

Appendices

SeeFood - Augmented reality menu



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A - Potential Customers

#	Name	Response	Type	City	Province	Adress	Email	Phone	Kitchen Type	Price	Website	Extra's
(Empty)												
1	The Hagout	Positive, Posi...		Delft	Zuid-Holl...	Stieltjesse...	info@thebarcross.eu	015-2400136		€	https://thab...	
2	Winkel van Sintet	Neutral, No R...		Utrecht		3511 AZ Ur...	info@winkelvanstet.nl	030 230 30 30		€€	https://www...	
3	Amigo	No Response		Rotterdam	Zuid-Holl...	3012 AR Ro...	centurion@amigo-resto...	+31 (0) 10 - 412 81 60			www.amigo...	
4	Shabu Shabu			Rotterdam	Zuid-Holl...	3077 MK R...		010 483 4161			https://www...	
5	TAPASIA			Ede	Gelderland	6711AB EDE	info@tapasia.nl	0318 613 457			https://www.t...	
6	Shiki Sushi & Lounge	No Response		Rotterdam	Zuid-Holl...	Prins Alex...	info@restaurantshiki.nl	010 72 00 856			www.restaurant...	
7	Sakana			Dordrecht	Noord-Br...	Havensinge...		073-6106888			www.sakana...	
8	Sakana Eindhoven			Eindhoven	Noord-Br...	5611 JS Eindhoven		040-2938335				
9	Shizen			Utrecht	Utrecht	Clarissenho...	info@shizenrestaurant.nl	0347 - 32 20 40	Japanese		www.shizen...	
10	Hollywok			Utrecht	Noord-H...	10-A Arnold...		023 - 565 11 88	Chinese		https://www...	
11	Goya Sushi & Grill			Heerhugowaard	Noord-H...	3431 LZ NL...	info@goya.nl	030 - 60 90 821	Japanese		www.goya.nl	
12	AislaBite			Doetinchem	Gelderland	Rozengard...	info@aislabite.nl		Fusion		aislabite.nl	
13	Sushi By Me			Deventer	Overijssel	Brink 35	info@sushiby.me.nl	0570 611 992	Japanese		www.sushib...	
14	Motto Sushi			Rotterdam	Noord-H...	Houtli 4-6	info@mottosushi.nl	072 - 7504290	Japanese		www.motto...	
15	Ginza			Enschede	Overijssel	Klenderij 50...	INFO@RESTAURANTGINZA.NL	053-4748354	Japanese		ginza-sushi...	
16	Goya	No Response		Rotterdam	Zuid-Holl...	Rijkseplein 11	info@sushigoya.nl	010 - 237 33 91	Japanese		www.sushi24...	
17	Aihiro	No Response		Rotterdam	Zuid-Holl...	Herengracht...	info@aihirosushi.nl	070-3070796	Japanese		www.aihiros...	
18	Taste			Wageningen	Gelderland	Markt 16	info@taste-wageningen.nl	(0371) 84 43 83			https://www...	
19	Mo-Jo Tilburg			Tilburg	Noord-Br...	5038CL, TE...	thour@mo-jo.eu	013 5359 887			www.mo-jo.nl	
20	HummUS	No Response		Delft	Zuid-Holl...	Mulkaan 39	info@hummus.nl	016796292			https://theh...	Take A...
21	Barbaar	No Response		Delft	Zuid-Holl...	Sint Agatha...	info@barbaar.nl	+31(0)6 33 91 86 68			https://barba...	
22	De Centrale	Positive		Delft	Zuid-Holl...	Voldersgrac...	info@decentrale@delft.nl	015 - 889 27 77			https://decent...	
23	Haka	No Response		Delft	Zuid-Holl...	Oude Lang...	oaze@thahaka.nl	06 5192539			https://thaha...	Catering
24	Y Postkantoor	No Response		Delft	Zuid-Holl...	Hippolytus...	info@postkantoor@delft.nl	015 - 750 32 43			https://post...	
25	Malee			Delft	Zuid-Holl...	Voldersgrac...		015 212 0781			https://malee...	
26	Hills & Mills	No Response		Delft	Zuid-Holl...	Oude Lang...	thillamilia.nl	015 212 39 30			https://www...	Take A...
27	De Pelican	No Response		Delft	Zuid-Holl...	Vanverndijk...	info@depelican@gmail.com	015-2193309	Italian		https://www...	
28	Het Vermeerde	Positive, Neu...		Delft	Zuid-Holl...	Nieuwe Lan...	info@hetvermeerde.nl	015-8697175		€€€	https://www...	
29	Café Einstein	No Response		Delft	Zuid-Holl...	Spoorsingel...	info@cafe-einstein.nl	015 2127014	Italian		https://www...	
30	Restaurantmaharaja			Delft	Zuid-Holl...	Nieuwe Lan...	info@restaurantmaharaja.nl	015 21 26 989	Indian		https://www...	
31	Boudoir Le Mariage			Delft	Zuid-Holl...	Hippolytus...	Contact form on site	+31 (0) 15 21 22 805	French		https://boud...	
32	Aishi			Rotterdam	Zuid-Holl...	Rijksweg A...	info@theashiteatery.com	+31 6 87570745	Indian		https://thaha...	
33	Beef & More Delft	Positive		Delft	Zuid-Holl...	Doelenplein 7	info@beefandmore@delft.nl	015 889 9627	American		https://beef...	
34	Seoul Sista	Positive		Rotterdam	Zuid-Holl...	Harmanstra...	info@seoulستا.nl	010 737 0179	Korean B...		https://www...	
35	Le Vieux Jean	No Response		Delft	Zuid-Holl...	Heilige Gee...	restaurant@le vieux-jean.nl	015 - 213 04 33	French	€€€€	https://www...	
36	Les Cigolans	No Response		Delft	Zuid-Holl...	Breestraat 8	lescigolans@les.nl	015-2144083	French	Se €€€€	https://www...	

#	Name	Response	Type	City	Province	Adress	Email	Phone	Kitchen Type	Price	Website	Extra's
37	Van Der Dussen	No Response		Delft	Zuid-Holl...	Bagijnhof 118	info@restaurantvander...	015 2147212	Dutch	Sea €€€€	https://www...	
38	Artusi	No Response		Delft	Zuid-Holl...	Voorstraat ...	info@restaurantartusi.nl	015 - 212 03 54	Italian	Sea €€€€	http://www.f...	
39	Kek	Negative		Delft	Zuid-Holl...	Voldersgrac...	info@kek@delft.nl	015 750 32 53			http://kekde...	
40	De Sjees	Positive, Posi...		Delft	Zuid-Holl...	Markt 5	info@desjees.nl	015 - 214 46 47			https://desj...	
41	De Gist	No Response		Delft	Zuid-Holl...	Phoenixstra...	rooier@degist.nl	015-887 5836			http://degist...	
42	Athene's Olif	Negative		Delft	Zuid-Holl...	Burgwal 14	info@athenesolif.nl	(015) 214 7128	Greek		https://athe...	
43	Belerd	Neutral		Delft	Zuid-Holl...	Burgwal 18	info@debelerd.nl	015 - 219 00 90			http://debel...	
44	Ciao Ciao	Negative		Delft	Zuid-Holl...	Binnenwate...		0152121313			https://www...	Home ...
45	De Delf	Neutral		Delft	Zuid-Holl...	Oude Delft ...	info@dedef.nl	015 - 212 45 63			https://www...	
46	Indian Garden	Negative		Delft	Zuid-Holl...	Kerkstraat 15	Contact form on site	015 212 5117			http://www.i...	Home ...
47	Kobus Kuch	No Response		Delft	Zuid-Holl...	Beestenmar...	info@kobuskuch.nl	015 212 4280			https://www...	
Potential Partner												
48	DoorMeal			Pote...	Amsterdam	Noord-H...					https://door...	
49	MenuBlender			Pote...	Rotterdam	Zuid-Holl...						
50	De kokkerie			Pote...	Delft	Zuid-Holl...						
51	FoodStory			Pote...								
52	Count3r			Pote...								
Chain, large (5+ rest...)												
53	Sumo Rotterdam			Chai...						€€		Tablet
54	Kwalltaria			Chai...		4132 CB VL...	info@ffc.nl	+31 (0) 88 044 60 00			https://kwall...	Tablet

B - Interview Guide

Interview Guide restaurant owners

Thank you for participating in this interview. Would it be a problem for you if this interview got recorded? If there are any questions which you would not like to answer, please let me know.

Motto: 'Ask why until they cry'

About the <restaurant>:

- How would you describe your <restaurant>?
- How long is your <restaurant> already in existence?
- What is your goal/mission?
- What image do you want to represent?
- How would you describe your customers?
- How many tables do you have? What is the average customer quantity?
- Do you also offer take-away, catering, and/or delivery?
- What is your experience with this?
- How much of this is part of your business?

