

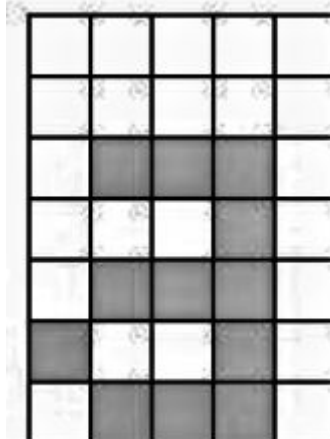
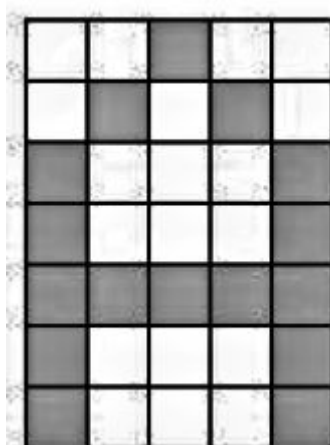
Sprawozdanie PSI 2:

Celem ćwiczenia było poznanie budowy i działania jednowarstwowej sieci neuronowej oraz uczenie rozpoznawania wielkości liter.

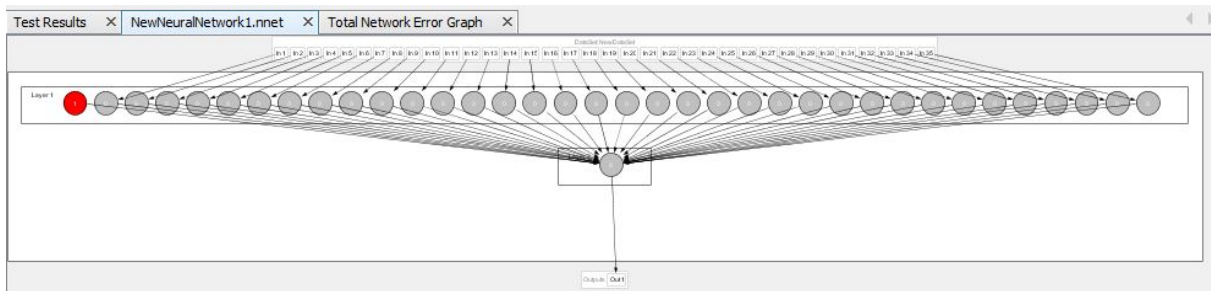
Dane uczące:

In ₁	In ₂	In ₃	In ₄	In ₅	In ₆	In ₇	In ₈	In ₉	In ₁₀	In ₁₁	In ₁₂	In ₁₃	In ₁₄	In ₁₅	In ₁₆	In ₁₇	In ₁₈	In ₁₉	In ₂₀	In ₂₁	In ₂₂	In ₂₃	In ₂₄	In ₂₅	In ₂₆	In ₂₇	In ₂₈	In ₂₉	In ₃₀	In ₃₁	In ₃₂	In ₃₃	In ₃₄	In ₃₅	In ₃₆	In ₃₇	In ₃₈	In ₃₉	In ₄₀	In ₄₁	In ₄₂	In ₄₃	In ₄₄	In ₄₅	In ₄₆	In ₄₇	In ₄₈	In ₄₉	In ₅₀	In ₅₁	In ₅₂	In ₅₃	In ₅₄	In ₅₅	In ₅₆	In ₅₇	In ₅₈	In ₅₉	In ₆₀	In ₆₁	In ₆₂	In ₆₃	In ₆₄	In ₆₅	In ₆₆	In ₆₇	In ₆₈	In ₆₉	In ₇₀	In ₇₁	In ₇₂	In ₇₃	In ₇₄	In ₇₅	In ₇₆	In ₇₇	In ₇₈	In ₇₉	In ₈₀	In ₈₁	In ₈₂	In ₈₃	In ₈₄	In ₈₅	In ₈₆	In ₈₇	In ₈₈	In ₈₉	In ₉₀	In ₉₁	In ₉₂	In ₉₃	In ₉₄	In ₉₅	In ₉₆	In ₉₇	In ₉₈	In ₉₉	In ₁₀₀	In ₁₀₁	In ₁₀₂	In ₁₀₃	In ₁₀₄	In ₁₀₅	In ₁₀₆	In ₁₀₇	In ₁₀₈	In ₁₀₉	In ₁₁₀	In ₁₁₁	In ₁₁₂	In ₁₁₃	In ₁₁₄	In ₁₁₅	In ₁₁₆	In ₁₁₇	In ₁₁₈	In ₁₁₉	In ₁₂₀	In ₁₂₁	In ₁₂₂	In ₁₂₃	In ₁₂₄	In ₁₂₅	In ₁₂₆	In ₁₂₇	In ₁₂₈	In ₁₂₉	In ₁₃₀	In ₁₃₁	In ₁₃₂	In ₁₃₃	In ₁₃₄	In ₁₃₅	In ₁₃₆	In ₁₃₇	In ₁₃₈	In ₁₃₉	In ₁₄₀	In ₁₄₁	In ₁₄₂	In ₁₄₃	In ₁₄₄	In ₁₄₅	In ₁₄₆	In ₁₄₇	In ₁₄₈	In ₁₄₉	In ₁₅₀	In ₁₅₁	In ₁₅₂	In ₁₅₃	In ₁₅₄	In ₁₅₅	In ₁₅₆	In ₁₅₇	In ₁₅₈	In ₁₅₉	In ₁₆₀	In ₁₆₁	In ₁₆₂	In ₁₆₃	In ₁₆₄	In ₁₆₅	In ₁₆₆	In ₁₆₇	In ₁₆₈	In ₁₆₉	In ₁₇₀	In ₁₇₁	In ₁₇₂	In ₁₇₃	In ₁₇₄	In ₁₇₅	In ₁₇₆	In ₁₇₇	In ₁₇₈	In ₁₇₉	In ₁₈₀	In ₁₈₁	In ₁₈₂	In ₁₈₃	In ₁₈₄	In ₁₈₅	In ₁₈₆	In ₁₈₇	In ₁₈₈	In ₁₈₉	In ₁₉₀	In ₁₉₁	In ₁₉₂	In ₁₉₃	In ₁₉₄	In ₁₉₅	In ₁₉₆	In ₁₉₇	In ₁₉₈	In ₁₉₉	In ₂₀₀	In ₂₀₁	In ₂₀₂	In ₂₀₃	In ₂₀₄	In ₂₀₅	In ₂₀₆	In ₂₀₇	In ₂₀₈	In ₂₀₉	In ₂₁₀	In ₂₁₁	In ₂₁₂	In ₂₁₃	In ₂₁₄	In ₂₁₅	In ₂₁₆	In ₂₁₇	In ₂₁₈	In ₂₁₉	In ₂₂₀	In ₂₂₁	In ₂₂₂	In ₂₂₃	In ₂₂₄	In ₂₂₅	In ₂₂₆	In ₂₂₇	In ₂₂₈	In ₂₂₉	In ₂₃₀	In ₂₃₁	In ₂₃₂	In ₂₃₃	In ₂₃₄	In ₂₃₅	In ₂₃₆	In ₂₃₇	In ₂₃₈	In ₂₃₉	In ₂₄₀	In ₂₄₁	In ₂₄₂	In ₂₄₃	In ₂₄₄	In ₂₄₅	In ₂₄₆	In ₂₄₇	In ₂₄₈	In ₂₄₉	In ₂₅₀	In ₂₅₁	In ₂₅₂	In ₂₅₃	In ₂₅₄	In ₂₅₅	In ₂₅₆	In ₂₅₇	In ₂₅₈	