

Predicting Disease Labels Prostate Cancer

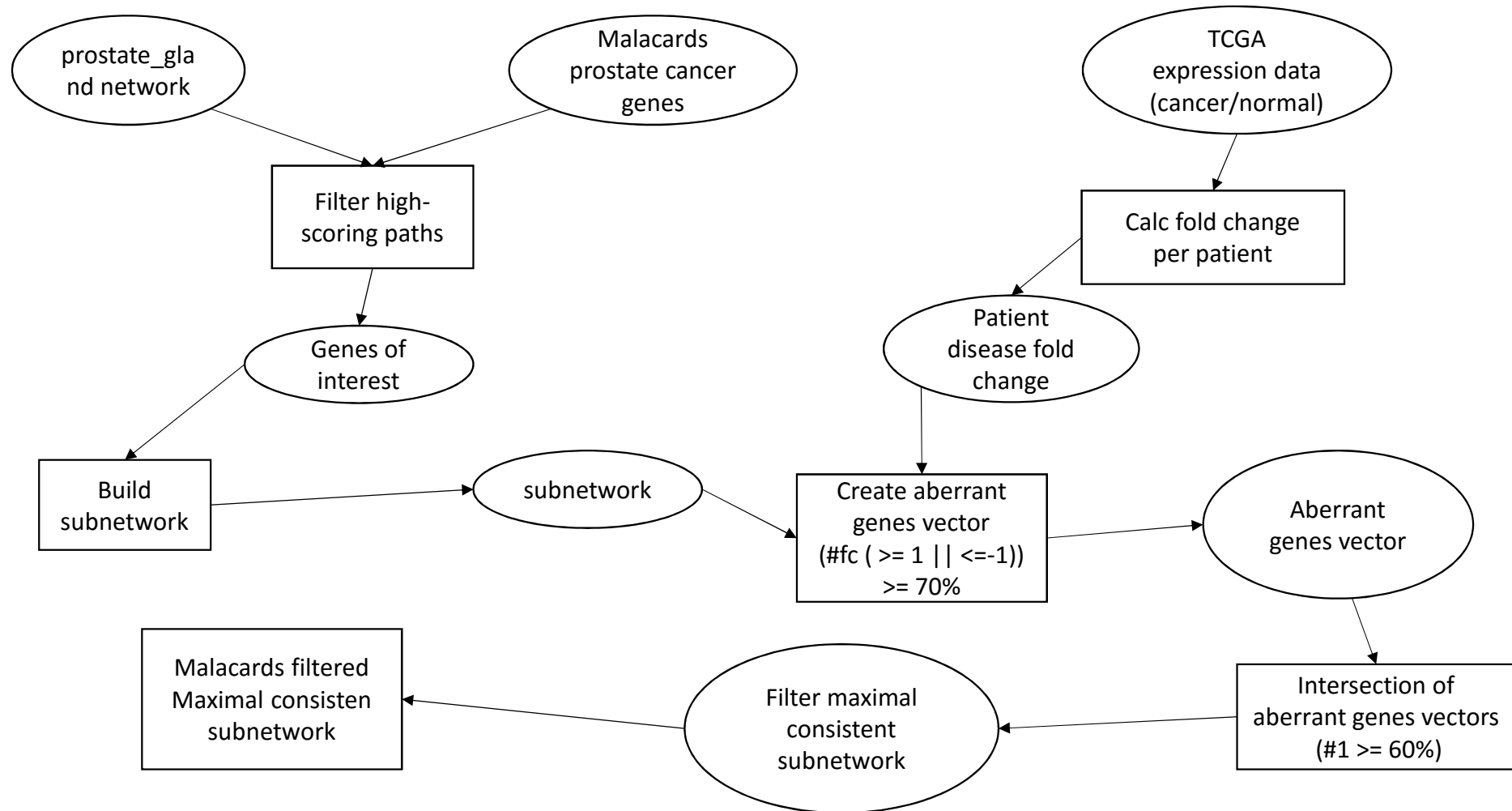
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Approaches

- Malacards Filtered McSubnet Approach
- Z-Score Approach
- Accumulated Approach
- Aberrant Neighbors Approach
- SVM