General issues:

- What are the biggest issues that you stumble upon during work?
- What are the biggest issues/complaints that you hear of from customers?
- What elements would you like to see innovated?

Menu issues:

- Tell me more about your menu. How did you create it?
- How often do you renew it?
- Would you do this more often?
- Are there any issues that you or your customers experience with the menu?
- Have you ever considered a digital menu?
- Why so/why not?

Experiments:

- What are some experiments that you have tried out?
- What are the results of those?
- Have you ever been approached by innovative companies or start-ups with new ideas for your restaurant?
- What did you think of that?
- What did you decide to do with that? Why?
- How do you keep yourself updated with the newest developments within the food service industry?

Current digital systems

- What (digital) systems do you use?
- What do those systems keep track of?
- What is your experience with its use?

Financials

- How would you describe your financial situation? Are you profitable? Is it stable?
- If you would not mind sharing, what is your turnover and profit?
- Does this change from month to month, or from year to year?
- What are the biggest cost items? (employees?)
- If employees: is this something you would be prepared to cut down with optimisation/automation?
- What do you currently spend on menus?
- How do you determine the prices on the menu?
- How big are the margins? Which products have the biggest margins?
- Is there budget to try out new things?

Augmented Reality Menus

The idea that I am developing currently exists out of two parts: A 3D food scanner for in the kitchen which scans dishes, and an accompanying menu application which works on tablets (or mobile phones) in which these 3D models can be viewed (in augmented reality).

- Would you be interested at all to ever acquire this kind of system? Why so/why not?
- What would you consider to be the most valuable aspects to be able to take that decision?
- What would you hope to be able to achieve with it eventually?
- (Are there any other non-financially driven reasons?)
- What would be your biggest concerns about it?
- Would you prefer the 3D scanning of dishes to be fully automatically done by yourselves, or would you prefer having this done by somebody you periodically let come over?
- If automatically scanning yourselves: How much space would you be willing to spare in the kitchen permanently for such a scanner?

Questions for restaurants that already use tablet menus

- Through which company did you acquire these tablet menus?
- How did you get into contact about this?
- What was the reason that you chose to use tablet menus? How did that moment look like?
- How long have you been using tablet menus?
- What is your experience with them over this period of time?
- How many tablets do you use per table?
- Have you experimented with this amount?
- What do you pay for this entire system in total?
- How does this financial situation more specifically look like? (subscription-based/leasing/one purchase?)
- What has the system delivered thus far? (more customers, higher prices, increased sales?)
- Was this worth your investment in time and money?
- (If terrace) Do you also use the tablet menus at the terrace?
- Many other restaurants do not yet use tablet menus or digital menus. Why do you think that is?

C - 3D Models

Below, all the 3D models of all the successfully scanned objects can be seen. They are sorted chronologically, with the top one on this page being the earliest 3D model. Seeing the progression in scanning quality over the next few pages.



Meal

of photos: 28
Software: Agisoft PhotoScan
triangles: 622K
URL: <https://skfb.ly/6xsxF>
Notes: Scanned in light tent with proper studio flashes, but few photos



Frikandel roll

of photos: 42
Software: Agisoft PhotoScan
triangles: 817K
URL: <https://skfb.ly/6xsZt>
Notes: Scanned in light tent
Software had issues with white plate



Cupcake

of photos: max. 60
Software: Trnio (phone app)
triangles: 160K
URL: <https://skfb.ly/6CYGZ>
Notes: Scanned using phone with harsh artificial lighting



Backpack

of photos: max. 60
Software: Trnio (phone app)
triangles: 159K
URL: <https://skfb.ly/6CYGV>
Notes: Scanned using phone but produced little depth



Burger

of photos: n/a
Software: Artec Eva
triangles: 698K
URL: <https://skfb.ly/6yF8z>
Notes: Scanned by Bertus using the Artec Eva, same lighting as picture below



Burger

of photos: 61
Software: RealityCapture
triangles: 435K
URL: <https://skfb.ly/6yHID>
Notes: Photos taken with iPhone X camera.
Masked by hand in photoshop



USA Burger

of photos: 96
Software: RealityCapture
triangles: 300K
URL: <https://skfb.ly/6z6pl>
Notes: Started using a lazy susan kitchen turntable



Pizza

of photos: 33
Software: Agisoft PhotoScan
triangles: 112K
URL: <https://skfb.ly/6CS76>
Notes: Relatively good result for such a low amount of photos



Curly Fries

of photos: 91
Software: Agisoft PhotoScan
triangles: 142K
URL: <https://skfb.ly/6CYH9>
Notes: Complex geometry, ended up with a few holes.



Air Presto

of photos: 145
Software: RealityCapture
triangles: 28K
URL: <https://skfb.ly/6CYHJ>
Notes: Also has a bottom, merged 2 scans to get a full 360 around 3D model



Croissant

of photos: 129
Software: Agisoft PhotoScan
triangles: 68K
URL: <https://skfb.ly/6CYHu>
Notes: First scan testing the automated turntable



Dessert for 2

of photos: 181
Software: Agisoft PhotoScan
triangles: 799K
URL: <https://skfb.ly/6CIBy>
Notes: First time scanning glass and thin metal surfaces



Donut

of photos: 164
Software: Agisoft PhotoScan
triangles: 137K
URL: <https://skfb.ly/6CYIo>
Notes: Scanned at The Hangout with automated turntable and high CRI LEDs



Cheesecake

of photos: 176
Software: Agisoft PhotoScan
triangles: 629K
URL: <https://skfb.ly/6CYIp>
Notes: Scanned at The Hangout with automated turntable and high CRI LEDs

