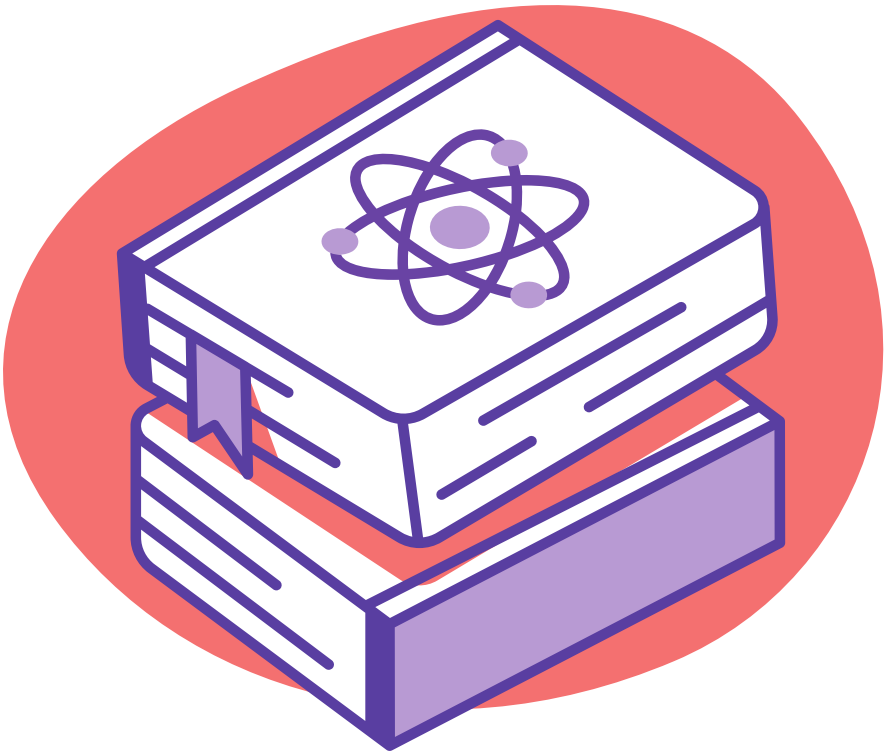
SCIENCE FAIR

PROJECT LOGBOOK

NOW YOU SEE ME TOO

JULY



JULY 19, 2023

I FINALLY GOT MY SCIENCE FAIR IDEA, IT IS A PAIR OF HEADPHONES THAT ARE ENHANCED WITH OBJECT DETECTION CAPABILITIES TO IMPROVE SAFETY FOR VARIOUS GROUPS, INCLUDING THE VISUALLY IMPAIRED, PEDESTRIANS, CHILDREN WALKING HOME, AND THE DEAF AND HARD OF HEARING. AND WHEN THE OBJECT IS DETECTED IT WILL PLAY AN AUDIO SIGNAL TELLING THE USER.

I NEED TO FIND SOFTWARE THAT HAS OBJECT-DETECTION CAPABILITIES. POSSIBLE SOLUTION

- OPEN CV AND PYTHON. BUT OPENCV IS HARD FOR BEGINNER CODERS AND I HAVE NEVER WORKED WITH ADVANCED PYTHON.
- HUSKY LENS, BUT OBJECT DETECTION IS MAINLY LIMITED TO ONLY FACIAL RECOGNITION AND IS MORE EXPENSIVE.
- THE ESP32 CAMERA MODULE IS A PROGRAMMABLE MICROCONTROLLER THAT CAN BE PROGRAMMED TO DETECT DIFFERENT OBJECTS.

AFTER BROWSING I FOUND A MACHINE LEARNING SOFTWARE CALLED EDGE IMPULSE WHERE YOU CAN TRAIN YOUR MODEL TO DETECT OBJECTS!

LATER IN THIS PROJECT, I NEED TO 3D PRINT A SHELL TO ATTACH TO THE SIDE OF THE EARCUP ON THE HEADPHONE TO ATTACH ALL THE TECHNOLOGY.

LATER TODAY I WATCHED SOME ONLINE TUTORIALS ON HOW TO USE EDGE IMPULSE WITH THE ESP32 CAMERA

JULY 20, 2023

TODAY I AM RESEARCHING FOR WHEN I DECIDE TO 3D PRINT THE EAR SHELL TO HOLD ALL OF THE TECH, AND AFTER RESEARCHING, THE AIRDRIE PUBLIC LIBRARY OFFERS 3D PRINTING BUT IT IS NOT THE CLOSEST, SO I ALSO DISCOVERED THAT THE U OF C OFFERS 3D PRINTING AT THE TAYLOR FAMILY DIGITAL LIBRARY, WHICH IS MUCH CLOSER TO MY HOUSE FOR WHEN I HAVE TO GO TO AND FROM TO MAKE NEW CHANGES TO TEH DESIGN SO IT FITS TEH HEADPHONES

SINCE ONE OF THE DEVICE ABILITIES IS TO VERBALLY SAY "PERSON/BIKER/DOG/ETC.. DETECTED" I NEED TO FIND AND MODULE THAT WILL RECORD MY VOICE SO I CAN PLAY AN AUDIO RECORDING SAYING "PERSON DETECTED" WHEN THERE IS A PERSON WHO IS IN RANGE OF THE CAMERA. THE VS1053 MP3 AUDIO PLAYER MODULE ALLOWS SOMEONE TO RECORD THEMSELF ON A SD CARD AND PLUG IT INTO THE MODULE SO YOU CAN CONNECT TO SPEAKER AND PLAY TEH RECORDING, AND I CAN REPURPOSE AN OLD SD CARD TO RECORD THE RECORDINGS.