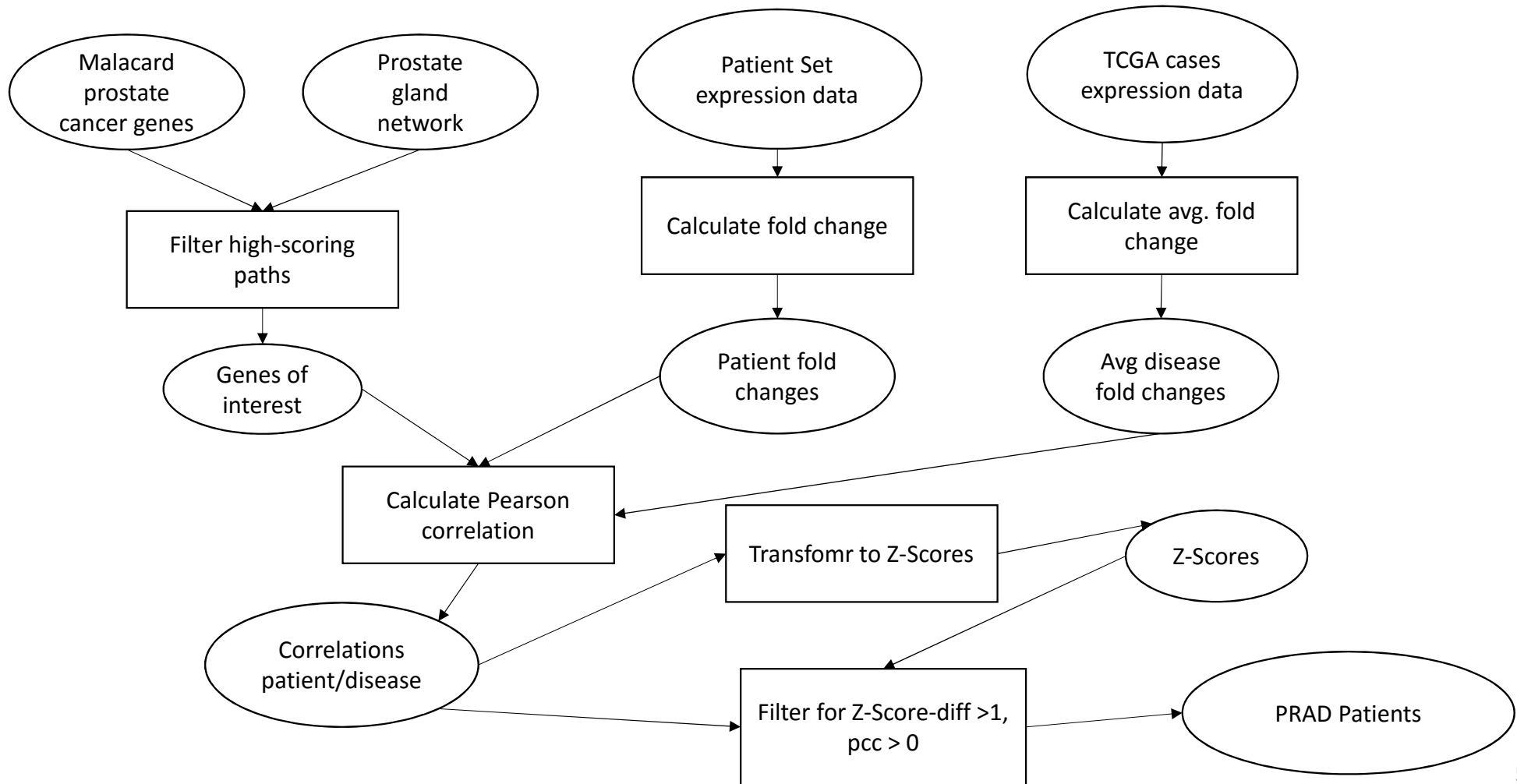
Malacards Filtered McSubnet Approach