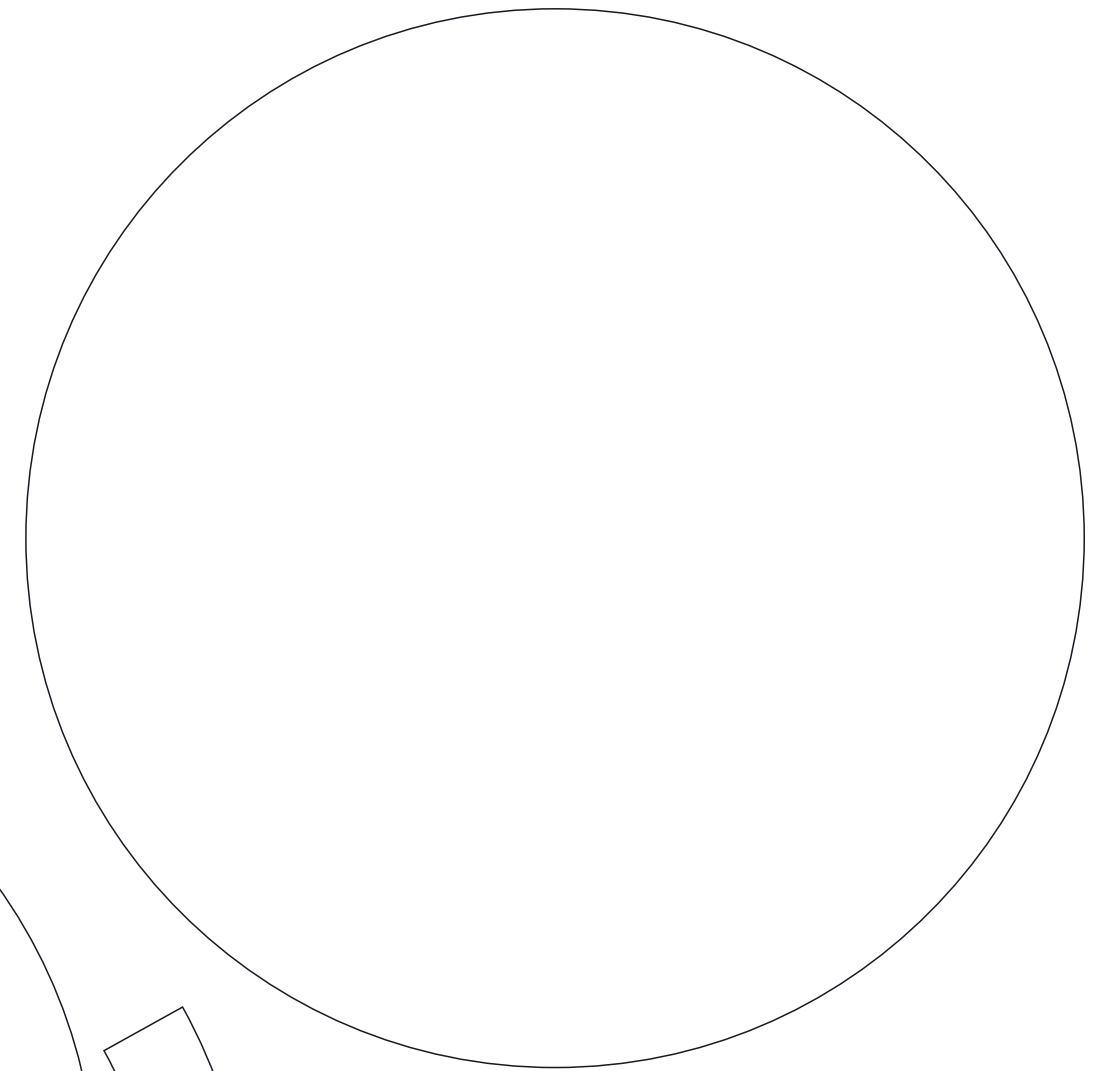
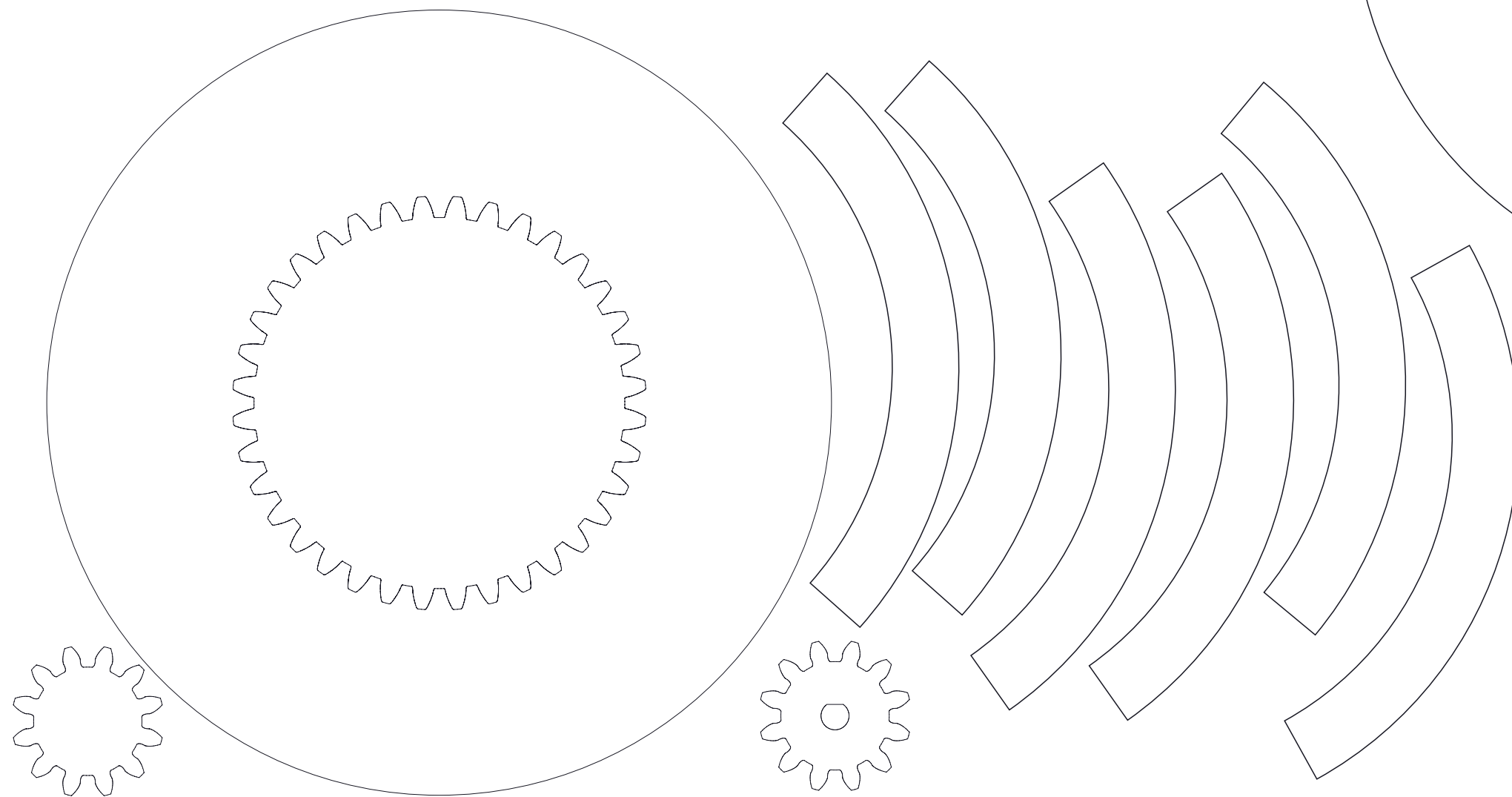


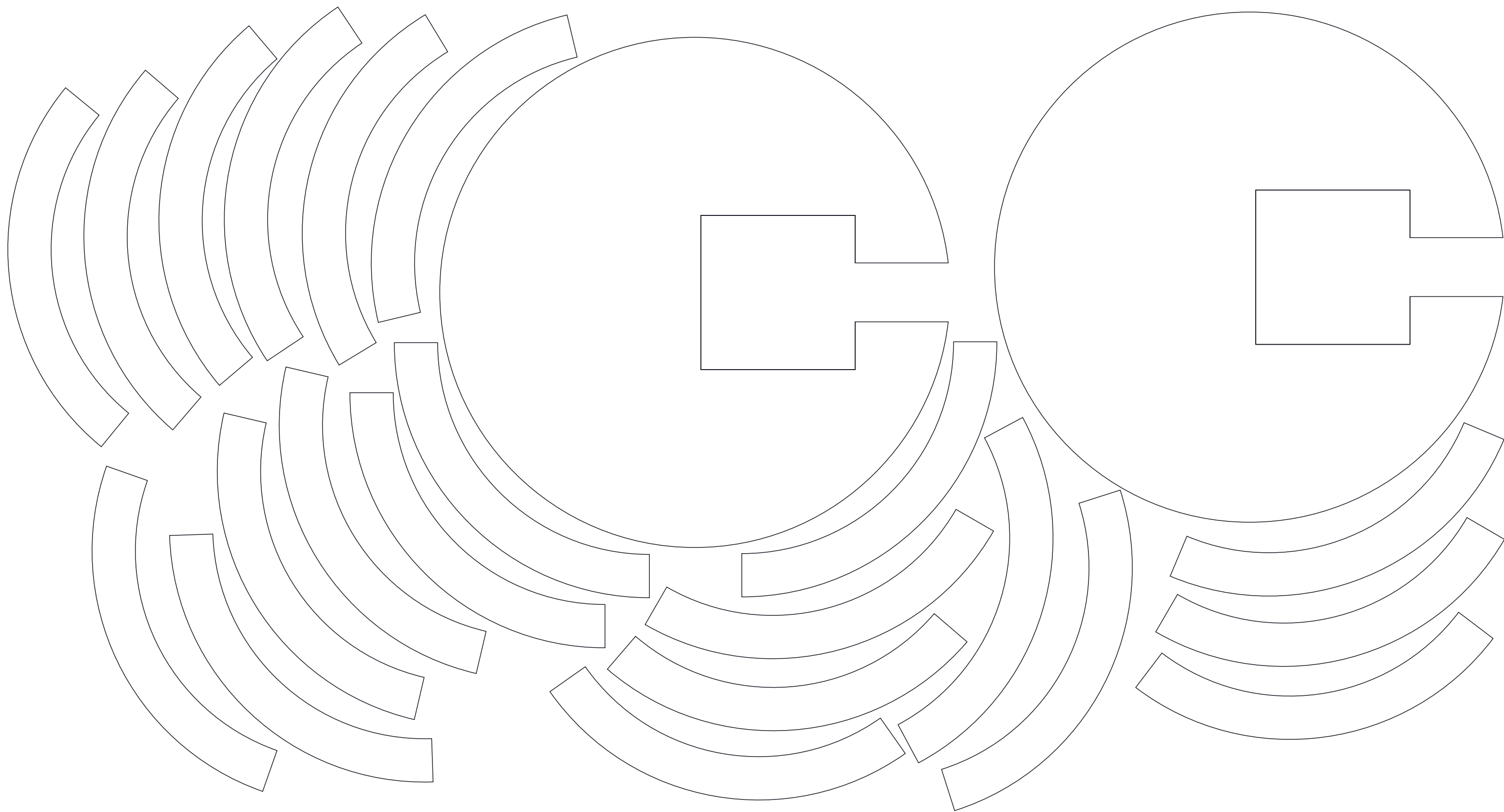
Apple Pie

of photos: 163
Software: Agisoft PhotoScan
triangles: 157K
URL: <https://skfb.ly/6CYI6>
Notes: Scanned at The Hangout with automated turntable and high CRI LEDs

