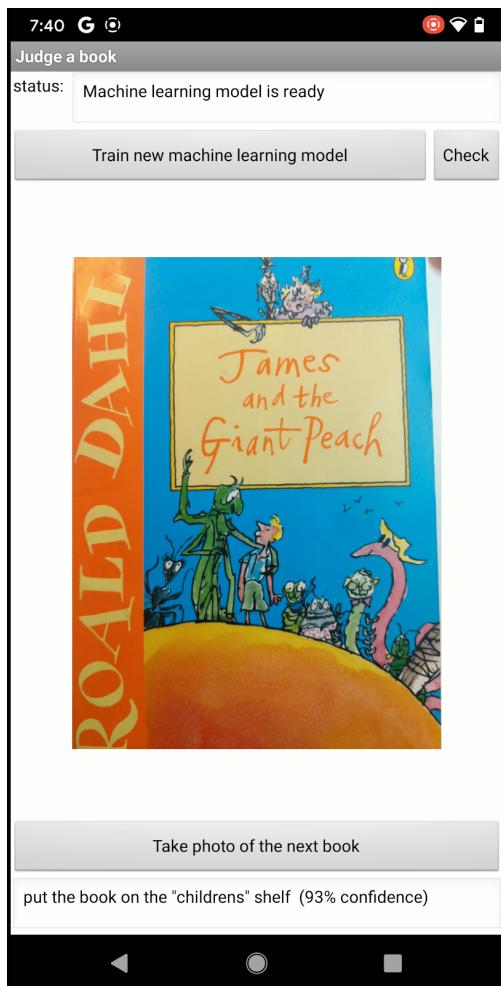


Judge a book

In this project, you will investigate whether it's really possible to judge a book by its cover.

You will make a mobile app for a library assistant. When you point the app camera at a book, it will recommend the best shelf to put the book on, just from what the cover looks like.

To do this, you'll need to train the computer to recognise book covers.



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1. Go to <https://machinelearningforkids.co.uk/> in a web browser

2. Click on “**Get started**”

3. Click on “**Log In**” and type in your username and password

If you don't have a username, ask your teacher or group leader.

If you've forgotten your password, ask your teacher or group leader to reset it for you.

4. Click on “**Projects**” on the top menu bar

5. Click the “**+ Add a new project**” button.

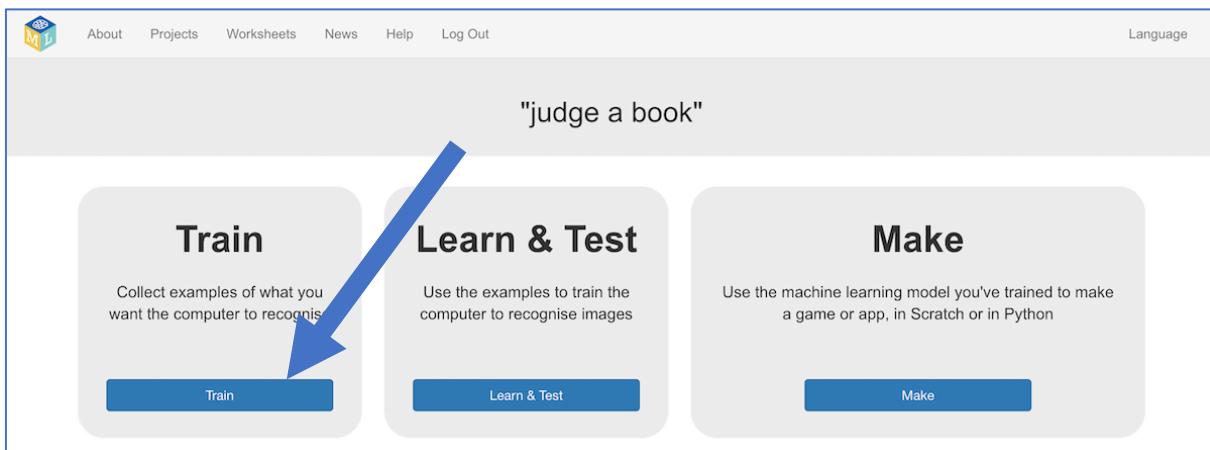
6. Name your project “judge a book” and set it to learn how to recognise “**images**”. Click “**Create**”