LATER TODAY I REALIZED THAT THE VS1053 MODULE RECQUIRES A ARDUINO UNO R3 BOARD WHICH IS TOO BULK AND WONT WITH ON THE EARCUP OF THE HEADPHONES, I WILL CONTINUE TO SEARCH FOR A AUDIO MODULE.

I'M CONSIDERING USING THE DFPLAYER MINI AUDIO MODULE WITH THE ESP32 CAMERA. I'LL NEED A MICROSD TO RECORD FILES ON. THE MICROSD SHOULD BE UNDER 32GB FOR COMPATIBILITY. THIS MODULE IS MORE COMPACT AND CAN WORK WITH MY ESP32 CAMERA WITHOUT AN ARDUINO BOARD

JULY 31, 2023

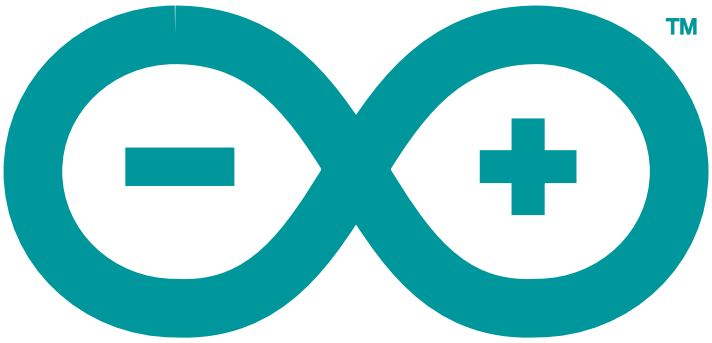
AFTER DOING SOME ONLINE SEARCHING, I FOUND A BUDGET-FRIENDLY PAIR OF BLUETOOTH HEADPHONES AT STAPLES. THEY HAVE A CONVENIENTLY FLAT EAR DESIGN, WHICH WILL MAKE IT EASIER TO INCORPORATE THE ADDITIONAL ELEMENTS I NEED AND SIMPLIFY THE 3D PRINT DESIGN PROCESS. HOWEVER, THESE HEADPHONES ARE CURRENTLY OUT OF STOCK AT MY LOCAL STAPLES, SO I`LL HAVE TO MAKE A TRIP TO COCHRANE TO FIND THEM.

I RECENTLY PURCHASED A 32GB MICROSD CARD FROM VISIONS ELECTRONICS, SPECIFICALLY FOR THE DFPLAYER MODULE. TODAY, I ALSO BOUGHT THE DFPLAYER, THE ESP32 CAM, AND A SMALL SPEAKER FOR AUDIO TRANSMISSION. I`M EXPECTING THE ESP32 CAM AND SPEAKER TO BE DELIVERED TOMORROW. WITH THESE COMPONENTS IN HAND, I WILL START A PROJECT ON EDGE IMPULSE TO TRAIN A MODEL USING MACHINE LEARNING TO DETECT PEOPLE, DOGS, BIKERS AND CARS. I WILL HAVE TO TAKE HUNDREDS OF PHOTOS OF EACH OBJECT TO THEN UPLOAD AND LABEL WHICH PART OF THE PICTURE IS THE HUMAN, DOG, ETC.. I WILL HAVE TO DRAW A BOX AROUND THE HUMAN SO IT OUTLINES THE HUMAN SO THE MACHINE WILL SOON LEARN WHAT A HUMAN IS. HOPEFULLY TOMMOROW I WILL START MY DATA COLLECTION. MY FAMILY MEMBERS HAVE VOLUNTER TO TAKE PHOTOS OF THEM TO TRAIN MY THE NEURAL NETWORK.

AUGUST

AUGUST 1, 2023

IN THE AFTERNOON, THE ESP32CAM AND THE MICRO SPEAKER FINALLY ARRIVED AT MY DOORSTEP. I TESTED THE ESP32 CAM. AFTER UPLOADING THE CODE TO THE ARDUINO, THE CAMERA IS RUNNING SMOOTHLY. THE NEXT STEPS INVOLVE COLLECTING IMAGES OF VARIOUS OBJECTS, THOUGH FOR NOW, I'LL START WITH SOME BASIC TESTS INVOLVING HUMANS, MAYBE A VEHICLE OR A DOG. THE PLAN WAS TO GATHER PHOTOS OF THESE SUBJECTS LATER IN THE DAY. HOWEVER, THE IMAGE COLLECTION PLANS HAVE BEEN PUSHED TO TOMORROW.



AUGUST 2, 2023

I RECEIVED AN EMAIL COMMUNICATION FROM AMAZON DETAILING THE UNFORESEEN ISSUE REGARDING THE DELIVERY OF THE DF PLAYER AUDIO MODULE. THE EMAIL STATES:

"DEAR CUSTOMER,
THANK YOU FOR VISITING US AND PURCHASING OUR PRODUCTS. WE HAVE JUST BEEN NOTIFIED BY THE LOGISTICS COMPANY THAT YOUR ORDER HAS BEEN INTERCEPTED BY CUSTOMS BECAUSE INTERNATIONAL LOGISTICS IS AFFECTED BY MANY UNCERTAIN FACTORS. WE APOLOGIZE FOR THIS AND HOPE FOR YOUR UNDERSTANDING. FOR THIS CAMPAIGN, WE RECOMMEND A FULL REFUND TO YOUR ORIGINAL PAYMENT ACCOUNT. ACCOUNT CAN BE CREDITED WITHIN 2 BUSINESS DAYS. IF YOU STILL NEED THIS PRODUCT, YOU CAN BUY IT LOCALLY. I WOULD LIKE TO KNOW IF YOU ARE SATISFIED WITH OUR PROPOSAL.
WE AWAIT YOUR RESPONSE, WE APOLOGIZE FOR THE INCONVENIENCE."