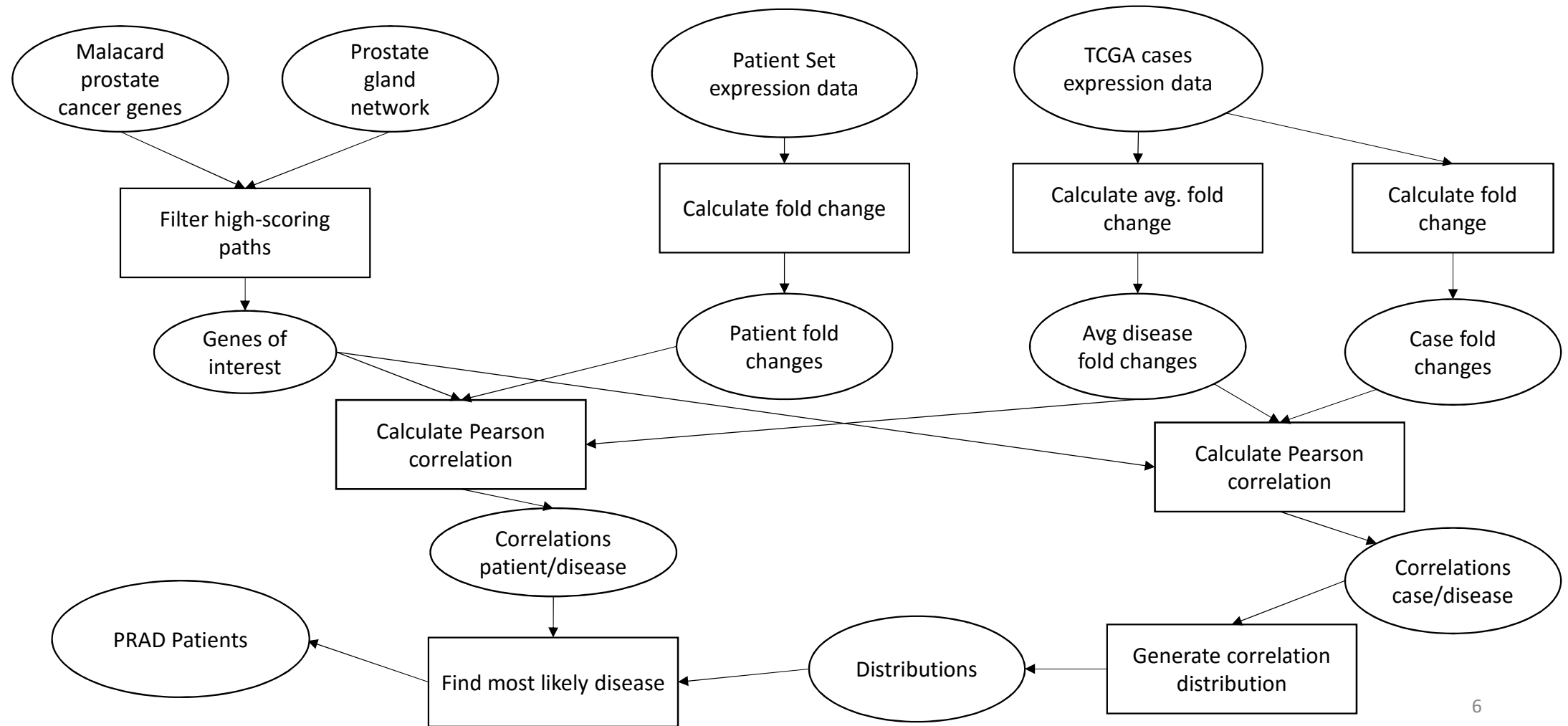
Malacards Filtered McSubnet Approach

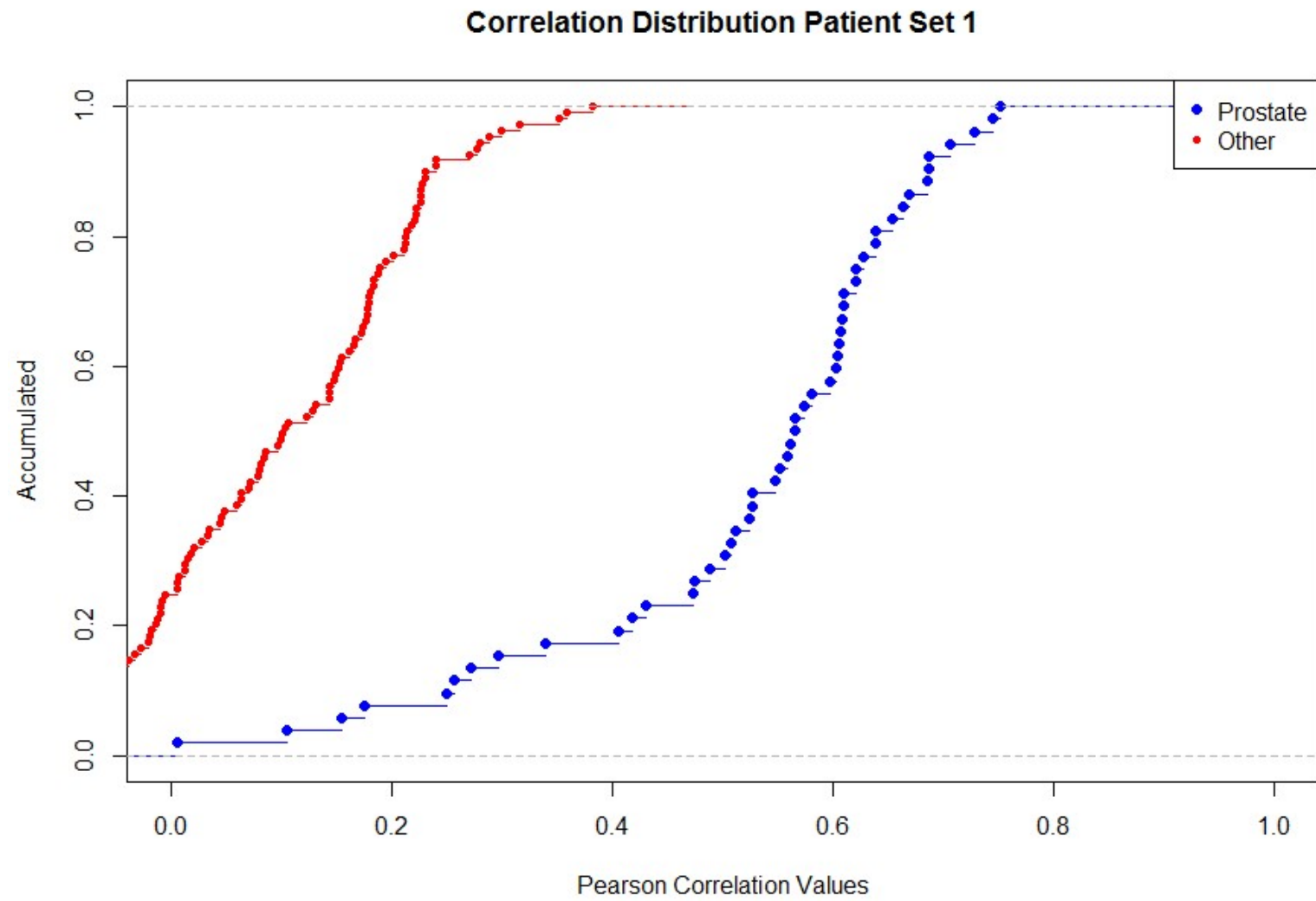
- Limitations:
 - Subnetworks way to small to predict anything properly (max 5 genes)

