Status of VBF MVA Updates

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2013-11-06, Informal VBF MVA Meeting



Acceptance Challenge

- Total data with old pt cut and mass window: 118500
- Total VBF events with the same cuts: 384153, weighted: 30.45
- Total VBF events with 2 jets: 230945, weighted: 18.33
- Events for training/test with VBF precuts:
- VBF signal
- Training: 96638, weighted: 15.36
- Test: 96175, weighted: 15.34
- Sherpa MC weighted with selected_weight*luminosity/NEVENT_weighted:
- Traing: 79825, weighted: 163.79
- Test: 79866, weighted: 163.81
- Reverse Isolation:
- Training: 3383
- Test: 3416

Acceptance Challenge

- Total data with relative pt and new mass window: 94135
- Total VBF events with the same cuts: 374230, weighted: 29.66
- Total VBF events with 2 jets: 224930, weighted: 17.85
- Events for training/test with VBF precuts:
- VBF signal
- Training: 94158, weighted: 14.97
- Test: 93629, weighted: 14.93
- Sherpa MC weighted with selected_weight*luminosity/NEVENT_weighted:
- Traing: 30259, weighted: 61.70
- Test: 30326, weighted: 61.92
- Reverse Isolation:
- Training: 2656
- Test: 2671

TMVA Training

• Configuration:

 NTrees=850:nEventsMin=500:BoostType=Grad:Shrinkage=0.06:Us eBaggedGrad:GradBaggingFraction=0.5:nCuts=30:MaxDepth=4



Categorization

- Using Sherpa+RevISO sample for optimization
- Optimized categorization: [0.32,0.82], >0.82



Results

- low category is [0.32,0.82], vbf significance is 0.677932
- in 5GeV window the total signal is 8.13127, ggF is 3.56517, VBF is 4.4496, ttH is 0.0193773, WH is 0.0696441, ZH is 0.0275449
- in 5GeV window fraction of ggF is 0.438452, of VBF is 0.547221, ttH is 0.00238306, WH is 0.00856498, ZH is 0.00338752
- in 5GeV window fitted background in 5GeV mass window is 38.0562
- in [105,160] the total signal is 9.90146, ggF is 4.27944, VBF is 5.49097, ttH is 0.0223001, WH is 0.0745003, ZH is 0.0343518
- in [105,160] fraction of ggF is 0.432203, of VBF is 0.554562
- in [105,160]total fitted background is 376.227
- in [105,160] number of data is 395
- high category is [0.82,1], vbf significance is 1.33988
- in 5GeV window the total signal is 5.15675, ggF is 1.0386, VBF is 4.09418, ttH is 0.00299889, WH is 0.0174003, ZH is 0.0035732
- In 5GeV window fraction of ggF is 0.201406, of VBF is 0.793946, ttH is 0.000581547, WH is 0.00337428, ZH is 0.000692916
- in 5GeV window fitted background in 5GeV mass window is 7.02785
- in [105,160] the total signal is 6.15131, ggF is 1.2205, VBF is 4.90643, ttH is 0.00342082, WH is 0.0174003, ZH is 0.0035732
- in [105,160] fraction of ggF is 0.198413, of VBF is 0.797624
- in [105,160]total fitted background is 69.0824
- in [105,160] number of data is 74
- Categorization is [0.32, 0.82, 1] with combined significance 1.50162



Sherpa vs. SherpaRevISO

Use only Sherpa for categorization to avoid fluctuation?



Sherpa vs. SherpaRevISO

Use only Sherpa for categorization to avoid fluctuation?



The effect of 3rd category