AS A RESULT OF THIS EMAIL, I NOW HAVE TO ORDER A PACK OF 5 MODULES ALTHOUGH I ONLY NEEDED ONE., DESPITE INITIALLY INTENDING TO PROCURE ONLY ONE. THIS ADJUSTMENT IS DUE TO THE UNEXPECTED CIRCUMSTANCES SURROUNDING THE DELIVERY OF THE PRODUCT.

AUGUST 3, 2023

LAST NIGHT, I PHOTOGRAPHED MY MOTHER WALKING OUR DOG FROM A PRECISE POSITION. THIS ANGLE WAS CAREFULLY CHOSEN TO GUARANTEE THAT THE PHOTOGRAPHS LOOK AT THE SAME ANGLE WHEN SEEN VIA HEADPHONES. THE GOAL OF THIS WORK WAS TO COLLECT DATA FOR DISTINGUISHING THESE TWO THINGS. DURING THIS SESSION, I TOOK ABOUT 140 PHOTOGRAPHS.

FOLLOWING THAT, I EDITED THESE IMAGES TO IMPROVE THEIR QUALITY. HOWEVER, FOLLOWING THE EDITING PROCEDURE, ONLY 94 IMAGES MET THE REQUIRED COMPETENCY LEVEL. I MOVED ON TO THE NEXT LEVEL WITH THESE 94 PHOTOGRAPHS, WHICH REQUIRED USING EDGE IMPULSE FOR MORE EDITING AND PROCESSING. ONLY 85 OF THE 94 IMAGES WERE CHOSEN FOR THIS STEP.

THE MODEL WAS THEN TRAINED USING THE HANDPICKED DATASET AS THE FOLLOWING STEP IN THE PROCESS. IT TOOK A LONG TIME, BUT THE EFFORT PAID OFF WHEN THE MODEL RECEIVED AN F1 SCORE OF 92.3%. THE F1 SCORE IS AN IMPORTANT INDICATOR IN BINARY CLASSIFICATION BECAUSE IT EFFICIENTLY BALANCES PRECISION AND RECALL. IT IS CALCULATED USING A FORMULA THAT TAKES BOTH OF THESE ELEMENTS INTO CONSIDERATION.

AUGUST 3, 2023

"IN STATISTICAL ANALYSIS OF BINARY CLASSIFICATION, THE F-SCORE OR F-MEASURE IS A MEASURE OF A TEST'S ACCURACY. IT IS CALCULATED FROM THE PRECISION AND RECALL OF THE TEST, WHERE THE PRECISION IS THE NUMBER OF TRUE POSITIVE RESULTS DIVIDED BY THE NUMBER OF ALL POSITIVE RESULTS, INCLUDING THOSE NOT IDENTIFIED CORRECTLY, AND THE RECALL IS THE NUMBER OF TRUE POSITIVE RESULTS DIVIDED BY THE NUMBER OF ALL SAMPLES THAT SHOULD HAVE BEEN IDENTIFIED AS POSITIVE. PRECISION IS ALSO KNOWN AS POSITIVE PREDICTIVE VALUE, AND RECALL IS ALSO KNOWN AS SENSITIVITY IN DIAGNOSTIC BINARY CLASSIFICATION."

-WIKIPEDIA, F-SCORE

$$F_1 = 2 \cdot \frac{\mathrm{precision} \cdot \mathrm{recall}}{\mathrm{precision} + \mathrm{recall}} = \frac{\mathrm{TP}}{\mathrm{TP} + \frac{1}{2}(\mathrm{FP} + \mathrm{FN})}$$

TP = NUMBER OF TRUE POSITIVES
FP = NUMBER OF FALSE POSITIVES
FN = NUMBER OF FALSE NEGATIVES

AUGUST 4, 2023

THE FOCUS OF TODAY'S SESSION WAS ON IMPROVING THE MODEL'S CAPABILITIES. WHILE I DID NOT GET PHOTOGRAPHS OF THE BIKE RIDER FROM THE FRONT, I DID COLLECT A LARGE NUMBER OF SAMPLES, MOST OF WHICH WERE PERSONS AND DOGS. BECAUSE MORE HUMAN SAMPLES WERE REQUIRED, THIS DATASET ADJUSTMENT WAS CRITICAL. MY OBJECTIVE FOR THE FUTURE IS TO INCORPORATE THESE NEW SAMPLES INTO THE EXISTING DATASET AND RETRAIN THE MODEL IN THE HOPES OF IMPROVING THE F SCORE.

THE DAY'S WORK BEGAN WITH THE CAPTURE OF 38 IMAGES, WHICH WERE THEN EDITED TO IMPROVE THEIR QUALITY AND QUANTITY. IN ORDER TO IMPROVE ACCURACY, I INCREASED THE NUMBER OF LEARNING CYCLES. HOWEVER, 180 CYCLES APPEARS TO BE THE BEST, AS SURPASSING THIS AMOUNT RESULTS IN A TRAINING TIME OF 24 MINUTES, WHICH EXCEEDS THE SOFTWARE'S 20-MINUTE TRAINING LIMIT. TO FIX THIS, I'M THINKING ABOUT DECREASING INPUT AXES TO IMPROVE PERFORMANCE.