The screenshot shows a web page titled "Start a new machine learning project". At the top, there is a navigation bar with links for "About", "Projects", "Worksheets", "News", "Help", "Log Out", and "Language". Below the title, there is a "Project Name" input field containing "judge a book". Underneath it, a "Recognising" dropdown menu is open, showing the option "images". To the right of the dropdown, a tooltip provides information about the choice: "What type of thing do you want to teach the computer to recognise? For words, sentences or paragraphs, choose "text". For photos, diagrams and pictures, choose "images". For sets of numbers or multiple choices, choose "numbers". For voices and sounds, choose "sounds".". At the bottom right of the form are two buttons: "CREATE" and "CANCEL".

7. You should now see “**judge a book**” in your projects list. Click on it.

The screenshot shows a list of machine learning projects under the heading "Your machine learning projects". The first project listed is "judge a book", which is recognised for "images". A large blue arrow points to the "judge a book" project. To the right of the project list, there is a button labeled "+ Add a new project" and a trash can icon.

8. Click the “Train” button



9. Choose a few types of books.

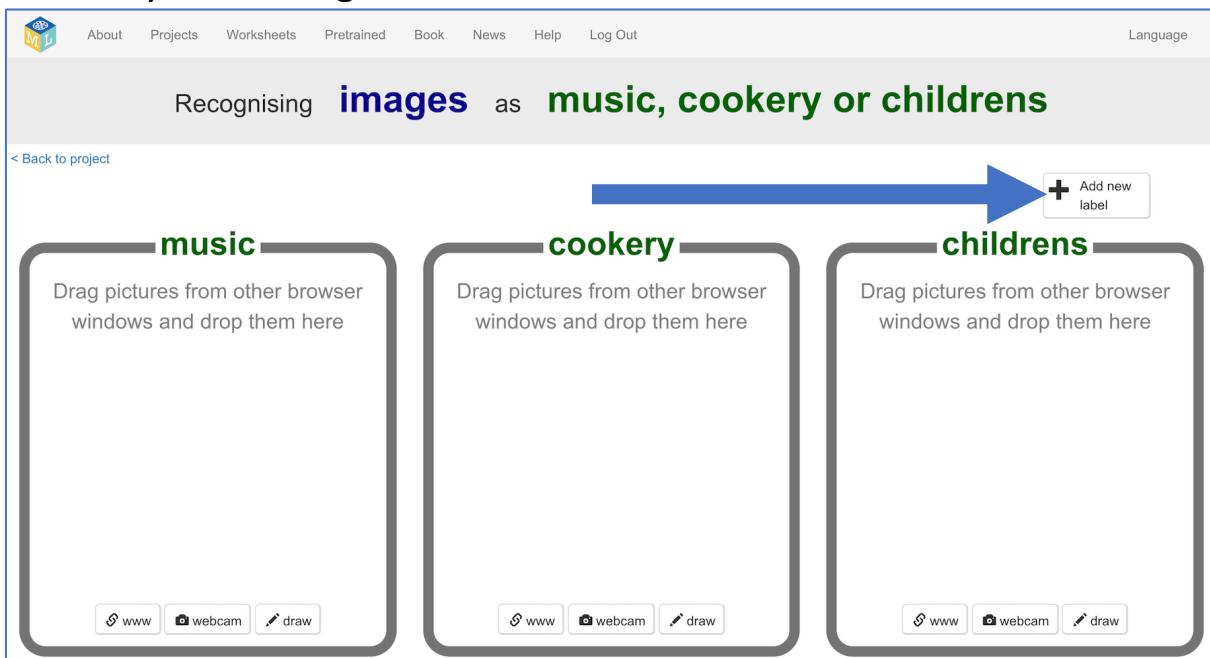
Imagine your app is going to be used to help sort books in a library, and you need to think of a few shelves in your library.

