

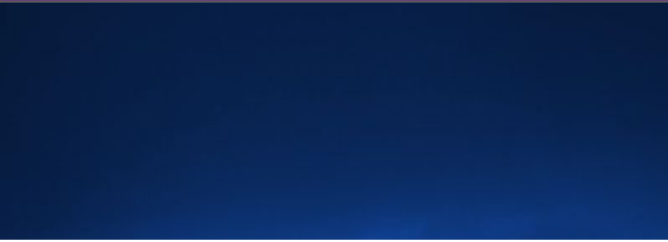
INDUSTRIAL AI CHALLENGE GROUP 3 FINAL PRESENTATION

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Davide Cavicchini · Emanuele Poiana · Andrea De Carlo · Silvano Vento Maddonni*



The Team...





- established in **1997** with the name *Alafil*
- situated in **Ala**.
- specialized in the **production of filaments**
- widely known for producing the **world shortest filament**.



THE CHALLENGE

REQUEST

Program for efficient scheduling

MOTIVATIONS

1. Clustered work load for the operators
2. Saving time and resources for training staff

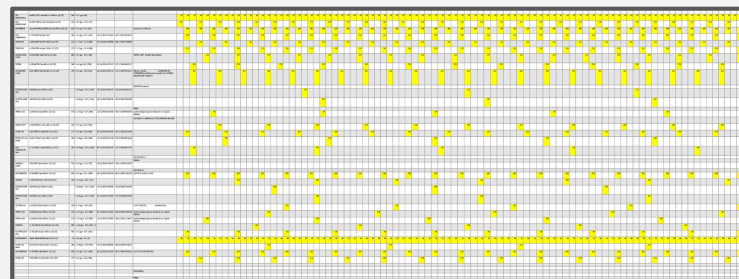


THE DATA (I)

PRODUZIONE	Cliente	n. ordine cliente	n. ordine ins	data inserimento ordine	n. ordine interno	cod articolo	quantità	data di consegna	nr. fusi	N° MC	n° levate	gg per produrre	data arrivo materia prima	Completamento ordine	prodotti o kg	consegnato kg	giacenza prodotto finito
PIANIFICAZIONE COMMERCIALE				03/06/2024		187.X21-20099DN2	420,0		256	1	3,02	17,68	10/10/2024	273,26			
CARICO ORDINE		163		03/06/2024		188.33002DN	414,0		256	1	1,99	11,27	03/10/2024	284,84		99,4	
PIANIFICAZIONE REPORT PIANIF. STORICO	...			03/06/2024		190.20135+ZN mini	334,0		202	1	4,19	41,02	02/11/2024	504,72		98,5	
STATISTICA	...	181198	19055	18/06/2024		33001DN2	1.200,0										1.100,0
GANTT	...	143646		19/06/2024		201.X21-39599V7DN0333	190,0		256	1	0,88	1,47	23/09/2024	59,88			

PRODUZIONE	articolo in standby	nr scheda standby	N° MC	N° fusi	N° levate eff. e ord	N° fusi effett.	cod articolo	vel. fusi eff.	ciclo	peso spola	ore levata	data ora partenza	data ora fine	data ora fine manuale	N° scheda
PIANIFICAZIONE COMMERCIALE															
CARICO ORDINE															
PIANIFICAZIONE REPORT PIANIF. STORICO			1	392	10		2277DN mini	20200	20226	2x 17 gg + 20 h (855)	250	426,95	06/09-09:45	24/09 04:45	
STATISTICA			2	448	C		12.2011DN mini	21000	21073	2 x 14 gg + 23 h (718)	310	357,76	18/09-10:15	03/10 08:15	
GANTT	24/75604-F1		3	448	C		11.2011DN mini	10000	21035	2 x 14 gg + 23 h (718)	310	358,40	10/09-09:30	25/09 07:30	24/98005-M4+M6
			4	448	C		11.2011DN mini	21000	20935	2 x 14 gg + 23 h (718)	310	360,11	11/09-13:45	26/09 13:45	
			5	448	C		11.2011DN mini	10000	21035	2 x 14 gg + 23 h (718)	310	358,40	13/09-09:30	28/09 07:30	24/57001-4+6
			6	256	14		31002DN1	18200	19612	1 x 5 gg + 20 h (140) / 2	325	68,53	17/09-07:45	20/09 04:45	24/69204-F1

