Additional Material:
Fitting the data from embryo implantation prediction: learning from label proportions

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	Variable	Possible values	Brief description
	Indication	endometriosis, failed intrauterine insemination, tubal factor, male, mixed, other, unknown	Indication of the cycle
	Infert.time	*numeric*	Time since infertility was detected
Female	Age	(0, 30],(30, 35],(35, inf)	Age
	BMI	(0, 20],(20, 25],(25, inf)	Body mass index
	Prev.Pregnancy	No, Yes	Has she ever got pregnant?
	Prev.Abortion	No, Yes	Has she ever aborted?
	Prev.Cycles	0,1,2+	Number of previously undergone ART cycles
	FSH	$[x \leq 10]$, $[10 < x]$	Quantity of follicle-stimulating hormone
	AMH	$[0, 0.5],(0.5, 1],(1, \text{inf})$	Quantity of anti-mullerian hormone
	antralFol	$[x \leq 4]$, $[4 < x]$	Number of antral follicles
	E2	$[x \leq 3000]$,$[3000 < x]$	Quantity of estradiol
	P4	$[x \leq 1.5]$, $[1.5 < x]$	Quantity of progesterone
	lEnd	*numeric*	Endometrial thickness
Male	Quality.Semen	A, N, O, OA, OAT	Quality of the semen
	REM	$[0, 0.5]$, $(0.5, 1]$, $(1, \text{inf})$	Total pregressive sperm recovery
Stimulation	Protocol	PC, PL	Stimulation protocol
	Stimulation	FSH+Lhrec, FSHrec, FSHrec+hMG, FSHur, FSHur+hMG, hMG	Stimulation treatment
	dEst	*numeric*	Number of days of stimulation
	unitFSH	*numeric*	Units of FSH
	unitLH	$[0],(0, 1500],(1500, \text{inf})$	Units of LH
Summary embr.	No.Oocytes	*numeric*	Number of retrieved oocytes
	No.MII	*numeric*	Number of mature oocytes (MII state)
	No.Embryos	*numeric*	Number of embryos
	FertilityRate	$[0, 0.5]$, $(0.5, 1]$	*No.Embryos / No.MII*
	No.Transf.Emb	1, 2, 3	Number of transferred embryos
	SelectiveTransf	No, Yes	Were transferred embryos selected? (*No.Embryos > No.Transf.Emb*)
	No.Sacs	0, 1, 2, 3	Number of gestational sacs

Table 1. Features collected for each ART cycle. *No.sacs* is an outcome variable which can only assessed after decisions are taken.

	Variable	Possible values	Brief description
Oocyte	Vac	No, Yes	Presence of vacuoles
	SER	No, Yes	Presence of smooth endoplasmic reticulum clusters
	PVS	Normal,Augmented	Description of the perivitelline space
	PB	Normal, Abnormal	Description of the first polar body
	Technique	IVF, ICSI	Fertilization technique
D+1	PB.1	1, 2, 3+	Number of polar bodies
	Z	Z1, Z2, Z3, Z4	Scott's pronuclear grade [?]
D+2	nCel.2	{4}, {2;5}, {other}	Number of cells
	frag.2	[0, 10], (10, 25], (25, 35], (35, 100]	Percentage of cell fragmentation
	symmet.2	No, Yes	Are the blastomeres symmetric?
	PZ.2	Normal, Abnormal	Presence of abnormalities in the pellucid zone
	vac.2	No, Yes	Presence of vacuoles
	multiNuc.2	No, Yes	Presence of multi-nucleation in a cell (no.nuclei ≥ 2)
	quality.2	A, B, C, D	ASEBIR quality grade [?]
	Implantation	No, Yes	Did it get implanted?

Table 2. Features collected for each oocyte/embryo. *Implantation* variable cannot be always annotated by clinicians.

