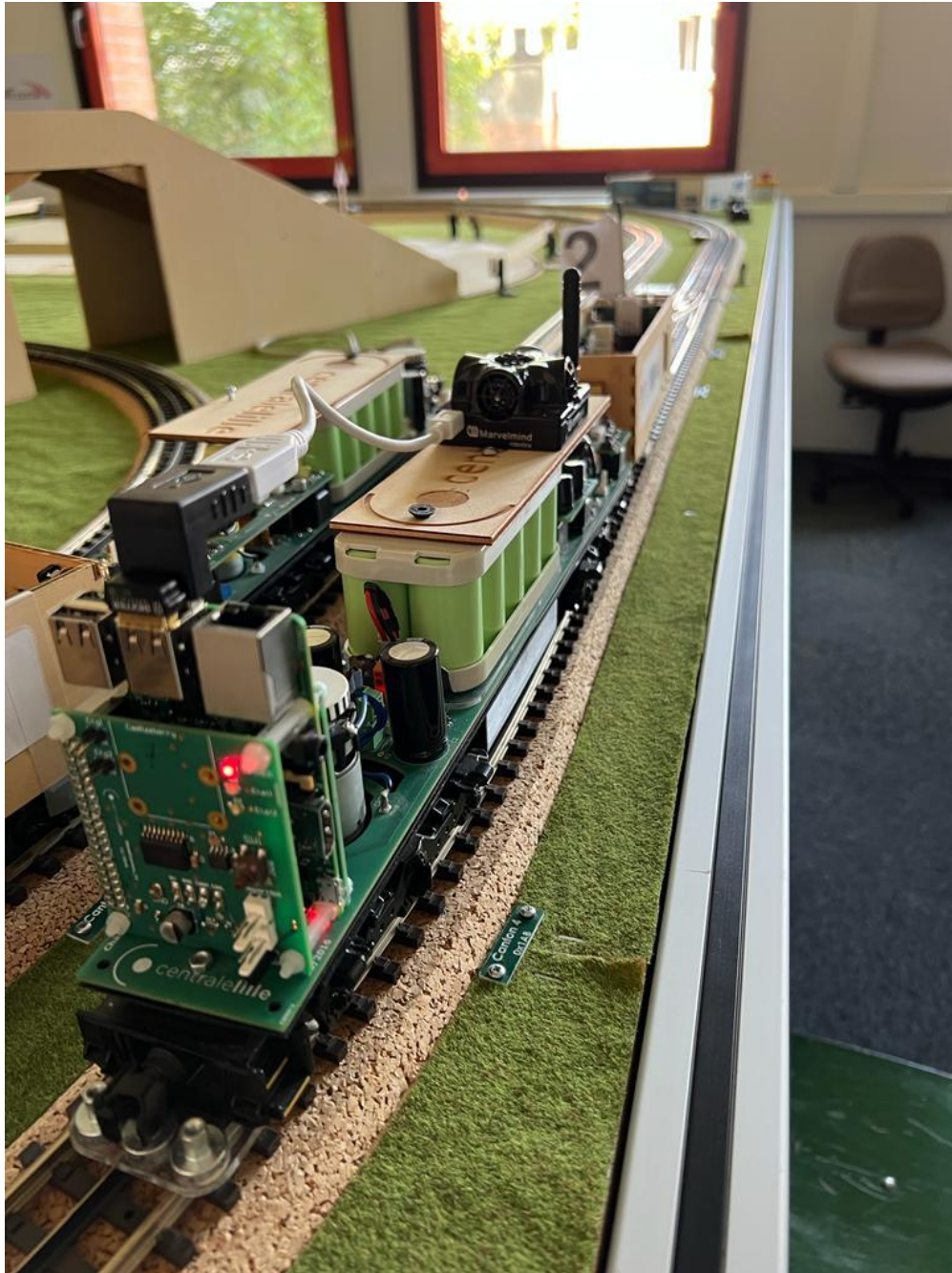


UNIRAIL

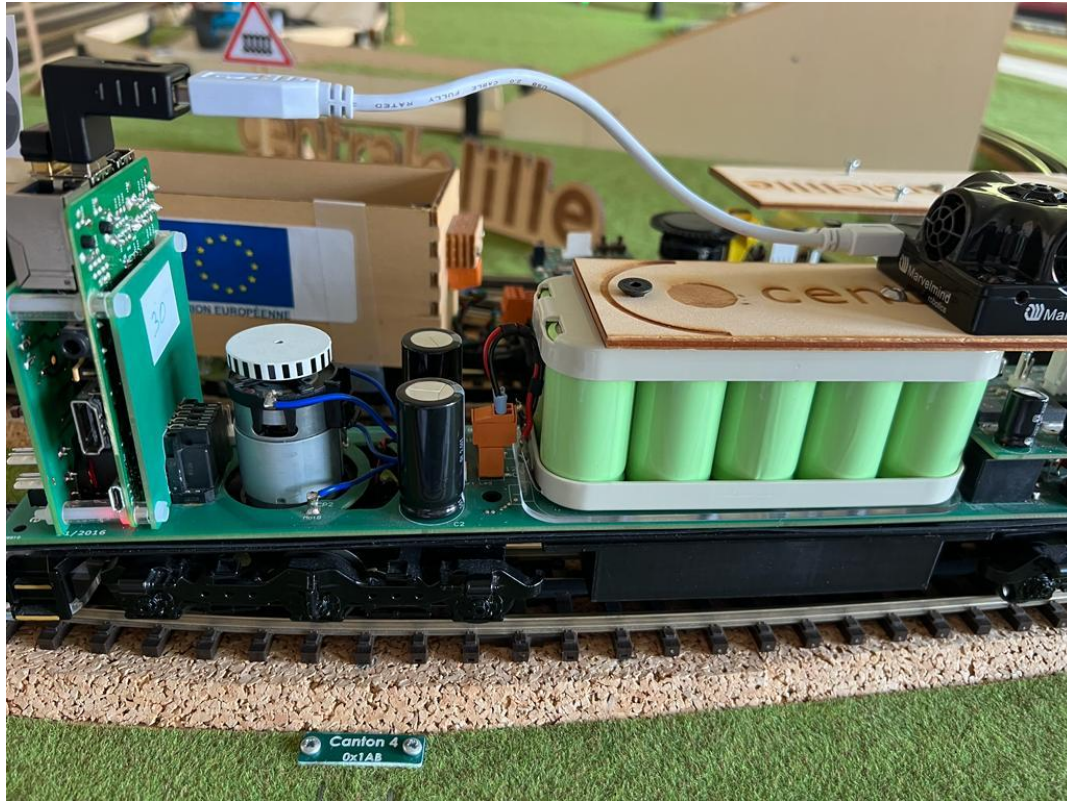
Project description:



Unirail is the train project which is a miniature setup of how real trains work. train draws power from the railway tracks and moves forward or backward with the help of remote. If the train does not draw power from tracks then it automatically draws power from the battery.



These are the railway tracks and the middle line in between the tracks is the power line, Train draws power from the middle line and moves.



The marvel mind installed above the train keeps on transmitting the live location of the train into our database. When the train is unable to draw power from the middle track of the railway lines, it draws power from Battery and Train keeps on sending voltage canframe with canid 32 into the canbus channel. The canbus is connected to the virtual box where data is stored in a database. From the Marvelmind data, we get location x and y coordinates which are sent into the canbus as location canframe with can id 291 into the data base.



To be precise with the position, Balise are installed all over the tracks. with the help of Balise number we can know which train is on which compartment. when the train passes over a balise, it automatically sends a Balise canframe into the database with can id 48.

DataBase:

279177	1686139696397	false	32	8	false	0	0	2	4	81	12	0	0
279178	1686139696465	false	291	8	false	0	0	6	57	0	0	24	95
279179	1686139696515	false	32	8	false	0	0	2	4	81	12	0	0
279180	1686139696596	false	291	8	false	0	0	6	59	0	0	24	95
279181	1686139696634	false	32	8	false	0	2	2	4	64	12	0	0
279182	1686139696748	false	291	8	false	0	0	6	57	0	0	24	95
279183	1686139696753	false	32	8	false	0	2	2	4	73	12	0	0
279184	1686139696871	false	32	8	false	0	2	2	4	73	12	0	0
279185	1686139696891	false	291	8	false	0	0	6	54	0	0	24	93
279186	1686139696990	false	32	8	false	0	2	2	4	74	12	0	0
279187	1686139697031	false	291	8	false	0	0	6	48	0	0	24	91
279188	1686139697108	false	32	8	false	0	2	2	4	75	12	0	0
279189	1686139697182	false	291	8	false	0	0	6	36	0	0	24	90
279190	1686139697227	false	32	8	false	0	2	2	4	78	12	0	0
279191	1686139697315	false	291	8	false	0	0	6	16	0	0	24	90
279192	1686139697346	false	32	8	false	0	2	2	4	78	12	0	0
279193	1686139697455	false	291	8	false	0	0	5	243	0	0	24	94
279194	1686139697464	false	32	8	false	0	2	2	4	76	12	0	0
279195	1686139697583	false	32	8	false	0	2	2	4	78	12	0	0
279196	1686139697597	false	291	8	false	0	0	5	212	0	0	24	97
279197	1686139697702	false	32	8	false	0	2	2	4	77	12	0	0
279198	1686139697738	false	291	8	false	0	0	5	181	0	0	24	98
279199	1686139697820	false	32	8	false	0	2	2	4	77	12	0	0
279200	1686139697879	false	291	8	false	0	0	5	155	0	0	24	96
279201	1686139697939	false	32	8	false	0	2	2	4	77	12	0	0
279202	1686139698021	false	291	8	false	0	0	5	135	0	0	24	92
279203	1686139698057	false	32	8	false	0	2	2	4	78	12	0	0
279204	1686139698162	false	291	8	false	0	0	5	115	0	0	24	87
279205	1686139698176	false	32	8	false	0	2	2	4	77	12	0	0
279206	1686139698295	false	32	8	false	0	2	2	4	79	12	0	0
279207	1686139698304	false	291	8	false	0	0	5	96	0	0	24	83
279208	1686139698413	false	32	8	false	0	2	2	4	76	12	0	0
279209	1686139698445	false	291	8	false	0	0	5	70	0	0	24	82
279210	1686139698532	false	32	8	false	0	2	2	4	76	12	0	0
279211	1686139698587	false	291	8	false	0	0	5	43	0	0	24	82
279212	1686139698651	false	32	8	false	0	2	2	4	76	12	0	0
279213	1686139698726	false	48	8	false	0	23	0	0	2	4	0	17
279214	1686139698729	false	291	8	false	0	0	5	10	0	0	24	83
279215	1686139698769	false	32	8	false	0	2	2	4	77	12	0	0
279216	1686139698870	false	291	8	false	0	0	4	240	0	0	24	82

id	Timestamp	ext	canid	dlc	rtr	data0	data1	data2	data3	data4	data5	data6	data7
279147	1686139694476	false	291	8	false	0	0	6	70	0	0	24	88
279148	1686139694500	false	32	8	false	0	0	2	12	81	12	0	0
279149	1686139694617	false	291	8	false	0	0	6	62	0	0	24	92
279150	1686139694620	false	32	8	false	0	0	2	12	81	12	0	0
279151	1686139694736	false	32	8	false	0	0	2	12	81	12	0	0
279152	1686139694758	false	291	8	false	0	0	6	61	0	0	24	94
279153	1686139694855	false	32	8	false	0	0	2	12	81	12	0	0
279154	1686139694901	false	291	8	false	0	0	6	61	0	0	24	94
279155	1686139694973	false	32	8	false	0	0	2	12	81	12	0	0
279156	1686139695051	false	291	8	false	0	0	6	59	0	0	24	94
279157	1686139695092	false	32	8	false	0	0	2	12	81	12	0	0
279158	1686139695193	false	291	8	false	0	0	6	62	0	0	24	93
279159	1686139695334	false	291	8	false	0	0	6	61	0	0	24	93
279160	1686139695330	false	32	8	false	0	0	2	12	81	12	0	0
279161	1686139695211	false	32	8	false	0	0	2	12	81	12	0	0
279162	1686139695448	false	32	8	false	0	0	2	12	81	12	0	0
279163	1686139695475	false	291	8	false	0	0	6	60	0	0	24	93
279164	1686139695566	false	32	8	false	0	0	2	4	81	12	0	0
279165	1686139695617	false	291	8	false	0	0	6	60	0	0	24	93
279166	1686139695685	false	32	8	false	0	0	2	4	81	12	0	0
279167	1686139695758	false	291	8	false	0	0	6	59	0	0	24	93
279168	1686139695804	false	32	8	false	0	0	2	4	81	12	0	0
279169	1686139695892	false	291	8	false	0	0	6	58	0	0	24	94
279170	1686139695923	false	32	8	false	0	0	2	4	81	12	0	0
279171	1686139696031	false	291	8	false	0	0	6	57	0	0	24	95
279172	1686139696041	false	32	8	false	0	0	2	4	81	12	0	0
279173	1686139696160	false	32	8	false	0	0	2	4	81	12	0	0
279174	1686139696172	false	291	8	false	0	0	6	57	0	0	24	95
279175	1686139696278	false	32	8	false	0	0	2	4	81	12	0	0
279176	1686139696315	false	291	8	false	0	0	6	58	0	0	24	95
279177	1686139696397	false	32	8	false	0	0	2	4	81	12	0	0
279178	1686139696465	false	291	8	false	0	0	6	57	0	0	24	95
279179	1686139696515	false	32	8	false	0	0	2	4	81	12	0	0
279180	1686139696596	false	291	8	false	0	0	6	59	0	0	24	95
279181	1686139696634	false	32	8	false	0	2	2	4	64	12	0	0
279182	1686139696748	false	291	8	false	0	0	6	57	0	0	24	95
279183	1686139696753	false	32	8	false	0	2	2	4	73	12	0	0
279184	1686139696871	false	32	8	false	0	2	2	4	73	12	0	0
279185	1686139696901	false	291	8	false	0	0	6	54	0	0	24	92