HOURS OF METICULOUS TINKERING FOLLOWED, INVOLVING ADJUSTMENTS TO TRAINING CYCLES AND IMAGE PARAMETERS. THIS DEDICATION FINALLY BORE FRUIT AS I MANAGED TO ATTAIN AN IMPRESSIVE F1 SCORE OF 96.7%. TO FURTHER VALIDATE THE MODEL'S ACCURACY, I INTRODUCED A STOCK PHOTO FEATURING A PERSON WALKING A DOG. INTERESTINGLY, THE MODEL ACCURATELY IDENTIFIED THE NUMBER OF DOGS BUT UNFORTUNATELY COUNTED TWO HUMANS.

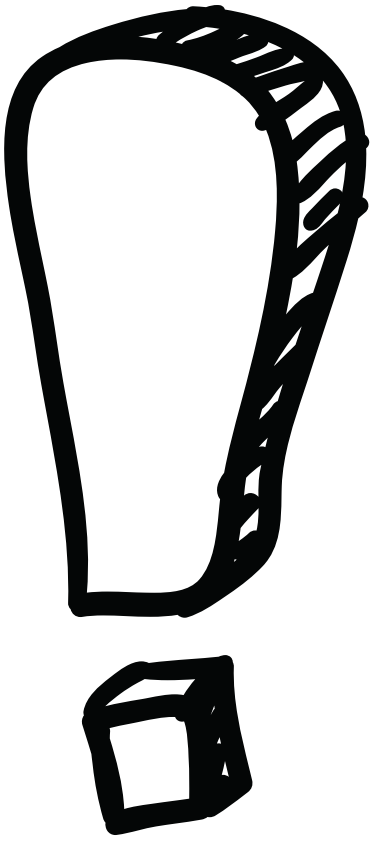
AUGUST 4, 2023

IN ORDER TO CONTINUE MY TESTING, I INCLUDED ANOTHER STOCK PHOTO. WHILE THE HUMAN COUNT WAS CORRECT THIS TIME, THE ALGORITHM IDENTIFIED NINE DOGS IN AN UNEXPECTED TWIST. I WENT ON A PHOTOGRAPHY RUN, TAKING APPROXIMATELY 400 PHOTOS THROUGHOUT THE DAY. THERE WERE PHOTOS OF THE RIDER AS WELL AS DOGS AND HUMANS. I AM CURRENTLY CATEGORIZING AND IMPORTING THESE PHOTOGRAPHS, WITH THE HOPE THAT THIS AMOUNT OF DATA CAN FURTHER REFINE THE MODEL`S ACCURACY. THE TOTAL NUMBER OF NEW ADDITIONS IS 374.

AUGUST 6, 2023

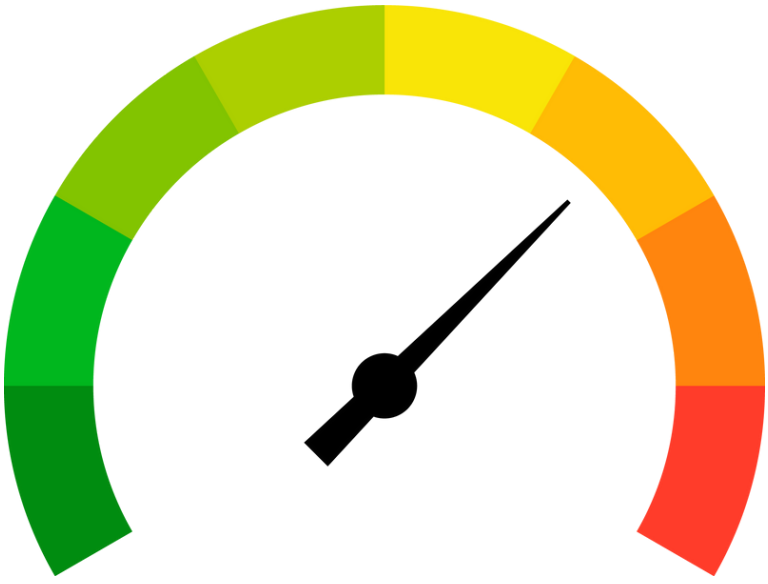
LABELLED THE BIKER DATASET WITH AN ACCURACY OF 65.9%. I'M IN THE PROCESS OF RAMPING UP THE LEARNING CYCLES TO ENSURE A MORE COMPREHENSIVE TRAINING APPROACH. HOWEVER, I'VE HIT A ROADBLOCK, IN ORDER FOR ME TO HAVE THIS MUCH DATA I MUST UPGRADE TO THE COSTLY ENTERPRISE VERSION REQUIRES ACCESS TO THE ENTERPRISE VERSION. TO ADDRESS THIS, I'VE TAKEN THE STEP OF SIGNING UP FOR A FREE TRIAL OF THE ENTERPRISE PLAN.

MAJOR SETBACK TODAY—ACCIDENTALLY WIPED OUT THE ENTIRE PROJECT BY ATTEMPTING TO UTILIZE THE FREE TRIAL OF THE ENTERPRISE VERSION TO ENHANCE ACCURACY! I NEED TO RE-LABLE 500 PLUS PHOTOS!



