Speech recognition has become a thriving field with many real-life applications. Voice dialing in cell phones, voice control in embedded devices, speech-driven interactive manuals and many other utilities rely on solid speech recognition software. We believe that research in speech recognition can boost performance of many applications related to the area. The thesis concentrates on automatic large-vocabulary continuous-speech recognition of Czech. Czech differs from English in a few aspects. We focus on these differences and propose new language-depended techniques. Namely rich morphology is investigated and its impact on speech recognition is studied. Out-of-vocabulary (OOV) words are identified as one of the major sources deteriorating recognition performace. New language modeling techniques are proposed to alleviate the problem of OOV words. The proposed language models are tested in speech recognition systems on diverse speech corpora. The obtained results validate the original approach to language modeling. Significant overall speech recognition improvement is observed.