PRODUZIONE	N° MC	cod articolo	velocità fusi inferiori	data ora partenza	data ora fine	ore lavorate dalla partenza	KWh assorbiti	KW medi	produzione [kg]	KWh/kg	€/Kg
PIANIFICAZIONE COMMERCIALE											
CARICO ORDINE											
PIANIFICAZIONE REPORT PIANIF. STORICO											
STATISTICA											
GANTT											



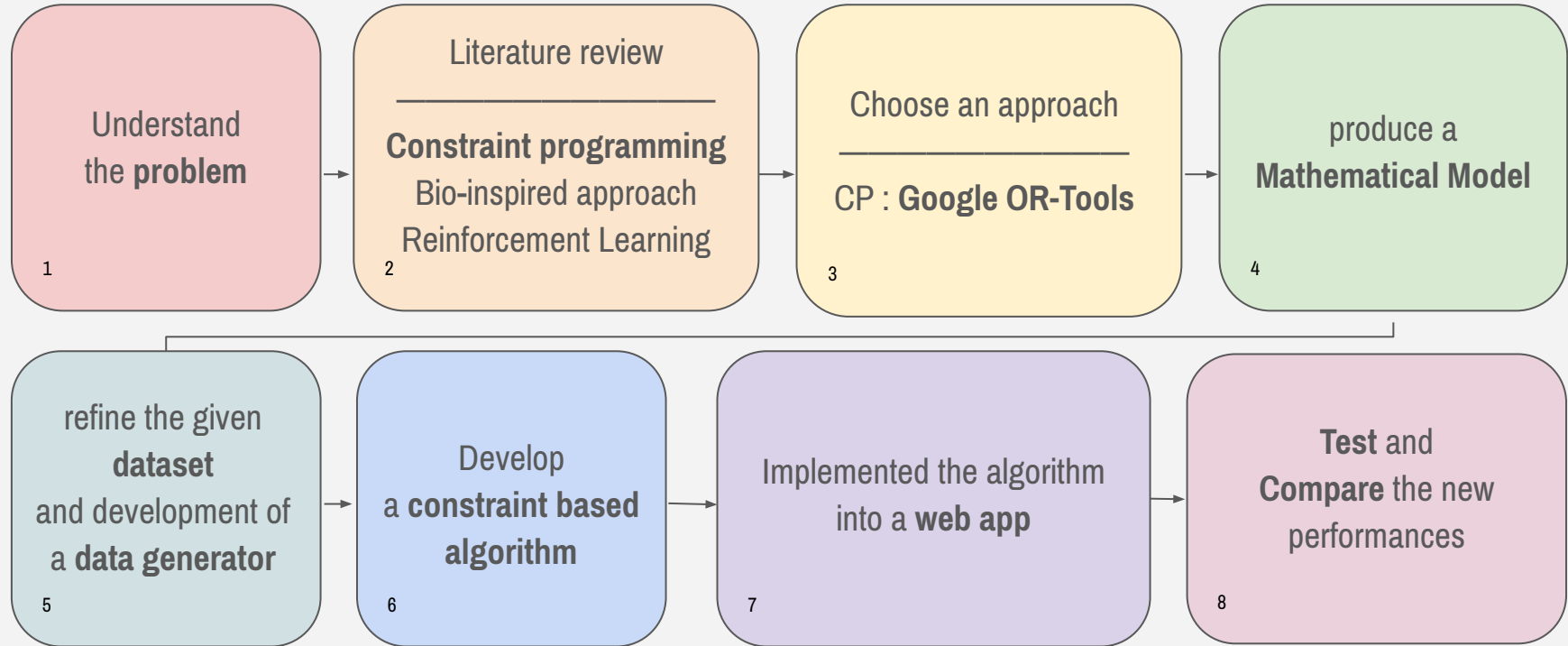
GANTT
(zoomed out)