In ₂₅₉	In ₂₆₀	In ₂₆₁	In ₂₆₂	In ₂₆₃	In ₂₆₄	In ₂₆₅	In ₂₆₆	In ₂₆₇	In ₂₆₈	In ₂₆₉	In ₂₇₀	In ₂₇₁	In ₂₇₂	In ₂₇₃	In ₂₇₄	In ₂₇₅	In ₂₇₆	In ₂₇₇	In ₂₇₈	In ₂₇₉	In ₂₈₀	In ₂₈₁	In ₂₈₂	In ₂₈₃	In ₂₈₄	In ₂₈₅	In ₂₈₆	In ₂₈₇	In ₂₈₈	In ₂₈₉	In ₂₉₀	In ₂₉₁	In ₂₉₂	In ₂₉₃	In ₂₉₄	In ₂₉₅	In ₂₉₆	In ₂₉₇	In ₂₉₈	In ₂₉₉	In ₃₀₀	In ₃₀₁	In ₃₀₂	In ₃₀₃	In ₃₀₄	In ₃₀₅	In ₃₀₆	In ₃₀₇	In ₃₀₈	In ₃₀₉	In ₃₁₀	In ₃₁₁	In ₃₁₂	In ₃₁₃	In ₃₁₄	In ₃₁₅	In ₃₁₆	In ₃₁₇	In ₃₁₈	In ₃₁₉	In ₃₂₀	In ₃₂₁	In ₃₂₂	In ₃₂₃	In ₃₂₄	In ₃₂₅	In ₃₂₆	In ₃₂₇	In ₃₂₈	In ₃₂₉	In ₃₃₀	In ₃₃₁	In ₃₃₂	In ₃₃₃	In ₃₃₄	In ₃₃₅	In ₃₃₆	In ₃₃₇	In ₃₃₈	In ₃₃₉	In ₃₄₀	In ₃₄₁	In ₃₄₂	In ₃₄₃	In ₃₄₄	In ₃₄₅	In ₃₄₆	In ₃₄₇	In ₃₄₈	In ₃₄₉	In ₃₅₀	In ₃₅₁	In ₃₅₂	In ₃₅₃	In ₃₅₄	In ₃₅₅	In ₃₅₆	In ₃₅₇	In ₃₅₈	In ₃₅₉	In ₃₆₀	In ₃₆₁	In ₃₆₂	In ₃₆₃	In ₃₆₄	In ₃₆₅	In ₃₆₆	In ₃₆₇	In ₃₆₈	In ₃₆₉	In ₃₇₀	In ₃₇₁	In ₃₇₂	In ₃₇₃	In ₃₇₄	In ₃₇₅	In ₃₇₆	In ₃₇₇	In ₃₇₈	In ₃₇₉	In ₃₈₀	In ₃₈₁	In ₃₈₂	In ₃₈₃	In ₃₈₄	In ₃₈₅	In ₃₈₆	In ₃₈₇	In ₃₈₈	In ₃₈₉	In ₃₉₀	In ₃₉₁	In ₃₉₂	In ₃₉₃	In ₃₉₄	In ₃₉₅	In ₃₉₆	In ₃₉₇	In ₃₉₈	In ₃₉₉	In ₄₀₀	In ₄₀₁	In ₄₀₂	In ₄₀₃	In ₄₀₄	In ₄₀₅	In ₄₀₆	In ₄₀₇	In ₄₀₈	In ₄₀₉	In ₄₁₀	In ₄₁₁	In ₄₁₂	In ₄₁₃	In ₄₁₄	In ₄₁₅	In ₄₁₆	In ₄₁₇	In ₄₁₈	In ₄₁₉	In ₄₂₀	In ₄₂₁	In ₄₂₂	In ₄₂₃	In ₄₂₄	In ₄₂₅	In ₄₂₆	In ₄₂₇	In ₄₂₈	In ₄₂₉	In ₄₃₀	In ₄₃₁	In ₄₃₂	In ₄₃₃	In ₄₃₄	In ₄₃₅	In ₄₃₆	In ₄₃₇	In ₄₃₈	In ₄₃₉	In ₄₄₀	In ₄₄₁	In ₄₄₂	In ₄₄₃	In ₄₄₄	In ₄₄₅	In ₄₄₆	In ₄₄₇	In ₄₄₈	In ₄₄₉	In ₄₅₀	In ₄₅₁	In ₄₅₂	In ₄₅₃	In ₄₅₄	In ₄₅₅	In ₄₅₆	In ₄₅₇	In ₄₅₈	In ₄₅₉	In ₄₆₀	In ₄₆₁	In ₄₆₂	In ₄₆₃	In ₄₆₄	In ₄₆₅	In ₄₆₆	In ₄₆₇	In ₄₆₈	In ₄₆₉	In ₄₇₀	In ₄₇₁	In ₄₇₂	In ₄₇₃	In ₄₇₄	In ₄₇₅	In ₄₇₆	In ₄₇₇	In ₄₇₈	In ₄₇₉	In ₄₈₀	In ₄₈₁	In ₄₈₂	In ₄₈₃	In ₄₈₄	In ₄₈₅	In ₄₈₆	In ₄₈₇	In ₄₈₈	In ₄₈₉	In ₄₉₀	In ₄₉₁	In ₄₉₂	In ₄₉₃	In ₄₉₄	In ₄₉₅	In ₄₉₆	In ₄₉₇	In ₄₉₈	In ₄₉₉	In ₅₀₀	