The above pictures show the data in the database containing 3 canframes data with can id 291,32, 48. Each canframe is a 8 bit data length with data frames 0-7
Can id 291 is the location canframe with data as follows :

For the x component of the position data:

positionframe.data[0] represents the most significant byte (MSB) of the x component.

positionframe.data[1] represents the second most significant byte.

positionframe.data[2] represents the third most significant byte.

positionframe.data[3] represents the least significant byte (LSB) of the x component.

For the y component of the position data:

positionframe.data[4] represents the MSB of the y component.

positionframe.data[5] represents the second most significant byte.

positionframe.data[6] represents the third most significant byte.

positionframe.data[7] represents the LSB of the y component.

For the Balise can frame with canframe id 48, the data frames are like this

D[0]: cdmc_lenEbtL0

D[1]: cdmc_CKS_EbtL2Ext

is equal to sum of data[2] to data[7] for Id = 0x30

added to the sum of the Data[i] of the additional and necessary "Ids".

PS: $CKS_EbtL2Ext = CKS_EbtL2 + cdmc_CRO_comIR$

D[2]: cdmc_standardCom (Communication Protocol)

D[3]: cdmc_dataSup

D[4]: cdmc_etatProchainFeu

D[5]: cdmc_sourceNumeroBalise

D[6] : 0x00, Reserved

D[7]: cdmc_CRO_comIR , This CRO indicates the .

Out of these frames ,we need only the data frame 5 which contains the Balise number . It means that the train is in that Balise compartment.

For The Voltage can frame with canframe id 32,

bit0: bdmc_MOT_initEnCours,

bit1: bdmc_noPoweredByRails
Bit2: bdmc_batterieFaible
bit3: Reserved
bit4: bdmc_MOT_bugSoft
bit5: bdmc_MOT_CAN_RxErrorPassive
bit6: bdmc_MOT_CAN_TxErrorPassive
bit7: bdmc_MOT_CAN_busOFF

Out of all these dataframes, we need the data in bit 1 which indicates the power drawn by rails. If the data in Bit 1 is 0 then it means that power is drawn from railway tracks. If bit 1 is 2 then that train is drawing power from its batteries which means there is a power loss in the track.

My Overall aim in this project is to create an algorithm to detect the power surges in the train and places when and where power surges occur . If the power surge occurs, then I want its position of x and y coordinates using the position canframe and its balise number on which the train is in using the Balise canframe.

To test the algorithm:



We can manually keep Tape on the middle Powerline of the Railway track and I want to test whether my algorithm is perfect in detecting the power surges in the train and if power surges occur tell its position and location.