Cliente	n. ordine interno	cod articolo	descrizione	quantità	data di consegna	Mc No.	data fermata prevista	data inserimento produzione	n. levate	nr fusi effettivi	fine produzione	kg prodotti evaso
SANTLEG		50.33001DN2	Ly330/2210 dc tpm 1500 st. 5,2 (FC)	3.550,0		41	14/12/2024	03/03/2024		28	24/06/2024	3.255,00
						67	12/11/2024	09/05/2024	4		25/05/2024	475,5313
FALKE		67.X24-1301V25+ZN mini	Ly 13/118 S+Z tpm 2400 st. 2,9 (CL)	900,0		55	17/12/2024	01/04/2024	5		10/07/2024	536,0625
						56	27/12/2024	20/04/2024	4		09/07/2024	431,9700
FALKE		79.X24-1301V22N1 mini	Ly 13/118 S+Z tpm 2400 st. 2,9 (CL)	50,0		C2	14/03/2024		1	32	03/04/2024	13,0900
						53	11/12/2024	10/05/2024	1	110	30/05/2024	44,9969
DUELESS		117.X23-44935+ZF	Ly 44/2270 S+Z tpm 1600 st. 3,7	1.270,0		24	23/11/2024	22/04/2024	7		24/06/2024	933,100
						25		05/05/2024	3		01/06/2024	399,900
FGP		127.31901DN220274	Ly310/8668 dc tpm 1200 st. 3,8	3.375,0		40		23/05/2024	15		23/07/2024	3.327,600
SCORTA		137.70342N	Cr 78/227 Z tpm 1900 st. 4,0 (EA)	1.930,0		45	03/01/2025	22/04/2024	12		19/08/2024	1.999,3884

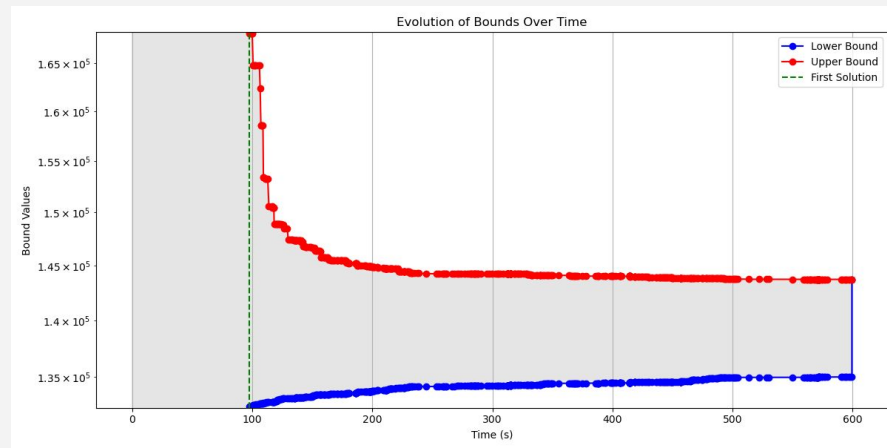
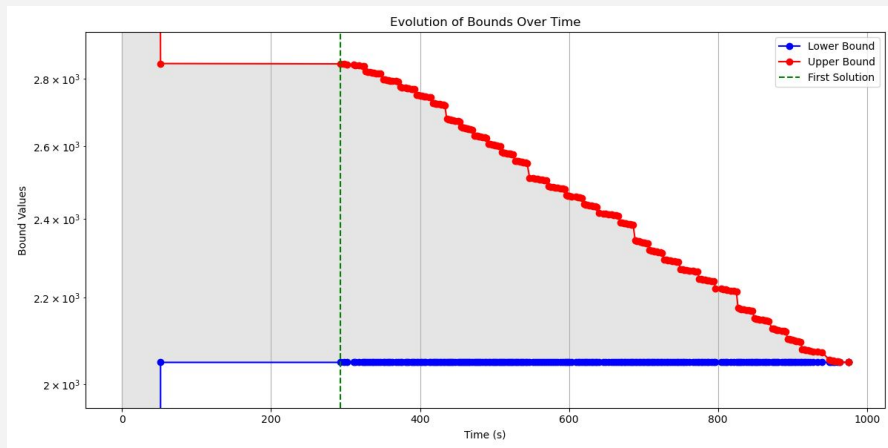
historical planning



