Online transductive support vector machine = 線上直推式支援向量機

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摘 要

支援向量機是以統計學習理論為主的一種機器學習法則。支援向量機的設計是以建立超平面分割二個類別的資料，並使得二者有最大的間距。然而應用支援向量機於分類問題仍有幾項缺點。首先支援向量機是以監督式的批次學習為主，因此若有新的樣本資料則支援向量機必須重新學習。再者若是以少量資料訓練支援向量機，雖然可以得到不錯的辨識率，但其通化的能力高度取決於所選用的訓練資料。另一方面有標示的資料較為稀少且不易產生，而無標示的資料卻很容易取得。為能解決上述的問題，本論文提出線上直堆式支援向量機(OTSVM)，使得支援向量機能夠遞增式的訓練無標示的資料。OTSVM 結合直堆式支援向量機與線上學習的功能於分類問題。不同於監督式支援向量機無法學習無標示的樣本資料，OTSVM 能夠同時學習有標示與無標示的樣本資料。因此OTSVM 可以提高分類的辨識率，並且保持計憶體需求與計算複雜性在一定程度之內。 為能驗證 OTSVM的效率與有效性，我們測試線性可分離/不可分離的資料的分類及合成孔徑影像的地物的辨識率，並且與監督式支援向量機、直堆式支援向量機、 PTSVM、及非監督式學習等比較其效率。由模擬的結果顯示，在少量有標示資料與多數無標示資料的條件下，比較於其他的方法OTSVM仍然可以有較佳的分類結果。

關鍵詞 : 支援向量機;統計學習理論;線上學習;直堆式支援向量機;有標示與無標示資料

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