D - Turntable Template

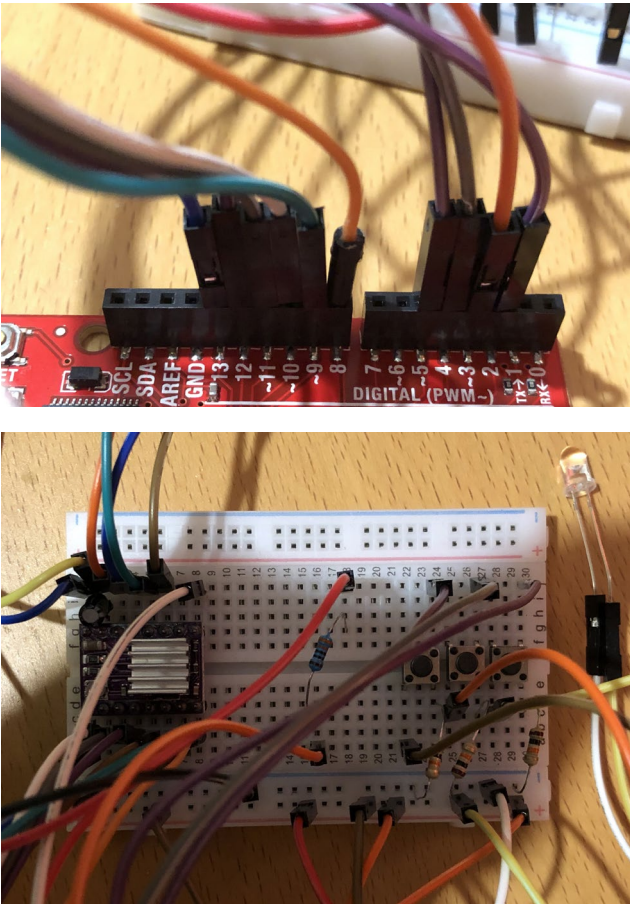
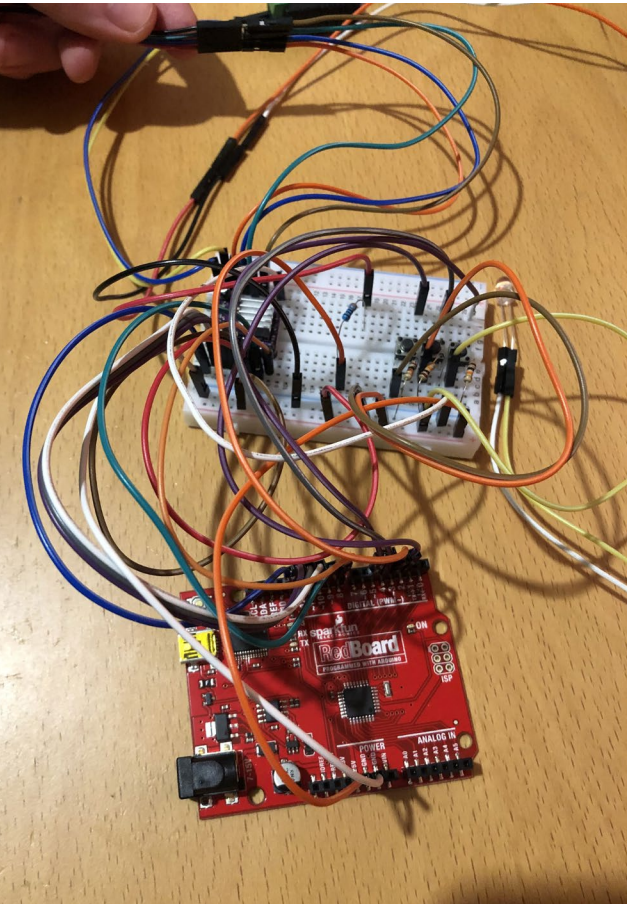
All the lasercut files to recreate the turntable scanner enclosure. These are positioned at 1:1 scale on each A4 spread. Don't resize them and use this PDF directly for lasercutting.





E - Turntable Electronics

The turntable is mainly powered by the Stepper motor
and the driver controlling it.
Stepper motor 17HS4401, 3.4V 1.7A
Stepper motor driver DRV8825
12V 0.7A power supply



```
/*
 * Arduino code to make the turntable spin
 * There are 3 buttons attached to the Arduino that can each
 * be programmed to a different amount of photos per rotation
 * values are now set at 30, 15, 5
 */

//1.5A current limit of motor. VREF = 0.75

#include <Arduino.h>
#include <multiCameraIrControl.h>

Canon Camera(3);

int photosPerRotation = 30;
const int buttonPin1 = 2;
const int buttonPin2 = 4;
const int buttonPin3 = 5;
const int gearRatio = 3; //12 small gears 36 big gears
int buttonState1 = 0;
int buttonState2 = 0;
int buttonState3 = 0;

// Motor steps per revolution. 17HS4401 is 200 steps or 1.8 degrees/step
#define MOTOR_STEPS 200
#define RPM 10

#define DIR 8
#define STEP 9
#define ENABLE 13 // optional (just delete ENABLE from everywhere if not used)

#include "DRV8825.h"
#define MODE0 10
#define MODE1 11
#define MODE2 12
DRV8825 stepper(MOTOR_STEPS, DIR, STEP, ENABLE, MODE0, MODE1, MODE2);

void setup() {
  /*
   * Set target motor RPM.
   */
  stepper.begin(RPM, 32);
  //stepper.enable();

  pinMode(buttonPin1, INPUT);
  pinMode(buttonPin2, INPUT);
  pinMode(buttonPin3, INPUT);

  Serial.begin(9600);
  Serial.println("start");
}

void loop() {
  // read the state of the pushbutton value:
  buttonState1 = digitalRead(buttonPin1);
  buttonState2 = digitalRead(buttonPin2);
  buttonState3 = digitalRead(buttonPin3);

  //Log button states for troubleshooting
  Serial.print(buttonState1);
  Serial.print(buttonState2);
  Serial.println(buttonState3);

  if (buttonState1 == HIGH || buttonState2 == HIGH || buttonState3 == HIGH) {
    // a button is pressed
    if(buttonState1 == HIGH){
      photosPerRotation = 30;
    } else if (buttonState2 == HIGH){
      photosPerRotation = 15;
    } else if (buttonState3 == HIGH){
      photosPerRotation = 5;
    }
    stepper.enable();
    stepper.setMicrostep(32); // Set microstep mode to 1:32
    for(int i=0;i <= photosPerRotation; i++){
      stepper.rotate((360/photosPerRotation)*gearRatio);
      //stepper.move(320); //(8*200*3)/photosPerRotation
      delay(500);
      Camera.shutterNow();
      delay(500);
    }
  }else{
    stepper.disable();
  }
}
```

F - Financial Model

The developed financial model is split into 9 different excel tabs. Each of those tabs is displayed here, sometimes multiple per page as these below.

Onderwerp	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven	Totaal bedrijven
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Perioden	2007 4e kwartaal	2008 4e kwartaal	2009 4e kwartaal	2010 4e kwartaal	2011 4e kwartaal	2012 4e kwartaal	2013 4e kwartaal	2014 4e kwartaal	2015 4e kwartaal	2016 4e kwartaal	2017 4e kwartaal**	2018 2e kwartaal*	2019	2020	2021
Bedrijfstakken/branches SBI 2008	aantal	aantal	aantal	aantal	aantal	aantal	aantal	aantal	aantal	aantal	aantal	aantal	aantal	aantal	aantal
Traditionele Horeca	34980	35325	35395	35235	35565	36370	36695	38035	39350	40225	41050	41220	41220	41220	41220
I Horeca	43970	44685	45095	45250	45995	47225	47765	49420	51330	53360	55125	55830	55830	55830	55830
56 Eet- en drinkgelegenheden	37765	38335	38405	38465	39030	40115	40520	41880	43520	45270	46625	47145	47145	47145	47145
56.1 Restaurants, andere eetgelegenheden	20290	20605	20955	21220	21690	22545	22965	24345	25470	26350	27265	27465	27465	27465	27465
56.1.1 Restaurants	10390	10465	10730	10975	11160	11485	11690	12480	12850	13280	13645	13760	13760	13760	13760
56.1.2 Snackbars, ijssalons e.d.	-	-	-	-	-	-	-	11870	12520	13065	13620	13705	13705	13705	13705
56.1.2 Snackbars, lunchrooms en eetkramen	9510	9725	9790	9745	9985	10455	10645	-	-	-	-	-	-	-	-
56.1.3 IJssalons	390	415	430	500	550	605	630	-	-	-	-	-	-	-	-
56.2 Kantines en catering	5410	5765	5925	6230	6585	7005	7180	7325	8015	9060	9825	10310	10310	10310	10310
56.3 Cafés	12065	11970	11525	11010	10750	10565	10375	10205	10035	9860	9535	9370	9370	9370	9370