For the rest of this worksheet, I'll be using:

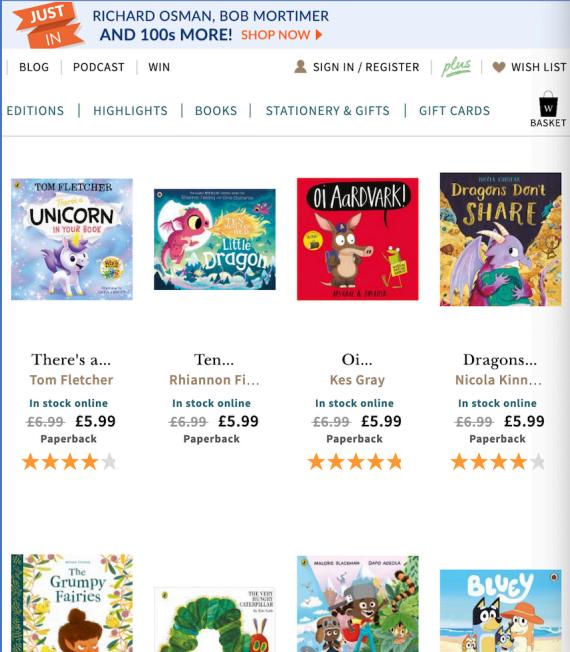
“music”, “cookery”, and “childrens”.

Choose your own. Books that obviously look different will be easier for the computer to recognize.

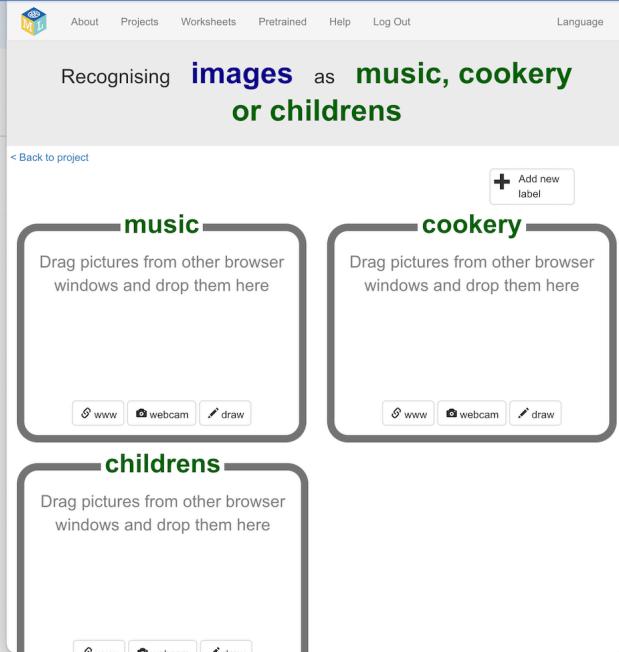
10. Use the “+ Add new label” button to create a bucket for each type of book you’re using.



- 11.** In another web browser window, find pictures of book covers. You need to find a website of pictures of book covers. This could be a library website, or a website that sells books. Find a site that arranges books by genre already to make it easier for you. Resize the windows so your training buckets are next to the book site.