Infert.time	Indication	Age	BMI	Prev.Pregnancy	Prev.Abortion	FSH	Prev.Cycles
(-inf, 3]:380	unknown : 35	(-inf, 30]: 81	(-inf, 20]:111	No :463	No :507	(-inf, 10]:655	0 :306
(3, 4]:179	endometriosis: 20	(30, 35]:324	(20, 25]:397	Yes:233	Yes:189	(10,inf]: 41	1 :225
(4,inf]:137	failed i.i. :170	(35,inf]:291	(25,inf]:188				2+:165
	male :342						
	mixed : 57						
	other : 21						
	tubal factor : 51						

AMH	antralFol	E2	P4	lEnd	Qua.Semen	REM	Protocol
(-inf,0.5]: 59	(-inf, 4]: 84	(-inf,3000]:516	(-inf,1.5]:643	(-inf, 9.4]:232	A :191	(-inf,0.5]:198	PC:613
(0.5,1.0]: 76	(4,inf]:612	(3000, inf]:180	(1.5,inf]: 53	(9.4,11.0]:290	N :210	(0.5,1.0]: 57	PL: 83
(1.0,inf]:561				(11.0, inf]:174	O : 9	(1.0,inf]:441	
					OA : 94		
					OAT:192		

Stimulation	dEst	unitFSH	unitLH	No.Oocytes	No.MII	No.Embryos	transSelect
FSH+Lhrec : 94	(-inf, 10]:419	(-inf,2400]:243	(-inf, 0]:303	(-inf, 6]:232	(-inf, 5]:256	(-inf, 4]:329	No :154
FSHrec :263	(10, 11]:201	(2400,3300]:260	(0,1500]:252	(6, 10]:256	(5, 9]:258	(4, 6]:147	Yes:542
FSHrec+hMG:155	(11,inf]: 76	(3300, inf]:193	(1500, inf]:141	(10,inf]:208	(9,inf]:182	(6,inf]:220	
FSHur : 33							
FSHur+hMG :121							
hMG : 30							

FertilityRate	No.Transf.Emb	Technique	Vac	SER	PVS	PB	PB.1
(-inf, 50]:127	1: 40	IVF :128	No :692	No :680	Augmented: 11	Abnormal: 21	1: 1
(50,inf]:569	2:428	ICSI:568	Yes: 4	Yes: 16	Normal :685	Normal :675	2:695
	3:228						

Z	nCel.2	frag.2	symmet.2	PZ.2	vac.2	multiNuc.2	quality.2
Z1:472	A: 62	(-inf, 10]:481	No :279	Abnormal: 1	No :687	No :684	A:284
Z2: 23	B:149	(10, 25]:141	Yes:417	Normal :695	Yes: 9	Yes: 12	B:134
Z3:140	C:485	(25, 35]: 43					C:228
Z4: 61		(35,inf]: 31					D: 50

Implantation
No :447
Yes: 72
? :177

Table 3. List of variables in the table of embryos and values. *CP.1*, *PZ.2*, *Vac* and *multiNuc.2* were not considered in the experiments because of lack of balance in the values and/or no correlation.

Technique	Vac	SER	PVS	PB	PB.1	Z	nCel.2	frag.2
IVF :128	No :692	No :680	Augmented: 11	Abnormal: 21	1: 1	Z1:472	A: 62	(-inf, 10]:481
ICSI:568	Yes: 4	Yes: 16	Normal :685	Normal :675	2:695	Z2: 23	B:149	(10, 25]:141
						Z3:140	C:485	(25, 35]: 43
						Z4: 61		(35,inf]: 31
PZ.2	symmet.2	vac.2	multiNuc.2	quality.2	Implantation			
Abnormal: 1	No :279	No :687	No :684	A:284	No :447			
Normal :695	Yes:417	Yes: 9	Yes: 12	B:134	Yes: 72			
				C:228	? :177			
				D: 50				

Table 4. List of variables in the table of embryos and values. *CP.1*, *PZ.2*, *Vac* and *multiNuc.2* were not considered in the experiments because of lack of balance in the values and/or no correlation.