AUGUST 8, 2023

TODAY WAS A SIGNIFICANT MILESTONE IN AN ONGOING PROJECT THAT AIMS TO ENHANCE THE ACCURACY AND OVERALL PERFORMANCE OF TWO DISTINCT CAMERAS, NAMELY "BIKER CAR" AND "HUMAN DOG," BY DISTRIBUTING TASKS BETWEEN THEM ACCORDING TO THEIR UNIQUE CAPABILITIES. MY PRIMARY FOCUS IN THIS PROJECT HAS BEEN TO IMPROVE THE OPERATIONAL EFFICIENCY OF THE CAMERA RESPONSIBLE FOR IDENTIFYING HUMANS AND DOGS. THE INITIAL ASSESSMENT SHOWED A PROMISING ACCURACY RATE OF 95.1%, BUT THERE WAS STILL ROOM FOR IMPROVEMENT. TO ADDRESS THIS, I INCREASED THE LEARNING CYCLES TO FINELY TUNE THE CAMERA`S RECOGNITION ABILITIES. WITH DETERMINATION, I RAISED THE TRAINING CYCLES TO 150, RESULTING IN AN IMPROVED ACCURACY RATE OF 96.55%. ENCOURAGED BY THIS PROGRESS, I AM NOW INTENSIFYING THE TRAINING CYCLES FURTHER TO PUSH THE CAMERA TO THE LIMIT.

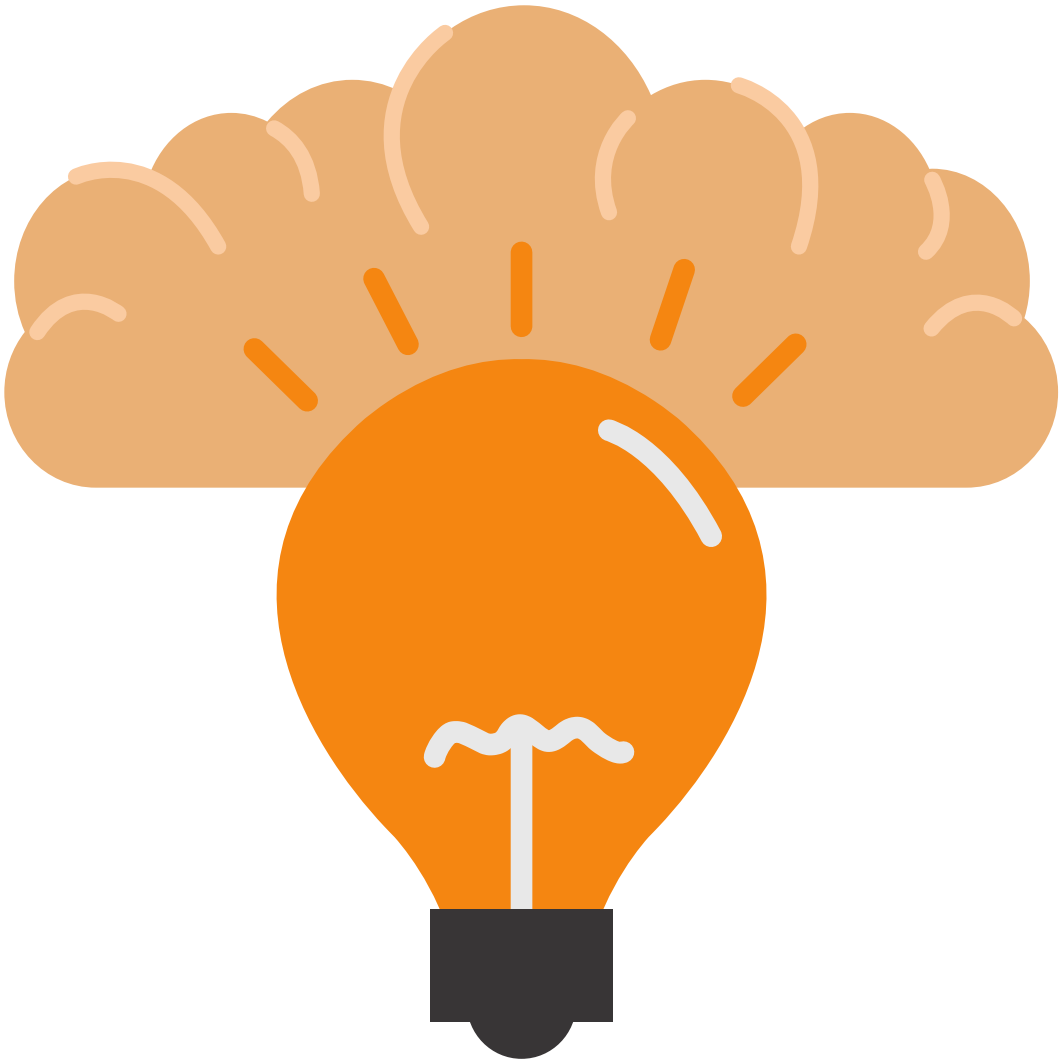


AUGUST 9, 2023

I RECENTLY CHANGED MY IMAGE FROM GRAYSCALE TO RGB, RESULTING IN MY HIGHEST ACCURACY YET AT 97.7%. NOW, I'M DECIDING WHETHER TO GO WITH QUANTIZED (INT8) OR UNOPTIMIZED (FLOAT32) MODELS, AND THERE ARE BENEFITS AND CONSIDERATIONS TO BOTH. IF I GO WITH QUANTIZATION TO INT8, I'LL REDUCE MEMORY USAGE AND ENHANCE INFERENCE SPEED, WHICH IS GREAT FOR DEVICES WITH RESTRICTED RESOURCES. HOWEVER, I'LL NEED TO BALANCE ACCURACY DUE TO THE LIMITED VALUE RANGE THAT INT8 CAN REPRESENT. TO ACHIEVE SUPERIOR OUTCOMES, I MIGHT NEED TO ENGAGE IN QUANTIZATION-AWARE TRAINING, WHICH CAN BE MORE COMPLEX. ADDITIONALLY, I NEED TO ENSURE THAT MY HARDWARE PLATFORM EFFICIENTLY SUPPORTS INT8 OPERATIONS. ON THE OTHER HAND, IF I GO WITH UNOPTIMIZED FLOAT32 MODELS, I'LL BENEFIT FROM HEIGHTENED MODEL PRECISION AND POTENTIALLY SUPERIOR ACCURACY. I WON'T NEED TO WORRY ABOUT QUANTIZATION COMPLEXITIES OR ACCURACY COMPROMISES. HOWEVER, I'LL NEED TO CONSIDER THE INCREASED MEMORY CONSUMPTION, WHICH CAN BE A CONCERN FOR RESOURCE-CONSTRAINED DEVICES. ALSO, FLOATING-POINT OPERATIONS MIGHT LEAD TO SLOWER INFERENCE TIMES COMPARED TO QUANTIZED MODELS. IN THE END, IT'S A MATTER OF WEIGHING THE BENEFITS AND CONSIDERATIONS AND DECIDING WHICH OPTION IS BEST SUITED FOR MY SPECIFIC NEEDS.