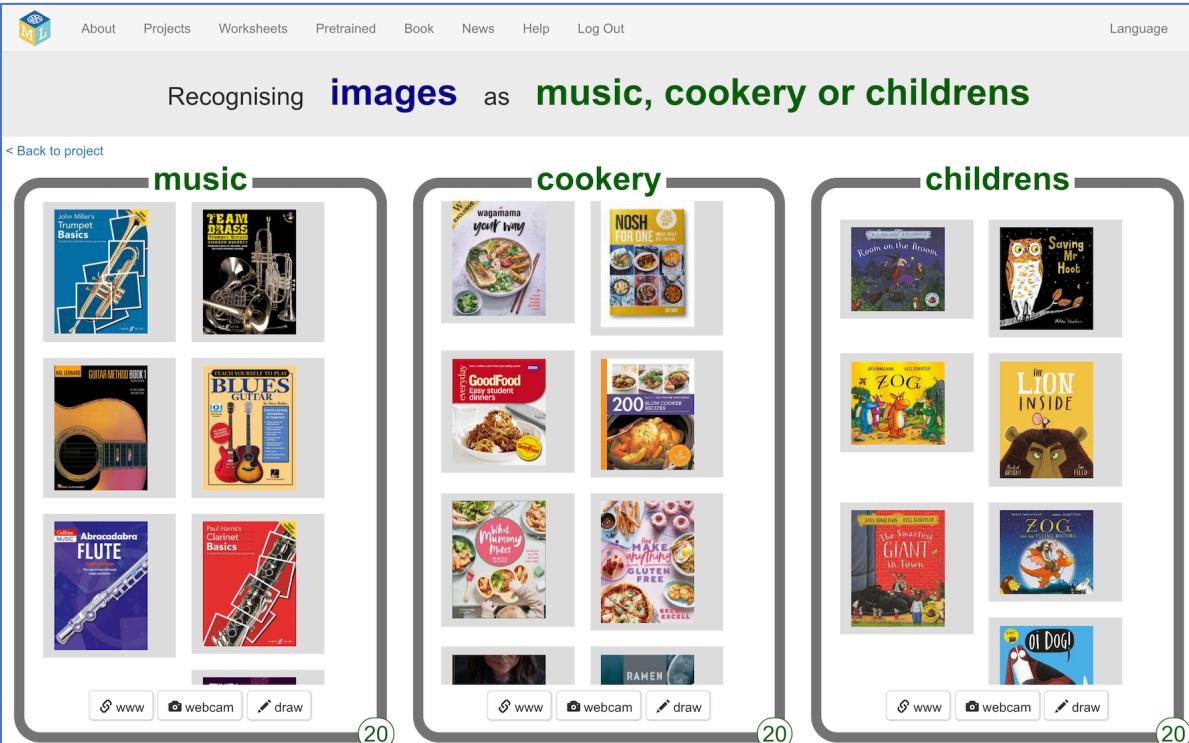


The screenshot shows a website for children's books. At the top, there's a banner for 'JUST IN' books by Richard Osmar, Bob Mortimer, and 100s more! with a 'SHOP NOW' button. Below the banner, there are navigation links for BLOG, PODCAST, WIN, SIGN IN / REGISTER, plus, WISHLIST, EDITIONS, HIGHLIGHTS, BOOKS, STATIONERY & GIFTS, and GIFT CARDS. A shopping basket icon is also present. The main content area displays four children's book covers: 'UNICORN IN YOUR BOOK' by Tom Fletcher, 'The Little Dragon' by Ten... Rhiannon Fi..., 'Oi Aardvark!' by Oi... Kes Gray, and 'Dragons Don't SHARE' by Nicola Kinn.... Each book has its title, author, price (£6.99), and a 'Paperback' link. Below each book cover is a five-star rating icon.



The screenshot shows a training interface titled 'Recognising images as music, cookery or childrens'. It features three sections: 'music', 'cookery', and 'childrens'. Each section has a placeholder box with the text 'Drag pictures from other browser windows and drop them here'. Below each box are three buttons: 'www', 'webcam', and 'draw'. A 'Language' dropdown menu is at the top right. The 'music' section has a 'Add new label' button. The 'childrens' section also has a placeholder box.

- 12.** Find pictures of book covers for each type that you chose. Drag the best examples into the correct buckets in your training page. Try and find about 20 examples of each type.



The screenshot shows a training interface titled 'Recognising images as music, cookery or childrens'. It features three sections: 'music', 'cookery', and 'childrens'. Each section contains a grid of book or recipe book covers. The 'music' section includes titles like 'John Miller's Trumpet Basics', 'TEAM BRASS', 'GUITAR METHOD BOOK 1', 'BLUES GUITAR', 'Abracadabra FLUTE', and 'Red Henrie's Clarinet Basics'. The 'cookery' section includes titles like 'wagamama your way', 'NOSH FOR ONE', 'The GoodFood Easy student guide', '200 Quick Cooker RECIPES', 'Salad Muffin Pies', 'The MAKE anything GLUTEN FREE COOKBOOK', and 'RAMEN'. The 'childrens' section includes titles like 'Room on the Broom', 'Saving Mr. Host', 'ZOG', 'LION INSIDE', 'ZOG and the Giant in Town', and 'Oi Dog!'. Each section has a placeholder box with the text 'Drag pictures from other browser windows and drop them here'. Below each box are three buttons: 'www', 'webcam', and 'draw'. A 'Language' dropdown menu is at the top right. The 'music' section has a 'Add new label' button. Each section has a '20' button at the bottom right.

