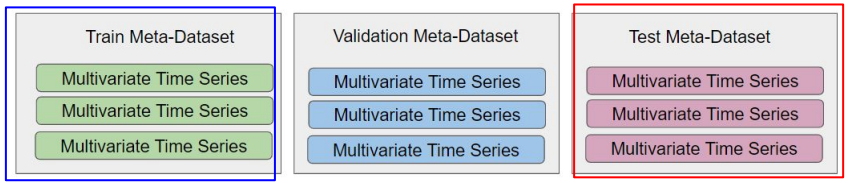
Data evaluation - Baselines

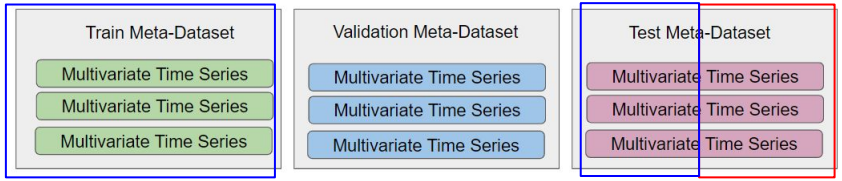
Sebastian Pineda-Arango

Evaluation types

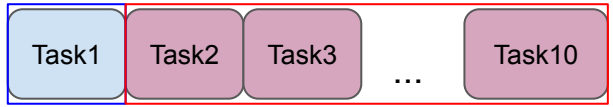
- Without fine-tuning (WOFT)



- On 50% (50-50)



- With fine-tuning (WFT)



Baselines

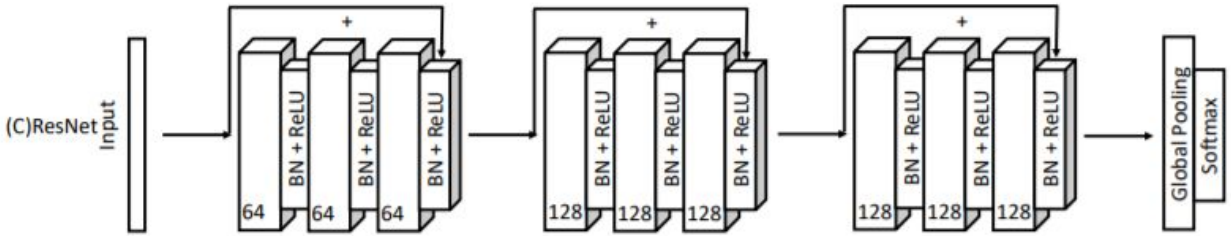
- **Gaussian Processes (GP)**
- **XG-Boost**
- **Resnet** (Wei, W. W. S. (2011). Time Series Regression. In *International Encyclopedia of Statistical Science* (pp. 1607–1609). Springer Berlin Heidelberg).
- **VRADA** (Purushotham, S., Carvalho, W., Nilanon, T., Liu, Y., & Angeles, L. (2017). Variational Recurrent Adversarial Deep Domain Adaptation, (2016), 1–11.)

To do (last week)

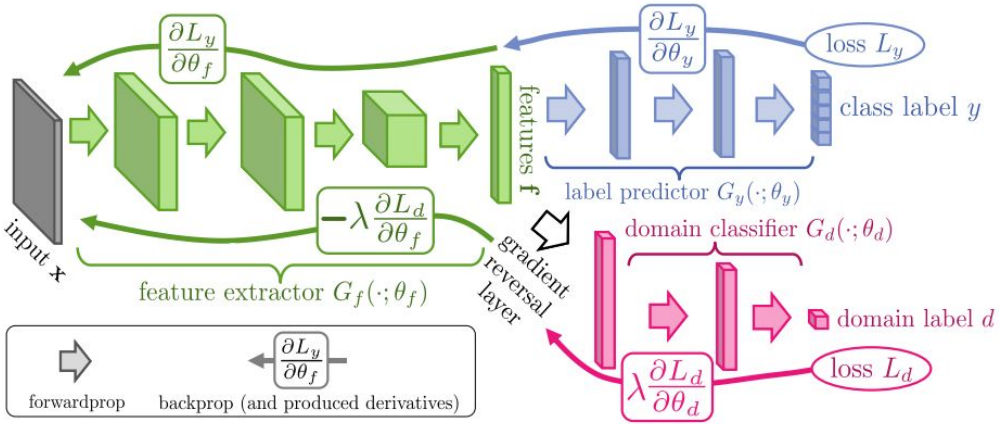
- Evaluation on Resnet Doing
- Implementation of LSTM To Do
- Implementation of VRADA Done
- Change task assignment for BATTERY Done

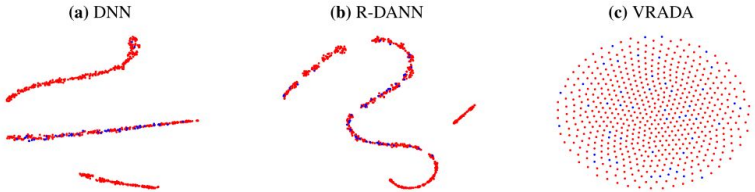
Resnet

- 507.841 parameters
- 3 Convolutional blocks



VRADA


$\frac{\partial L_y}{\partial \theta_f}$
$\frac{\partial L_y}{\partial \theta_y}$
loss L_y
class label y
features f
label predictor $G_y(\cdot;\theta_y)$
$-\lambda\frac{\partial L_d}{\partial \theta_f}$
domain classifier $G_d(\cdot;\theta_d)$
input x
gradient reversal layer
feature extractor $G_f(\cdot;\theta_f)$
domain label d
loss L_d
$\lambda\frac{\partial L_d}{\partial \theta_d}$
forwardprop
backprop (and produced derivatives)


(a) DNN
(b) R-DANN
(c) VRADA

Fine-tuning

- Learning rate and number of epochs?
- Options:
  - The same learning rate for all tasks. Validate number of epochs. 
  - The same number of epochs. Validate the learning rate. 
  - Use 10% of the task data as validation data and apply early stopping.

Results

		WOFT		
		XGBOOST	**GP**	**RESNET**
POLLUTION	**MAE**	**0.043028**	-	0.051254
	RMSE	**0.065909**	-	0.091040
HR	**MAE**	0.076297	-	**0.057630**
	RMSE	0.093565	-	**0.083713**
BATTERY	**MAE**	**0.023632**	-	0.037211
	RMSE	**0.038736**	-	0.055966

Results

		50-50		
		XGBOOST	**GP**	**RESNET**
POLLUTION	**MAE**	0.046320	-	**0.041743**
	RMSE	**0.070666**	-	0.071891
HR	**MAE**	0.064060	-	**0.051280**
	RMSE	0.076843	-	**0.066053**
BATTERY	**MAE**	**0.020206**	-	0.023419
	RMSE	**0.033321**	-	0.037959

Results

		WFT		
		XGBOOST	GP	RESNET
POLLUTION	MAE	-	0.049127	
	RMSE	-	0.067008	
HR	MAE	-	0.118233	
	RMSE	-	0.164541	
BATTERY	MAE	-	0.012753	
	RMSE	-	0.047939	

To do (this week)

- Evaluation on Resnet
- Implementation of LSTM
- Evaluation of VRADA

Timeline

Time	Tasks
August	Literature review, data exploration
September	Baselines implementation
October	Proposed model implementation
November	Experiments on models (Hyper. Tun., etc.)
December	Results evaluation and adjustments
January	Results report and thesis finalization