Algorithm FuzzyOntoExt(*D, PA, Ont*)
Input: corpus D and vector of threshold values PA
Output: a light weight fuzzy domain ontology Ont
Main Procedure:

1) $Ont = \langle\rangle$
2) For each document $d \in D$ Do
   a) Construct text windows $w \in d$
   b) Remove stop words sw from w
   c) Perform POS tagging for each term $t_i \in w$
   d) Apply Porter stemming to each term t_i
   e) Filter specific linguistic patterns such as NN, AN, NVN, etc.
   f) Accumulate the frequency for $t_i \in w$ and the joint frequency for any pair $t_i, t_j \in w$
   g) IF $lower \leq Freq(t_i) \leq upper$, THEN $A = A \cup t_i$
3) For each term $t_i \in A$ Do /* Concept Extraction */
   a) compute its context vector c_i using BMI, MI, JA, CP, KL, ECH, or NGD
   b) $C = C \cup c_i$
4) For each $c_i \in C$ Do /* Concept Filtering - α-cut */
   a) IF $\exists t_i \in c_i : \mu_{c_i}(t_i) < \zeta$, THEN $C = C - c_i$
5) For each $c_i \in C$, $t_i \in A$ Do /* Update R_{AC} relations */
   a) IF $\mu_{c_i}(t_i) \geq \zeta$, THEN $R_{AC} = R_{AC} \cup (t_i, c_i)$
6) $\forall c_i \in C$: Compute $Rel(c_i, D_j)$
7) IF $Rel(c_i, D_j) < \varpi$, THEN $C = C - c_i$ /* Concept Pruning */
8) Perform Dimensionality Reduction SVD
9) For each pair of concepts $(c_i, c_j) \in C$ Do
   a) Compute the taxonomy relation (c_i, c_j) using $Spec(c_i, c_j)$
   b) IF $\mu_{R_{CC}}(c_i, c_j) > \lambda$, THEN $R_{CC} = R_{CC} \cup (c_i, c_j)$
10) For each $(c_i, c_j) \in R_{CC}$ Do /* Taxonomy Pruning */
   a) IF $\mu_{R_{CC}}(c_i, c_j) < \mu_{R_{CC}}(c_j, c_i)$, THEN $R_{CC} = R_{CC} - (c_i, c_j)$
   b) IF $\exists P(c_i \rightarrow c_x, \ldots, c_y \rightarrow c_j)$ AND $\mu_{R_{CC}}(c_i, c_j) \leq \min(\{\mu_{R_{CC}}(c_i, c_x), \mu_{R_{CC}}(c_x, c_y), \ldots, \mu_{R_{CC}}(c_y, c_j)\})$, THEN $R_{CC} = R_{CC} - (c_i, c_j)$
11) $Ont = \langle A, C, R_{AC}, R_{CC}\rangle$
12) RETURN Ont

Fig. 4. The fuzzy domain ontology extraction algorithm.