In ₅₀₁	In ₅₀₂	In ₅₀₃	In ₅₀₄	In ₅₀₅	In ₅₀₆	In ₅₀₇	In ₅₀₈	In ₅₀₉	In ₅₁₀	In ₅₁₁	In ₅₁₂	In ₅₁₃	In ₅₁₄	In ₅₁₅	In ₅₁₆	In ₅₁₇	In ₅₁₈	In ₅₁₉	In ₅₂₀	In ₅₂₁	In ₅₂₂	In ₅₂₃	In ₅₂₄	In ₅₂₅	In ₅₂₆	In ₅₂₇	In ₅₂₈	In ₅₂₉	In ₅₃₀	In ₅₃₁	In ₅₃₂	In ₅₃₃	In ₅₃₄	In ₅₃₅	In ₅₃₆	In ₅₃₇	In ₅₃₈	In ₅₃₉	In ₅₄₀	In ₅₄₁	In ₅₄₂	In ₅₄₃	In ₅₄₄	In ₅₄₅	In ₅₄₆	In ₅₄₇	In ₅₄₈	In ₅₄₉	In ₅₅₀	In ₅₅₁	In ₅₅₂	In ₅₅₃	In ₅₅₄	In ₅₅₅	In ₅₅₆	In ₅₅₇	In ₅₅₈	In ₅₅₉	In ₅₆₀	In ₅₆₁	In ₅₆₂	In ₅₆₃	In ₅₆₄	In ₅₆₅	In ₅₆₆	In ₅₆₇	In ₅₆₈	In ₅₆₉	In ₅₇₀	In ₅₇₁	In ₅₇₂	In ₅₇₃	In ₅₇₄	In ₅₇₅	In ₅₇₆	In ₅₇₇	In ₅₇₈	In ₅₇₉	In ₅₈₀	In ₅₈₁	In ₅₈₂	In ₅₈₃	In ₅₈₄	In ₅₈₅	In ₅₈₆	In ₅₈₇	In ₅₈₈	In ₅₈₉	In ₅₉₀	In ₅₉₁	In ₅₉₂	In ₅₉₃	In ₅₉₄	In ₅₉₅	In ₅₉₆	In ₅₉₇	In ₅₉₈	In ₅₉₉	In ₆₀₀	In ₆₀₁	In ₆₀₂	In ₆₀₃	In ₆₀₄	In ₆₀₅	In ₆₀₆	In ₆₀₇	In ₆₀₈	In ₆₀₉	In ₆₁₀	In ₆₁₁	In ₆₁₂	In ₆₁₃	In ₆₁₄	In ₆₁₅	In ₆₁₆	In ₆₁₇	In ₆₁₈	In ₆₁₉	In ₆₂₀	In ₆₂₁	In ₆₂₂	In ₆₂₃	In ₆₂₄	In ₆₂₅	In ₆₂₆	In ₆₂₇	In ₆₂₈	In ₆₂₉	In ₆₃₀	In ₆₃₁	In ₆₃₂	In ₆₃₃	In ₆₃₄	In ₆₃₅	In ₆₃₆	In ₆₃₇	In ₆₃₈	In ₆₃₉	In ₆₄₀	In ₆₄₁	In ₆₄₂	In ₆₄₃	In ₆₄₄	In ₆₄₅	In ₆₄₆	In ₆₄₇	In ₆₄₈	In ₆₄₉	In ₆₅₀	In ₆₅₁	In ₆₅₂	In ₆₅₃	In ₆₅₄	In ₆₅₅	In ₆₅₆	In ₆₅₇	In ₆₅₈	In ₆₅₉	In ₆₆₀	In ₆₆₁	In ₆₆₂	In ₆₆₃	In ₆₆₄	In ₆₆₅	In ₆₆₆	In ₆₆₇	In ₆₆₈	In ₆₆₉	In ₆₇₀	In ₆₇₁	In ₆₇₂	In ₆₇₃	In ₆₇₄	In ₆₇₅	In ₆₇₆	In ₆₇₇	In ₆₇₈	In ₆₇₉	In ₆₈₀	In ₆₈₁	In ₆₈₂	In ₆₈₃	In ₆₈₄	In ₆₈₅	In ₆₈₆	In ₆₈₇	In ₆₈₈	In ₆₈₉	In ₆₉₀	In ₆₉₁	In ₆₉₂	In ₆₉₃	In ₆₉₄	In ₆₉₅	In ₆₉₆	In ₆₉₇	In ₆₉₈	In ₆₉₉	In ₇₀₀	In ₇₀₁	In ₇₀₂	In ₇₀₃	In ₇₀₄	In ₇₀₅	In ₇₀₆	In ₇₀₇	In ₇₀₈	In ₇₀₉	In ₇₁₀	In ₇₁₁	In ₇₁₂	In ₇₁₃	In ₇₁₄	In ₇₁₅	In ₇₁₆	In ₇₁₇	In ₇₁₈	In ₇₁₉	In ₇₂₀	In ₇₂₁	In ₇₂₂	In ₇₂₃	In ₇₂₄	In ₇₂₅	In ₇₂₆	In ₇₂₇	In ₇₂₈	In ₇₂₉	In ₇₃₀	In ₇₃₁	In ₇₃₂	In ₇₃₃	In ₇₃₄	In ₇₃₅	In ₇₃₆	In ₇₃₇	In ₇₃₈	In ₇₃₉	In ₇₄₀	In ₇₄₁	In ₇₄₂	In ₇₄₃	In ₇₄₄	In ₇₄₅	In ₇₄₆	In ₇₄₇	In ₇₄₈	In ₇₄₉	In ₇₅₀	In ₇₅₁	In ₇₅₂	In ₇₅₃	In ₇₅₄	In ₇₅₅	In ₇₅₆	In ₇₅₇	In ₇₅₈	In ₇₅₉	In ₇₆₀	In ₇₆₁	In ₇₆₂	In ₇₆₃	In ₇₆₄	In ₇₆₅	In ₇₆₆	In ₇₆₇	In ₇₆₈	In ₇₆₉	In ₇₇₀	In ₇₇₁	In ₇₇₂	In ₇₇₃	In ₇₇₄	In ₇₇₅	In ₇₇₆	In ₇₇₇	In ₇₇₈	In ₇₇₉	In ₇₈₀	In ₇₈₁	In ₇₈₂	In ₇₈₃	In ₇₈₄	In ₇₈₅	In ₇₈₆	In ₇₈₇	In ₇₈₈	In ₇₈₉	In ₇₉₀	In ₇₉₁	In ₇₉₂	In ₇₉₃	In ₇₉₄	In ₇₉₅	In ₇₉₆	In ₇₉₇	In ₇₉₈	In ₇₉₉	In ₈₀₀	In ₈₀₁	In ₈₀₂	In ₈₀₃	In ₈₀₄	In ₈₀₅	In ₈₀₆	In ₈₀₇	In ₈₀₈	In ₈₀₉	In ₈₁₀	In ₈₁₁	In ₈₁₂	In ₈₁₃	In ₈₁₄	In ₈₁₅	In ₈₁₆	In ₈₁₇	In ₈₁₈	In ₈₁₉	In ₈₂₀	In ₈₂₁	In ₈₂₂	In ₈₂₃	In ₈₂₄	In ₈₂₅	In ₈₂₆	In ₈₂₇	In ₈₂₈	In ₈₂₉	In ₈₃₀	In ₈₃₁	In ₈₃₂	In ₈₃₃	In ₈₃₄	In ₈₃₅	In ₈₃₆	In ₈₃₇	In ₈₃₈	In ₈₃₉	In ₈₄₀	In ₈₄₁	In ₈₄₂	In ₈₄₃	In ₈₄₄	In ₈₄₅	In ₈₄₆	In ₈₄₇	In ₈₄₈	In ₈₄₉	In ₈₅₀	In ₈₅₁	In ₈₅₂	In ₈₅₃	In ₈₅₄	In ₈₅₅	In ₈₅₆	In ₈₅₇	In ₈₅₈	In ₈₅₉	In ₈₆₀	In ₈₆₁	In ₈₆₂	In ₈₆₃	In ₈₆₄	In ₈₆₅	In ₈₆₆	In ₈₆₇	In ₈₆₈	In ₈₆₉	In ₈₇₀	In ₈₇₁	In ₈₇₂	In ₈₇₃	In ₈₇₄	In ₈₇₅	In ₈₇₆	In ₈₇₇	In ₈₇₈	In ₈₇₉	In ₈₈₀	In ₈₈₁	In ₈₈₂	In ₈₈₃	In ₈₈₄	In ₈₈₅	In ₈₈₆	In ₈₈₇	In ₈₈₈	In ₈₈₉	In ₈₉₀	In ₈₉₁	In ₈₉₂	In ₈₉₃	In ₈₉₄	In ₈₉₅	In ₈₉₆	In ₈₉₇	In ₈₉₈	In ₈₉₉	In ₉₀₀	In ₉₀₁	In ₉₀₂	In ₉₀₃	In ₉₀₄	In ₉₀₅	In ₉₀₆	In ₉₀₇	In ₉₀₈	In ₉₀₉	In ₉₁₀	In ₉₁₁	In ₉₁₂	In ₉₁₃	In ₉₁₄	In ₉₁₅	In ₉₁₆	In ₉₁₇	In ₉₁₈	In ₉₁₉	In ₉₂₀	In ₉₂₁	In ₉₂₂	In ₉₂₃	In ₉₂₄	In ₉₂₅	In ₉₂₆	In ₉₂₇	In ₉₂₈	In ₉₂₉	In ₉₃₀	In ₉₃₁	In ₉₃₂	In ₉₃₃	In ₉₃₄	In ₉₃₅	In ₉₃₆	In ₉₃₇	In ₉₃₈	In ₉₃₉	In ₉₄₀	In ₉₄₁	In ₉₄₂	In ₉₄₃	In ₉₄₄	In ₉₄₅	In ₉₄₆	In ₉₄₇	In ₉₄₈	In ₉₄₉	In ₉₅₀	In ₉₅₁	In ₉₅₂	In ₉₅₃	In ₉₅₄	In ₉₅₅	In ₉₅₆	In ₉₅₇	In ₉₅₈	In ₉₅₉	In ₉₆₀	In ₉₆₁
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Co po przeniesieniu do macierzy i zaciemnieniu miejsc którym odpowiada 1 daje przykładowo dla litery A oraz a:



Budowa sieci:



Działanie perceptronu polega na klasyfikowaniu danych pojawiających się na wejściu i ustawianiu stosownie do tego wartości wyjścia. Przed używaniem perceptron należy wytrenować, podając mu przykładowe dane na wejście i modyfikując w odpowiedni sposób wagi wejść i połączeń między warstwami neuronów, tak aby wartość na wyjściu przybierała pożądane wartości.

Ustawienia uczenia:

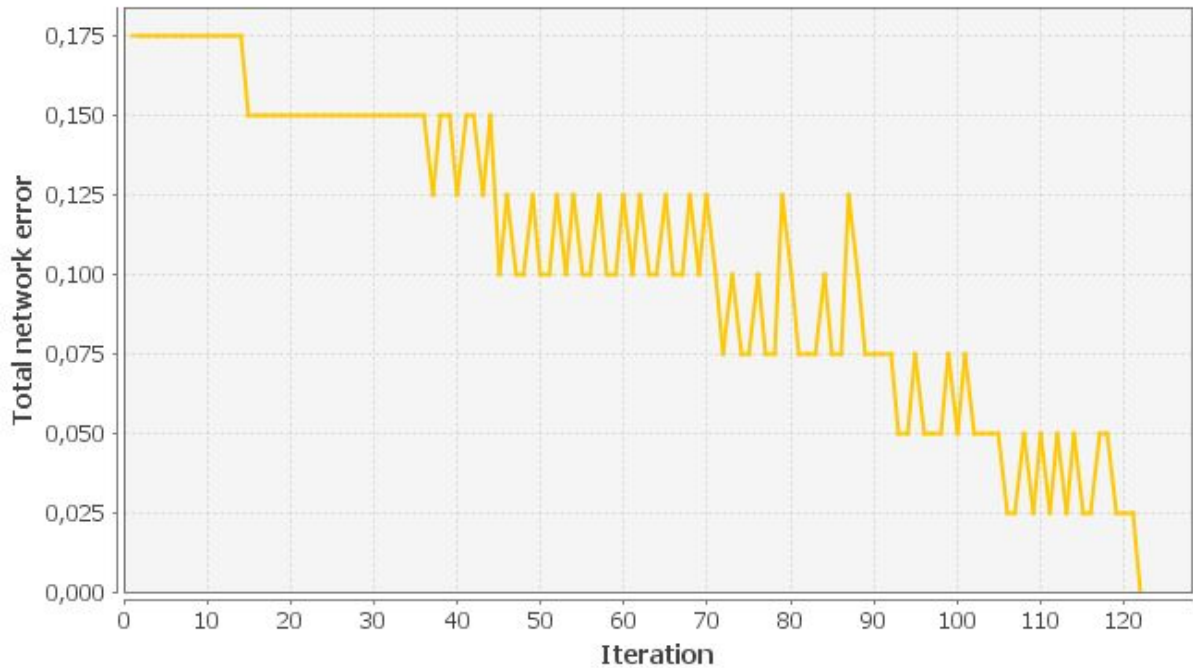
Stopping Criteria	
Max Error	<input type="text" value="0.01"/>
<input type="checkbox"/> Limit Max Iterations	<input type="text"/>

Learning Parameters	
Learning Rate	<input type="text" value="0.001"/>
Momentum	<input type="text" value="0.7"/>

Crossvalidation	
<input type="checkbox"/> Use Crossvalidation	
<input type="radio"/> Subset count	<input type="text" value="4"/>
<input type="radio"/> Subset distribution (%)	<input type="text" value="60 20 20"/>
<input type="checkbox"/> Allow samples repetition	
<input type="checkbox"/> Save all trained networks	

Options	
<input checked="" type="checkbox"/> Display Error Graph	
Turn off for faster learning	

Total Network Error Graph



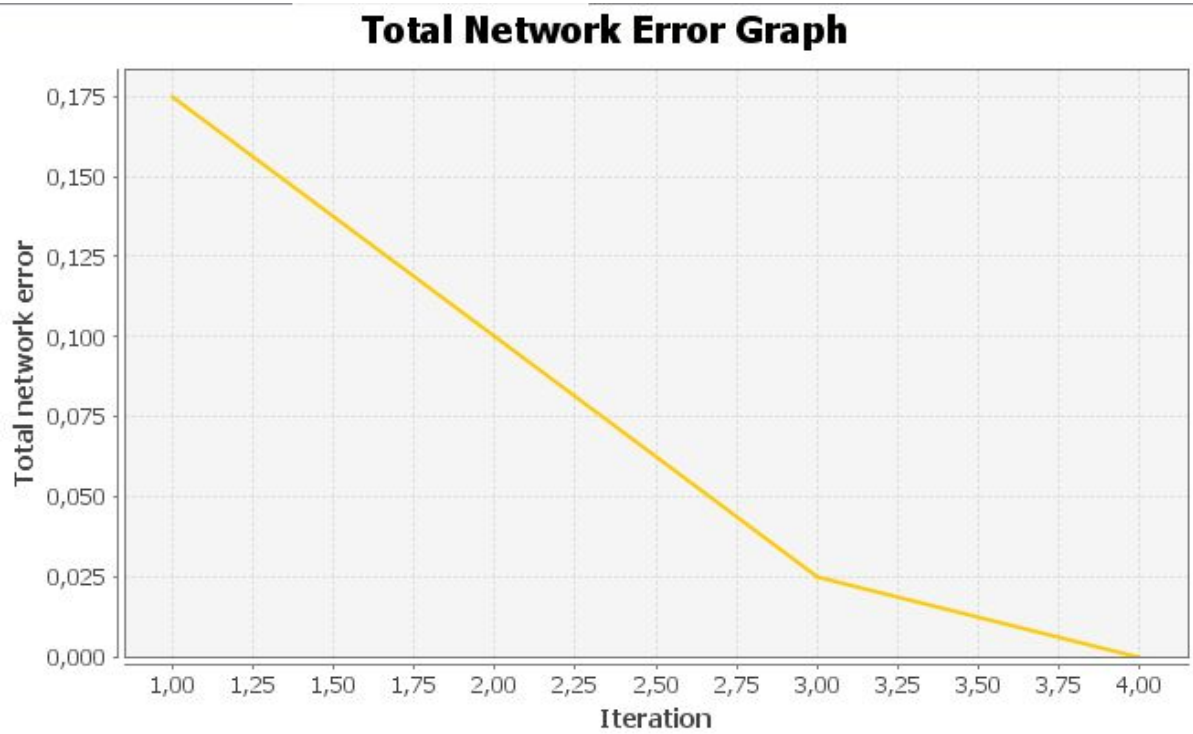
Test działania sieci:

Input: 0; 0; 1; 0; 0; 0; 1; 0; 1; 0; 1; 0; 0; 0; 1; 1; 0; 0; 0; 1; 1; 1; 1; 1; 1; 0; 0; 0; 1; 1; 0; 0; 0; 1;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 1; 1; 0; 0; 0; 0; 1; 0; 0; 1; 0; 0; 1; 0; 0; 1; 0; 0; 1; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 1; 1; 1; 1; 0; 1; 0; 0; 0; 1; 1; 0; 0; 0; 1; 1; 1; 0; 0; 0; 1; 0; 0; 0; 1; 1; 0; 0; 1; 1; 1; 0;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 1; 0; 0; 0; 1; 0; 0; 1; 0; 1; 0; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 1; 1; 1; 1; 1; 1; 0; 0; 0; 1; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 1; 1; 1; 1; 1;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 1; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 1; 1; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 1; 1; 1; 0; 0; 1; 0; 0; 1; 0; 0; 0; 1; 1; 0; 0; 0; 1; 1; 0; 0; 0; 1; 0; 0; 1; 1; 1; 1; 0; 0;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 1; 0; 0; 1; 0; 0; 1; 1; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 1; 1; 1; 1; 1; 1; 0; 0; 0; 1; 0; 0; 0; 0; 1; 1; 1; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 1; 1; 1; 1;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 1; 0; 0; 1; 0; 0; 1; 0; 0; 1; 1; 1; 1; 0; 0; 0; 0; 1; 1; 1; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 1; 1; 1; 1; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 1; 1; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 0;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 1; 0; 0; 0; 0; 1; 1; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 0; 1; 1; 0; 0; 1; 0; 0; 0; 1; 1; 0; 0; 0; 0; 1; 1; 1; 0; 0; 0; 1; 1; 0; 0; 0; 1; 0; 0; 0; 1; 1; 1; 0;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 1; 0; 0; 1; 0; 0; 0; 1; 1; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 1; 0; 0; 0; 1; 1; 0; 0; 0; 1; 1; 0; 0; 0; 1; 1; 1; 1; 1; 0; 0; 0; 0; 1; 1; 0; 0; 0; 0; 1; 1; 0; 0; 0; 1;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 1; 0; 0; 1; 0; 0; 1; 0; 0; 1; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 1; 0; 0;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0;	Output: 0; Desired output: 0; Error: 0;
Input: 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 0; 0;	Output: 1; Desired output: 1; Error: 0;
Input: 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 1; 0; 0; 0; 0; 1; 1; 0; 0;	Output: 0; Desired output: 0; Error: 0;