AUGUST 9, 2023

THE MODEL HAS DEMONSTRATED ITS EFFICACY AND IS NOW BEING PREPARED FOR EXPORT TO AN ARDUINO LIBRARY. IT SHOULD BE NOTED THAT THE INCLUSION OF AN AMPLIFIER FOR THE SPEAKER IS NOT A MANDATORY REQUIREMENT, AS THE SPEAKER`S PROXIMITY TO THE EAR IS NOT THE SOLE DETERMINANT OF ITS VOLUME.



AUGUST 12, 2023

TODAY, I SPENT MY TIME LABELING 190 BIKER PHOTOS. IT WAS A TEDIOUS TASK, BUT I MANAGED TO FINISH IT EFFICIENTLY. AFTER THAT, I NEEDED TO TAKE A PHOTO OF THE CAR FOR DOCUMENTATION PURPOSES. IT WAS A BIT CHALLENGING SINCE THE LIGHTING WASN`T IN MY FAVOR, BUT I STILL MANAGED TO GET A CLEAR SHOT. MOVING FORWARD, I ALSO NEED TO START ASSEMBLING THE CIRCUITRY. I HAVE ALL THE NECESSARY MATERIALS, AND I AM LOOKING FORWARD TO STARTING THIS PROJECT. IT MIGHT TAKE SOME TIME, BUT I AM CONFIDENT THAT I CAN FINISH IT SUCCESSFULLY.

AUGUST 13, 2023

TODAY, I SPENT SOME TIME BRAINSTORMING POSSIBLE SOLUTIONS FOR THE BATTERY SITUATION. AS YOU KNOW, I NEED TO POWER UP MY HEADPHONES, BUT I DON`T WANT TO CARRY A BULKY EXTERNAL BATTERY PACK IN MY POCKET OR BAG. SO, I THOUGHT OF TWO POSSIBLE SOLUTIONS. THE FIRST ONE IS TO GET AN EXTERNAL BATTERY PACK THAT IS SMALL ENOUGH TO FIT IN MY POCKET. I DID SOME RESEARCH ONLINE AND FOUND SOME COMPACT MODELS THAT COULD WORK FOR ME. HOWEVER, I NEED TO MAKE SURE THAT THE BATTERY PACK HAS ENOUGH POWER TO LAST FOR THE WHOLE DAY. THE SECOND SOLUTION THAT I THOUGHT OF IS TO FIND A REALLY FLAT BATTERY THAT COULD FIT INSIDE MY HEADPHONES. THIS WOULD ELIMINATE THE NEED FOR AN EXTERNAL BATTERY PACK ALTOGETHER. AGAIN, I DID SOME RESEARCH AND FOUND SOME ULTRA-THIN BATTERIES THAT COULD FIT INSIDE HEADPHONES. HOWEVER, I NEED TO MAKE SURE THAT THE BATTERY HAS ENOUGH POWER AND IS COMPATIBLE WITH MY HEADPHONES. I WILL NEED TO DO SOME MORE RESEARCH AND TESTING BEFORE I CAN DECIDE WHICH SOLUTION TO GO FOR. HOWEVER, I AM OPTIMISTIC THAT I WILL FIND A SUITABLE BATTERY SOLUTION SOON.

AUGUST 18, 2023

TODAY,I TOOK SOME PHOTOS OF MY CAR WHILE IT WAS IN MOTION. I WAS ABLE TO CAPTURE SOME REALLY COOL SHOTS AND ENDED UP TAKING 56 PHOTOS IN TOTAL. I PLAN ON UPLOADING THE PHOTOS TOMORROW, ONCE I HAVE HAD A CHANCE TO GO THROUGH THEM AND SELECT THE BEST ONES.