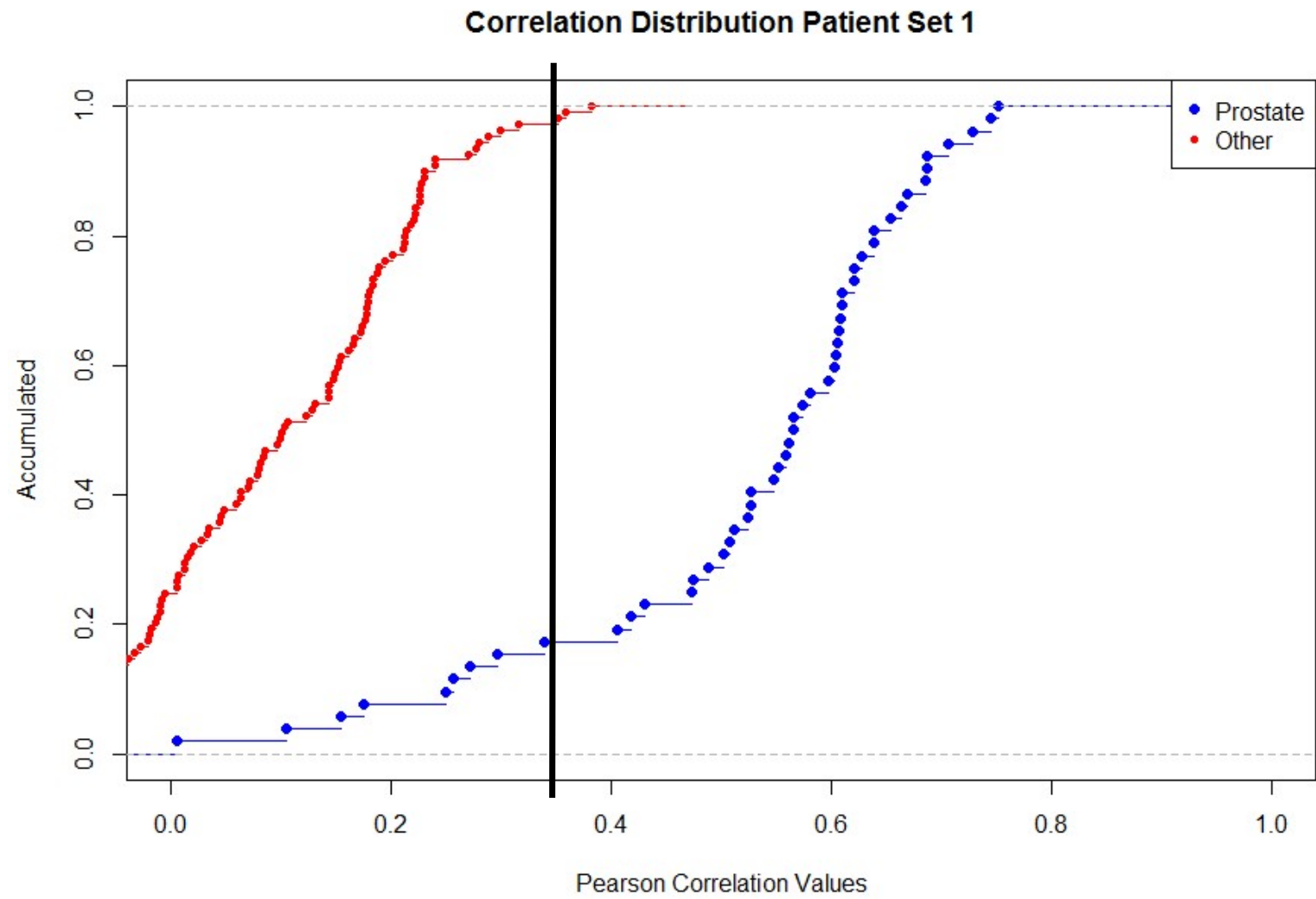
Z-Score Approach



Accumulated Approach







Validation PatientSet1

Approach	TP	TN	FN	FP
Z-Score	9	78	1	12
Accumulated	8	88	2	2

Prediction Aberrant neighbors

- Determine aberrant genes (aberrant: $|\log(\text{FC})| > 1$)
- Score sample for average “association score” a of aberrant genes to genes of interest
- Scoring approaches:
 - Portion of genes with at least one edge to gene of interest with weight $>$ threshold
 - $a_{n+1} = a_n + (1 - a_n) * \gamma(e)$ for $n \in \{0: \#genes\ of\ interest - 1\}, n_0 = 0$
 - $a_{n+1} = a_n + (1 - a_n) * \gamma(e)^2$ for $n \in \{0: \#genes\ of\ interest - 1\}, n_0 = 0$

Prediction SVM

Trainings data:

- 52 prostate (PRAD) cases
- 112 breast (BRCA) cases
- 58 thyroid (THCA) cases
- 49 lung (LUSC) cases
- (126 kidney (KIRC, KIRP, KICH))

Features

- Unique Prostate cancer Malacard genes
- Direct high scoring neighbors in GIANT prostate_gland network
- 117 Genes

Prediction SVM – PatientSet1

	Observed Prostate	Observed other
Predicted Prostate	10	4 (all KICH)
Predicted other	0	86

Lung, breast, thyroid as negative
set

Prediction SVM – PatientSet1

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Lung, breast, thyroid as negative
set

	Observed Prostate	Observed other
Predicted Prostate	10	0
Predicted other	0	90

Lung, breast, thyroid, kidney as negative
set

To Do

- Improve features selection
- Make MCSubnetwork Approach more efficient
 - With no malacards filter step
- Find maximal consistent subsets with bi-cliques