Source: CBS
<https://opendata.cbs.nl/statline/#/CBS/nl/dataset/81589ned/table?ts=1526297411869>

		Perioden									
Bedrijfstakken/branches (SBI 2008)	Onderwerp	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
I Horeca	Netto-omzet	17203	18299	19203	19503	19770	20811	22485	24136	25885	27465
I Horeca	Bedrijfskosten totaal	x mln euro	15748	16645	17188	17538	17835	18451	19786	21205	22822
Traditionele Horeca	Netto-omzet	x mln euro	13105	14085	14878	15254	15553	16441	17969	19433	20985
Traditionele Horeca	Bedrijfskosten totaal	x mln euro	11912	12688	13125	13534	13870	14397	15584	16873	18285
56 Eet- en drinkgelegenheden	Netto-omzet	x mln euro	12390	13275	14003	14237	14406	15197	16222	17413	18745
56 Eet- en drinkgelegenheden	Bedrijfskosten totaal	x mln euro	11208	11898	12364	12644	12865	13353	14226	15271	16385
56.1 Restaurants, andere eetgelegenheden	Netto-omzet	x mln euro	7133	7662	8188	8485	8730	9401	10330	11285	12285
56.1 Restaurants, andere eetgelegenheden	Bedrijfskosten totaal	x mln euro	6385	6853	7164	7469	7722	8225	9053	9861	10745
56.1.1 Restaurants	Netto-omzet	x mln euro	4617	5025	5324	5503	5688	6179	6948	7645	8385
56.1.1 Restaurants	Bedrijfskosten totaal	x mln euro	4202	4582	4769	4961	5152	5493	6199	6743	7385
56.1.1 Restaurants	Inkoopwaarde omzet totaal	x mln euro	1398	1553	1593	1646	1700	1884	2116	2298	2485
56.1.1 Restaurants	Personele kosten totaal	x mln euro	1383	1498	1614	1703	1768	1878	2141	2282	2445
56.1.1 Restaurants	Overige bedrijfskosten Totaal	x mln euro	1211	1286	1314	1355	1417	1512	1692	1897	2055
56.2 Kantines en catering	Netto-omzet	x mln euro	2460	2566	2710	2665	2641	2744	2781	2885	3005
56.2 Kantines en catering	Bedrijfskosten totaal	x mln euro	2322	2380	2560	2521	2529	2592	2634	2732	2845
56.3 Cafés	Netto-omzet	x mln euro	2797	3047	3104	3087	3035	3052	3111	3185	3265
56.3 Cafés	Bedrijfskosten totaal	x mln euro	2501	2665	2640	2655	2614	2536	2538	2678	2785

Source: CBS
<https://opendata.cbs.nl/statline/#/CBS/nl/dataset/81156ned/table?ts=1526299962846>

BOM Level	Part Name	Quantity	Price (excl. btw)	Total Price	Source
1	Raspberry Pi Zero W + Pi Camera + Pi Power Adapter + 16GB microSD Card	4	€ 56,90	€ 227,60	https://www.kiwi-electronics.nl/raspberry-pi-zero-w-camera-pack?search=pi%20zero%20camera
2	Portable photostudio with integrated LED lighting	1	€ 160,00	€ 160,00	https://www.amazon.de/HAVOX-Fotostudio-LED-Beleuchtung-kommerziellen-commerce/dp/B06XQ4L3D4
3	Red and green laser pen	1	€ 37,98	€ 37,98	https://www.laserpennen.com/
4	36W wall adapter with 4 usb ports	1	€ 17,99	€ 17,99	https://www.amazon.de/Anker-Ladeger%C3%A4t-Ladeadapter-Technologie-Motorola-Schwarz/dp/B00MVHKTZQ
5	6" Lazy Susan	1	€ 4,58	€ 4,58	https://nl.aliexpress.com/item/Vierkante-Lager-Kwartelplaat-Lazy-Susan-Draaitafel-3-4-6-TV-Rack-Bureau-Tool-H0VH-Drop-verzending/32841516387.html
6	Nema17 Stepper Motor 17HS4401	1	€ 6,62	€ 6,62	https://nl.aliexpress.com/item/5pcs-4-lead-Nema17-Stepper-Motor-42-motor-Nema-17-motor-42BYGH-40MM-1-7A-17HS4401/32376023464.html
7	Stepper Motor Driver Drv8825	1	€ 1,01	€ 1,01	https://nl.aliexpress.com/item/5pcs-lot-StepStick-DRV8825-Stepper-Motor-Driver-Carrier-Reprap-4-layer-PCB-RAMPS-replace-A4988-for/32754134358.html
8	MDF 6 Wood (50cm x 50cm)	1	€ 1,88	€ 1,88	https://www.tudelft.nl/io/over-de-faculteit/faciliteiten/pmb/materialenshop/
9	Lasercutter usage (€0,42/min)	1	€ 0,84	€ 0,84	https://www.tudelft.nl/io/over-de-faculteit/faciliteiten/pmb/
10	Other small parts (bolts, screws, paint, cables, buttons)	1	€ 10	€ 10,00	

	Total material price	€ 468,50
	Assembly costs	€ 10,00
	Total cost	€ 478,50

Market and revenues

	Unit	2018	2019	2020	2021	2022
# restaurants Market size (forecasted)	#	13.808	14.218	14.648	15.116	15.613
€ revenue Market size (forecasted)	million EUR	7.683	8.074	8.675	9.699	11.312
€ profit Market size (forecasted)	million EUR	572	544	536	762	1.306
Market growth (based on revenue)	%	-	5,09%	7,44%	11,80%	16,63%
Market share SeeFood	%	0,0%	0,1%	0,5%	1,0%	2,0%
Customers	# restaurants	0	14	73	151	312
Churn Rate	% lost per year	0%	10%	10%	10%	10%
Lost Customers	# restaurants	0	0	1	7	15
New Customers	# restaurants	0	14	60	85	176
Average number of tablets	# tablets per resta	20	20	20	20	20
One-time upfront price	EUR	200	200	200	200	200
Subscription Fee	EUR/month	150	150	150	150	150
Tablet Lease	EUR/tablet/month	15	15	15	15	15
SeeFood revenue	EUR	0	79.619	407.581	833.302	1.721.492

Revenue option 2: commission based pricing

One-time upfront price	EUR	200	200	200	200	200
Commission rate	% of revenue	1%	1%	1%	2%	2%
Average revenue per Restaurant	EUR	€ 556.411	€ 567.896	€ 592.250	€ 641.646	€ 724.485
SeeFood Revenue	EUR	€ 0	€ 83.585	€ 445.849	€ 1.956.849	€ 4.559.912

Historical Data tabs were used for prediction of market size
Assumptions made on Market share and churn rate
Restaurants will use 1 tablet per table

Profit & Loss statement						
	Unit	2018	2019	2020	2021	2022
Revenues	EUR	0	79.619	407.581	833.302	1.721.492
-/- 3D Scanner production costs	EUR	0	6.803	28.922	25.573	52.868
-/- Cloud computing costs	EUR	0	191	800	1.247	2.320
-/- Software licensing costs	EUR	412	412	412	412	412
Gross margin	EUR	-412	72.213	377.447	806.070	1.665.892
-/- Overhead	EUR	0	67.200	220.800	369.600	549.600
-/- Depreciation	EUR	0	9.670	49.812	94.951	188.283
EBIT	EUR	-412	-4.657	106.835	341.519	928.009
EBT	EUR	-412	-4.657	106.835	341.519	928.009
Corporate income taks	%	27%	27%	27%	27%	27%
-/- Taxes	EUR	0	0	28.845	92.210	250.562
Earnings, Net profit	EUR	-412	-4.657	77.989	249.309	677.446
	Unit	2018	2019	2020	2021	2022
Earnings, Net profit	EUR	-412	-4.657	77.989	249.309	677.446
Dividend	%	0%	0%	25%	25%	25%
Dividend paid out	EUR	0	0	19.497	62.327	169.362
Equity increase	EUR	-412	-4.657	58.492	186.981	508.085