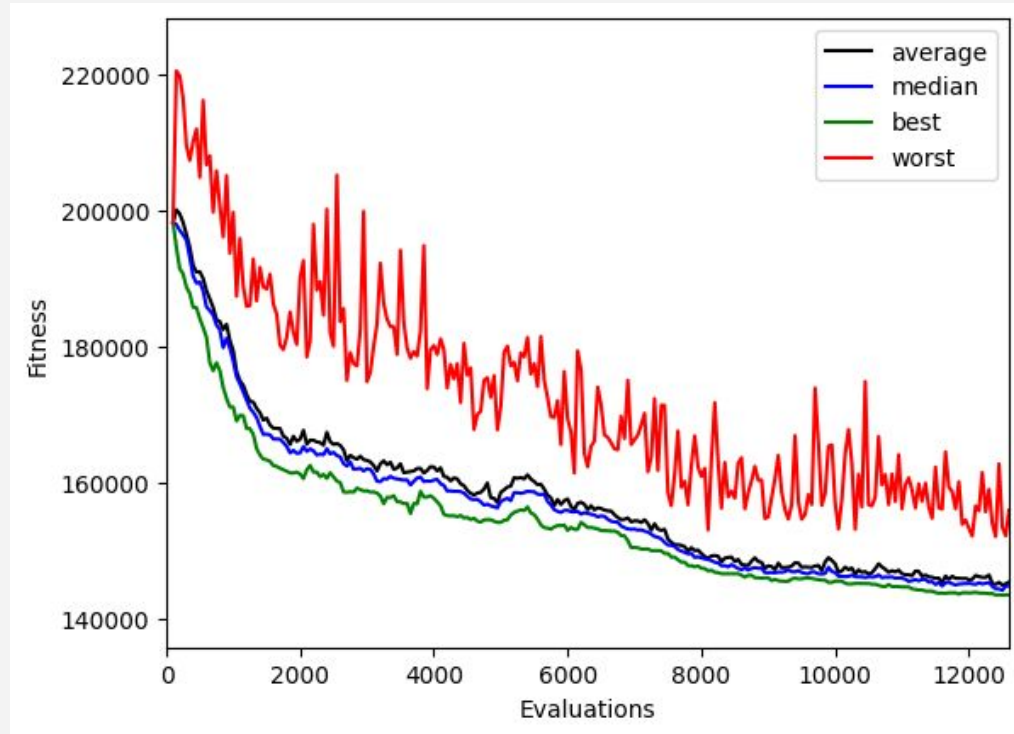
To reach that result we had to :