NB					TAN					2DB				
Accuracy	Recall	Precision	F1	PPR	Accuracy	Recall	Precision	F1	PPR	Accuracy	Recall	Precision	F1	PPR
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.03 ± 0.00	0.29 ± 0.00	0.05 ± 0.00	0.01 ± 0.00	0.83 ± 0.00	0.04 ± 0.00	0.13 ± 0.00	0.06 ± 0.00	0.04 ± 0.00	0.83 ± 0.00	0.03 ± 0.00	0.09 ± 0.00	0.04 ± 0.00	0.04 ± 0.00
0.86 ± 0.00	0.03 ± 0.00	0.29 ± 0.00	0.05 ± 0.00	0.01 ± 0.00	0.83 ± 0.00	0.04 ± 0.00	0.14 ± 0.01	0.06 ± 0.00	0.04 ± 0.00	0.81 ± 0.00	0.06 ± 0.00	0.12 ± 0.00	0.08 ± 0.00	0.07 ± 0.00
0.86 ± 0.00	0.03 ± 0.00	0.29 ± 0.00	0.05 ± 0.00	0.01 ± 0.00	0.83 ± 0.00	0.04 ± 0.01	0.13 ± 0.02	0.06 ± 0.01	0.04 ± 0.00	0.84 ± 0.00	0.08 ± 0.00	0.25 ± 0.00	0.12 ± 0.00	0.05 ± 0.00
0.86 ± 0.00	0.03 ± 0.00	0.40 ± 0.00	0.05 ± 0.00	0.01 ± 0.00	0.84 ± 0.00	0.02 ± 0.01	0.08 ± 0.03	0.03 ± 0.01	0.03 ± 0.00	0.84 ± 0.00	0.03 ± 0.00	0.13 ± 0.00	0.05 ± 0.00	0.03 ± 0.00
0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.85 ± 0.00	0.02 ± 0.01	0.14 ± 0.07	0.04 ± 0.02	0.02 ± 0.00	0.84 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.02 ± 0.00
0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.85 ± 0.00	0.02 ± 0.01	0.12 ± 0.04	0.03 ± 0.01	0.02 ± 0.00	0.83 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.03 ± 0.00
0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.84 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.02 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.79 ± 0.00	0.19 ± 0.00	0.21 ± 0.00	0.20 ± 0.00	0.13 ± 0.00	0.79 ± 0.00	0.11 ± 0.02	0.15 ± 0.02	0.12 ± 0.02	0.10 ± 0.00	0.76 ± 0.00	0.18 ± 0.00	0.16 ± 0.00	0.17 ± 0.00	0.15 ± 0.00
0.79 ± 0.00	0.19 ± 0.00	0.21 ± 0.00	0.20 ± 0.00	0.13 ± 0.00	0.78 ± 0.00	0.10 ± 0.02	0.14 ± 0.02	0.12 ± 0.02	0.11 ± 0.00	0.76 ± 0.00	0.18 ± 0.00	0.16 ± 0.00	0.17 ± 0.00	0.15 ± 0.00
0.72 ± 0.00	0.42 ± 0.00	0.23 ± 0.00	0.29 ± 0.00	0.25 ± 0.00	0.77 ± 0.00	0.23 ± 0.01	0.21 ± 0.01	0.22 ± 0.01	0.15 ± 0.00	0.75 ± 0.00	0.14 ± 0.00	0.13 ± 0.00	0.13 ± 0.00	0.15 ± 0.00