Costs						
	unit	2018	2019	2020	2021	2022
Customers SeeFood	# customers	0	14	73	151	312
New Customers	# customers	0	14	60	85	176
Average number of tablets	# tablets per	20	20	20	20	20
Total amount of tablets in use	# tablets	0	284	1.465	3.023	6.245
New tablets needed	# tablets	0	284	1.180	1.558	3.222
Purchasing new tablets	EUR	-	83.600	347.047	380.243	786.216
Purchase cost per tablet (excl. btw)	EUR	294	294	294	244	244
Salvage value after 5 years	EUR	150	150	150	120	120
Salvage value after 5 years (excl. btw)	EUR	124	124	124	99	99
Depreciatable cost	EUR	170	170	170	145	145
Tablet costs (depreciatable)	EUR	-	48.350	200.713	225.694	466.659
Depreciation period	ys		5	5	5	5
Depreciation	EUR		9.670	49.812	94.951	188.283
Material cost per 3D scanner	EUR	479	479	479	300	300
Total scanner production cost	EUR	-	6.803	28.922	25.573	52.868
Cloud Computing Power (AWS)	EUR/hour	0,83	0,75	0,67	0,61	0,54
Compute Power needed per model	hour	0,20	0,20	0,20	0,20	0,20
Models scanned with new restaurant	# models	50	50	50	50	50
Extra models scanned throughout the year	# models	40	40	40	40	40
Total compute power costs	EUR	-	191	800	1.247	2.320
RealityCapture subscription (photogrammetry s	EUR/3 mths	103	103	103	103	103
Total sotware costs	EUR	412	412	412	412	412
Employees	FTE	2	4	6	10	15
Office	EUR/mth	-	400	400	800	800
Salaries	EUR/mth	-	4.000	12.000	20.000	30.000
Social security	EUR/mth	-	1.200	6.000	10.000	15.000
Overhead costs	EUR	-	67.200	220.800	369.600	549.600

Assumptions:

iPad 2018 (cheapest which supports ARKit) costs €359 incl. btw. and €294 excl. btw

iPad from 2013 is the iPad Air 1, new price €479 (incl. Btw), second hand price is €150-200 after 5 years.
Because of that you can likely expect to sell the iPad 2018 for €150 in 5 years. As a company you need to charge btw for this used sale, so your effective second hand profit (salvation value) will be €124
With the price of electronics going down we expect to be able to purchase cheaper tablets in 2021 and 2022
Tablets will be upgraded after 5 years, expected value after 5 years is €150

Material cost of scanner will go down after a few years when we will produce a new customed designed one and can buy parts in bulk
We expect the scanners to last at least 5 years

For cloud computing we will make use of AWS' Amazon EC2 on demand p2.xlarge GPU Instance <https://aws.amazon.com/ec2/pricing/on-demand/>
Cloud computing costs will drop by 10% each year

For photogrammetry software we will make use of RealityCapture and use their Steam subscription licenses <https://store.steampowered.com/app/489180/RealityCapture/>

Financing

	Unit	2018	2019	2020	2021	2022
Share capital	EUR	10.000	10.000	10.000	10.000	10.000
Investor	EUR	-	100.000	700.000	700.000	700.000

Find an initial investor early in 2019 for 100K, late in 2020 do another round for 600K to fund upcoming growth

Balance sheet

Assets	Unit	2018	2019	2020	2021	2022
Purchasing value tablets	EUR	-	83.600	430.648	810.891	1.597.107
Cumulative depreciations	EUR	-	9.670	59.482	154.434	342.717
Fixed assets	EUR	-	73.930	371.165	656.457	1.254.390
Cash	EUR	9.588	31.001	411.755	356.274	373.461
Current assets	EUR	9.588	31.001	411.755	356.274	373.461
Total	EUR	9.588	104.931	782.920	1.012.732	1.627.851
Liabilities	Unit	2018	2019	2020	2021	2022
Share capital	EUR	10.000	10.000	10.000	10.000	10.000
Investor	EUR	-	100.000	700.000	700.000	700.000
Other reserves	EUR	412-	5.069-	53.423	240.404	748.489
Equity	EUR	9.588	104.931	763.423	950.404	1.458.489
Fixed liabilities	EUR	-	-	-	-	-
Dividend paid out	EUR	-	-	19.497	62.327	169.362
Current liabilities	EUR	-	-	19.497	62.327	169.362
Total	EUR	9.588	104.931	782.920	1.012.732	1.627.851

- - - - -

Cash flow

	Unit	2018	2019	2020	2021	2022
Net profit	EUR	412-	4.657-	77.989	249.309	677.446
-\ Depreciation	EUR	-	9.670	49.812	94.951	188.283
-\ Dividend payments	EUR	-	-	-	19.497-	62.327-
Operational cash flow	EUR	412-	5.013	127.802	324.762	803.402
Purchase fixed assets	EUR	-	83.600-	347.047-	380.243-	786.216-
Investment cash flow	EUR	-	83.600-	347.047-	380.243-	786.216-
Delta investment investor	EUR	-	100.000	600.000	-	-
Shares issued	EUR	10.000	-	-	-	-
Financing cash flow	EUR	10.000	100.000	600.000	-	-
Change in cash position	EUR	9.588	21.413	380.754	55.481-	17.186
Cumulative cash flow		9.588	31.001	411.755	356.274	373.461

9.588 21.413 380.754 55.481- 17.186
- - - - -

G - Pilot Questionnaire

1 Initial questions

Have a look at the desserts menu, how much do you like the available options? *



☐

1

☐

2

☐

3

☐

4

☐

5

☐

6

☐

7

Don't like them

Like them a lot

How would you rate your hunger at this moment? *

☐

1

☐

2

☐

3

☐

4

☐

5

☐

6

☐

7

Not hungry at all

Very hungry

How much do you crave having a dessert? *

☐

1

☐

2

☐

3

☐

4

☐

5

☐

6

☐

7

Not interested now

I might want one

I want it very much

a. Are you planning on ordering a dessert? *

- ☐ Yes
- ☐ Maybe
- ☐ No

b. Do you ever experience problems with the menu at restaurants? Yes/no? *

If yes, please elaborate.

DEMO TIME! Please indicate that you're done with this first part of the questionnaire but leave this website open. You will be shown the new and improved menu now.

Afterwards you can continue with the questions below.

5 Questions concerning your menu experience

Again, how would you rate your hunger at this moment? *

☐

1

☐

2

☐

3

☐

4

☐

5

☐

6

☐

7

Not hungry at all

Very hungry

Again, how much do you crave having a dessert? *

☐

1

☐

2

☐

3

☐

4

☐

5

☐

6

☐

7

Not interested now

I might want one

I want it very much

Having seen the actual desserts, how much did you like the available options? *

☐

1

☐

2

☐

3

☐

4

☐

5

☐

6

☐

7

Didn't like them

Liked them a lot

a. Did you end up ordering a dessert? *

- ☐ Yes
- ☐ No

b. What was your opinion on seeing 3D food models in augmented reality? *

c. How would you rate the quality of the 3D food models? *

☐

1

☐

2

☐

3

☐

4

☐

5

☐

6

☐

7

Do you prefer the normal menu or this new 3D augmented reality menu? *

☐

1

☐

2

☐

3

☐

4

☐

5

☐

6

☐

7

Prefer old

Prefer new

H - Pilot Results

Have a look at the desserts menu, how much do you like the available options?

13 out of 13 people answered this question



Don't like them

Like them a lot



How would you rate your hunger at this moment?

13 out of 13 people answered this question



Not hungry at all

Very hungry



How much do you crave having a dessert?

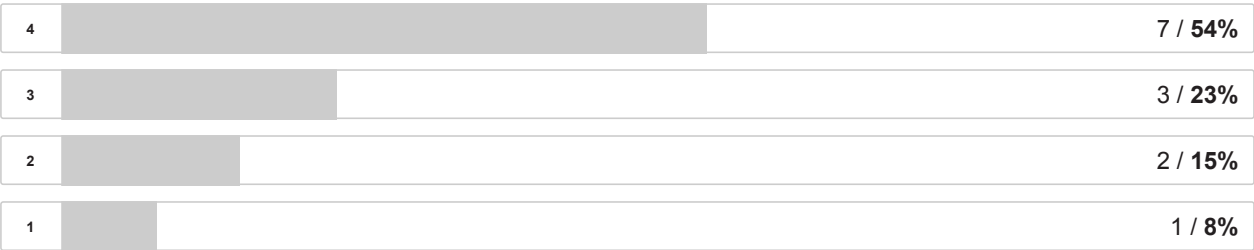
13 out of 13 people answered this question



Not interested now

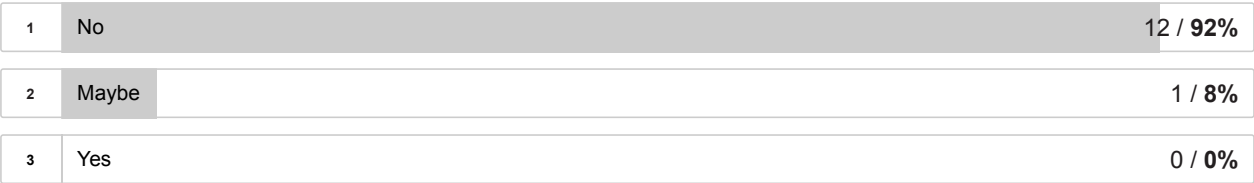
I might want one

I want it very much



Are you planning on ordering a dessert?