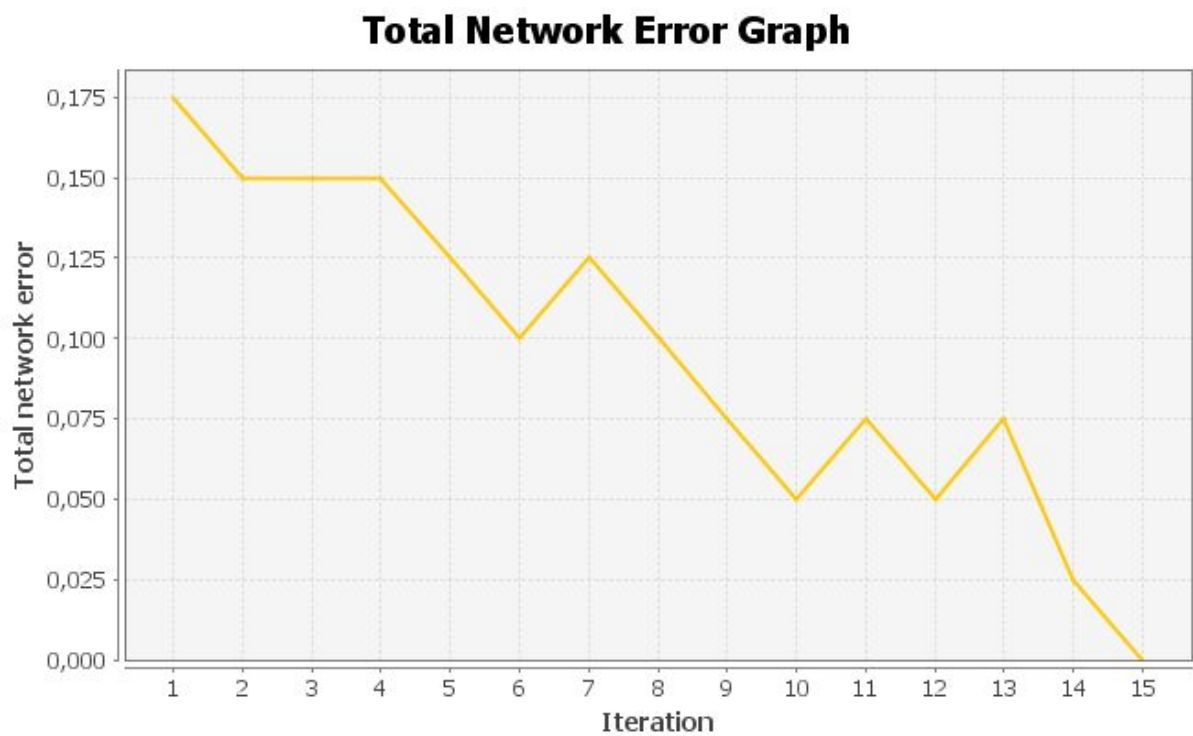
Total Mean Square Error: 0.0

Dla różnych współczynników uczenia:

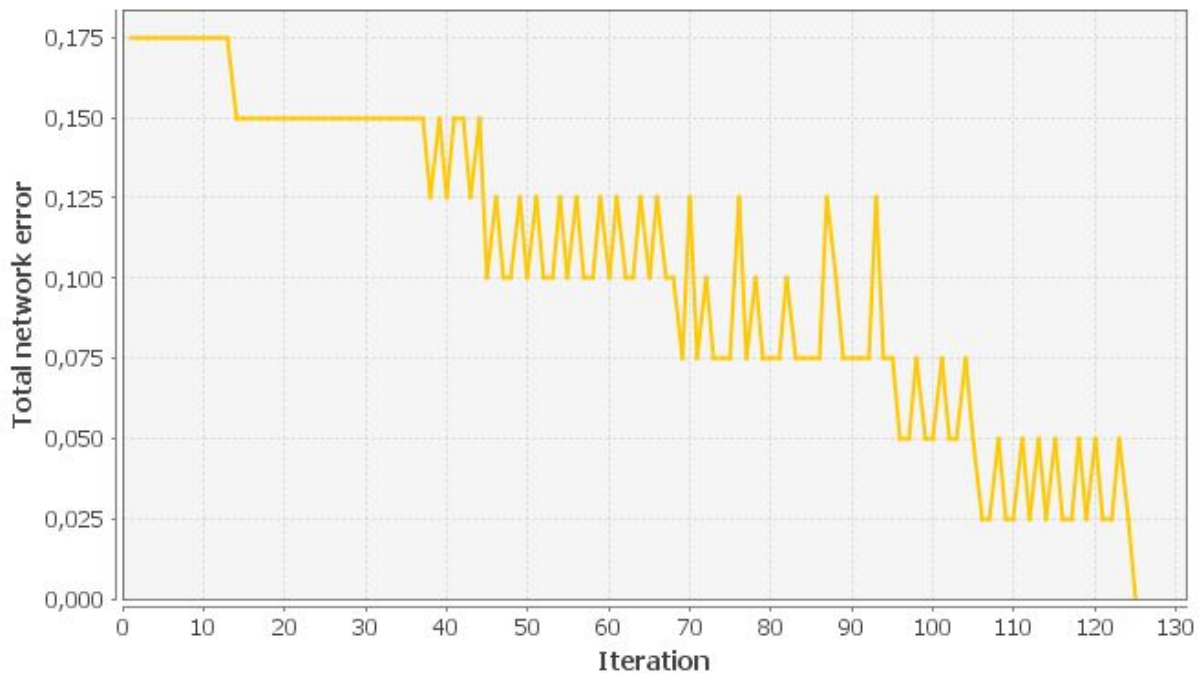
Współczynnik uczenia 0.1:



Współczynnik uczenia 0.01:



Współczynnik uczenia 0.001:
Total Network Error Graph



Analiza i dyskusja błędów uczenia:

Im większy współczynnik uczenia tym sieć uczy się szybciej, odbija się to jednak na dokładności. Przy 20 danych uczących sieć praktycznie nie popełnia błędów dla współczynnika uczenia nawet 0.1.

Wnioski:

Jeśli zależy nam na dokładności powinniśmy wybrać mały współczynnik uczenia, jednak spowoduje to wydłużenie czasu który sieć potrzebuje na nauczenie się.

Jeśli zależy nam na szybkim uczeniu, należy ustawić wysoki współczynnik uczenia.

Duża ilość danych uczących pozwala na szybsze i poprawne nauczenie sieci rozpoznawania wielkości liter.