0.72 ± 0.00	0.42 ± 0.00	0.23 ± 0.00	0.29 ± 0.00	0.25 ± 0.00	0.77 ± 0.00	0.24 ± 0.01	0.21 ± 0.01	0.23 ± 0.01	0.16 ± 0.00	0.76 ± 0.00	0.12 ± 0.00	0.13 ± 0.00	0.13 ± 0.00	0.13 ± 0.00
0.73 ± 0.00	0.42 ± 0.00	0.23 ± 0.00	0.30 ± 0.00	0.25 ± 0.00	0.78 ± 0.00	0.25 ± 0.01	0.23 ± 0.01	0.24 ± 0.01	0.16 ± 0.00	0.76 ± 0.00	0.15 ± 0.00	0.14 ± 0.00	0.15 ± 0.00	0.15 ± 0.00
0.73 ± 0.00	0.42 ± 0.00	0.23 ± 0.00	0.30 ± 0.00	0.25 ± 0.00	0.78 ± 0.00	0.26 ± 0.01	0.23 ± 0.01	0.24 ± 0.01	0.16 ± 0.00	0.76 ± 0.00	0.17 ± 0.00	0.15 ± 0.00	0.16 ± 0.00	0.15 ± 0.00
0.74 ± 0.00	0.44 ± 0.00	0.25 ± 0.00	0.32 ± 0.00	0.25 ± 0.00	0.78 ± 0.00	0.24 ± 0.01	0.22 ± 0.01	0.23 ± 0.01	0.15 ± 0.00	0.74 ± 0.00	0.06 ± 0.00	0.06 ± 0.00	0.06 ± 0.00	0.14 ± 0.00
0.74 ± 0.00	0.44 ± 0.00	0.25 ± 0.00	0.32 ± 0.00	0.25 ± 0.00	0.78 ± 0.00	0.24 ± 0.01	0.22 ± 0.01	0.23 ± 0.01	0.15 ± 0.00	0.73 ± 0.00	0.07 ± 0.00	0.07 ± 0.00	0.07 ± 0.00	0.15 ± 0.00
0.74 ± 0.00	0.44 ± 0.00	0.25 ± 0.00	0.32 ± 0.00	0.24 ± 0.00	0.79 ± 0.00	0.26 ± 0.01	0.25 ± 0.01	0.25 ± 0.01	0.15 ± 0.00	0.73 ± 0.00	0.07 ± 0.00	0.06 ± 0.00	0.07 ± 0.00	0.15 ± 0.00
0.75 ± 0.00	0.44 ± 0.00	0.26 ± 0.00	0.33 ± 0.00	0.24 ± 0.00	0.78 ± 0.00	0.19 ± 0.01	0.20 ± 0.01	0.19 ± 0.01	0.13 ± 0.00	0.76 ± 0.00	0.15 ± 0.00	0.14 ± 0.00	0.15 ± 0.00	0.15 ± 0.00
0.74 ± 0.00	0.44 ± 0.00	0.26 ± 0.00	0.32 ± 0.00	0.24 ± 0.00	0.79 ± 0.00	0.19 ± 0.00	0.21 ± 0.00	0.20 ± 0.00	0.13 ± 0.00	0.75 ± 0.00	0.15 ± 0.00	0.14 ± 0.00	0.15 ± 0.00	0.15 ± 0.00
0.76 ± 0.00	0.42 ± 0.00	0.27 ± 0.00	0.33 ± 0.00	0.21 ± 0.00	0.78 ± 0.00	0.19 ± 0.00	0.20 ± 0.01	0.20 ± 0.00	0.14 ± 0.00	0.75 ± 0.00	0.17 ± 0.00	0.15 ± 0.00	0.16 ± 0.00	0.16 ± 0.00
0.76 ± 0.00	0.44 ± 0.00	0.27 ± 0.00	0.34 ± 0.00	0.23 ± 0.00	0.79 ± 0.00	0.23 ± 0.01	0.24 ± 0.02	0.23 ± 0.01	0.14 ± 0.00	0.76 ± 0.00	0.17 ± 0.00	0.15 ± 0.00	0.16 ± 0.00	0.15 ± 0.00
0.76 ± 0.00	0.49 ± 0.00	0.29 ± 0.00	0.36 ± 0.00	0.23 ± 0.00	0.79 ± 0.00	0.26 ± 0.02	0.24 ± 0.01	0.25 ± 0.02	0.15 ± 0.01	0.77 ± 0.00	0.19 ± 0.00	0.18 ± 0.00	0.19 ± 0.00	0.15 ± 0.00
0.77 ± 0.00	0.47 ± 0.00	0.29 ± 0.00	0.36 ± 0.00	0.23 ± 0.00	0.78 ± 0.00	0.25 ± 0.02	0.23 ± 0.01	0.24 ± 0.02	0.15 ± 0.00	0.77 ± 0.00	0.21 ± 0.00	0.19 ± 0.00	0.20 ± 0.00	0.15 ± 0.00