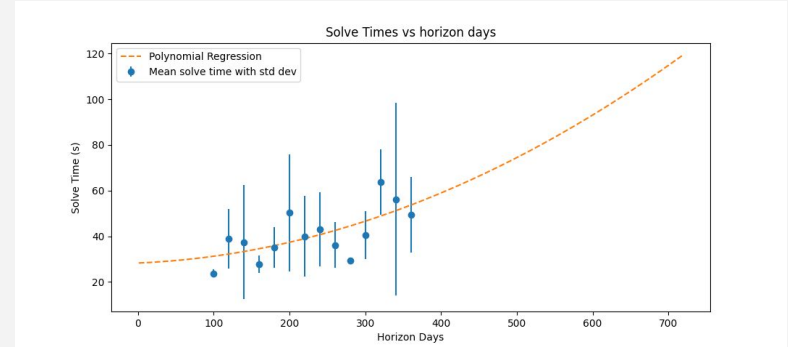
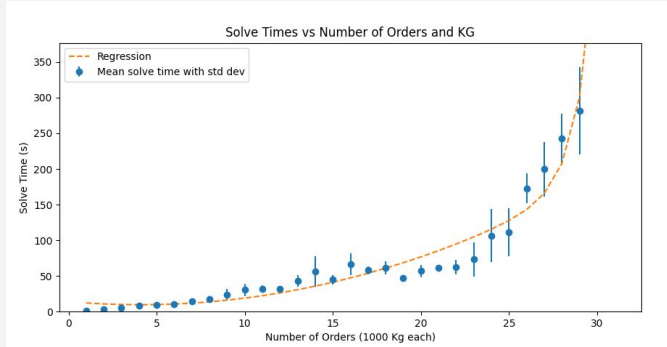
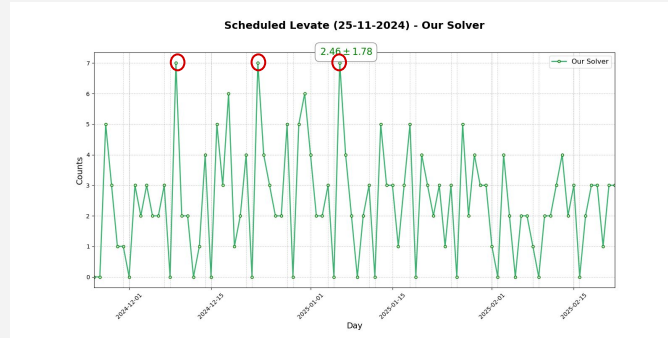
HOW THE SOLVER WORKS



SOLVER WITH THE GENETIC ALGORITHM



IMPACT AND SCALABILITY



[Upload Article-Machine Compatibility \(JSON\)](#)[Upload Machine Info \(JSON\)](#)[Upload Article List \(CSV\)](#)[Upload New Orders \(CSV\)](#)[Upload Running Products \(CSV\)](#)

Execute the Scheduler and View Results

Run Solver

Solver Output

Product : SCORTA_2277DN mini_34 - Article : 2277DN mini - Request : 184 Kg - Start Date : 0 - Due Date : 8448

Levate: {0: 2}

Cycle 0 :

Machine : 64:

Velocity : 0

Cycle End : 1065

Setup : (32, 32) COST: 0 GAP: 0

Levata [0] : LOAD(2024-12-03 08:00:00.096812, 2024-12-03 08:00:00.096812, COST: 0 GAP: 0) UNLOAD(2024-12-28 09:00:00.096812, 2024-12-28 10:00:00.096812, COST: 1 GAP: 0)

Levata [1] : LOAD(2024-12-28 10:00:00.096812, 2024-12-28 13:00:00.096812, COST: 3 GAP: 0) UNLOAD(2025-01-15 08:00:00.096812, 2025-01-15 09:00:00.096812, COST: 1 GAP: 0)

Product : MAXIS_7035DN1_35 - Article : 7035DN1 - Request : 161 Kg - Start Date : 0 - Due Date : 1296

Levate: {0: 1}

Cycle 0 :

Machine : 67:

Velocity : 0

Cycle End : 352

Setup : (32, 32) COST: 0 GAP: 0

IMPACT ON THE COMPANY

better **efficiency**
in production

improvement of
working
environment

reduced
time and
resources
for scheduling

predict orders