13 out of 13 people answered this question



Again, how would you rate your hunger at this moment?

13 out of 13 people answered this question



Not hungry at all

Very hungry



Again, how much do you crave having a dessert?

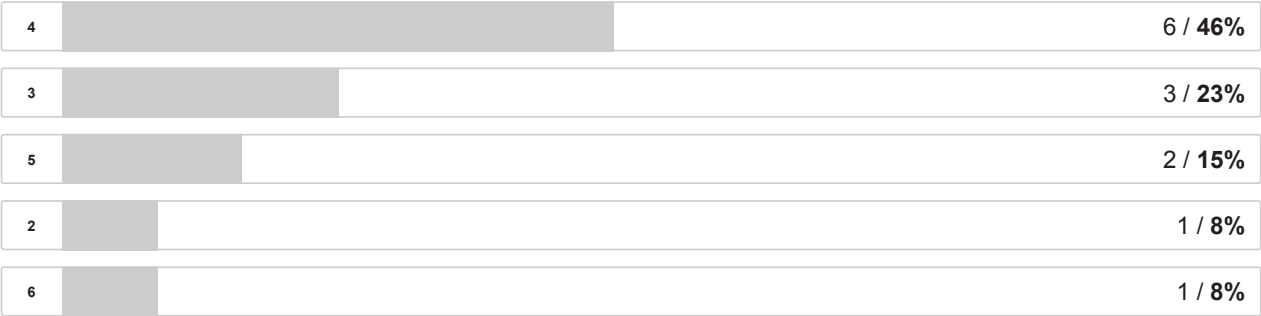
13 out of 13 people answered this question



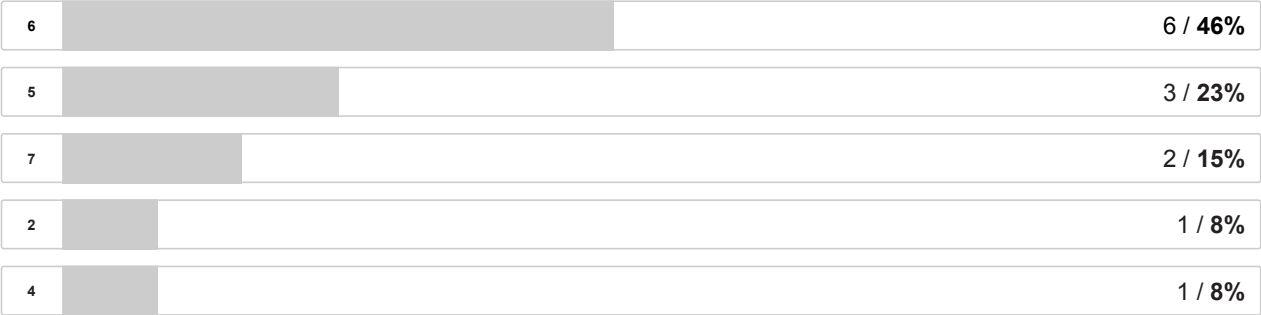
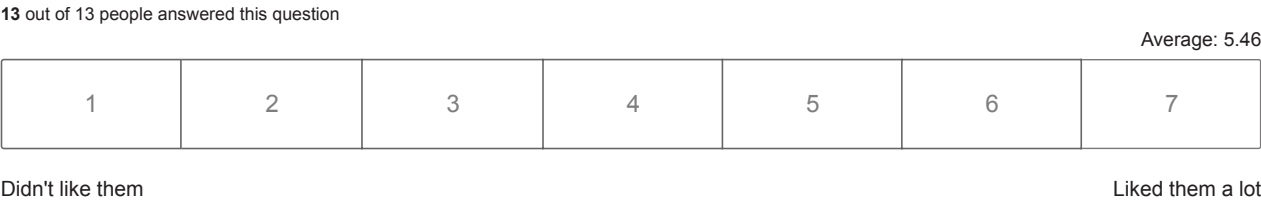
Not interested now

I might want one

I want it very much



Having seen the actual desserts, how much did you like the available options?



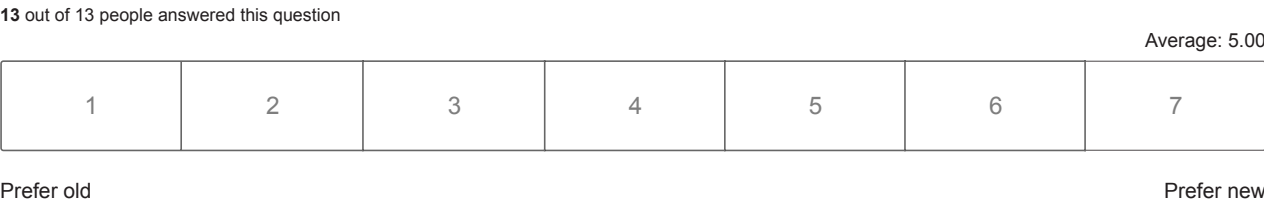
Did you end up ordering a dessert?



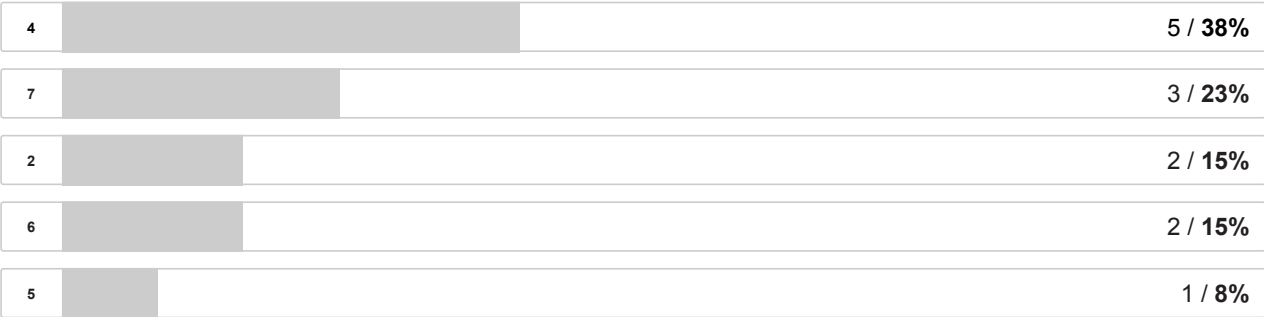
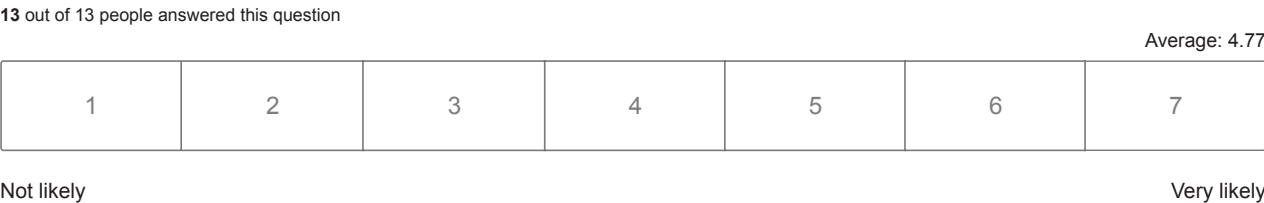
How would you rate the quality of the 3D food models?



Do you prefer the normal menu or this new 3D augmented reality menu?



How likely are you to share this experience with friends or family?

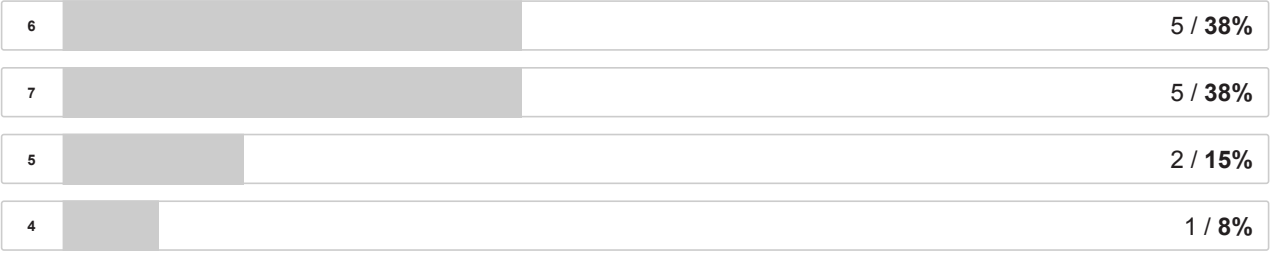


How important is food to you?



It just keeps me alive

Very important



How important is technology to you?