0.76 ± 0.00	0.42 ± 0.00	0.26 ± 0.00	0.32 ± 0.00	0.22 ± 0.00	0.79 ± 0.00	0.25 ± 0.02	0.24 ± 0.01	0.24 ± 0.01	0.14 ± 0.00	0.76 ± 0.00	0.24 ± 0.00	0.20 ± 0.00	0.22 ± 0.00	0.17 ± 0.00
0.76 ± 0.00	0.42 ± 0.00	0.26 ± 0.00	0.32 ± 0.00	0.22 ± 0.00	0.79 ± 0.00	0.28 ± 0.01	0.26 ± 0.01	0.27 ± 0.01	0.15 ± 0.00	0.77 ± 0.00	0.22 ± 0.00	0.21 ± 0.00	0.21 ± 0.00	0.15 ± 0.00
0.75 ± 0.00	0.42 ± 0.00	0.26 ± 0.00	0.32 ± 0.00	0.22 ± 0.00	0.80 ± 0.00	0.26 ± 0.01	0.27 ± 0.01	0.26 ± 0.01	0.14 ± 0.00	0.77 ± 0.00	0.21 ± 0.00	0.20 ± 0.00	0.20 ± 0.00	0.15 ± 0.00
0.76 ± 0.00	0.46 ± 0.00	0.28 ± 0.00	0.35 ± 0.00	0.23 ± 0.00	0.79 ± 0.00	0.24 ± 0.01	0.24 ± 0.01	0.24 ± 0.01	0.14 ± 0.00	0.76 ± 0.00	0.14 ± 0.00	0.14 ± 0.00	0.14 ± 0.00	0.14 ± 0.00
0.76 ± 0.00	0.44 ± 0.00	0.28 ± 0.00	0.34 ± 0.00	0.22 ± 0.00	0.78 ± 0.00	0.24 ± 0.01	0.23 ± 0.01	0.24 ± 0.01	0.14 ± 0.00	0.75 ± 0.00	0.11 ± 0.00	0.11 ± 0.00	0.11 ± 0.00	0.14 ± 0.00
0.77 ± 0.00	0.40 ± 0.00	0.28 ± 0.00	0.33 ± 0.00	0.20 ± 0.00	0.79 ± 0.00	0.20 ± 0.01	0.22 ± 0.01	0.21 ± 0.01	0.13 ± 0.00	0.74 ± 0.00	0.14 ± 0.00	0.12 ± 0.00	0.13 ± 0.00	0.16 ± 0.00
0.78 ± 0.00	0.40 ± 0.00	0.28 ± 0.00	0.33 ± 0.00	0.20 ± 0.00	0.78 ± 0.00	0.18 ± 0.02	0.20 ± 0.01	0.19 ± 0.01	0.13 ± 0.01	0.75 ± 0.00	0.17 ± 0.00	0.15 ± 0.00	0.16 ± 0.00	0.16 ± 0.00
0.78 ± 0.00	0.29 ± 0.00	0.26 ± 0.00	0.27 ± 0.00	0.16 ± 0.00	0.80 ± 0.00	0.22 ± 0.00	0.24 ± 0.01	0.23 ± 0.00	0.13 ± 0.00	0.72 ± 0.00	0.10 ± 0.00	0.08 ± 0.00	0.09 ± 0.00	0.16 ± 0.00
0.80 ± 0.00	0.38 ± 0.00	0.31 ± 0.00	0.34 ± 0.00	0.17 ± 0.00	0.80 ± 0.00	0.22 ± 0.00	0.25 ± 0.00	0.23 ± 0.00	0.12 ± 0.00	0.72 ± 0.00	0.10 ± 0.00	0.08 ± 0.00	0.09 ± 0.00	0.17 ± 0.00
0.79 ± 0.00	0.29 ± 0.00	0.27 ± 0.00	0.28 ± 0.00	0.15 ± 0.00	0.79 ± 0.00	0.24 ± 0.01	0.24 ± 0.01	0.24 ± 0.01	0.14 ± 0.00	0.76 ± 0.00	0.14 ± 0.00	0.14 ± 0.00	0.14 ± 0.00	0.14 ± 0.00
0.80 ± 0.00	0.32 ± 0.00	0.29 ± 0.00	0.30 ± 0.00	0.15 ± 0.00	0.80 ± 0.00	0.22 ± 0.01	0.25 ± 0.01	0.23 ± 0.01	0.12 ± 0.00	0.77 ± 0.00	0.14 ± 0.00	0.15 ± 0.00	0.14 ± 0.00	0.13 ± 0.00