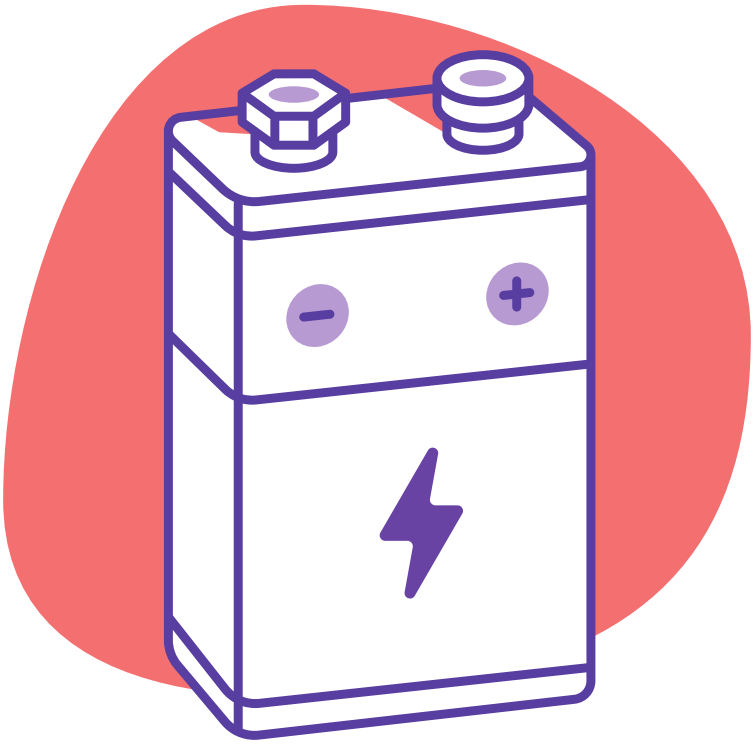
AUGUST 20, 2023

I AM HAPPY TO REPORT THAT I HAVE UPLOADED THE PHOTOS OF MY CAR IN MOTION THAT I TOOK DURING THE DRIVE THE OTHER DAY. I SPENT SOME TIME GOING THROUGH ALL 56 PHOTOS AND SELECTING THE BEST ONES TO SHARE WITH MY FRIENDS AND FAMILY. AFTER UPLOADING THE PHOTOS, I TOOK SOME TIME TO LABEL EACH ONE WITH A PROPER DESCRIPTION. IT WAS IMPORTANT FOR ME TO ACCURATELY IDENTIFY THE CAR IN EACH PHOTO, AS WELL AS ANY OTHER OBJECTS THAT MAY HAVE BEEN IN THE FRAME. I AM PLEASED TO REPORT THAT THE ACCURACY OF MY LABELING WAS QUITE HIGH. BASED ON THE F1 SCORE, THERE WAS A 98.5% ACCURACY RATE BETWEEN THE BIKERS AND THE CAR IN THE PHOTOS. NOW BOTH MODELS ARE DONE WITH THE OTHER ONE AT 97.7% ACCURACY.

AUGUST 22, 2023

TODAY I WAS PLAYING AROUND ON TINKERCAD AND STARTED THE ROUGH COPY OF THE 3D-PRINTED SHELL, I WILL PRINT IT EVENTUALLY AT THE TAYLOR FAMILY DIGITAL LIBRARY.

NOVEMBER

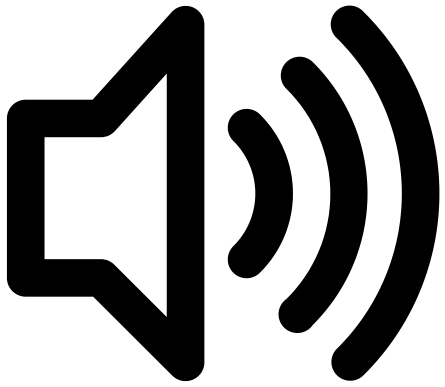


NOVEMBER 22, 2023

TODAY, I ATTEMPTED TO MAKE THE DFPLAYER MODULE WORK FOR SOUND OUTPUT THROUGH THE SPEAKER, BUT UNFORTUNATELY, IT DIDN`T FUNCTION AS EXPECTED. TO ADDRESS THIS, I`VE TAKEN STEPS TO STRENGTHEN THE CONNECTIONS BY ORDERING A SOLDERING IRON, WHICH SHOULD ARRIVE SOON. ONCE IT`S HERE, I`LL CAREFULLY SOLIDIFY THE CONNECTIONS TO ENSURE A MORE STABLE SETUP. I`LL ALSO BE RESEARCHING DIFFERENT CODES TO EXPLORE THE COMPATIBILITY OF THE DFPLAYER MODULE WITH THE ESP32 CAM. MY GOAL IS TO FIND ALTERNATIVE CONFIGURATIONS THAT MIGHT ENABLE SUCCESSFUL SOUND EMISSION USING ONLY THE ESP32 CAM.

NOVEMBER 30, 2023

SPENT DAYS TRYING TO FIX THE DFPLAYER MODULE, EVEN DID SOME SOLDERING, BUT NO LUCK. SHIFTING GEARS NOW, FOCUSING ON THE COLOR DISPLAY FOR OBJECT DETECTION. GONNA SOLDER THE RGB TO THE ESP32 NEXT AND GET THE CODE UPLOADED.



DECEMBER 28, 2023

BEEN TRYING TO SET UP AN IF STATEMENT FOR DETECTING THINGS, BUT IT`S NOT CLICKING AFTER SEVERAL TRIES. CURRENTLY, I`M DIVING INTO ARDUINO COMMANDS TO FIGURE OUT HOW TO SCAN THE SERIAL MONITOR FOR A SPECIFIC LABEL THAT CAN TRIGGER THE DESIRED RESPONSE. WILL KEEP AT IT AND PROVIDE UPDATES AS I MAKE PROGRESS.

JANUARY 11, 2024

AFTER CHECKING OUT A BUNCH OF FORUMS ONLINE, I FOUND SOMEONE WHO HAD A SIMILAR ISSUE AND FIXED IT WITH A SLIGHTLY DIFFERENT COMMAND. UPLOADING MY TWEAKED CODE NOW, HOPING IT SORTS THINGS OUT.

[NEW IDEA]

SINCE THE DFPLAYER ISN`T COOPERATING (IT`S SUPPOSED TO ANNOUNCE OBJECT DETECTION), I`M THINKING OF A DIFFERENT PLAN TO SIMPLIFY THE SETUP. INSTEAD OF USING BOTH SPEAKERS AND THE DFPLAYER, I`LL GO FOR A CLEANER DESIGN WITH FEWER SOLDERED PARTS.