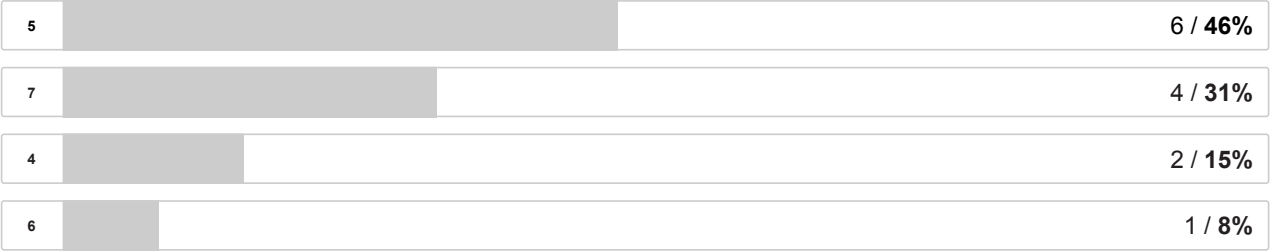
13 out of 13 people answered this question

Average: 5.54



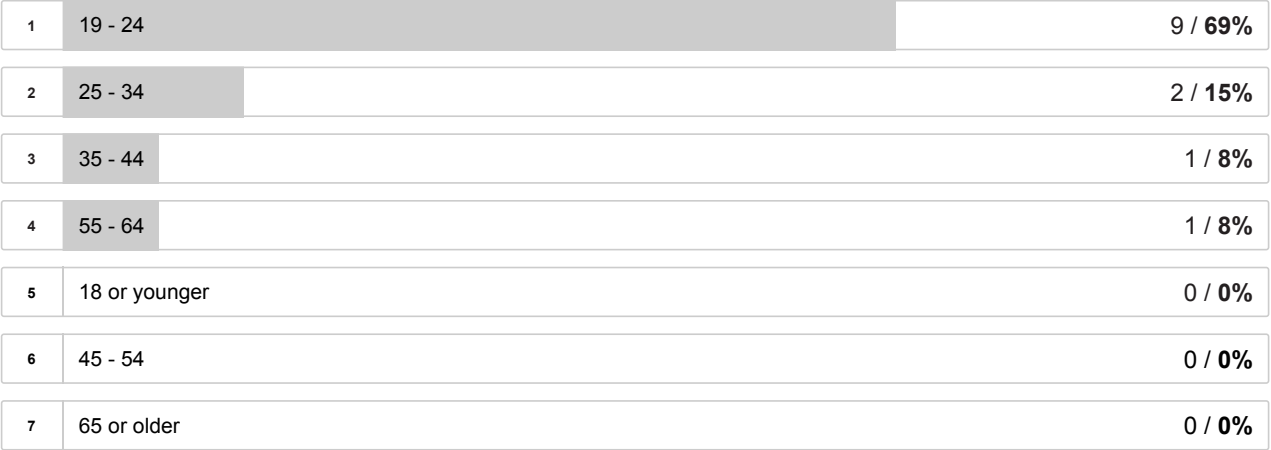
Not important at all

Very important



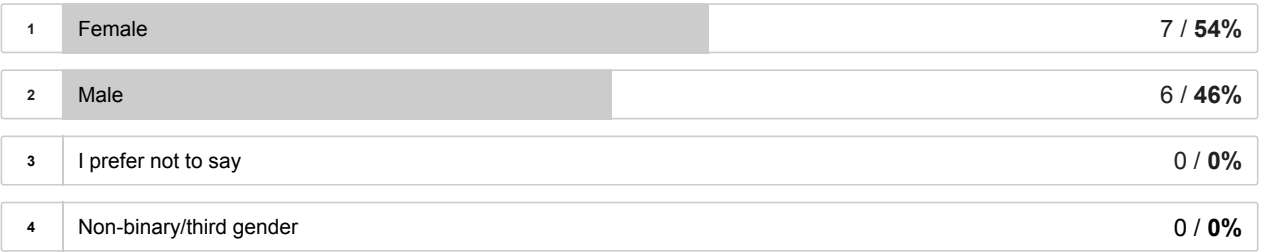
What is your age range?

13 out of 13 people answered this question



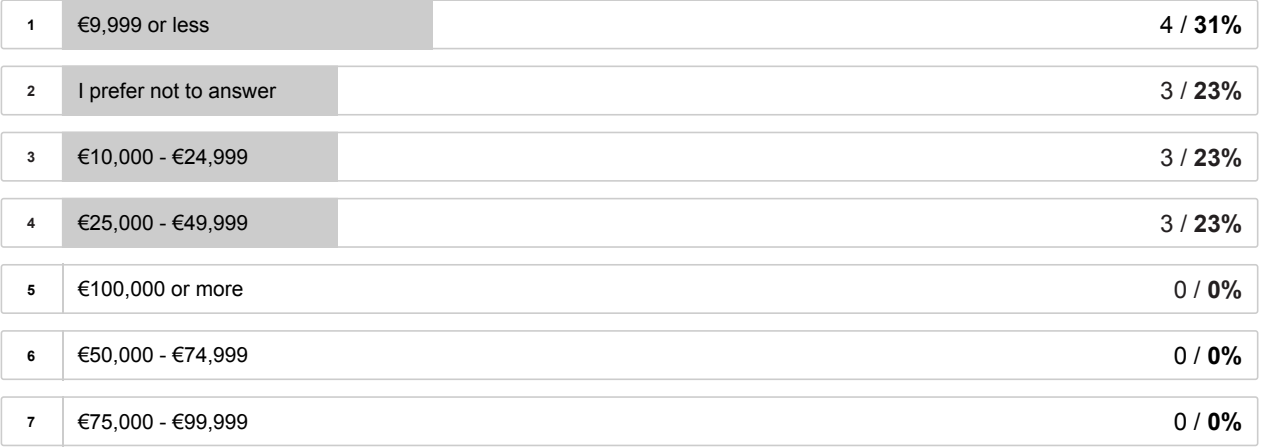
What's your gender?

13 out of 13 people answered this question



What is your yearly income?

13 out of 13 people answered this question



What is the highest level of education you have completed (or are doing at the moment)?

13 out of 13 people answered this question



I - Letter of Intent

SeeFood

Non-Binding Expression Of Interest

date ____ - ____ - ____

Hereby I declare that I am interested in
(multiple options can be selected)

☐ Receiving updates of the development of SeeFood by email.

Email address: _____

☐ Participating in an user interview which will take approximately 30-60 minutes, to discover what features of the product are most important.

☐ Participating in the pilot. This will help us validate and perfect the product, it will be free of charge in return for your collaboration and feedback.

☐ Being one of the launching customers and agreeing to subscribe to SeeFood for a period of at least 3 months.

For the price:

☐ Monthly 1% of total restaurant revenue per month.
SeeFood app, automated 3D scanner and 1 tablet per 3 chairs provided

☐ €150/month for automated 3D scanner & app + €15/month for every tablet

☐ Other (please specify): _____

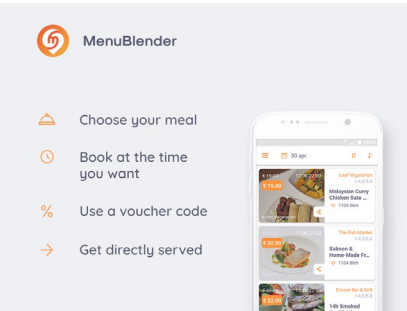
Name:

Restaurant:

Signature:

This letter does not create a binding agreement between the restaurant and SeeFood.

J - Potential Partnerships



MENUBLENDER

MenuBlender is a service to help restaurant visitors book a meal upfront. Through the app or website customers can choose a meal at a certain restaurant, pick a certain time, pay upfront and have the meal ready when they arrive. They launched a few months ago in Rotterdam, they expressed interesting in partnering up and integrating 3D food models within their app and offered to provide connections with their current customers.



THE HANGOUT (restaurant)

The Hangout expressed extreme interest in the product and both owners are actively engaged in the development process of SeeFood. The Hangout will be the place where the pilot is conducted (see chapter 5.1 Evaluate), where they gave full freedom to experiment and interact with their customers. As both owners of The Hangout have been working their whole lives in the hospitality sector they have knowledge about the market and a big network, we talked about them joining our company as advisors and for making new connections. A final decision about this will be made after the pilot.



COUNT3R

Count3r was developed to help consumers during the buying process of buying a consumer electronics device (e.g. laptop). Their algorithms work by giving people 3 options to begin with, the user picks the device that they would be most likely to order out of the three. By doing this a couple of times, an algorithm learns the user's preference and presents them with a final ranking of all the products which best match their interests.

It would be interesting to apply this same principle to making your decision in the restaurant, by presenting customers with multiple sets of 3 options to choose from. I had a talk with the founder of Count3r who is open to a potential partnership where their decision algorithms is used within the SeeFood app. A quick mockup has been made to get an idea of how such a 3-choice food menu would look like.