Table 5. Results for NB, TAN and 2DB classifiers learnt in the proposed learning from label proportions paradigm. Accuracy, recall, precision, F1 and predicted positive rate (PPR) metrics are used. The horizontal division of the table separates the experiments performed with two datasets: upper rows, where only the embryo features are used as predictive variables and, lower rows, where the cycle features are also used. Specifically, each row collects experiments performed using a different subset of variables: backward/forward CFS and selection of the s most relevant variables ($s \in \{10, \dots, 2\}$ for the first dataset and $s \in \{36, \dots, 13\}$ for the second one).

NB					TAN					2DB				
Accuracy	Recall	Precision	F1	PPR	Accuracy	Recall	Precision	F1	PPR	Accuracy	Recall	Precision	F1	PPR
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
0.81 ± 0.00	0.17 ± 0.00	0.24 ± 0.00	0.20 ± 0.00	0.10 ± 0.00	0.82 ± 0.00	0.10 ± 0.02	0.20 ± 0.03	0.13 ± 0.02	0.07 ± 0.00	0.81 ± 0.00	0.08 ± 0.00	0.15 ± 0.00	0.11 ± 0.00	0.08 ± 0.00
0.81 ± 0.00	0.17 ± 0.00	0.24 ± 0.00	0.20 ± 0.00	0.10 ± 0.00	0.82 ± 0.00	0.09 ± 0.01	0.18 ± 0.02	0.12 ± 0.02	0.07 ± 0.00	0.80 ± 0.00	0.06 ± 0.00	0.10 ± 0.00	0.07 ± 0.00	0.08 ± 0.00
0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.25 ± 0.00	0.03 ± 0.00	0.01 ± 0.00
0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.20 ± 0.00	0.03 ± 0.00	0.01 ± 0.00
0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.85 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00
0.85 ± 0.00	0.01 ± 0.00	0.14 ± 0.00	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.20 ± 0.00	0.03 ± 0.00	0.01 ± 0.00
0.85 ± 0.00	0.01 ± 0.00	0.14 ± 0.00	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.33 ± 0.00	0.03 ± 0.00	0.01 ± 0.00
0.85 ± 0.00	0.03 ± 0.00	0.17 ± 0.00	0.05 ± 0.00	0.02 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.33 ± 0.00	0.03 ± 0.00	0.01 ± 0.00
0.85 ± 0.00	0.04 ± 0.00	0.23 ± 0.00	0.07 ± 0.00	0.03 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.28 ± 0.05	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.50 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.85 ± 0.00	0.03 ± 0.00	0.17 ± 0.00	0.05 ± 0.00	0.02 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.26 ± 0.05	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.85 ± 0.00	0.04 ± 0.00	0.23 ± 0.00	0.07 ± 0.00	0.03 ± 0.00	0.85 ± 0.00	0.01 ± 0.00	0.17 ± 0.02	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.50 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.85 ± 0.00	0.03 ± 0.00	0.17 ± 0.00	0.05 ± 0.00	0.02 ± 0.00	0.85 ± 0.00	0.01 ± 0.00	0.19 ± 0.02	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.85 ± 0.00	0.04 ± 0.00	0.21 ± 0.00	0.07 ± 0.00	0.03 ± 0.00	0.85 ± 0.00	0.01 ± 0.00	0.17 ± 0.00	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.84 ± 0.00	0.04 ± 0.00	0.19 ± 0.00	0.07 ± 0.00	0.03 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.33 ± 0.00	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.84 ± 0.00	0.04 ± 0.00	0.18 ± 0.00	0.07 ± 0.00	0.03 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.25 ± 0.05	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.85 ± 0.00	0.03 ± 0.00	0.17 ± 0.00	0.05 ± 0.00	0.02 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.33 ± 0.02	0.03 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.85 ± 0.00	0.03 ± 0.00	0.17 ± 0.00	0.05 ± 0.00	0.02 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.02 ± 0.08	0.00 ± 0.01	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.50 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.85 ± 0.00	0.03 ± 0.00	0.18 ± 0.00	0.05 ± 0.00	0.02 ± 0.00	0.85 ± 0.00	0.00 ± 0.00	0.02 ± 0.06	0.00 ± 0.01	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.50 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.85 ± 0.00	0.03 ± 0.00	0.18 ± 0.00	0.05 ± 0.00	0.02 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	0.50 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.84 ± 0.00	0.04 ± 0.00	0.17 ± 0.00	0.07 ± 0.00	0.03 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.02 ± 0.08	0.00 ± 0.01	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.83 ± 0.00	0.03 ± 0.00	0.11 ± 0.00	0.04 ± 0.00	0.04 ± 0.00	0.86 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.84 ± 0.00	0.03 ± 0.00	0.12 ± 0.00	0.05 ± 0.00	0.03 ± 0.00	0.85 ± 0.00	0.01 ± 0.00	0.13 ± 0.01	0.03 ± 0.00	0.02 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.84 ± 0.00	0.03 ± 0.00	0.12 ± 0.00	0.04 ± 0.00	0.03 ± 0.00	0.85 ± 0.00	0.03 ± 0.00	0.16 ± 0.01	0.05 ± 0.00	0.02 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.84 ± 0.00	0.03 ± 0.00	0.12 ± 0.00	0.04 ± 0.00	0.03 ± 0.00	0.85 ± 0.00	0.03 ± 0.00	0.18 ± 0.01	0.05 ± 0.00	0.02 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.84 ± 0.00	0.03 ± 0.00	0.13 ± 0.00	0.05 ± 0.00	0.03 ± 0.00	0.85 ± 0.00	0.04 ± 0.01	0.27 ± 0.05	0.07 ± 0.01	0.02 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00
0.84 ± 0.00	0.03 ± 0.00	0.13 ± 0.00	0.05 ± 0.00	0.03 ± 0.00	0.86 ± 0.00	0.04 ± 0.00	0.44 ± 0.05	0.08 ± 0.00	0.01 ± 0.00	0.86 ± 0.00	0.01 ± 0.00	1.00 ± 0.00	0.03 ± 0.00	0.00 ± 0.00