13. Click the “< Back to project” link. Then click “Learn & Test”.

14. Click “Train new machine learning model”.

The screenshot shows the 'Machine learning models' page. At the top, there is a navigation bar with links for About, Projects, Worksheets, Pretrained, Book, News, Help, Log Out, and Language. Below the navigation bar, there are two main sections: 'What have you done?' and 'What's next?'. The 'What have you done?' section contains text about collected examples and a list of items collected. The 'What's next?' section contains text about starting training and a 'Train new machine learning model' button. A large blue arrow points from the text in the 'What's next?' section towards the 'Train new machine learning model' button.

15. Try out your machine learning model to see if it is working

Find another picture of a book cover.

Make sure you use one that you didn't use in the training.

Drag it into the test box where there is a space for a web address.

The screenshot shows the 'Learn & Test' page. It features a central testing interface with options to 'Test with webcam', 'Test by draw', and 'Test with www'. Below this is a text input field for a web address. To the right of the testing interface is a sidebar displaying book recommendations. The first recommendation is 'Comfort' by Ben Lebus, available in Kindle Edition for £11.49. The second recommendation is 'Flavours from Hungary' by Alicia Brezo, available in Paperback for £19.50. The third recommendation is 'Slimming World Weight Loss' by Slimming World, available in Office Product for £9.45.

16. Click on “Test with www”

You have collected:

- 20 examples of music,
- 20 examples of cookery,
- 20 examples of childrens

If the computer seems to have learned to recognise things correctly, then you can go to Scratch and use what the computer has learned to make a game!

If the computer is getting too many things wrong, you might want to go back to the Train page and add more examples.

Once you've done that, click on the button below to train a new machine learning model and see what difference the extra examples will make!

Try putting in an image to see how it is recognised based on your training.

Recognised as **cookery** with 77% confidence

Comfort MOB
by Ben Lebus | ★★★★☆ | Hardcover £10.00 £18.99 prime Get it FREE Delivery by 17 Sep Kindle Edition £11.49 £18.99 Available instantly

Sponsored Flavours from Hungary by Alicia Brezo Paperback £19.50 prime Get it FREE Delivery by 17 Sep

Sponsored Slimming World Weight Loss ★★★★☆ | Office Product £9.45

17. Try a few different book covers and see what your machine learning model has learned to recognize.

If you're not happy with the answers it is giving, go back to Step 12 and add more examples to your training buckets, then come back and train a new machine learning model.

When you're happy, carry on to Step 18.

18. Click on “< Back to project”

19. Click on the “Make” button

About Projects Worksheets Pretrained Book News Help Log Out Language

"judge a book"

Train
Collect examples of what you want the computer to recognise

Learn & Test
Use the examples you've given the computer to recognise images

Make
Use the machine learning model you've trained to make a game or app, in Scratch, Python, or App Inventor

20. Click the “App Inventor” button

The screenshot shows the ML4K website interface. At the top, there's a navigation bar with links for About, Projects, Worksheets, Pretrained, Book, News, Help, Log Out, and Language. Below the navigation, a main heading says "Make something with your machine learning model". There are three main sections: "Scratch 3" (with a Scratch logo and a screenshot of the Scratch 3 interface), "Python" (with a Python logo and a screenshot of Python code), and "App Inventor" (with an App Inventor logo and a screenshot of the App Inventor IDE). A large blue arrow originates from the top left and points directly at the "App Inventor" section.

21. Copy the App Inventor extension address shown in red

You'll need this in a moment

The screenshot shows the "Using machine learning in App Inventor" page. It includes a "Back to project" link and an "Open App Inventor" button. On the left, there's a block of text about using App Inventor to make mobile apps for Android phones and tablets, mentioning it runs in a web browser like Scratch and can be used with Machine Learning for Kids. It also provides a GitHub link for detailed instructions. On the right, there's a section titled "To add your machine learning model to your App Inventor project:" with three numbered steps: 1. Click on Import extension, 2. Click on URL, 3. Fill in the URL for your project. A red URL is highlighted: <https://machinelearningforkids.co.uk/api/appinventor/0760f710-17fe-11ec-94f0-7b0bc66803501d9971f6-9712-493a-8328-256f5f53c647/extension>. A large blue arrow originates from the top left and points towards the "Import extension" instructions.