RATHER THAN TRIGGERING AN AUDIO RECORDING, I`M CONSIDERING SENDING NOTIFICATIONS TO THE USER`S PHONE. FOUND A HANDY APP CALLED PUSHSAFER THAT ARDUINO CAN CONTROL. ONCE I GIVE IT A GO AND IT WORKS, I`LL ADD IT TO THE MAIN CODE.

JANUARY 12, 2024

THE PUSHSAFER APP WASN`T GETTING THE NOTIFICATION FROM MY EXAMPLE CODE, SO I SPENT A COUPLE OF HOURS FIGURING OUT THE ISSUE. TURNS OUT, I SWITCHED THE DEVICE ID AND DEVICE KEY. IT`S WORKING FINE NOW.
NEXT, I`LL ADD IT TO MY MAIN CODE. WHEN IT DETECTS AN OBJECT, IT SHOULD READ A NOTIFICATION ON THE BLUETOOTH HEADPHONES. I`LL UPDATE YOU ON HOW THAT GOES.

JANUARY 14, 2024

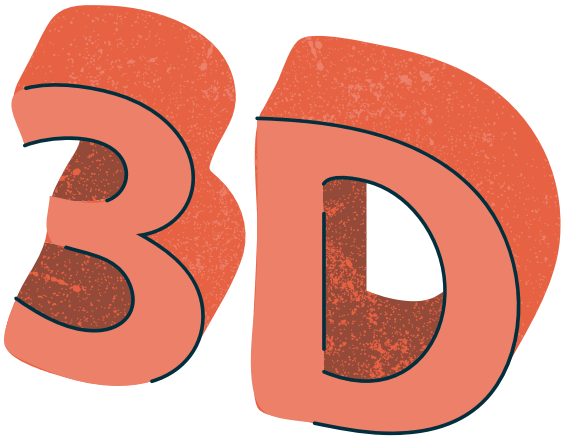
I I ADDED ALL THE CODE, AND IT`S WORKING, BUT THERE`S A HITCH – THE PHONE WON`T ANNOUNCE NOTIFICATIONS ON NON-APPLE HEADPHONES. TRIED MULTIPLE TIMES, NO LUCK UNLESS IT`S AN APPLE AUDIO DEVICE. MY NEXT MOVE IS TO EXPLORE IF IT`S DOABLE TO HAVE DIFFERENT TONES FOR EACH NOTIFICATION SINCE IT CAN`T ANNOUNCE THEM.
SUCCESS! AFTER SPENDING QUITE A FEW HOURS TROUBLESHOOTING, I FIGURED OUT HOW TO PLAY A DOG BARK WHEN A DOG IS DETECTED AND A BEEP FOR A HUMAN. NOW, THE NOTIFICATIONS HAVE THEIR OWN SOUNDS. MOVING FORWARD, I`LL FOCUS ON CRAFTING THE 3D PRINTED SHELL TO HOUSE ALL THE ELECTRONIC COMPONENTS.

JANUARY 15, 2024

STARTED THE INITIAL PHASE OF DESIGNING THE EXTERNAL SHELL ON TINKERCAD, TAKING PRECISE MEASUREMENTS OF BOTH THE CAMERA AND HEADPHONES. I CREATED A TEMPORARY ESP32 CAMERA MODEL IN TINKERCAD, ACTING AS A PLACEHOLDER TO MAKE SURE THE REAL CAMERA WILL FIT IN THE PHYSICAL SHELL.

I DEDICATED A SUBSTANTIAL AMOUNT OF TIME TO THE DESIGN PROCESS, ENSURING ITS PRACTICALITY AND ACCURACY BY CONDUCTING A THOROUGH REEVALUATION OF ALL MEASUREMENTS. THE METICULOUS APPROACH AIMED TO GUARANTEE SEAMLESS INTEGRATION OF ELECTRONIC COMPONENTS INTO THE FINAL STRUCTURE.

TO MATERIALIZE THE DESIGN, A 3D PRINTER HAS BEEN ORDERED, WITH AN ESTIMATED ARRIVAL DATE FOR JANUARY 31. THE INTERVENING PERIOD WILL BE UTILIZED FOR PLANNING AND REACHING OUT TO EXPERTS BEFORE TRANSITIONING INTO THE PRINTING PHASE.



FEBRUARY 1, 2024
AND ONWARDS...

SSUCCESSFULLY PRINTED THE SHELL, AND IT FITS PERFECTLY. SOLDERED THE RGB COMPONENTS TO BOTH CAMERAS AND SECURELY AFFIXED THEM TO THE SHELL. MADE NECESSARY MODIFICATIONS TO ACCOMMODATE THE WIRING BY USING A DRILL BIT, ALLOWING THE WIRES TO EXTEND FROM THE SHELL. ADDITIONALLY, DRILLED A HOLE FOR THE POWER WIRE TO CONNECT TO THE CAMERA.

IN A PRESCIENT MOVE, I DESIGNED A CLIP THAT CAN BE ATTACHED TO THE EDGE OF THE SHELL, CONSIDERING SITUATIONS WHERE USERS MIGHT NOT HAVE POCKETS FOR CARRYING POWER BANKS. THE CLIP DESIGN WAS EXECUTED AND PRINTED.

USING HOT GLUE, METICULOUSLY ASSEMBLED THE SHELL WITH ALL ELECTRONIC COMPONENTS ONTO THE HEADPHONES, ENSURING A SECURE AND STABLE CONNECTION.

THEN I STARTED THE CREATION OF A VIDEO FOR THE DESIGNATED PLATFORM, AND THEN PRINTED ALL THE IMAGES AND PARAGRAPHS FOR MY TRIFOLD.