Table 6. Results for NB, TAN and 2DB classifiers learnt in the standard supervised classification paradigm. Accuracy, recall, precision, F1 and predicted positive rate (PPR) metrics are used. The horizontal division of the table separates the experiments performed with two datasets: upper rows, where only the embryo features are used as predictive variables and, lower rows, where the cycle features are also used. Specifically, each row collects experiments performed using a different subset of variables: backward/forward CFS and selection of the s most relevant variables ($s \in \{10, \ldots, 2\}$ for the first dataset and $s \in \{36, \ldots, 13\}$ for the second one).

LLP			Classical supervision		
NB	TAN	2DB	NB	TAN	2DB
Implantation	Implantation	Implantation	Implantation	Implantation	Implantation
Infert.time	Infert.time	Infert.time	Infert.time	Infert.time	Infert.time
Indication	Indication	Indication	Indication	Indication	Indication
BMI	BMI	BMI	BMI	BMI	BMI
Prev.Pregnancy	Prev.Pregnancy	Prev.Pregnancy	Prev.Abortion	Prev.Abortion	Prev.Abortion
Prev.Abortion	Prev.Abortion	Prev.Abortion	FSH	FSH	FSH
FSH	FSH	FSH	Prev.Cycles	Prev.Cycles	Prev.Cycles
Prev.Cycles	Prev.Cycles	Prev.Cycles	AMH	AMH	AMH
AMH	AMH	AMH	E2	E2	E2
E2	E2	E2	unitFSH	unitFSH	unitFSH
lEnd	lEnd	lEnd	unitLH	unitLH	unitLH
Protocol	Protocol	Protocol	No.Transf.Emb	No.Transf.Emb	No.Transf.Emb
Stimulation	Stimulation	Stimulation	SER	SER	SER
unitFSH	unitFSH	unitFSH	PVS	PVS	PVS
unitLH	unitLH	unitLH	nCel.2	nCel.2	nCel.2
No.Oocytes	transSelect	No.Oocytes	frag.2	frag.2	frag.2
transSelect	No.Embryos	transSelect			
No.Embryos	No.Transf.Emb	No.Embryos			
FertilityRate	Technique	No.Transf.Emb			
No.Transf.Emb	PB	Technique			
Technique	nCel.2	PB			
SER	frag.2	nCel.2			
PB	quality.2	frag.2			
nCel.2		quality.2			
frag.2					
quality.2					

Table 7. Cycle+embryonic variables selected for the FSS technique in the experiments of Table 3 (paper).

LLP			Classical supervision		
NB	TAN	2DB	NB	TAN	2DB
Implantation	Implantation	Implantation	Implantation	Implantation	Implantation
Technique	Technique	Technique	SER	SER	SER
SER	SER	SER	PVS	PVS	PVS
PB	PVS	PB	PB	PB	PB
nCel.2	PB	Z	nCel.2	nCel.2	nCel.2
frag.2	Z	nCel.2	frag.2	frag.2	frag.2
symmet.2	nCel.2	frag.2	vac.2	vac.2	vac.2
quality.2	frag.2	symmet.2			
	symmet.2	quality.2			
	quality.2				

Table 8. Embryonic variables selected for the FSS technique in the experiments of Table 3 (paper).