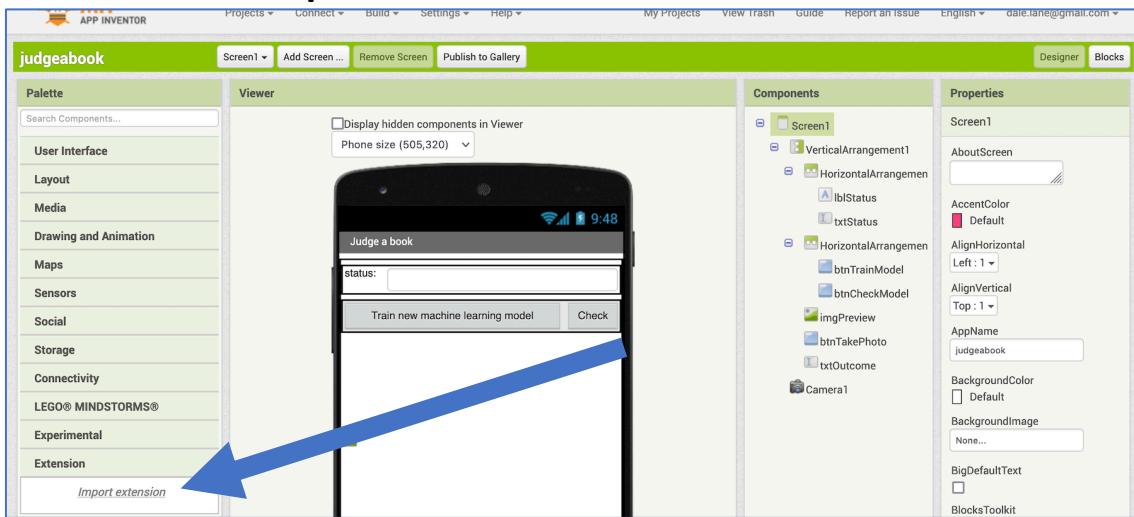
22. In a new web browser window, open the “judgeabook” template in App Inventor using this address:

<http://ai2.appinventor.mit.edu/?repo=raw.githubusercontent.com/dalelane/ml4k-appinventor-templates/master/judgeabook.asc>

If you're using a printed copy of this worksheet, use this short address instead:

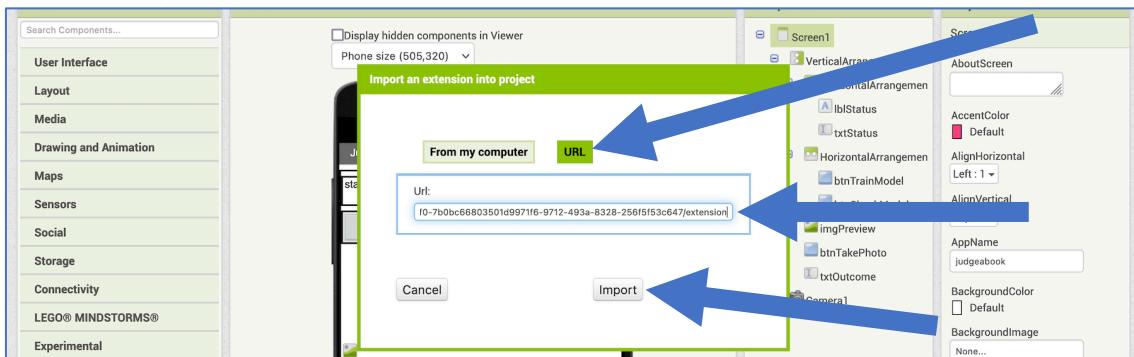
<https://ibm.biz/ai-template-book>

23. Click on “Import extension”



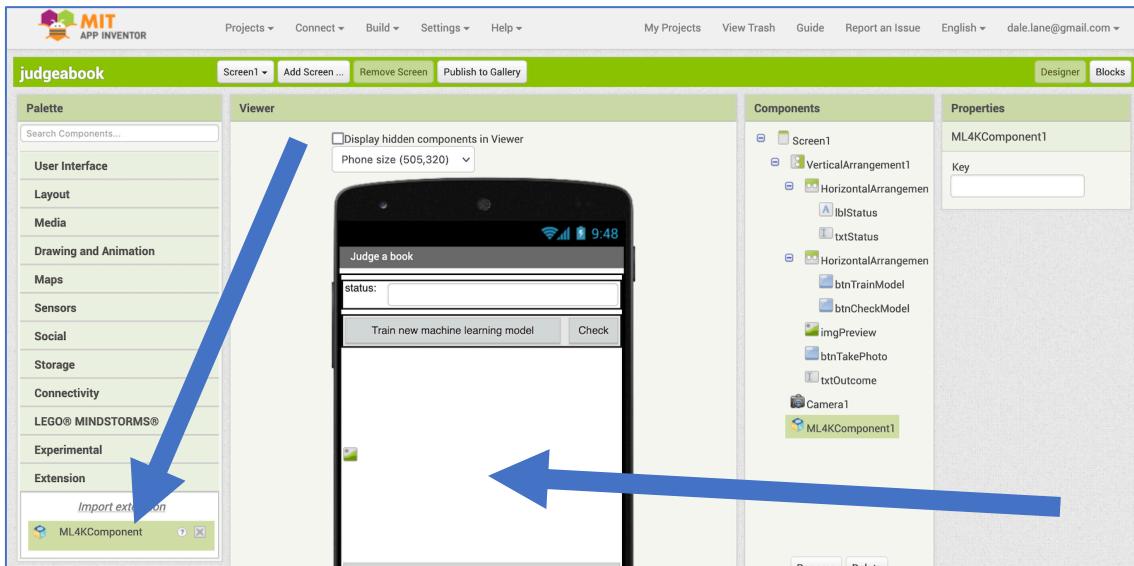
24. Click on the “URL” button

Paste the address from Step 21 (the red text) into the box
Click “Import”



25. Drag “ML4KComponent” from the list, and drop it on the phone.

It takes a few minutes for it to appear in the list. Please be patient!



- 26.** In the Blocks tab, find the “when btnTrainModel Click” code and add a TrainNewModel block so that it looks like this:

```
when btnTrainModel .Click
do set txtStatus .Text to "Training model ... "
  set btnTakePhoto .Enabled to false
  call ML4KComponent1 .TrainNewModel
```



- 27.** Find the “when btnCheckModel Click” code and add a GetModelState block so that it looks like this:

```
when btnCheckModel .Click
do set txtStatus .Text to "Checking model ... "
  set btnTakePhoto .Enabled to false
  call ML4KComponent1 .GetModelState
```



- 28.** Create the following code:

```
when ML4KComponent1 .GotStatus
  statusCode message
do call check_ML_model_status
  modelStatusCode get statusCode
```

- 29.** Find the “when Camera1 AfterPicture” code and add a ClassifyImage block so that it looks like this:

```
when Camera1 .AfterPicture
  image
do set txtOutcome .Text to "Analysing photo...."
  set imgPreview .Picture to get image
  call ML4KComponent1 .ClassifyImage
    path get image
```



30. Create the following code:

```
when ML4KComponent1 .GotClassification  
    data classification confidence  
do set txtOutcome Text to prepareRecommendation  
    classification get classification  
    confidence get confidence
```

31. It's time to test!

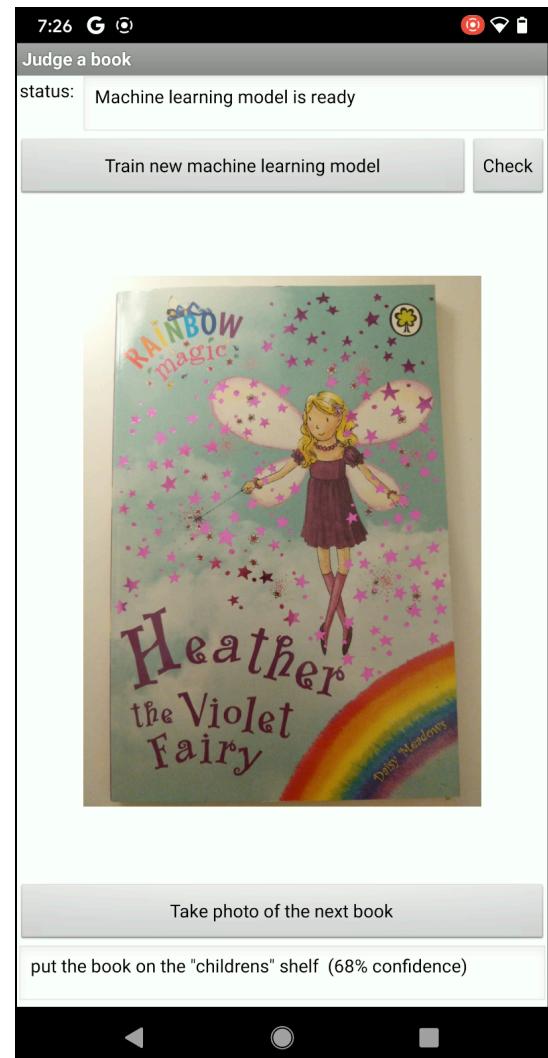
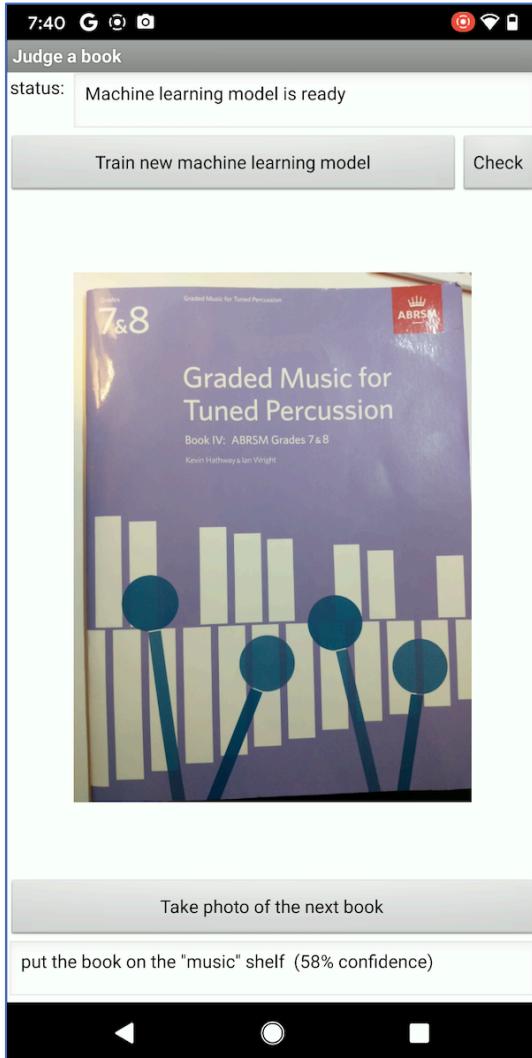
Deploy the app to an Android device

Click on the “Train new machine learning model” button

It will take a minute to train – click on “Check” to see if it’s finished

When it is ready, click on “Take photo of the next book”

Your app will predict what shelf the book belongs on!



- 32.** Try your app out with a few different books
Are you happy with the predictions that it makes?
What could you do to improve the predictions that the app makes?

What have you done?

You've trained a machine learning model to classify pictures. The computer learned from patterns in the colours and shapes from each of the images you've given it. These were used to recognise new covers.

This means your app will be able to predict the best place to put books, even new books that the app has never seen before, without needing any record of that book – other than what the cover looks like.

Ideas and Extensions

Now that you've finished, why not give one of these ideas a try?

Or come up with one of your own?

Alternative project ideas

Instead of book covers, why not try:

- album covers – train a computer to recognise the music genre of an album from a picture of the cover – do pop music albums look different from rap albums?
- movie posters – train a computer to recognise the type of movie based on a picture of the poster – do action movie posters look different from period drama movie posters?